Paper H11.4.

Importance of social contact for housing of horses

Operant conditioning in horses: Motivation for various levels of social contact

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Background:
In economic theory, the demand for a certain resource is estimated according to the change in demand as a function of the price of the article. If an article is a necessity, the demand will remain the same irrespective of the price, whereas the demand for luxury goods will decrease if the price increases. By making it possible for the animals by means of a test to express how much they are willing to pay to have their needs met, the same method may be used to assess the needs of animals. Thus, by means of a method called 'operant conditioning' animals may be trained to press a panel to get access to contact with other animals. Gradually, the number of times that the animal has to press the panel to get access to social contact for a given period of time is increased, i.e. the workload per reward (access to other animals) is increased. The demand curve describes the change in the number of rewards as a function of the amount of work required. If the animal has to work more and more to maintain a constant amount of a given type of social contact, the need for this type of social contact is said to be inelastic, i.e. of high priority. If the number of rewards decreases the more the animal has to work per reward, the need is said to be elastic, i.e. of low priority. By comparing the elasticity of the demand curves of various types of social contact, it is possible to assess their mutual importance (Jensen et al., 2003).

In horses such tests have been used to assess the motivation for light (Houpt and Houpt, 1988), feed, social contact, and time in the paddock (Lee et al., 2001).

Objective:
To study the motivation of horses for social contact in relation to three levels of contact: full contact, head contact and sniff contact. An empty arena will be used as control.

Hypothesis

- Horses are more motivated for full contact than limited contact with other horses meaning that limited social contact do not fulfil the need of horses for social contact

Material and methods:

Animals:
12 horses, Danish Warmblood fillies 1½ year old bred and raised at the same stud were used. All animals were from the same group and have been housed in loose housing previously. In the experimental period the horses were housed in single boxes with one companion horse between two test horses i.e. 8 horses were tested.

Housing:
During the experiment horses were housed singly with visual contact to other horses as shown below. By limited social contact and thereby social deprivation in the experimental period a closed economical situation is achieved, where the horses have to work for all physical social contact. The motivation to work is likely to be higher in this situation.

Test horse	Companion horse	Test horse	Test horse	Companion horse	Test horse
Test horse	Companion horse	Test horse	Test horse	Companion horse	Test horse

visual contact ———
no contact ▬▬▬

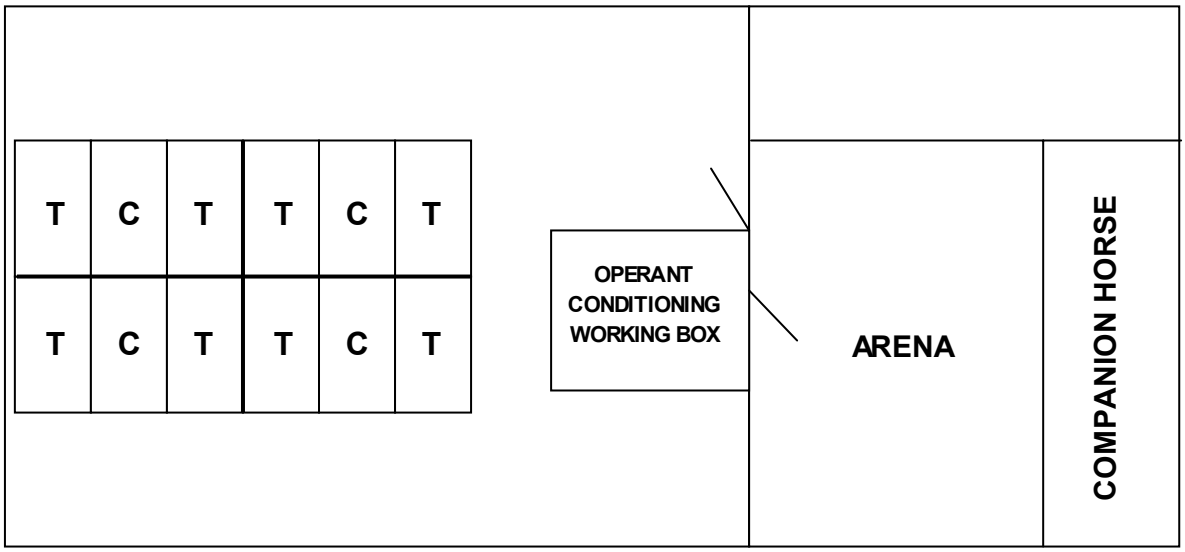
Feeding:

Grass silage, hay, barley straw, rape seed, barley, minerals

Management
Each day the horses were let out in a paddock for approximately 1 hour prior to training or testing. Two test horses and their companion horses will be let out at the same time but in individual paddocks so that the horses will only have visual contact.

On Saturdays all horses were let out together in a large paddock for 6 to 8 hours. On Sundays the horses were stabled all day.

Test apparatus:
The test apparatus consisted of a test box, an arena and one box for a companion animal as shown in figure 1. Operant response, consisting of a fixed number of pressings (Fixed Ratio, FR) on a plate in the test box lead to the opening of a door to the arena. This gave the horse access to the arena. In the arena the horse had access to either another horse in the arena (full contact, **F**)), another horse in a box with open sides (head contact, **H**), another horse in a box with vertical bars (sniff contact, **S**) or an empty arena (control, **C**). This arrangement secured that the horses had to move out of the test box to get social contact. All horses were then handled to get back to the test box. During the experiment the arena and the test box were video monitored.



