

Behavioural effects of goats on disabled persons

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Abstract

It is well known that contact with animals may benefit humans in a number of ways. In our pilot project we arranged weekly contacts of 10 multiply disabled adults (all deaf, 4 women, 6 men, age 18-45) with well human-socialized goats. This is part of an effort to team up residential institutions for disabled clients with suitable farms. Over a period of 3 months, clients were video-taped when in contact with goats, 1 hour per week, 11 weeks in a row. In parallel, clients were video-taped in a dining room situation. This was done with the consent of clients and with support of the residential institution in Upper Austria. From these tapes, a number of parameters were coded for each client covering behaviour, communication and mood. Over time, attentiveness, active participation in the program, and expression of joy increased, whereas withdrawal decreased in contact with the goats, but not in the dining room situation. Only in the goat situation, the population variance of most significant parameters decreased indicating an increasing homogeneity of the clients behaviour over the weeks. We conclude that regular animal contact had contributed to the well-being of multiple disabled clients, and had a sustained effect on their behaviour when with the goats, but

did not lead to a measurable behavioural change of clients in other situations.

Introduction

Animal companions may improve quality of life, particularly in disabled persons (Allen and Blascovich 1996; Brehmer 2003; Duncan and Allen 2000; Fine 2000; Lane et al. 1998; Tschochner 2000; Wilson and Turner 1998; Zieger 2003). Service dogs, for example, are trained to be practical helpers and thereby, enhance individual independence, but also boost self-esteem, responsibility, communication skills and openness and finally promote societal integration of their human partners (Bateson et al. 1998; Hart 2000; Hart et al., 1987; Sanders 2000).

In general, a common denominator of human-animal interactions seems to be the disposition to develop mutual emotional links (Bradshaw and Nott 1995; Podberscek et al. 2000; Wilson 1984), even in clients with severe cognitive impairment (Duncan and Allen 2000). In a number of therapeutic contexts, animals positively affected client compliance and counteracted therapy resistance (Corson et al. 1977; Fine 2000; Olbrich and Otterstedt 2003). This was already appreciated by S. Freud and C.G. Jung, who both employed their dogs to facilitate communication with clients (Niehus 2004). In fact, animal contact may facilitate social interactions among humans (Wells 2004). Motivational effects and locomotory stimulation may, for example, explain the effectiveness of hippotherapy (Fine 2000; Otterstedt 2001) or of swimming with dolphins (Nathanson et al. 1997).

Regular animal contact over long periods of time may enrich lives, particularly in mentally impaired persons (Duncan and Allen 2000; Edney 1992; Lane et al. 1998; Palla 2002; Raina et al. 1999). Workable approaches are needed to get such clients in contact with animals. For practical and ethical reasons domestic animals should be employed. Domestication included selection for tameness, and improved attention towards, and communication with, humans (Hare et al. 2003; Miklosi et al. 2003; Soproni et al. 2001; 2002). Hence, domestic animals are disposed to make good animal companions (Bradshaw and Nott 1995; Podberszek et al. 2000; Robinson 1995; Serpell, 1986), they are generally better suited in a therapeutic context than most tame wildlife. Goats are particularly socially responsive and gentle animals.

Many residential institutions for disabled persons are located in rural areas, where animals are still kept on small farms. Therefore, our idea was to team up institutions for the mentally disabled with suitable farms. Contracting farmers would allow clients regular animal contact at relatively low costs to the institution, because these would not have to run an animal keeping unit of their own, often a logistic hurdle (Grosse-Svestrup 2003). In addition, this may create a new economic niche for a number of farmers. Towards that goal, we initiated a pilot project together with an Upper Austrian housing institution for multiple disabled persons. In this first study, we employed goats, housed in a stable at 10min walking distance from the institution. Animal keeping was not directly connected with a farm, but was established at a purpose-built stable on the premises of the residential institution, because we first intended to concentrate on the relationships between the clients and the goats, and wanted to work out interaction routines. A farm environment may have added more factors to this trial than could have been handled at the beginning.

The aim of our pilot study was 1) to test the workability of our concept and 2) to study the potential effects of regular visits, over more than four months on the behaviour and well-being of these clients. Based on the available evidence, we predicted positive effects (Duncan and Allen 2000; Fine 2000). We also predicted that behavioural effects, if any, would mainly become manifest in contact with the goats, rather than producing context-independent behavioural changes in the clients. Finally, we predicted that behavioural effects would not only show at the beginning of the goat program and hence, represent a novelty effect, but would rather persist over period of animal contact.

