



7th International
Veterinary Behaviour
Meeting
Edinburgh, Scotland, UK
28–31 October 2009



PROCEEDINGS OF THE

7th International Veterinary Behaviour Meeting

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EDITED BY

Sarah E. Heath

ESVCE



**EUROPEAN COLLEGE OF
Veterinary Behavioural Medicine
Companion Animals**



PROCEEDINGS OF THE

7th International Veterinary Behaviour Meeting

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INCORPORATING

15th Annual Congress of the European
Society of Veterinary Clinical Ethology (ESVCE)

6th Annual Congress of the European
College of Veterinary Behavioural Medicine –
Companion Animals (ECVBM-CA)

Annual Congress of the Companion Animal
Behaviour Therapy Study Group (CABTSG)

EDITED BY

Sarah E. Heath

This collection of papers was first presented at the 7th International Veterinary Behaviour Meeting which incorporated the 15th Annual Congress of The European Society of Veterinary Clinical Ethology (ESVCE), the 6th Annual Congress of The European College of Veterinary Behavioural Medicine – Companion Animals (ECVBM-CA) and the Annual Congress of The Companion Animal Behaviour Therapy Study Group (CABTSG). The meeting took place in Edinburgh, Scotland from 28–31 October 2009 and was hosted by the CABTSG in conjunction with ESVCE and ECVBM-CA.

The organisers would like to express their gratitude to all of the sponsors who helped to make the event possible.

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The Behaviour Chapter of Australian College of Veterinary Scientists

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Prefaces

CABTSG

It is a great pleasure for the Companion Animal Behaviour Therapy Study Group (CABTSG) to be hosting the 7th IVBM Congress in Edinburgh 28–31 October 2009. Companion animal behaviour studies and research are occurring on a continuous basis world wide. The International Veterinary Behaviour Meeting gives an ideal opportunity for the world leaders in this field to come together and share their experiences. Bringing the world's experts together under the same roof can only be beneficial for all concerned. The breath of experience is enormous and working within the field are veterinary surgeons, veterinary nurses, psychologists, trainers and behaviourists each contributing in their own way to the advancement of knowledge. This increased knowledge will automatically mean improvements in animal welfare, which is the most important thing that we all strive for. The more we know about animal behaviour the better able we are to enhance the human-companion animal bond which has an enormously beneficial effect on the whole of society.

These proceedings are a summary of the topics and themes taking place over the four days of the event. These include, on the first day, relationships with dogs, predicting behaviour, behavioural interventions, training and communication. On the second and third days we extend this to cover issues such as stress management, behavioural psychology, animal management and behaviour, assessing behaviour and cognition and profiling animals – its application and implication.

We hope and trust that in addition to the scientific forum all delegates will also be able to participate in the social programme and enjoy the delights of the Capital City of Scotland

Des Thompson

President CABTSG

ECVBM-CA

Since the College was created, having an annual congress has been identified as a crucial need. In common with the other veterinary colleges, ECVBM-CA emphasises a clinical approach to the field. Understanding the symptoms, distinguishing between normal (albeit odd sometimes) and abnormal and prescribing the most accurate treatment, are the main, and sometimes difficult, aims of our activity. In the field of behavioural medicine we have witnessed a significant improvement in efficacy in the treatment of clinical cases over the last twenty years. However, we need to be aware that our success in treating cases does not automatically confirm that we were right in our theoretical approach to the case. In other words, clinical success can sometimes be achieved despite errors in our understanding of why the symptoms have occurred or how our treatment affects them. After all it is well recognised that 30 to 40% of patients treated with a placebo during controlled clinical trials are rated as improved or cured.

So how do we improve our understanding and avoid falling into the trap of believing that clinical success confirms theoretical accuracy? I believe that there are two important components to avoiding this trap – research and humility. Science dictates that even the most trivial phenomenon deserves to be measured and analysed in order to improve our understanding and this is the key to improving our clinical success. This congress offers us the opportunity to listen to colleagues who are dedicated to high quality research and gives us access to their observations and results. In turn this will improve our understanding of our clinical cases. In addition the recognition of the hard work that is needed to complete the research and an acceptance of the discrepancy between our pre-conceived ideas and beliefs and the truth that science confirms should lead us to a higher level of humility.

There is no scientific congress without an organizing committee and a scientific committee and this congress has benefited from the hard work of wonderful and highly professional people in both. On behalf of the European College of Veterinary Behavioural Medicine – Companion Animals, I want to thank them and express my admiration for their dedication to our specialty.

Patrick Pageat

President of ECVBM-CA

ESVCE

The International Veterinary Behaviour Meeting was born in Birmingham in 1997 and as co-founder of the event it is both a personal and a professional pleasure to welcome it back to the UK. It is wonderful to have the opportunity to meet with colleagues from around the world and to share the most up to date research in our field. In the twelve years since the IVBM was founded we have seen tremendous growth within the field of veterinary behavioural medicine. An improved understanding of the link between physical and behavioural symptoms and of the impact of behavioural disorders on the quality of life for both animal and owner, has led to an increased level of recognition of this speciality within the veterinary community. Good quality research has been the foundation of our increased understanding and led to significant improvements in the efficacy of treatment for behavioural cases. The launch of a journal dedicated to the field is a sign of the way in which behavioural medicine has been accepted as a veterinary discipline and we are delighted that the Journal of Veterinary Behaviour – Clinical Applications and Research has agreed to publish abstracts from this meeting. In order to comply with the publication rules of the journal many of the texts within these proceedings have been limited in their word count and we therefore encourage you to read the extended versions of these texts in the JVB-CAR when they are published.

I will be retiring as President of ESVCE at the IVBM and it is a pleasure that my last duty has been to be involved in the organisation of this event. I would like to thank all of our sponsors and encourage you to visit their stands in the commercial exhibition during the congress. Without their support it would not be possible to hold this event. Meetings like this do not happen by accident and there is a tremendous amount of hard work going on behind the scenes. I would like to thank everyone who has been involved but a special mention must go to Claire Corridan who has shown phenomenal dedication to this project and given so freely of her time and energy. She has led the organising committee with professionalism and good humour.

On behalf of ESVCE and the organising committee of IVBM it is a great pleasure to welcome you to Edinburgh. We hope that you enjoy this congress and look forward to welcoming the IVBM back to the UK in the future.

Sarah Heath

President of ESVCE

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Preschool children's attitudes to dogs in Italy, Spain and the United Kingdom

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Introduction

The aim of this study was to assess young children's attitudes to dogs in different European countries. Attitudes to animals may differ between different cultures (Kellert, 1994; Miura, Bradshaw and Tanida, 2002; Passariello, 1999). However, differences in attitudes to pets between European countries have not yet been investigated. Since exchange of information between the European countries is increasing, investigating differences in cultures is important for creating an effective European dog bite prevention programme.

Method

A short questionnaire composed of 12 items was created to measure children's attitudes to dogs. This was administered to 107 nursery school children (mean age = 4.5 years old) in Milan, Barcelona and Edinburgh. Parents were asked to fill in a form which included questions on pet ownership and whether the child had been bitten by a dog in the past. This study was carried out as part of a larger study measuring children's ability to interpret dog behaviour.

