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Dog training methods: their use, effectiveness and interaction with behaviour and welfare

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Abstract

Historically, pet dogs were trained using mainly negative reinforcement or punishment, but positive reinforcement using rewards has recently become more popular. The methods used may have different impacts on the dogs' welfare. We distributed a questionnaire to 364 dog owners in order to examine the relative effectiveness of different training methods and their effects upon a pet dog's behaviour. When asked how they trained their dog on seven basic tasks, 66% reported using vocal punishment, 12% used physical punishment, 60% praise (social reward), 51% food rewards and 11% play. The owner's ratings for their dog's obedience during eight tasks correlated positively with the number of tasks which they trained using rewards ($P < 0.01$), but not using punishment ($P = 0.5$). When asked whether their dog exhibited any of 16 common problematic behaviours, the number of problems reported by the owners correlated with the number of tasks for which their dog was trained using punishment ($P < 0.001$), but not using rewards ($P = 0.17$). Exhibition of problematic behaviours may be indicative of compromised welfare, because such behaviours can be caused by — or result in — a state of anxiety and may lead to a dog being relinquished or abandoned. Because punishment was associated with an increased incidence of problematic behaviours, we conclude that it may represent a welfare concern without concurrent benefits in obedience. We suggest that positive training methods may be more useful to the pet-owning community.

Keywords: *animal welfare, domestic dog, human–animal interaction, obedience, problematic behaviour, training methods*

Introduction

Domestic dogs (*Canis familiaris*) are kept in large numbers by humans worldwide, and their welfare is worth serious ethical and scientific consideration. The majority of previous research in this area has been in laboratories and re-homing centres (eg Hubrecht 1993, 1995; Hennessey *et al* 1998; Wells & Hepper 2000), but most domestic dogs are kept as pets within homes. The manner in which these dogs are trained may be of particular importance to their welfare. Most pet dogs receive at least rudimentary training. For instance, dogs are trained to eliminate in an appropriate place, to walk to heel, and to obey a range of commands including sitting and lying down. The methods by which these tasks are trained vary greatly.

Traditional training techniques have used mainly aversive stimuli, either in the form of positive punishment (application of an aversive stimulus in response to an undesirable behaviour) or negative reinforcement (removal of an aversive stimulus leading to an increase in the performance of a desirable behaviour) (Lieberman 1999). The use of aversive stimuli in training may have negative welfare implications: it is thought to cause suffering (Beerda *et al* 1997), possibly poses health risks (through increased levels of physiological stress), and has been found to be related to aggression towards other dogs (Roll & Unshelm 1997).

In contrast, other training methods utilise positive reinforcement through the presentation of rewards in response to desired behaviours. These methods have been adopted as part of the training regime of many working dog organisations, including the Guide Dogs for the Blind Association (Johnston 1995) and agencies training dogs to detect illegal substances (Adams & Johnson 1994).

In this paper we survey the training methods used by the general pet owning community in the UK. We also examine the relative effectiveness of these methods for training a variety of specific tasks. This is important because positive training methods are likely to be adopted only if they are at least as successful as their negative counterparts. We hypothesise that specific training methods will be associated with the performance of behaviours deemed problematic by owners (Overall 1997). The manifestation of 'problematic behaviours' may be important for dog welfare for several reasons: first, they are often caused by, or result in, states of anxiety; and second, problematic behaviours have been implicated in the weakening of the pet–owner relationship (Mugford 1981), which may result either in the relinquishment of dogs (Serpell 1996) or in euthanasia.

Previous studies of the relationship between training methods and problematic behaviours have yielded apparently conflicting results. Podberscek and Serpell (1997) and Voith *et al* (1992) found no relationship between obedience training and problematic behaviours, while Clark and Boyer (1993) and Jagoe and Serpell (1996) found a decrease in these behaviours following obedience training. This discrepancy

may be because these studies compared formal (under the supervision of a dog trainer) versus informal training and took no account of the specific methods used (eg punishment and reward). The aim of the current study is to document the use of training methods by the pet-owning community and investigate how these methods interact with both obedience and problematic behaviours.