Materials and Methods

We conducted this study in summer and fall 2003 at a residential institution for deaf and multiple disabled adults, "Lebenswelt Schenkenfelden", in collaboration with the management and staff. Of a group of 15 clients, who initially volunteered for this program, 10 (4 women, 6 men, age range 18-45) participated regularly. Aside of being deaf and impaired in vocal communication, clients showed a range of other, mainly

mental, impairments. All of the clients were involved in a range of therapeutic activities, individually as well as in groups, which mainly aimed at intensifying communication. None of these programs, however, included animals.

Clients are shortly described in the following:

A: Female; depression spells with somatic symptoms, is only considerate of others if sympathetic.

B: Female; stable but unable to say no, dependent on the opinion of her girl friend.

C: Female; on her own, instable, difficulties to come to grips with novel situations, joyful about achievements.

D: Female; friendly and sociable, very short attention spans, low in sign language skills, but innovative, initially low motivation to visit the goats.

E: Male; low self-esteem, anxious, cheerful about achievements and when praised.

F: Male; reserved and restrained, dislikes being in a group.

G: Male; low in general drive, perseverance and stamina, little contact with group, mainly because of limited communicative means.

H: Male; friendly and curious, only limited sign language repertoire, therefore restrained in his communication.

I: Male: distant at the beginning, but cooperative and helpful later on, occasional bursts of rage.

J: Male; hyperactive, initially aggressive against the goats.

Ten goats of 4 breeds, all of them females and gently tempered, were housed in a stable (approx. 15 m²), in walking distance from the institution. Goats had no horns, were approx. 5 months old and were well socialized with humans. Goats had access to an outdoor enclosure (meadow, approx. 2000 m²) at all times. A farmer from the neighbourhood provided basic care for the animals. Additional care was given by the clients. By the end of the observation period, mid of October, the goats were moved to a nearby farm for the winter. There, clients could still visit them. Five of the goats were moved back to their stable near the residential institution in spring, where a total of 7 young were born. Clients resumed their regular visitation program and particularly the goat fawns triggered great interest and empathy.

Clients regularly visited the goats once a week, after supper (1900-2000) as a group. Apart from the weekly visits, only a few clients visited the goats regularly, mainly because their daily routines left little spare time. During the one hour period, clients interacted with the goats spontaneously for approx 1/3 of the time, stroking, brushing, feeding goats with herbs from outside the enclosure, etc. Another 1/3 of the time was occupied by organized activities, mainly playing with the goats in the group to promote social interactions (teach goats little tricks, let them search for hidden food, etc.). Finally, 1/3 of the time was devoted to feeding the goats with hay, twigs, freshly cut grass, pellets and replenishing water. Care was taken, that the goats were not harmed by interactions with clients, although this risk was low, because goats could always escape or avoid contact.

During weekly visits, from mid July to mid October 2003, clients were video-taped in contact with the goats. They were accompanied by 6 persons, one communicating about the activities in sign language, one video-taping, 2 with check-sheets, one protocolling qualitative observations and one photografer. In addition, clients were video-taped the same day for half an hour (1530-1600) during leisure times in an unstructured situation, in the dining room of their residential area. This was the regular break of their afternoon work period, when also a light meal and fruits were offered. Our goal was to monitor the undisturbed and spontaneous behaviour and interactions of clients. Obviously, his was not a control situaton in the proper sense. However, if any effects over time would show in the situation with the goats, we could check, whether or not a parallel shift in behavioural parameters would also occur in the dining room situation. A total of 11 of such observation periods were coded and analyzed. In addition to video taping, events were protocolled on paper and staff was interviewed regarding potential changes in client behaviour.

From these tapes, 26 behavioural parameters in three classes were coded by one-zero-sampling over one-min periods for each client:

1) Locomotion: sit, walk, stand; social activities: interacions with other client, interaction with goat (including stroking, feeding, etc.), interaction with other client over goat,

interaction with staff, interaction with staff over goat, touching goat, stroking goat, brushing goat, spontaneous play with goat, does/does not participate in suggested activity, passive, withdraws, attentive.

2) Sign language and acoustical communication: sign language with/without excitement, vocal expression with/without excitement.

3) Expressions of emotion: signs of: anger, joy (laughing), fear, aggression, stereotypic behaviour.

4) A number of parameters were combined as a measure of “activity”. These included: interactions with other client, interaction with a goat, interaction with another client and goat, interaction with staff and a goat, interaction with staff, touching a goat, stroking a goat, brushing a goat, spontaneous play with a goat, participation in suggested activity. An index for being passive was derived from the following parameters: does/does not participate in suggested activity, passive, withdraws.