Results

Reliability testing of the questionnaire yielded a Cronbach's alpha coefficient of 0.77, suggesting that the questionnaire reliably measures preschool children's attitudes to dogs. Children who owned dogs were found to have a more positive attitude to dogs than children who did not own dogs ($U = 1347, p < 0.001$). No significant differences in attitudes to dogs were found between: the different countries, dog bite victims and non-victims, boys and girls. Overall, children's attitudes to dogs were positive. In addition, no correlation was found between children's ability to interpret the behaviour of dogs and their attitudes to dogs.

Conclusions

These results suggest that it is possible to measure very young children's attitudes to dogs and that attitudes are positive across the three European cities tested. It should therefore be possible to use a single dog bite prevention programme for Italy, Spain and the UK, rather than having to modify it to suit different cultures.

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Keywords: children, attitudes, dogs, cross-cultural, dog bite prevention

Owner behaviour and its relationships with characteristics of the owner and the dog

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Introduction

Owner behaviour toward dogs, for example through the use of training methods (e.g. Hiby et al. 2004) or engagement in shared activities (Bennet and Rohlf 2007), is regarded to be a causal factor in relation to dog behavioural responses. However, no study has investigated whether owner behaviour may be related to characteristics of the owner or its dog. The aim of our study was to assess whether general characteristics of the owner or its dog can be used to predict owner behaviour and to explore whether relationships exist between different owner behaviours.

Material and methods

For the purpose of this study a questionnaire-based survey was conducted in an urban and suburban population of companion dog owners. The questionnaire was developed based on literature reviews and discussions with dog owners and dog trainers. Participants were asked how often they used different training techniques (five-point scale: 1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = very often),

how often they engaged in a range of shared activities (five-point scale: 1 = never, 2 = less than once a week, 3 = once or twice a week, 4 = three to six times a week, 5 = daily) and whether statements concerning the interactions between owner and dog applied to them (three-point scale: 1 = applies to me, 2 = partly applicable, 3 = does not apply to me). Furthermore the questionnaire contained questions relating to owner demographics and personality (Ten-Item-Personality-Inventory in German (Hell and Muck 2003) and three traits considered to be relevant to dog training) and dog characteristics and the dog's behaviour as perceived by the owner in the first four weeks after acquisition. Additionally, participants were asked about the sources of information about dog keeping and dog training that they used and about their reasons for keeping a dog.

Registered Viennese dog owners were selected as study subjects. The questionnaire was sent to a total of 5000 randomly chosen dog owners. As an incentive the participants received dog food and could participate in a prize draw. 1405 questionnaires were returned (response rate 28%). Since the target group of the study was companion dogs kept in their owner's living space, we excluded, for example, respondents who mainly kept their dogs in kennels. In total, 1345 questionnaires were analysed.

In order to group the questionnaire items to subscale scores, principal component analyses were carried out. Items were included in subscale scores if they had a loading of at least 0.3 and did not load on any other component. Subscale scores were obtained by calculating the mean of the items included in the respective subscale.

Five items relating to owner consistency resulted in one component, named **inconsistency**. It contained for example "When interacting with my dog I maintain fixed rules consistently" or "I always respond to a specific misbehaviour in the same way". The item "Sometimes my dog is allowed to do something usually forbidden" had a negative loading and was reverse scored so that a high score indicates high inconsistency.

Items concerning shared **activities** resulted in two components. The components were called training-and-play-activities (e.g., obedience training, playing ball/tug-of-war, agility) and other-social-activities (e.g., social contact to other humans or dogs, walk the dog, take the dog out shopping/to a café).

Since principal component analyses did not result in easily interpretable components, **training techniques** were grouped according to learning theory or the intention the owner had when applying each type of training technique. This resulted in three training methods subscales. The first subscale was called punishment (e.g., leash jerk, scold the dog verbally, startle the dog with noise, slap with hand/implement). The second subscale was called reward-based-responses-to-unwanted-dog-behaviour (comfort dog by petting/speaking to it, distract dog by playing, withdraw reward/time-out). The third subscale was called rewards (verbal praise, caressing, food rewards, play). Again, subscale scores were

obtained by calculating the mean of the items.

The Ten-Item-Personality-Inventory scores were calculated as described by Gosling (2004).

To identify characteristics of the owner or the dog which may influence the behaviour of the owner towards the dog we carried out multiple linear regression analyses. To select predictor variables we ran a stepwise linear regression with imputation of the variable mean in case of missing values. We then repeated the analyses by entering the variables selected in the stepwise procedure and omitting cases with missing values. Only the results of the second analyses will be displayed. To check the regression model assumptions residual plots were obtained and variance-inflation factors were inspected and required to be smaller than two.

To identify relationships between the owner behaviour subscales Pearson correlations were calculated.

Results

Consistent behaviour, in all situations presented, was found in only 8% of the dog owners (Mean: 1.67, S.D.: 0.43). The regression model regarding inconsistency in the owners' behaviour explained 27% of the variance ($F_{(11, 1102)} = 37.797$, $p < 0.001$). The best predictor of consistent owner behaviour was the degree to which owners consider themselves to be consistent and to maintain established rules (β (standardised regression coefficient) = -0.38, $p < 0.001$). Additionally, participants who gather information from dog training facilities ($\beta = -0.12$, $p < 0.001$) and books or journals ($\beta = -0.11$, $p < 0.001$) reported higher consistency in their behaviour towards their dog. Increased inconsistency was found in older owners ($\beta = 0.13$, $p < 0.001$), in owners with a longer experience of dog-ownership ($\beta = 0.08$, $p < 0.05$) and owners who rely on media, e.g. television and newspaper, as sources of information ($\beta = 0.08$, $p < 0.01$). Ownership of two or more dogs was associated with increased consistency ($\beta = -0.06$, $p < 0.05$) whereas the owners rating themselves as gentle was related to lower consistency ($\beta = -0.06$, $p < 0.05$). In the final model, lower weight of the dog (in kg) only showed a tendency to be related to higher inconsistency in the owner ($\beta = -0.05$, $p = 0.05$). Variables selected by the stepwise procedure but not significant in the final model were "Reason to own a dog-by coincidence" and "Emotional stability scores of the owner".

At least one type of training-and-play-activity was reported by 86% of all dog owners whereas other-social-activities were reported by all participants in our study. On average, respondents engaged in training or play less than once a week (Mean: 2.02, S.D.: 0.73) compared to sharing other-social-activities with the dog three to six times a week (Mean: 3.81, S.D.: 0.59).

The model for training-and-play-activities explained 27% of the variance ($F_{(12,$

836) = 25.752, $p = 0.000$). The best predictor for regularly engaging in such activities was to own a younger dog ($\beta = -0.25$, $p < 0.001$) but also younger age of the owner was, with a smaller effect, related to increased training-and-play-activities ($\beta = -0.13$, $p < 0.001$). Furthermore owners rating themselves as being consistent ($\beta = 0.14$, $p < 0.001$), owners who had visited a dog training class ($\beta = 0.11$, $p < 0.01$) and relied on courses or lectures ($\beta = 0.12$, $p < 0.001$) and books or journals ($\beta = 0.08$, $p < 0.05$) as a source of information about dog topics reported a more frequent engagement in training-and-play-activities. Other factors slightly related to more frequent training-and-play-activities were dog training facilities ($\beta = 0.09$, $p < 0.05$), the observation of dog behaviour ($\beta = 0.07$, $p < 0.05$) and the media ($\beta = 0.06$, $p < 0.05$) as a source of information and whether the respondent had acquired the dog because a family member wanted a pet ($\beta = 0.09$, $p < 0.05$). Less frequent training-and-play-activities were found in owners who perceived their dog to be gentle during play in the first 4 weeks after acquisition ($\beta = -0.09$, $p < 0.01$) and who felt strained because of dog ownership ($\beta = -0.1$, $p < 0.01$).