Methods

Participants and distribution

Three main sites were used in Hampshire: Southampton Common (50°55′36″N, 1°24′39″W), Southampton Sports Centre (50°56′28″N, 1°25′14″W), and Deer's Leap (50°52′53″N, 1°30′45″W). Four main sites were used in Cambridgeshire: Gog Magog Down (52°9′22″N, 0°10′25″E), Cherry Hinton Estate Park (52°11′13″N, 0°9′59″E), Midsummer Common (52°12′36″N, 0°7′46″E), and Jesus Green (52°12′43″N, 0°7′25″E). These sites were chosen for their high concentration of dog walkers and because they represented a cross-section of the types of areas open for dog walking, ie both rural and urban. All sites were visited at various times of the day during daylight hours, on both weekends and weekdays. All dog walkers were approached by the experimenter and asked if they would mind participating in a questionnaire survey about their dog. If amenable, they were given a questionnaire with a stamped addressed envelope.

In addition, 60 questionnaires were distributed to local veterinary surgeries and pet stores in each of the two counties (Hampshire and Cambridgeshire) for voluntary pick-up. This ensured that not only people who walked their dogs received the questionnaire.

To avoid reports of puppy behaviour, only people who owned a dog over one year of age were recruited. If respondents owned more than one dog, they were asked to answer with regard to the youngest dog (over one year), as it was assumed that the training techniques used for the younger dog would be remembered better.

Design

The questionnaire contained 26 questions, 13 simple/multiple-choice and 13 open-ended, covering the following topics.

Demographics

Respondents were asked their gender and age and that of their dog. They also gave information on the breed, sexual status (entire or neutered), source and age at acquisition of the dog, and how many dogs they owned both presently and in the past.

Training methods

Respondents were asked open-ended questions about the training methods that they had used to train seven common tasks. They were first asked about three specific training situations: how they toilet trained their dog, how they reacted to their dog chewing household objects, and how they reacted if their dog stole food or other objects. They were then asked which methods they had used to train their dog to perform four tasks: to come when called, to sit on command, to leave or give up an object on command, and to walk to heel.

Obedience

Owners were asked to rate their dog's obedience on a scale of 1–5 (5 being the most obedient) for each of the seven tasks. They were also asked to give an eighth obedience score (1–5) for 'overall obedience'. All eight obedience scores were summed to give a 'summed obedience score'.

Problematic behaviours

Respondents were presented with a list of 16 common problematic behaviours (Barlow 2003) and asked to indicate whether their dog had shown each of them in the past, currently or never. These 16 problems were reduced to 13 during analysis (Table 1).

Statistical analysis

All statistical analyses were carried out using SPSS 11 for Windows (SPSS Inc, 1989–2001).

Demographics

The data from Hampshire and Cambridgeshire were compared using the χ^2 test for categorical data and the Mann-Whitney U test (Siegel & Castellan 1988) for ordinal data.

Training methods and obedience

Questionnaires with incomplete training sections, or in which the respondents stated that they had not trained the dog themselves, were excluded from analysis. We analysed the success of each commonly used method for training the seven tasks. For each task in turn, we examined each training method mentioned by at least 10% of respondents. We used Mann-Whitney U tests to compare the obedience scores given by those respondents who had used that training method with the obedience scores given by those respondents who had not used it.

Each reported training method was then categorised as reward-based, punishment-based, or miscellaneous (ie not obviously rewarding nor punishing) (see Table 2). The authors and also two clinical animal behaviourists agreed the categorisation. For each respondent, we then added up the total number of times that they had reported use of each method type (reward, punishment and miscellaneous) to generate three new variables: reward frequency, punishment frequency, and miscellaneous method frequency. These variables were tested for correlation with the summed obedience scores using Spearman's Rank correlation tests (Siegel & Castellan 1988).

Finally, we categorised the respondents according to their general training strategy. Each respondent was categorised as using reward only, punishment only, a combination of reward and punishment, or miscellaneous methods only. The summed obedience scores for the four groups were compared using the Kruskal-Wallis test (Siegel & Castellan 1988).

Table 1 Incidence of the 13 categories of problematic behaviours, displayed as a percentage of the total respondent population.

Problematic behaviour	Never displayed	Displayed in the past	Currently being displayed
Barking at people	15.8	8.2	75.7
Aggression towards people	50.2	16.8	33.0
Barking at dogs	34.4	12.9	52.7
Nipping at dogs	74.8	7.7	13.8
Growling at dogs	40.1	17.5	42.4
Fear in a few situations	22.0	17.8	60.2
Fear in many situations	46.6	19.8	33.6
Excitement in a few situations	9.6	8.3	82.1
Excitement in many situations	37.1	15.1	47.8
Separation-related behaviours	46.3	38.0	15.6
Inappropriate mounting	71.3	14.7	14.1
Repetitive behaviours	80.1	10.1	9.8
Eating non-foodstuffs	57.6	25.9	16.5

Problematic behaviours

All problematic behaviours reported by less than 10% of the population were combined with other problem categories. Nipping and growling at people were combined into the category 'aggression towards people'. Destruction, noise and elimination (urinate or defecate) when left alone were combined into the category 'separation-related behaviours'. This resulted in 13 problematic behaviour categories (Table 1).

