



Gentle interactions decrease the fear of humans in dairy heifers independently of early experience of stroking



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ARTICLE INFO

Article history:

Received 28 October 2015

Received in revised form 18 February 2016

Accepted 28 February 2016

Available online 7 March 2016

Keywords:

Human-animal relationship

Avoidance distance

Calves

Cattle

Gentle interactions

Stroking

ABSTRACT

The relationship of farmed animals with humans has important implications for animal welfare and productivity. To investigate the short- and long-term effect of gentle interactions (stroking, talking in a gentle voice) during different life stages on the fear of humans, we tested heifers that had or had not experienced gentle interactions as calves in a previous experiment on a large commercial farm. We investigated a) whether the reduction in calves' avoidance distance caused by gentle interactions was still detectable one year later, b) whether a second treatment with gentle interactions would be effective in reducing the avoidance distance of heifers and c) whether there were cumulative effects of the two treatment phases. We provided a total of 42 min of voluntary gentle interactions to 45 of 79 heifers, resulting in a cross-over design with four groups that had been stroked as calves; or as heifers; or both as calves and heifers; or not at all. We measured the avoidance distance before, 1 day after and 5 weeks after the treatment phase.

There was no significant difference between heifers stroked or not stroked as calves in the avoidance distance measured before the treatment. All heifers that were stroked had an avoidance distance of 0 cm towards the experimenter after the treatment, and the decrease in avoidance distance was significantly higher than in non-stroked heifers ($p < 0.001$). The effect was persistent for at least 5 weeks and extended to an experimenter who was blind to the treatment ($p = 0.03$). Most heifers accepted the treatment for most of the time and stretched their necks while being stroked, which is a behavioural indicator of pleasure.

The experience of gentle interactions as calves did not have a long-term effect on their avoidance distance before the treatment. Regular positive interactions may be necessary to maintain a good relationship with humans. Heifers seemed to perceive the treatment as pleasurable and displayed a very strong and consistent reduction in avoidance distance, indicating reduced fear of humans and increased confidence. Gentle tactile and vocal interactions may be a suitable method to improve heifers' relationship with humans and their quality of life.

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1. Introduction

A good relationship between farm animals and humans is important for animal welfare as well as economic reasons (Waiblinger et al., 2006; Hemsworth and Coleman, 2011). To establish and maintain a good relationship, stockpeople should take care to reduce negative behaviours towards the animals and increase the

amount of positive behaviours (Hemsworth and Coleman, 2011). In order to influence the relationship most effectively and efficiently, it is of importance to know during which phases of life the effects of positive interactions are most pronounced and how long they last.

Time-window and long-term studies on the effects of gentle handling in cattle are scarce and to date did not include potential additive effects of gentle treatment during different life stages. Boissy and Bouissou (1988) tested the effect of 30 days of brushing and halter training on dairy heifers during months 0–3, 6–9 or 0–9 of life. At 15 months of age, the group handled during the entire 9 months performed significantly better in tests of the human-animal relationship than non-handled controls but the group handled only during the first three months did not differ significantly from the

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Table 1

Descriptive data of pens in barns A and B. All animals were moved through all pens according to their age (or weight in case of pen A2, see Section 2.2). Area of the pens and runs is given in m², space allowance in m²/animal. Group size, number of all animals in pen; experimental, number of experimental animals in pen; treatment, number of animals per treatment group for the respective pen. Treatment groups: CC, not stroked as calves or as heifers; CS, not stroked as calves but as heifers; SC, stroked as calves but not as heifers; SS, stroked both as calves and as heifers. Avoidance distance tests were performed before the experimental stroking treatment (ADT1), one day after the treatment (ADT2) and five weeks after the treatment (ADT3).

	Pen	A1	A2 ^a	A3	A4	B1 ^b	B2	B3	B4	B5	B6
	Area pen	481	940	527	523	209	667	682	203	227	226
	Area run	0	56869	0	0	246	0	0	113	228	168
ADT1	Space allowance	5.1	317.6	3.8	4.0			8.2			
ADT2	Group size	95	182	140	132			83			
	Experimental	1	13	31	32			2			
	Treatment	1 CC	7 CS, 6 SS	12 CC, 19 SC	15 CS, 17 SS			1 CC, 1 SC			
ADT3	Space allowance			5.3	4.4	16.3 (7.5)	7.3	9.5	9.9	8.3	6.9
	Group size			100	119	28	91	72	32	55	57
	Experimental			4	6	9	15	15	16	2	7
	Treatment			1 CC, 1 CS, 2 SS	4 CS, 2 SS	3 CS, 6 SS	8 CS, 7 SS	7 CC, 8 SC	5 CC, 11 SC	1 SS, 1 SC	4 CS, 3 SS

^a Animals had permanent access to low quality pasture.