In the model regarding other-social-activities 12 predictors only explained 14% of the variance ($F(12, 835) = 11.207$, $p < 0.001$). For example the perception of the dog as well-behaved in the first four weeks after acquisition ($\beta = 0.13$, $p < 0.001$), older age of the owner ($\beta = 0.12$, $p < 0.01$) and a high score on the Openness-to-Experience dimension in the owner ($\beta = 0.13$, $p < 0.001$) were related to increased other-social-activities. Older age of the dog ($\beta = -0.12$, $p < 0.001$), the owner being employed ($\beta = -0.1$, $p < 0.05$) and the owner feeling strained by dog-ownership ($\beta = -0.07$, $p < 0.05$) were associated with a lower frequency of other-social-activities.

At least one type of punishment was reported by 95% of the respondents. However, on average only 25% of the owners used punishments “sometimes”, “often” or “very often” (Mean: 1.78, S.D.: 0.47). The use of rewards was reported by almost all respondents (99%), and on average owners use rewards “often” (Mean: 4.01, S.D.: 0.74). Reward-based-responses-to-unwanted-dog-behaviour are used by about the same proportion of respondents as punishing methods (94%) but compared to punishment they were reported to be used at higher frequencies (Mean: 2.40, S.D.: 0.83).

The regression model for the punishment subscale explained 21% of the variance ($F(13, 776) = 15.4$, $p < 0.001$). The best predictors of less frequent use of positive punishment were the owner rating himself as gentle ($\beta = -0.18$, $p < 0.001$) and the owner being older ($\beta = -0.14$, $p < 0.001$). The owner’s perception of the dog being wild during play in the first four weeks after acquisition ($\beta = 0.13$, $p < 0.001$) and of feeling strained because of dog ownership ($\beta = 0.14$, $p < 0.001$) related to a more frequent use of punishment. Further variables associated to increased use of punishment were lower scores on the Openness-to-experience dimension ($\beta = -0.13$, $p < 0.001$), to own two or more dogs ($\beta = 0.1$, $p < 0.01$), to own a male dog ($\beta = 0.09$, $p < 0.01$), to rely on friends as a source of information on dog topics

($\beta = 0.08$, $p < 0.05$) and whether the respondent stated as a reason to own a dog that dogs promote well-being ($\beta = 0.08$, $p < 0.05$). Additionally, lower reported use of punishment was related to courses or lectures as a source of information ($\beta = -0.12$, $p < 0.001$) and whether the owner perceived his dog as well-behaved in the first four weeks after acquisition ($\beta = -0.07$, $p < 0.05$). Variables selected by the stepwise procedure but not significant in the final model were “Source of information-dog training facility” and “Agreeableness scores of the owner”.

Concerning the use of rewards only 17% of the variance could be explained by the regression model ($F(13, 962) = 15.1$, $p < 0.001$). A more frequent use of rewards was best predicted by younger age of the owner ($\beta = -0.14$, $p < 0.001$) and dog training facilities as a source of information ($\beta = 0.13$, $p < 0.001$). Further variables that had small increasing effects on the frequency of rewards were the owners considering themselves as gentle ($\beta = 0.1$, $p < 0.01$) and consistent ($\beta = 0.08$, $p < 0.05$), the former visit of dog training classes ($\beta = 0.09$, $p < 0.01$), to give as a reason for dog-owning that they liked dogs ($\beta = 0.08$, $p < 0.01$) and courses or lectures as a source of information ($\beta = 0.08$, $p < 0.01$) whereas older age of the dog ($\beta = -0.08$, $p < 0.05$) was related to a lower frequency of rewards. Variables selected by the stepwise procedure but not significant in the final model were “Extraversion scores of the owner”, “the owner being patient”, “the dog being lively in the first four weeks after acquisition”, “the owner being employed” and “children living in the household”.

We failed to find a model explaining reward-based-responses-to-unwanted-dog-behaviour.

Training methods and inconsistency were found to be related to the frequency of the activity subscales. Increased training-and-play-activities were related to a more frequent use of rewards ($r = 0.3$, $p < 0.001$) and to less inconsistent behaviour of the owner towards the dog ($r = -0.3$, $p < 0.001$). In contrast, owners who engaged almost exclusively in other social activities (percentage of other social activities in relation to overall activities) reported higher inconsistency ($r = 0.3$, $p < 0.001$).

Conclusions

The aim of this study was to identify whether general characteristics of the owner or the dog could influence the owner's behaviour. Although we succeeded in finding predictors for owner behaviour, the influence of the single variables were small to moderate. Bennet and Rohlf (2007) used a similar questionnaire design and found effects with similar magnitude. This may result from a rather rough measurement of frequencies by using rating scales or be the consequence of multiple populations in larger samples which is known to inflate correlations (Runyon et al. 2000). Further, as in other questionnaire studies via postal mailing, respondents made their own decision as to whether to participate in the study or not. Therefore, the sample is likely to be comprised of more committed dog

owners willing to fill in a rather long questionnaire. Thus, further studies using more accurate measurements or investigating less committed dog owners seems to be required.

Some of the returned questionnaires contained a relatively high number of missing values. The missing values were not randomly distributed. For example more missing values were present in questionnaires that were returned by older owners. For that reason we included all questionnaires in the stepwise regression procedure to select potential predictors of owner behaviour. Even if some of the predictors did not remain significant in the final regression model they might have some influence on owner behaviour.

An increased degree of inconsistency was found to be related to lower obedience (Arhant et al. under review) and a higher number of problem behaviours such as fear responses towards familiar people (Casey et al. 2007) in companion dogs, and popular dog literature claims the importance of consistent owner behaviour in interactions with the dog. However, in our study consistent behaviour was only reported by 8% of the participants. Although, it seems that the disposition to be consistent plays a major role, other factors influencing consistency of the owner were identified. Gathering information from dog training facilities contributed to more consistent behaviour in our study. This is in line with Blackwell et al. (2007) who found that owners who informally trained their dog at home reported higher inconsistency. In this analysis weight of the dog only showed a tendency to influence consistency of the owner. However, when owners of dogs weighing less than 20 kg were compared to owners of dog weighing 20 kg or more, small dog owners reported considerably lower levels of consistent owner behaviour (Arhant et al. under review). In addition, some other factors such as age or experience of the owner were found to be related to inconsistency. Nevertheless, further studies are needed to better understand causes of inconsistent behaviour in dog owners, especially since inconsistent use of punishment may have detrimental effects on the dog's welfare and behaviour (Schalke et al. 2007, Arhant et al. 2008).