We tested the relationship between the frequency of reward, punishment and miscellaneous methods and the number of current problematic behaviours using Spearman's rank correlation tests. We initially used the number of current problematic behaviours, as those performed in the past might have been influenced by a previous owner's treatment or reflect normal puppy behaviour, and might not be related to the current owner's training regime. Previous problems were only included, to increase sample sizes, when exploring specific relationships between individual problems and training methods.

Respondents using each of the four training strategies (reward only, punishment only, a combination of reward and punishment, and miscellaneous methods only) were compared for the total incidence of the 13 problems among their dogs using Kruskal-Wallis tests. Next, χ^2 tests were used to compare the number of dogs undergoing each training strategy with their performance of individual problematic behaviours (currently, in the past, or never). Where non-significant results were found, the dogs in those training strategy groups were combined and the χ^2 test re-run. This process was continued until only those training strategies that showed a significantly different incidence of the problematic behaviour remained.

Results

Returned questionnaires

600 questionnaires were distributed (300 in each of the two counties) and 364 were returned (return rate 61%). Of these, 38 were either incomplete or were answered for a dog under one year old. Of the remaining 326, exactly 50% came from each county.

Demographics

Of the respondents, 69.6% were female, 26.1% were male, and 4.3% of questionnaires were answered by a mixed-sex couple. Overall 4.6% of respondents were under 25 years old, 26.1% were between 25 and 40, 46.9% were between 41 and 60 and 22.2% were over 60 years old.

The dogs ranged from 1 to 15 years with a mean age of 61 months (± 40 months); 22.4% were entire males, 32.5% were neutered males, 7.7% were entire females and 37.4% were neutered females. The mean number of dogs owned by the respondents at the time of receiving the questionnaire was 1.4 (± 0.8), and the mean number of dogs owned in the past was 2.3 (± 3.7).

Breeds were split into Kennel Club categories (see 'Discover Dogs' at www.the-kennel-club.org.uk), with an extra category containing all cross-breeds including lurchers. In total, 1.8% of dogs were hounds, 4.3% were working breeds, 17.5% were terriers, 31.9% were gun dogs, 14.7% were pastoral, 2.8% were utility, 5.8% were toy breeds and 21.1% were cross-breeds. The most popular breed was the Labrador Retriever (10.4%).

When the data from Hampshire and Cambridgeshire were compared, two significant differences were found: a greater proportion of Cambridgeshire respondents were women (73% versus 66.3%; $\chi^2 = 21.9$, $P < 0.01$); and Cambridgeshire respondents had owned a greater number of

Table 2 Categorisation of the 12 training techniques into the three training method types.

Training method category	Training technique
Punishment-based	Physical punishment (eg smacking, tapping nose)
	Vocal punishment (eg shouting, using stern voice)
	Sending the dog to bed/outside
	Tugging back at lead in heel training
Reward-based	Play reward
	Food reward
	Praise reward
	Reward, type unspecified
Miscellaneous	Newspaper on floor to encourage elimination in a particular area during toilet training
	Providing an alternative object to chew
	Ignoring the behaviour (chewing or stealing behaviour)
	Placing the dog into sit using pressure on hindquarters

dogs previously (median 2 versus 1; $U = 11676.5$, $P = 0.05$). Since no further differences were found, we considered the two populations to be sufficiently similar to combine them for further analysis.

Training methods

Twelve training techniques were described (by >10% of the respondents) in response to the seven training tasks. When methods were categorised into the three types (Table 2), the type of training method was seen to vary depending on the task being trained. Punishment was commonly reported when training dogs not to chew household objects or steal; rewards were more common when training dogs to sit or come to call (Table 3).

Overall 20.2% of respondents used reward-based methods only, 9.8% used punishment-based methods only, 60.4% used a combination of reward and punishment, and 9.6% used miscellaneous methods only or mentioned no methods at all.

Obedience

The median summed obedience score was 33 (first quartile = 29, third quartile = 36). The scores ranged from 19 to the maximum possible score of 40.

Obedience and overall use of training methods

The reward frequency correlated positively with the summed obedience score (Rho = 0.26, $P < 0.01$). No significant correlation was found between obedience and the frequency of either punishment or miscellaneous methods.