^b Run was shared with another pen; access time was irregular depending on farm operations.

controls, indicating no lasting effect of the early treatment. Sato et al. (1984) found no long term-effects of daily gentle tactile contact during the first 35 days of life in dairy calves that were observed up to an age of about 12 months. In contrast, beef cattle raised in a suckler herd had reduced avoidance distances (ADs) 9 months after gentle handling during the first 4 weeks of life (Probst et al., 2012). Extensively housed beef heifers that had been stroked for two weeks after weaning performed better in different tests of their relationship to humans 7 months after the treatment (Boivin et al., 1992).

In a previous study (Lürzel et al., 2015), we provided gentle interactions (stroking of the ventral neck, talking in a gentle voice) to dairy calves on a large commercial farm. The treatment reduced ADs in the short term and increased the average daily gain in body weight between birth and shortly after weaning. In the present study, we measured the ADs of these animals approximately one year later. We provided gentle interactions in a cross-over design that allowed us to investigate not only the direct effect of the recent treatment on AD but also a potential interaction with the previous treatment. Five weeks later, we tested the AD again to investigate medium-term effects of the gentle interactions provided to the heifers. We predicted that animals stroked as calves have a lower AD than animals that had not been stroked as calves; furthermore, that they accept stroking more easily and show more neck stretching during the treatment, a behaviour interpreted as a sign of relaxation, i.e. a low arousal, positive affective state (Mendl et al., 2010). Animals stroked as heifers were expected to have a lower AD than animals not stroked in the present study, one day after the treatment phase as well as five weeks later. We expected a cumulative effect of gentle interactions at both life stages and therefore the lowest avoidance distances in animals in the group that had experienced two stroking treatments. In addition, we tested for the persistence of the effect of early stroking on average daily gain in body weight.

2. Methods

2.1. Animals and study design

In a previous study (Lürzel et al., 2015), 91 female Holstein-Friesian calves born during summer 2013 had been housed under usual commercial conditions, individually for about one week and later in groups of up to 26 animals. Half of them had experienced gentle interactions (stroking and talking in a gentle voice) during the first 14 d of life for 3 min/d (treatment S), whereas the other half had served as controls and had

not experienced gentle interactions (treatment C). For the sake of simplicity, we will use the term “stroking” in the remainder of the text when referring to the “treatment with gentle interactions” in our studies.

During the year between the previous and the present study, 12 animals died or were sold. At the beginning of the present study, the mean age of the remaining 79 heifers was 13.1 months (SD = 0.5 months). A cross-over design was implemented on the heifers, of which 36 were former control calves and 43 had been previously stroked. In the present study, about half of the heifers had the opportunity to experience stroking (S) and about half of them did not (C), resulting in four experimental groups: the first group was stroked neither as calves nor as heifers (C–C, n = 14), the second group not stroked as calves but as heifers (C–S, n = 22), the third group stroked as calves but not as heifers (S–C, n = 20), and the fourth group stroked both as calves and as heifers (S–S, n = 23).

All experimental procedures applied during the course of this study were discussed and approved by the institutional ethics committee in accordance with guidelines for Good Scientific Practice and with national legislation.

2.2. Housing and management

The heifers were housed on deep litter in young stock barns that were part of a farm comprising about 2000 head of young stock. Animals were moved once a month from one pen to the next, passing through a series of pens with increasing sizes located in different barns. Pen sizes, numbers of animals per pen and space allowance per animal for each pen are presented in Table 1. All pens were equipped with drinkers; the feeding places were equipped with neck rails in barn A and with headlock feed barriers in barn B.

Heifers were fed ad libitum with a total mixed ration (TMR) provided twice daily at 6:00 h–6:30 h and at 13:00 h–13:30 h. TMR composition varied according to availability of single components, and carrots were added to the TMR from the third day of the treatment phase onwards.

General handling of the animals by the farm's stockpeople occurred mostly during pen cleaning, monthly rehousing and weighing. It was rather rough and included sudden movements and shouting. Animals in pen A2 were weighed once a month (mean age ± SD: 12.3 ± 1.0 months) and transferred to pen A3 if they had a body weight of at least 360 kg. As all experimental animals had reached this threshold already at their first weighing, all of them were weighed only once.

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