In particular, play activities are highly influenced by age of the dog (Westgarth et al. 2008). This is in accordance with our results, given that the best predictor of a low frequency of training-and-play-activities was older age of the dog. However, the frequency of other-social-activities was, with a smaller effect, also lower in older dogs, which is consistent with the results of Bennet and Rohlf (2007). Interestingly, they found that older owners reported less shared activities with their dog whereas in our study increased other-social-activities were related to older age of the owner. In contrast, older owners reported less training-and-play-activities. Interest in "dog topics" seems to contribute to more activities in general and the use of several sources of information on dog keeping and behaviour was related to increased activities. Furthermore, differences in dog behaviour seem to have converse effects on the frequency of activities with the dog. Increased other-social-activities were related to the perception of the dog as well-behaved in the

first four weeks after acquisition and increased training-and-play-activities were related to the perception of the dog being wild during play as opposed to being gentle during play. Desired behaviour is likely to lead to increased social activities whereas more undesirable behaviour may increase the willingness to engage in dog training. Nevertheless, when owners are feeling strained by dog ownership they engage less frequently in both types of shared activities.

Previous studies found that punishing animals was related to anger resulting from disobedient behaviour of the dog (Ben-Michel et al. 2000), to lower perceived control during care-giving situations with children and to being male (Chin et al. 2008). In our study no effect of owner gender was found but the use of punishment was predicted by other characteristics of the owner and the dog. "Gentle" owners and those with high "Openness-to-experience" scores reported a lower use of punishment whereas the perception of the dog as wild during play in the first four weeks after acquisition was related to increased use of punishment as was the owner feeling strained because of dog-ownership. It seems that interactions with the dog depend at least partly on owner personality. However, our findings suggest that use of punishment may be influenced as well by temperament traits of the dog which are likely to strain the owner. Additionally, some other general characteristics of the owner were related to use of punishment and we suggest that there are owner attitudes and beliefs of how to train dogs that might influence the frequency and use of punishment.

The use of rewards was, to a smaller extent, related to owner personality but temperament of the dog had no significant effect in the final model. However, older age of the dog predicted less frequent use of rewards. Furthermore, younger age of the owner, interest in dog training and dog topics was associated to a more frequent use of rewards as was the frequency of training-and-play-activities. Perhaps, encouraging reward-based dog training may, as it is likely to be more pleasant for the owner, lead to increased training activities.

To summarise, there is evidence that owner behaviour depends on both characteristics of the owner and the dog. Nevertheless, further studies, investigating owner attitudes and their subsequent behaviour towards the dog more thoroughly, seem to be required as changing owner behaviour is fundamental to veterinary behavioural medicine.

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Keywords: dog owner behaviour, training methods, inconsistency, shared activities

Correlates of a 'Successful human:dog bond'

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Introduction

This study contributed to a large study investigating the expectations of dog owners in relation to the time commitments associated with dog ownership.

Materials and methods

Current dog owners were recruited through the dog press, media and animal welfare organisations and asked to complete an online survey which enabled data collection for: dog and dog owner demographics; owner satisfaction ratings for their dog; information on a range of dog activity items (time commitment, frequency, predictability and control); and the prevalence of canine behavioural problems. The population was divided into dog owners reporting high and low satisfaction with their dog (using the median point as the dividing point between categories) and owners of dogs with and without any reported behavioural problems. Demographic and dog activity item responses given by more highly satisfied owners of dogs without behavioural problems, defined for the purposes of this paper as a 'successful human: dog bond', were compared against the remainder of the sample population.

Results

Univariate analysis (chi-squared test) revealed that 2/10 demographic factors and 18/66 dog activity item factors differed significantly at $p < 0.0001$ between these two dog owner groups. These 20 factors were then entered into a binary logistic regression model which revealed 4 strongly predictive factors for a successful human: dog bond. These were: dog owner age group; control of play by the owner

rather than the dog; time spent engaging in exercise where the dog is restrained by a lead or harness; and exposure to potentially frightening experiences for the dog 1–3 times each week, without induction of any fearful or phobic behaviours in the dog.

Conclusions

The implications of these findings should be considered in the advice given to new or potential dog owners from both rescue and private sources in order to help establish appropriate routines and expectations.

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The American shelter dog: identification of dogs by personality

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In most shelters across the United States, the majority of dogs are mixed breeds of unknown parentage. Yet shelters usually assign at least partial breed ancestry to dogs. The breed assignment may be based on what the owners said the dog was, what the mother of a litter looked like, but most commonly what the dog appeared to be to someone on the staff. After a dog enters a facility, the breed description may change as other opinions are offered. Any dog with a black spot on its tongue is generally labelled as a Chow-mix. Brown medium-large sized dogs with erect ears and a sickle-shaped tail are usually called German Shepherd mixes. Dogs, with or without masks, are Husky-mixes. Stocky, medium to large, short haired dogs are often identified as pit-bulls or Labradors. Black and white dogs with wavy hair coats are labelled as Border Collies.

It is common practice for staff to guess a dog's breed based on appearance. This 'best guess' is used to identify the dog, although the actual pedigree is unknown. The ramifications of this can influence the adoption of a dog, elicit behavioural expectations on the part of the new owner (regardless of whether or not the dog may actually be of the breed ancestry listed and even though there is behavioural variability within all breeds), and impinge on the owners regarding where they can live and if they can obtain household/liability insurance.

A recent study (Voith et al, 2009) compared breed identification of 20 mixed breed dogs adopted from shelters and similar agencies to breed identification by DNA analysis. Volunteers for the study were recruited by email from university personnel at Western University of Health Sciences, in Pomona, California. Forty dogs met the criteria of having been adopted from a shelter, rescue group or similar agency, having its permanent canine teeth, and being available for

photographs and blood draw on a specific day. These dogs were assigned to one of 4 weight ranges: < 20 lb., 21–40 lb., 41–60 lb., and > 60 lb. The study randomly selected 5 dogs from each weight range. The dogs had been adopted from 17 different agencies across North America. We are, indeed, a mobile society and our dogs go with us.

Some dogs had been identified by the adoption agencies as a ‘type’ of dog, e.g., terrier, shepherd. Sixteen had been identified as having, or probably having, 1 or 2 specific breeds in their ancestry. For only 4 of these 16 dogs, did DNA analysis report the same breeds as the most predominant in the dog’s ancestry; and, in 3 of these 4 dogs, those breeds comprised only 12.5% of a dog’s genetic make-up. The majority of breeds suggested by the adoption agencies were not indicated in the DNA analysis. In fact, breeds proposed by the adopting agencies were not reported in DNA analysis in 87.5% (14/16) of the dogs. The ‘Lab mixes’ were really just black dogs with floppy ears, with no DNA evidence of a Labrador retriever. The ‘shepherd mixes’ did not have evidence of the German Shepherd Dog in the DNA analysis. The wavy-haired black and white dogs did not have Border Collie in their DNA analysis.

In this group of 20 adopted mixed breeds, only one was detected by DNA analysis as 50% a specific purebred dog, 9 dogs had at least one purebred ancestor at 25%, the rest had only 12.5 % of any specific purebred ancestor. In only 2 dogs was 100% of the breed ancestry identified. Perhaps mixed breed dogs have few, if any, purebreds in their ancestry.

The DNA was analysed by a commercial laboratory, MARS VETERINARY™ in Lincoln, Nebraska, USA. DNA contributions less than 12.5% were not reported. At the time this study was conducted, the Wisdom Panel™ MX reported an average accuracy of 84% of first generation of crossbred dogs (Jones et al, 2008) and there were 130 registered purebred dogs in the data base.

This study is not meant to imply that personnel at adopting agencies do not know what purebred dogs look like. Over 40 years ago, Scott and Fuller (1965) published pictures depicting offspring of known purebred crosses that did not resemble either parent. Mixed breed dogs may not resemble purebred ancestors.