The summed obedience scores for the four categories of respondents (those that used reward only, punishment only, a combination of reward and punishment, or miscellaneous methods only) differed significantly (Kruskal-Wallis; $\chi^2 = 8.152$, $P < 0.05$). Highest obedience scores were given by respondents using reward-based methods only; this was followed by those using a combination of reward and punishment, and then those using punishment only. Respondents using miscellaneous methods only reported the lowest obedience scores.

Obedience and training for each task

When the obedience scores for each individual task were compared between respondents who had and who had not used each of the common methods, three significant results were found:

(1) Obedience to leave or give up an object was significantly greater for those dogs that had been trained using play as a reward, in comparison with those dogs that had not been trained using this method ($U = 1977.5$, $P < 0.01$).

(2) Obedience to walk to heel was significantly greater for those dogs that had been trained using praise as a reward, in comparison with those dogs that had not been trained using this method ($U = 1612$, $P < 0.05$).

(3) Obedience for not chewing household objects was greater in those dogs that had received an alternative object to chew in response to their chewing behaviour, in comparison with those dogs that had not received an alternative ($U = 3181.5$, $P < 0.05$).

No significant associations were found between the obedience scores for any of the other tasks and any specific training technique.

Problematic behaviours

Of the respondents, 97.2% mentioned at least one of the 13 problematic behaviours. The most prevalent problems were showing excitement in a few situations, barking at people, and showing fear in a few situations (Table 1).

Problematic behaviours and use of training methods

The punishment frequency correlated positively with the number of current problematic behaviours (Rho = 0.17, $P < 0.01$). In contrast, no significant correlations were

Table 3 Percentage of respondents using each training method type for each of the seven tasks.

Training situation	Training method categories		
	Punishment	Reward	Miscellaneous
Toilet training	11.6	39.1	44.9
Chewing household objects	78.5	4.3	39.8
Stealing food/objects	83.6	7.3	10.3
Sit on command	0.4	75.2	39.1
Come to call	1.9	77.8	0
Leave/give-up object	29.8	63.3	0
Heel training	26.2	45.2	0

found between the frequency of either reward or miscellaneous methods and the incidence of problematic behaviours.

The number of current problematic behaviours reported by the four categories of respondents (those that used reward only, punishment only, a combination of reward and punishment, or miscellaneous methods only) differed significantly (Kruskal-Wallis; $\chi^2 = 8.993$, $P < 0.05$). The greatest number of current problematic behaviours was reported by respondents using punishment only, or a combination of both punishment and reward (both medians = 5); the lowest number was reported by respondents using reward only or miscellaneous methods only (both medians = 4).

When the respondents using the four different training strategies were compared for the occurrence of each of the 13 problematic behaviours, three significant associations were found:

(1) Owners reporting reward-based methods only had the lowest percentage of dogs showing current over-excitement ($\chi^2 = 11.6$, $P < 0.01$).

(2) Owners using punishment, either alone or in combination with reward, had the highest percentage of dogs exhibiting separation-related problems either currently or in the past ($\chi^2 = 29.2$, $P < 0.001$).

(3) Owners who reported using only miscellaneous methods, or no methods at all, reported the lowest percentage of dogs eating non-foodstuffs either currently or in the past ($\chi^2 = 6.8$, $P < 0.01$).

Discussion

This survey has shown that reward-based training is used extensively within the dog-owning community, with over three-quarters of respondents reporting using some form of reward. However, it is unusual for owners to base all of their training on rewards, and the vast majority use a training regime that combines reward and punishment. Thus, punishment (verbal or physical) continues to feature prominently in the training of pet dogs.

Although there is an increasing concern that certain forms of punishment can cause suffering (Beerda *et al* 1997), there remains a general belief that, for many canine tasks, punishment is the most effective training technique (Christiansen *et al* 2001; Marschark & Baenninger 2002). For example, many owners used punishment-based training to teach dogs not to chew or steal objects. However, this survey suggests that for everyday training, punishment is not the most effective method. Furthermore, for certain tasks, reward-based methods are significantly more successful.

When we compared dogs' obedience at seven basic tasks, for four of these tasks (toilet training, stopping stealing objects, coming to call and sitting on command) we discovered no significant difference between dogs trained using one specific method in comparison with another. However, for three tasks (leaving or giving up an object on command, walking to heel and avoiding chewing household objects), the use of specific methods was associated with significantly higher obedience scores. Although the most effective technique varied according to the specific training task, for none of the tasks was a punishment-based method most effective. Even for chewing and stealing objects, where punishment is very commonly used, those owners who used it did not report greater obedience. Thus, examination of the individual tasks provides no support for the value of punishment.