For data analysis by SPSS software, means within parameters of those 10 individuals who participated regularly in the goat visitation program were formed over each of the 11 observation days, separate for the dining room situation and the period with the goats. Because the dining room situation was too different to be regarded as a control situation, we did not compare behavioural parameters between the situations directly, but only within situations. Kendall’s Tau was used to check for changes of parameters over time, because this non-parametric correlation is well suited for small sample sizes and more resilient against outliers than, for example, Spearman’s rank correlation. A power analysis of the different correlations revealed “intermediate” power of our analyses ($1-\beta \Rightarrow 0.45$ to <0.53) (<http://calculators.stat.ucla.edu/powercalc/>). Trends in variances over time were analyzed based on the coefficients of variation (VR%) at the 11 time points to and then applying Kendall’s tau.

Results

Quantitative Results

When with the goats, the 10 regularly participating clients differed in how intensely they touched each other and the animals spontaneously (outside the structured play situations), in how withdrawn or attentive they were, and in expression of joy. They did

not differ, however, in the degree they participated in activities with the goats. Similar differences between individuals were also found for the dining room situation (Tab. 1)

Only over the 11 successive weekly meetings with the goats, a number of client behavioural parameters changed (Fig. 1). None of these parameters changed in the dining room situation. At the goats, participation in guided activities increased over time (Kendall's Tau, $n=11$ in all following cases, $\tau=0.709$, $p=0.002$), as did attentiveness ($\tau=0.782$, $p=0.001$), but also expression of anger ($\tau=0.597$, $p=0.021$). Withdrawal and apathy decreased ($\tau=-0.564$, $p=0.016$), as did touching each other and the goats ($\tau=-0.6$, $p=0.01$). Not all changes were linear over time. During weeks 3 and 4, attention and joy were at a minimum, retreat and apathy at a maximum (Fig. 1). In a few of these parameters the variance within the population decreased exclusively in the goat situation, but not in the dining room. These were participation in activities over time (Kendall's Tau, $n=11$ in all following cases, $\tau=0.527$, $p=0.024$), attentiveness ($\tau=0.6$, $p=0.01$), withdrawal ($\tau=-0.556$, $p=0.025$), and touching each other and the goats ($\tau=-0.6$, $p=0.01$).

Qualitative results

Qualitative observations and communication with staff revealed that the regular contact with goats had a beneficial influence on a number of clients. In the following we summarize three cases:

1. *Increase of joy and responsibility in A:* From the beginning she enthusiastically participated in the program and showed much joy in contacting the goats. Via mutual interest, A established a close relationship with one particular goat, with which she often interacted by hugging. Also, A was devoted to caring for her goat. Evidently, she developed feelings of protection and affection for, and from, the goat, which made her visibly happy. A took responsibility for „her“ goat. She was concerned about her well-being and often paid visits on her own.

2. *Initiative and increasing skills and mobility in E:* At the beginning, E had difficulties in coping with the goats. Still, he was not discouraged and did not retreat, but intensely communicated with the observation team over the goats by sign language and by acoustic verbalization. His intense interest and engagement enabled E to become

increasingly successful in contacting and handling the goats (skillful brushing, attracting goats with twigs). He evidently gained much joy and satisfaction from that. Staff members were surprised by E's activity and lack of fear of the goats. His activity and his usually low muscular tonus was increased in contact with the animals.

3. *Overcoming fear, increased mobility and ability to concentrate in D:* D is open for contact, but is usually unable to keep her attention focussed at social partners for some period of time. In contact with the goats, E's attention time spans clearly increased. At the beginning, her attention deficits in interaction with the goats evidently provoked some of the goats to jump up on her to reach the food which she held too high above ground. Occasionally, goats knocked her off her feet this way, which caused fear on side of E. Over time however, E learned to present the twigs appropriately low, so that the goats did not need to jump any more. Improved concentration on her side also increased her trust in the goats. E had so much joy from the goats that she often demanded to contact them outside the scheduled time. This is remarkable, because the 10 min walk is a considerable effort for her due to her walking impairment.

Discussion

Our study showed specific behavioural changes over time in contact with the goats. Particularly the interested clients adjusted their behaviour accordingly. Also, the goats showed interest in the clients and thereby, substantially activated them and triggered communication of clients, among themselves, with staff or the observers, and with the goats. Similar effects of animal contacts on humans of all ages and states are reported in the literature (Allen 1996; Anderson et al 1984; Brehmer 2003, Edney 1992; Fine 2000; Friedmann 1995; 2000; Hergovich et al. 2002; Kotrschal and Ortbauer 2003; Olbrich 1997; Otterstedt 2001; Podberszek et al. 2000). Not all of the changes measured were positive, although the increase of anger spells over time measured at the goats was mainly due to the behaviour of a single client.