Presently, DNA analysis is not perfect either. Most commercial companies do not report DNA contributions from ancestral breeds that are less than 10 or 12.5%. This is probably because the ability to be accurate decreases as the percentage of a purebred ancestor decreases. Different commercial companies may use different lines of purebred dogs in their databases and different statistical genetic algorithms (Kochan, 2008). Over time, the accuracy of a company’s results can change. For example, currently the Wisdom Panel™ MX Mixed Breed-Dog DNA Test reports that their proprietary algorithm provides a 90% accuracy of breed detection in first generation crosses (www.wisdompanel.com).

In a separate study, Amy Marder and colleagues analysed DNA samples from dogs visually identified as ‘Pit bull mixes’. While the DNA of many of these dogs

showed some evidence of American Staffordshire Terrier, a variety of other breeds were identified as well. It is becoming clear that breed identification based on appearance alone is inaccurate at the best and terribly damaging at the worst. A new approach is needed.

This new approach would enable owners to choose their future canine companions based on accurate personality profiles, among other factors important to them (e.g., size, sex, haircoat). Dogs which are described in terms of their behavioural tendencies have a greater chance of being matched with appropriate homes. Owners who understand their chosen companion's personality characteristics, both strengths and weaknesses, can better understand and manage any behavioural challenges which may arise. Better matching increases the likelihood of dogs remaining in their homes.

The Animal Rescue League of Boston currently uses the MATCH-UP Behaviour Evaluation, a standardised evaluation where 38 behaviours are coded during 18 scenario sub-tests. Scenarios include cage approach, room behaviour, handling, toys, food, men, toddler doll, and other dogs. Behaviours are assigned points on a 4 point scale (0–3) with more intense behaviours receiving more points. At the end, dogs are described in terms of their reactions to specific scenarios (e.g., food aggressive, playful with other dogs) as well as in terms of four personality traits: Friendliness, Fear, Arousal, and Aggression. This well-rounded approach provides a wealth of information about the dog and allows staff to select appropriate behavioural and enrichment programmes for that dog. Moreover, owners are able to learn about the dogs through their personality profiles. This new approach has provided potential owners greater insights into a dog's personality and ideal home, allowing more informed decision-making about suitable canine companions.

An important aspect of this new approach relates to how the subject of breed is handled. Rather than identify dogs by assumed breed, the Animal Rescue League of Boston has begun to identify mixed breed dogs in a new way, one which does not clutter perceptions of dogs with erroneous assumptions based on breed. Mixed breed dogs are identified as 'American Shelter Dogs' to reflect their mixed ancestry. The emphasis is on personality rather than breed.

The Center for Shelter Dogs at the Animal Rescue League of Boston is revising the MATCH-UP Behaviour Evaluation and then will begin the process of validating the instrument to ensure results are reliable and accurately predict behaviour in the home. This new approach will enhance understanding and appreciation of dogs and will benefit both dogs and owners alike.

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Keywords: dog; breed identification; personality; shelter

Temperament assessment on guide dogs using questionnaire survey and behaviour tests

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Introduction

Guide dogs for the blind are required to have appropriate temperament in addition to their working performance and health condition. Regardless of the country or training facility involved the majority of rejected guide dogs are disqualified because of temperament problems that vary according to the individual dogs (Goddard and Beilharz, 1983; Serpell and Hsu, 2001). Considering the high cost of rearing and training guide dogs with low success rate, a temperament assessment which enables early prediction of successful guide dog qualification is desired. In this study, we took a step-by-step approach to establish a temperament assessment during the training term; (1) we conducted a questionnaire survey to identify important traits for being a guide dog, and (2) we developed a behaviour test to assess the traits objectively.

Materials and methods

Animals

The dogs used in this study were two groups of Labrador Retrievers, group A (n=78) and B (n=75), trained at the Kanagawa training centre of the Japan Guide Dog Association (JGDA), which is one of the largest training facilities in Japan. They were further categorised into the success group, which finally became guide dogs, and the failure group, which were disqualified due to temperament problems.

Temperament assessments

(1) We used a questionnaire consisting of 22 temperament-related items, and primary trainers assessed each candidate dog on a scale of 1 to 5 after three months of training.

(2) Behaviour tests took place during a 'kennel period' of 10–15 minutes and were conducted at the end of the first and the second month of training. During the kennel period, dogs stayed alone in the kennel wearing band-type HR monitor (Polar) and could act freely. For some of the candidate dogs belonging to group B, an excitatory stimulus (a tester entered the kennel with a leash) was also presented during the kennel period at the end of the second month of training. As an objective measurement, HR was monitored and behavioural responses (postures such as lying down, standing or moving) were recorded at 5 seconds intervals.

Statistical analyses

The following analyses were performed in group A and B separately and the consistencies of results were examined.

(1) Question items were subjected to factor analysis and extracted factors were compared between success dogs and failure dogs to identify important traits (one-way ANOVA).

(2) For the kennel period, mean HR and the duration of each posture (lie down/stand/move) were compared to the extracted factors. Regarding the response to pleasant stimuli, delta HR every 5 seconds were compared to the extracted factors (Pearson's product-moment correlation coefficient).

Results

Questionnaire survey

Factor analysis of question items extracted three common factors, "Distraction", "Sensitivity", and "Docility", in group A and B: "Distraction" consisted of steadiness, Dominance, Dog interest, Self interest, Excitability, and Sudden movement; "Sensitivity" consisted of Body sensitivity, Hearing sensitivity, Sound sensitivity, and Mental sensitivity; "Docility" consisted of Adaptability, Learning ability, and Maturity. When each factor was compared between success and failure dogs, "Distraction" (group A: $F_{(1, 76)} = 49.048$, $P < 0.0001$; group B: $F_{(1, 72)} = 48.031$, $P < 0.0001$) and "Docility" (group A: $F_{(1, 76)} = 11.814$, $P = 0.001$; group B: $F_{(1, 72)} = 15.229$, $P = 0.0002$) were significantly associated with the success/failure outcome in both groups, while "Sensitivity" showed significant association only in one group (group A: $F_{(1, 76)} = 6.608$, $P = 0.0121$; group B: $F_{(1, 72)} = 2.791$, $P = 0.29$).

Behaviour tests

For the kennel period at the end of the second month, the mean HR tended to positively correlate with “Distraction” (group A: $n=67$, $r = 0.219$, $P=0.0756$; group B: $n=70$, $r=0.218$, $P=0.0696$) in both groups. The duration of ‘lie down’ was significantly correlated with “Distraction” (group A: $n=30$, $r = -0.394$, $P=0.0303$; group B: $n=74$, $r = -0.253$, $P=0.0295$) and “Docility” (group A: $n=30$, $r = 0.390$, $P=0.0326$; group B: $n=74$, $r = 0.294$, $P=0.0107$), and the duration of ‘stand’ was negatively correlated with “Docility” (group A: $n=30$, $r = -0.388$, $P=0.0334$; group B: $n=74$, $r = -0.28$, $P=0.0155$) in both groups.

Regarding the response to the excitatory stimulus, delta HR after 10 seconds from stimulus presentation was significantly correlated with “Docility” ($n=36$, $r = -0.508$, $P=0.0013$).