Shaping and training:
The behavioural tests began with approx. 2 weeks of shaping, where the horses were trained to be in the test box and to press the plate to get access to the arena. Hereafter there was approx. 4 weeks of training where FR was gradually increased.

Experimental design:
The horses were tested in sessions lasting a minimum of 20 minutes and a maximum of 45 minutes as decided in the training period. The test horse was rewarded with social contact in 3 minutes. After each reward the horse was lead back to the test box and the session continued. After 20 minutes, pauses in panel pressing were recorded, and the session was terminated if a pause exceeded 2 minutes (decided from trials in the training period).

The horses were tested in a cross over design, where all horses experienced all levels of social contact (table 1):

Table 1. Experimental design

Pair	Horse	1. period (3 weeks)	2. period (3 weeks)	3. period (3 weeks)	4. period (3 weeks)
1	1	S	H	F	C
	2	F	H	S	H
2	1	H	S	F	S
	2	F	S	H	C
3	1	H	F	S	F
	2	S	F	H	C
4	1	H	F	S	C
	2	F	S	H	S

F=full social contakt
H=head contact
S=sniff contact
C=control

The control treatment was placed as the last period for all horses because a pilot study by some students showed that the horses loose interest when there is no reward, thus needed retraining.

In each test week a FR-schedule with in total 5 FR-values in random order was carried out. The FR-values were 8, 16, 24, 32 and 40 presses to obtain a reward.

Preliminary results

A preliminary analysis of the results shows that horses are more willing to work for access to another horse than for access to an empty arena (Figure 2). Both for the intercept and the slope there is a significant difference between the two curves.

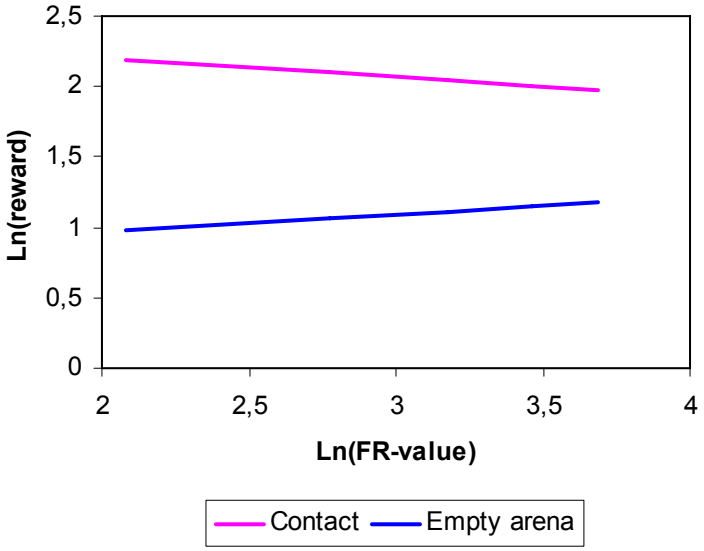


Figure 2. Demand curves (log-transformed) for working for access to an empty arena or for access to physical contact with another horse.

Between the levels of physical contact there was no difference neither concerning the intercept nor the slope as shown in figure 3.

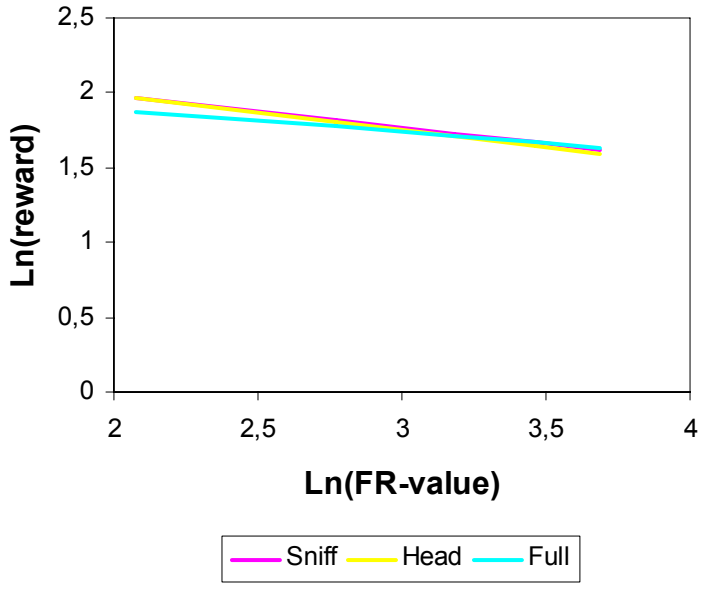


Figure 3. Demand curves (log-transformed) for working for access to sniff, head or full contact with another horse.

Conclusion and perspectives

- Horses are more motivated to work for contact to another horse than for access to an empty arena

- No difference in horses' motivation to work for 3 levels of physical social contact, when the basic level of contact is visual contact

From this experiment we can conclude that visual contact with other horses is of less value to the horse than any form of physical contact. But further experiments are needed to decide if the level of physical contact is important to the horse as well. The next experiment will be carried out at Research Centre Foulum in Denmark in the winter 2006-2007.

References

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