Further evidence supporting the use of reward-based methods was found when examining 'overall obedience' scores. These scores correlated significantly with the number of times the owners reported using reward-based training methods, but were unrelated to their reports of either punishment-based or miscellaneous methods. Furthermore, dogs trained exclusively using reward-based methods were reported to be significantly more obedient than those trained using either punishment or a combination of reward and punishment.

These results suggest that there is a link between the use of reward-based methods and obedience in pet dogs. However, this is a correlation and although the frequent use of rewards may lead to increased obedience, it is also possible that when dogs show an initial high level of obedience, their owner is more inclined to use reward-based training methods. However, regardless of which is cause and which is effect, it is clear that use by the general dog-owning community of punishment-based methods, as compared to reward-based methods, does not result in a more obedient dog.

Obedience is an important attribute of a dog–owner relationship. In previous studies, Clark and Boyer (1993) found that obedience training, with its concurrent increase in task obedience, was related to an improvement in the 'human–canine relationship'. Also, Serpell (1996) found that owners were less attached to their newly adopted dog if there was a large discrepancy between their ratings of the 'ideal' and the actual dog, and one of the main discrepancies was lack of obedience. Because satisfied owners are less likely to relinquish or abandon their dogs (Arkow & Dow 1984), training methods that produce an obedient dog may exert a secondary welfare benefit.

Problematic behaviours are common within the general dog population (Voith *et al* 1992; Clark & Boyer 1993; O'Farrell 1997). In this survey, 97.2% of owners reported their dogs showing behaviours which they themselves did not necessarily regard as a problem, but others might. Our data suggest that the use of specific training methods may be linked to enhanced exhibition of problematic behaviours. The number of times owners reported using punishment-based methods correlated positively with the number of potentially problematic behaviours they reported. Furthermore, those owners who trained their dogs using a regime based entirely on punishment, or a combination of punishment and reward, reported significantly more problems than those using only reward-based or miscellaneous methods. It may be that punishment increased the number of problematic behaviours displayed, perhaps by creating a state of anxiety or conflict in the dog that is later expressed as a problematic behaviour. However, it is also possible that owners of dogs that already exhibit many problematic behaviours are more likely to incorporate punishment into their training regime. Either way, at the time of completion of the questionnaire, increased punishment correlated with increased problematic behaviours, which suggests that punishment had not effectively eliminated these behaviours.

Previous research has found a link between punishment-based Schutzhund training and dog–dog aggression (Roll & Unshelm 1997). We did not detect this, but we did find a link between the use of punishment and increased incidence of separation-related behaviour. Separation-related problems are known to have many causes, including anxiety and conflict (eg Askew 1996), which may be exacerbated by the use of punishment.

In addition, we saw a reduced incidence of over-excitement in dogs trained using reward-based methods only. Punishment or combined methods can lead to anxiety, which may be manifest as over-excitement; hence, a predictable reward-based regime may be more effective at reducing excitement. The relationship between the use of miscellaneous methods and a decreased incidence of eating non-foodstuffs does not appear to have a straightforward explanation.

Overall, our results suggest that punishment-based training is not effective at reducing the incidence of problematic behaviours, and its use seems to be linked with the increased occurrence of potential problems. In contrast, the frequency of rewards was unrelated to problematic behaviours.

Although our survey has found no support for the use of punishment-based methods, we are not suggesting that they cannot be used effectively. Historically, punishment has been used successfully for many types of dog training (Most 2000). However, within the pet-owning community, training is very often performed by inexperienced people who are unfamiliar with the behavioural principles involved, hence the timing of the delivery of punishment may be inappropriate and its use inconsistent. We suggest that such training can result in states of anxiety in the animal, leading to an increased probability of problematic behaviours and inhibiting the desired increase in obedience. Thus, for the general dog-owning population, reward-based training methods may produce a more balanced and obedient animal.

Conclusions and welfare benefits

There are ethical concerns that dog-training methods incorporating physical or verbal punishment may result in pain and/or suffering. We provide evidence that, in the general dog-owning population, dogs trained using punishment are no more obedient than those trained by other means and, furthermore, they exhibit increased numbers of potentially problematic behaviours. Problematic behaviours can compromise welfare as they are often associated with an increased state of anxiety (eg Askew 1996) and they can also lead the owner to relinquish the dog (Serpell 1996). Because reward-based methods are associated with higher levels of obedience and fewer problematic behaviours, we suggest that their use is a more effective and welfare-compatible alternative to punishment for the average dog owner.

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