Discussion

In this study, three temperament factors, “Distraction”, “Sensitivity” and “Docility” could be assessed consistently by the questionnaire survey and were identified as important behavioural traits that have significant associations with success or failure in guide dogs. Of these temperament factors, “Distraction” had the strongest association with success/failure outcome, and it was reported as the reason for disqualification in other facilities (Goddard and Beilharz, 1983; Serpell and Hsu, 2001).

“Distraction” was correlated positively with mean HR and negatively with the duration of ‘lie down’ during the kennel period at the end of the second month of training. The kennel period was an everyday situation where dogs were not commanded and could act freely, thus the dogs’ reactions toward natural environmental stimuli were expected to be clearly identifiable. As dogs with high “Distraction” points are easily aroused and move in an unexpected fashion, it would be valid for them to show higher HR and more movement during the kennel period. HR has been generally used as an objective assessment for anxiety or stress level in canine behaviour tests (King et al., 2003; Palestirini et al., 2005), whereas in this study the mean HR during the kennel period was considered to reflect another mental status of arousal to some extent.

“Docility” was correlated positively with the duration of ‘lie down’ and ‘stand’ during the kennel period. As the duration of ‘lie down’ had association with both “Distraction” and “Docility”, it might become an objective parameter for calmness in a broad sense. The strongest negative correlation was shown between “Docility” and delta HR after the stimulus presentation. Stimuli used in canine behaviour tests tend to be startling or frightening such as noise and sudden appearance of doll (Wilsson and Sundgren, 1997; Svartberg and Forkman, 2002). Since we intended to establish a behaviour test which can assess calmness objec-

tively, the stimulus that was used in this study was selected based on observation of candidate dogs and was a situation which would be encountered in the normal daily routine. When the tester entered the kennel with a leash, most of the studied dogs seemed to be positively aroused, wagging tails and following the tester, but the reaction speed was variable. It is suggested that dogs with higher “Docility” react to the stimulus in a relaxed way and their increase of HR was slower.

Conclusions

We have identified three temperament factors “Distraction”, “Sensitivity”, and “Docility”, which are important traits for guide dog qualification and can be assessed objectively based on measurement of HR and behavioural responses at the end of the second month of training. This study showed that the everyday situation of the dog being freely in the kennel can be successfully used to assess calmness factors including both “Distraction” and “Docility”.

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Keywords: behaviour; guide dogs for the blind; heart rate; questionnaire

Differences in serotonin levels between aggressive English Cocker Spaniels and aggressive dogs of other breeds

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Introduction

Behavioural problems are very common. They have become an important cause of abandonment and euthanasia of dogs and cats, therefore having a negative effect on the quality of the human-animal bond and on animal welfare (Patronek et al., 1996). Additionally, aggression, particularly in dogs, is considered to be a serious public health problem (Quinlan and Sacks, 1999; Mertens, 2002). Aggression, together with destructiveness and house soiling, has been reported as the most common behavioural problem in dogs (Fatjó et al., 2006).

Aggressive behaviour shows a remarkable individual variation in dogs (Beaver, 2009) and in other species (Houpt, 1998) and only a small percentage of dogs are involved in biting episodes. The mechanisms underlying individual differences in aggressive behaviour are likely to involve genetic and environmental components. The importance of breed as a risk factor for aggressive behaviour in dogs has been widely debated. There is ample evidence showing that dog breeds differ in their behaviour (Scott and Fuller, 1965). Recent research has also shown that breeds differ in the expression of genes that code for receptors of neurotransmitters with an important role in behaviour (Niimi et al., 1994; Takeuchi et al., 2005).

However, epidemiological evidence supporting the importance of breed as a

risk factor for aggression is controversial, and this is mainly due to considerable within breed variation in aggression (Hart and Hart, 1985). Recent work in our lab has shown that, despite this within breed variation, some breeds are over-represented among dogs that are involved in biting accidents. In particular, the English Cocker Spaniel (ECS) appears to be involved in a far larger percentage of biting accidents than would be expected according to its relative abundance in the canine population (Fatjó et al., 2007). Additionally, ECS are more likely to show impulsive aggression, i.e. a lack of warning signals before the attack, than aggressive dogs of other breeds (Amat et al., 2009). Therefore, the ECS could be a good model to understand the mechanisms underlying differences in aggressive behaviour in dogs.

Aggressive behaviour in animals is affected by several neurotransmitters and hormones. Among the former, serotonin plays a particularly important role and there is ample evidence that serotonin activity in the central nervous system is negatively correlated with aggression and that increasing serotonin activity reduces aggression in many species, including the domestic dog (Reisner et al., 1996; Edwards and Kravitz, 1997). The effect of serotonin on aggression appears to be particularly important in animals that show impulsive aggression (Lesh and Merschdorf, 2000).

The hypothesis of this study was that aggressive ECSs have a lower serotonin activity in their central nervous system than aggressive dogs of other breeds.

Material and methods

Nineteen ECSs presented for aggression at the Animal Behaviour Service, Barcelona School of Veterinary Medicine were evaluated through an interview with the owners. Twelve ECS (63.15%) were females (50% of which were intact) and seven (36.84%) were males (85.7% of which were intact). The mean age at consultation was 9.5 years.

The study group was compared with twenty aggressive dogs of other breeds presented to the same centre. Thirteen dogs were males (84.61% of which were intact) and seven dogs were females (all of them were intact). Mean age at consultation was 4.9 years. Serum serotonin levels were measured using an ELISA method (DLD Diagnostika GmbH, Germany). Statistical analysis was done using the SPSS 15.0 for Windows.

Results

Aggressive ECSs had significantly lower levels of serum serotonin than aggressive dogs of other breeds ($318.6 \text{ ng/ml} \pm 67.1$ and $852.77 \text{ ng/ml} \pm 100.58$ respectively). Variances were not significantly different between ECSs and other breeds

(SD = 449.84 vs 292.47; $p > 0.05$).

Discussion

There is evidence in dogs and other species that serum serotonin is correlated with serotonin activity in the central nervous system (Sarrias et al., 1990; Yan et al., 1993). Therefore, our results give support to the hypothesis that aggressive English Cocker Spaniels have a lower serotonin activity in their central nervous system than aggressive dogs of other breeds. The causes of this difference in serotonin activity between aggressive English Cocker Spaniels and aggressive dogs of other breeds are to be determined, but could be grouped into three categories: nutrition and management, early experience and genetics.

Serotonin is synthesised in the central nervous system from tryptophan. Availability of tryptophan depends on the content of tryptophan in the diet as well as on the presence in the diet of other aminoacids that compete with tryptophan for transport from the blood to the CNS. Based on this, nutritional management, e.g. giving a low protein diet supplemented with tryptophan, has proved to be useful in reducing some forms of aggression in dogs (De Napoli et al., 2000; Dodman et al., 1996). Physical exercise has been shown to increase serotonin activity in both humans and rodents (Chaouloff, 1997), although to the extent of our knowledge this has not been established in dogs. Finally, chronic stress reduces serotonin activity (McKittrick, 2000). It could be argued, therefore, that differences in serotonin activity between English Cocker Spaniels and other breeds could be due to English Cocker Spaniels being subjected to a different environment (in terms of nutrition, exercise or chronic stress) compared with dogs of other breeds. Although this seems unlikely, it cannot be ruled out definitively.