In the dining room situation, clients did not show any behavioural changes over time in parallel to the goat situation. This indicates that the observed changes were specific to the goat contact and may not be interpreted as general changes in the individuals involved. In addition, our design would not allow to estimate potential subtle changes in

individuals' social and communicative performance. Finally, because clients are enrolled in a multiple therapeutic program, it would not be possible to attribute any general change in a client to the contact with the goats only.

Because of the steady changes in client behavioural parameters at the goats over the 11 weeks of the program (Fig. 1), we suggest, that the regularity of animal contact was a major factor for these changes (Raina et al. 1999; Robinson 1995). Attentiveness, activity and expressions of joy increased, withdrawal and being passive decreased. A low of attentiveness and joy, but high in passivity measured during weeks 3 and 4 of the program (Fig. 1) indicates a crisis, probably reflecting the initial hurdles on side of the clients and the staff to come to grips with this new situation. Hence, a temporal limitation of such a program to just a few weeks or occasional visits may not overcome such thresholds and, therefore, may not reach the quality of regular, long-term projects.

Sustained effects are evidently achieved, when the animals become part of the daily environment of clients. Structured interactions with animals took some time to gain momentum. Clearly, there was no "novelty effect", which may occur in a number of therapy programs (Fellinger, pers.comm.). Such an effect should have been measurable as a quick return-to-baseline of the parameters studied. In contrast, there was a continuous change over the 11 weeks. It was also remarkable that only while at the goats, the variance between clients in the parameters participation in the activities with the goats, withdrawal and attentiveness decreased over time, whereas non of this occurred in the dining room situation. This indicates a gradual increase in homogeneity of the clients' behaviour over time, which again underlines the value of long-term animal contacts.

Our results suggest once more, that animal contact may contribute considerable extra value to therapeutic settings (Fine 2000; Lane et al. 1998; Podberscek et al. 2000). Contact with goats spontaneously increased joy of life in most participating clients. At least during their time in contact with the animals, they became more attentive towards their surroundings. Some withdrawn clients opened for communication at the goats, exchange was triggered between some individuals and conflicts were dampened. The

goat project also remarkably increased the clients locomotory activity (comp. Olbrich 1997), potentially counteracting the rapid bodily decline which tends to affect impaired persons older than 40 years of age. Also, it is well known that regular animal contact may positively affect physiological variables (Allen 1996; Baun et al. 1984; Baun and McCabe 2000; Burch et al. 1995; Edney 1992; Friedmann 1995; 2000).

Still, caution is appropriate not to overinterpret. The dynamic and positive changes in client behaviour over the 11 weeks of observation (Fig. 1) were only measured in contact with the goats, but not in the dining room situation. Clearly, animals are not a miraculous cure, but they may improve quality of life and support therapy in those clients who accept the animals. In fact, five of the initially 15 participating clients pulled out early, mainly because they were not interested in animal contact. No injuries or traumatic events occurred in contact with the goats. Hence, we conclude that clients enjoyed benefits without evident disadvantages. Regular animal contact clearly enriched their daily routine. Although the additional effort for the host institution may not be substantial, if, for example, basic housing and care for the animals is provided by a neighbouring farm, such a program may still increase the work load for the institutional staff. On the other hand, the improvements in client mood, and sociability, potentially also in conscientiousness and enhanced dependability may benefit the work of staff members.

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Table 1: Parameters in which the 10 clients differed within the situations without goats and with goats.

Behavioural parameters,	Dining room	At the goats
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comparison between clients within situations Kruskal-Wallis, d.f.=9		
Tactile contacts between clients	Chi-square=7.53 n.s.	Chi square=26.88 P=0.001
Retreated, disengaged	Chi square=36.54 P<0.001	Chi square=26.62 P=0.002
Attentiveness	Chi square=36.23 P<0.001	Chi square=22.02 P=0.009
Expression of joy	Chi square=26.53 P=0.002	Chi square=46.44 P<0.001

Figure Legend

Figure 1: Change of parameters in the group of 10 clients over 11 weekly sessions with the goats, one per week, over 3 months. Data coded from video tapes taken at the goats. Means \pm standard deviations of 1 min one-zero samplings over the visit given, based on individual averages. A) Change of attentiveness (Kendalls Tau, $n=11$, $\tau=0.782$, $p=0.001$). B) Participation in structured activities (Kendalls Tau, $n=11$, $\tau=0.709$, $p=0.002$). C) Retreat and apathy (Kendalls Tau, $n=11$, $\tau=-0.564$, $p=0.016$). D) Expression of joy (Kendalls Tau, $n=11$, $\tau=-0.434$, n.s.).