Work done in laboratory rodents has shown that early experience may have a long-lasting effect on serotonin activity. Pups that during the first weeks of life are licked by their dams for a long period of time each day have higher serotonin activity in their brains than pups that receive less licking. This difference lasts until adulthood and is a consequence of changes in the epigenome (Meaney, 2001). Differences in maternal behaviour between and within breeds or strains have been described in a variety of species, and some of them include differences in the amount of time that the female spends licking the neonates. If English Cocker Spaniel dams differ in their maternal behaviour from females of other breeds so that their pups receive less licking than pups of other breeds, this could explain differences in serotonin activity in adulthood. This possibility warrants further study.

Genetic differences between dog breeds in dopamine pathways have been reported (Hejjas et al., 2007). Although to the best of our knowledge similar differences in serotonin have not been studied, they cannot be ruled out.

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Keywords: Aggression; behaviour; dog; English cocker spaniel; serotonin

The Blue Dog programme – update 2008/2009

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Since the launch of the Blue Dog Project in 2006, its progress has been successful on many fronts and all activities have been funded by income from sales (De Keuster et al 2005, Meints & De Keuster 2009). Although the ultimate priority is to reach children and parents in the home, efforts have been largely concentrated on building links with other interested professional groups at international and local levels. Within the veterinary profession a network of 12 language groups now exists, and new editions in Estonian, Thai and Spanish are in production. Positive interest has also been shown by major European veterinary bodies including FVE and UEVP, as well as organisations in the US (AVMA). Links with the medical profession have been difficult to establish in many countries but have been very successful in Belgium (Besser 2007, Van De Walle et al 2008)

Oral and poster presentations about the Blue Dog Project have been made at IAHAIO Congress in Tokyo 2008, The European Conference of Paediatrics in Nice 2008, and the Belgian Conference of Paediatrics in Liege 2009. Contacts in the field of child accident prevention show potential promise and the presence of the Blue Dog at the UK Injury Prevention Conference in Cardiff in September 2009 has been very constructive. A major international meeting on the subject of child accident prevention is due to take place in London in 2010. A 'train the trainers' programme was introduced in Flanders, in order to increase the pool of professionals that were available to give talks and spread the word. Prospective candidates were given resources and coached in presentation skills (Halsberghe et al 2009)

Progress has been made in the UK with attempts to adapt the Blue dog programme for use in the classroom by two schools in the London Borough of Havering. Their ideas were presented at informal multidisciplinary meetings in Dublin (2008) and Gent (2009). The primary concerns of the teachers are that a project must be workable, allowing it to fit into the current overcrowded

curriculum, and allow progression through the different age groups within the school. It will be important to maximise the opportunity for breath of learning and to make sure the concepts taught match the maturity and the comprehension levels of the children. Finally a school programme should be based on 'child led learning', where children are encouraged to use their own experiences and ideas and the teacher acts more as a facilitator for leaning to take place.

Government support has been strong in the Netherlands through an organisation called LICG (LICG 2007) and in Germany the city of Munich has adopted the Blue Dog Programme as an official municipal project. Financial support has also been given in Flanders and a recent application has been submitted for funding for integrating the Blue Dog programme into the National Child Safety Action Plan, as well as for a revised website aimed at parents and children.

Since promoting to the end user (parents and their children) has proved to be more challenging, a marketing survey on the Blue Dog in Flemish society has been conducted by students of Ghent University (De Ruyter et al 2009). The report gave a number of recommendations, and included a SWOT analysis that highlighted the potential Strengths, Weaknesses, Opportunities and Threats involved in trying to market the Blue Dog. One interesting point was the problem of marketing a prevention programme using a fear message (e.g. every dog has the potential to bite) , and suggested that presenting the prevention message by a *Joy Message* (e.g. living safely together) would be preferable in terms of marketing. Achieving this goal, will not only require widening the spectrum of professionals involved, but also require redesigning the website, which will be the major project for 2009/2010. Financial surpluses from the sale of the CD have funded the production of a film for promotional purposes (Blue Dog Promo Movie 2008), that can be downloaded for free and used in waiting rooms.

Finally the Trust has been able to fund a number of research projects. Professor Meints (University of Lincoln) has recently finalised a study on the proximity behaviour of young children and investigated how far children explore objects by placing their face close to the object. New research projects in the US and Canada have also been funded. The researchers David Schwebel (Birmingham Alabama) and Barbara Morrongiello (Guelph, Canada) are both world-renown child psychologists working in the field of injury prevention and parent supervision and they will investigate the effects of the Blue Dog Programme in families with children.

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The effect of *Nepeta Cataria* on kitten behaviour

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Introduction

The genus *Nepeta* (*Lamiaceae*) comprises many species used in folk medicine for the treatment of pain and anxiety (Rabbani et al. 2008). *Nepeta* species are associated with analgesic and sedative effects. *Nepeta* is known to induce active behaviours, including grooming, rubbing and object-playing in adult cats (Hatch 1972), but its effect has not previously been investigated in kittens. The aim of this study was to evaluate the influence of *Nepeta* extracts on the behaviour of pure breed kittens during the Open Field Test (OFT).

Materials and methods

147 kittens (Oriental, Siamese, Abyssinian and Norwegian Forest pure breed kittens) were individually exposed, from the 4th to the 10th week of age, to an OFT of 6 minutes duration at weekly intervals. Each kitten was tested in a rounded arena containing a cylindrical novel object (NO), which was neutral for the Control Group (CG) (n=82) or steeped with *Nepeta* extract for the Treatment Group (TG) (n=65).

OFT kittens' behaviour was video recorded and analysed by *focal animal sampling* as time spent in locomotion, exploration, resting, grooming and rubbing. Behaviours were analysed using the SAS 9.1 statistical package proc genmod.

Results

The TG kittens spent significantly less time exploring the arena compared with the CG ones ($F(1)=5.41$; $p<0.05$); this decrease included wall exploration while standing ($F(1)=24.53$; $p<0.001$), walking ($F(1)=17.25$; $p<0.001$) and floor exploration while walking ($F(1)=11.99$; $p<0.001$). The TG kittens dedicated more time exploring the NO ($F(1)=24.89$; $p<0.001$), less time rubbing on it ($F(1)=4.67$; $p<0.05$), more time resting ($F(1)=21.71$; $p<0.001$), less time walking ($F(1)=24.87$; $p<0.001$), receding ($F(1)=6.06$; $p<0.05$) and grooming ($F(1)=6.31$; $p<0.05$) than the CG kittens.

Conclusions

In kittens exposed to a novel environment, *Nepeta* extract appeared to induce a calming effect and a decrease of interest in surroundings. Such results encourage further studies aimed to assess if *Nepeta* can be used as a worthwhile co-therapeutic aid for the prevention of some behavioural problems in kittens.

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Keywords: *Nepeta cataria*; kitten; behaviour; Open Field Test.

The effects of exogenous corticosteroids on dog behaviour: a preliminary study

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Introduction

Glucocorticoids are widely used in veterinary medicine (McDonald and Langston, 1995, Sousa, 2009). In spite of their frequent use and well known side effects, more subtle effects on dog behaviour, linked to their role in the stress response and effects on mood, remain largely overlooked (De Kloet et al., 1999, Brown and Chandler, 2001, Hall et al. 2003). This preliminary study aimed to identify possible behavioural changes in dogs that are given corticosteroid therapy and generate items for a structured questionnaire for use in a later study.

Method

The perception of behavioural changes in dogs during corticosteroid therapy, were investigated through semi-structured open interviews of owners of 31 dogs of different breeds, gender and ages. All dogs had received corticosteroid therapy in the last 6 months. 17 dogs were treated with methylprednisolone (mean dose 0.7 mg/kg), 8 with prednisolone (mean dose 0.6 mg/kg) and 6 with dexamethasone (mean dose 0.1 mg/kg). Methylprednisolone and prednisolone were used for dermatological conditions, while dexamethasone was used for orthopaedic conditions.

Owners were asked to describe their dog's behaviours on and off corticosteroid therapy. Interviews ceased when answers became repetitive with no new reported behavioural change (interview to redundancy method).

Results

11 owners reported behavioural changes in their dog's behaviour, 9 dogs were reported to show more than one behavioural change. 6 dogs reportedly showed nervousness/restlessness, 3 an increase in startle responses, 3 food guarding, 2 a decrease in their activity level, 3 an increase of avoidance responses, 4 irritation related aggression and 2 increased barking.

Conclusions

Semi-structured interviews can be used as preliminary tools to identify relevant areas for future investigation (Wemelsfelder, 1997, Wiseman et al. 2001), and the outcomes of these interviews will be used in further quantitative research, to establish the validity of these preliminary observations. Given both the strong theoretical basis for corticosteroids increasing vigilance and biasing sensitivity towards aversion, together with these preliminary results, veterinary surgeons should offer some precautionary behavioural management advice to owners when dispensing these drugs.

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Keywords: Dog, Behaviour, Corticosteroids

Comparative efficacy of litter odour control additives

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Introduction

A malodorous litterbox has been implicated as a cause of feline litterbox rejection (Landsberg 2003). Litter often contains additives to help with odour control. Two commonly used additives for odour control are carbon and bicarbonate of soda (Neilson 2009). The purpose of this study is to identify if cats preferentially use a litterbox with one of these additives implying that one additive has superior odour control properties.

Method

Eight identical, new, large, uncovered plastic litterboxes were purchased for use in the study. Two litters, identical in every parameter with the exception of the odour control additive, were used in the study. The two different odour control additives tested were reactivated carbon and bicarbonate of soda.

The study site was a local shelter. Thirty-two adult cats housed in four separate colony rooms (8 cats per room) served as the study subjects. Two test boxes, identical in every manner with the exception of the odour control additives were introduced into the colony rooms. Boxes were filled with equal amounts of their respective litter to a 2" depth. The study ran over four consecutive nights from approximately 6 pm to 6 am. Each morning the investigator scooped, removed and weighed excrement.

Results and conclusions

The total grams of excrement in the carbon enhanced litter was 4679 grams and

the total grams of excrement in bicarbonate of soda enhanced litter was 3720 grams. The amount of excrement was analysed via both parametric (ANOVA) and non-parametric (Friedman Test) tests using a randomized block design by room. There was a significant treatment effect (ANOVA $p=0.047$; Friedman Test $p=0.046$) for carbon enhancement. Carbon enhanced litter had more excrement by weight deposited in the box, suggesting that it may have superior odour controlling properties as compared to bicarbonate of soda.

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Keywords: bicarbonate of soda; carbon; elimination; feline; litter

Comparison of two homeopathic treatments for fear of firework noises in dogs: consistency of effect

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Introduction

Sensitivity to loud noises, such as fireworks and thunderstorms, is a common concern reported by dog owners (Landsberg et al. 2003; Bamberger and Houpt 2006; Sherman and Mills 2008). There are alternative therapies on the market claiming to alleviate this problem, however there is a need for controlled studies verifying the efficacy of these products so that owners can make an informed decision on their use.

Homeopathy is a controversial form of alternative therapy. The reasons behind this relate to the inability of current scientific knowledge to provide a mechanism of action for homeopathy's purported effects, as well as a lack of consistent and replicable evidence (Hektoen, 2005). The aim of the current study was to investigate whether a consistent effect of treatment would be reported when a homeopathic remedy for sensitivity to firework noises was tested by the same owners on two consecutive firework periods, and between two studies.

Materials and methods

Seventy-three dogs with a sensitivity to firework noises were enrolled and randomly allocated one of two homeopathic preparations: Treatment A, which was previously evaluated against a placebo (Cracknell and Mills, 2008), or Treat-

ment B, a different homeopathic formulation. Owners were instructed to administer treatment once daily for 4 weeks before and through the November fireworks period, and similarly before and through the New Year firework season. Owners scored their dog's reaction to fireworks at baseline, whilst administering treatment, and at the end of the study. Owners were unaware that they were giving the same treatment on both occasions as they were briefed only that two formulations were being assessed.

Results

No significant differences were found in the owner reported effects of treatment between the two firework periods, and this was true for both treatment groups. Comparison of the responses of a small subgroup of 11 owners who participated in both the current study and a previous placebo-controlled study by the authors (Cracknell and Mills, 2008) (and received Treatment A on both occasions), revealed no significant differences in their reports of treatment effect between the two studies.

Significant correlations were found for the response profiles of the individual treatments on the two occasions, however, the correlation of the response profiles between the two treatments was not found to be significant for any other combination of treatment group or firework period.

Discussion and conclusions

The reported improvements that followed each treatment were similar across the two firework periods, and across two studies. However, there was a consistently different pattern of behavioural improvements reported between the treatment groups. These results may indicate that the two treatments have consistently different effects, or they may be a product of biases between populations. A crossover study in a larger or different population of dogs is therefore warranted to investigate the uniqueness of the response pattern to homeopathy and its potential benefits for alleviating sensitivity to firework noises in dogs.

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Keywords: dog, fear, fireworks, homeopathy

The use of Equine Appeasing Pheromone to reduce ethological and physiological stress symptoms in horses

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Introduction

Humans often impose a number of stressors on equines when working with them. Despite habituation there are situations in which the induction of stress is unavoidable, for instance during the first separation during weaning (Waran et al 2008). The use of synthetic Equine Appeasing Pheromone (EAP) could potentially facilitate the habituation processes naturally (Falewee et al 2006).

Method

Two double-blind placebo-controlled studies assessed the effect of EAP on ethological and physiological stress parameters in 1) dams and foals during first time short-term maternal separations and 2) in adult horses during 'clipping'. In the weaning experiment 32 dam and foal pairs were divided over four matched control groups: with either the mare or the foal being given EAP, the other the placebo, or both being given EAP or both being given placebo. In the 'clipping' experiment 41 horses were divided over two groups based on their initial reaction (initially 'fearful' or behaviourally 'not fearful') to the sound of clippers. In each group half the number of horses were treated either with EAP or with the placebo.

Dams and foals were separated and assessed on three consecutive days (for five, ten, twenty minutes), and the foals were assessed one day after the actual weaning; in the 'clipping' test the horses were confronted with the sound and sight of a clipper for five minutes on five consecutive days. In both experiments, the behaviour was videotaped and scored afterwards for predefined behavioural elements. Physiological stress was measured by changes in salivary cortisol concentration, heart rate and heart rate variability parameters.

Results

The most interesting results revealed a significant decrease in the frequency of unrest behaviours in the foals treated with EAP compared to the non-treated foals ($P=0.01$). Furthermore the EAP treated foals displayed a lower frequency of unrest behaviours on Day 1 ($P=0.010$) and Day 2 ($P=0.044$), and a higher duration of standing behaviours on Day 1 ($P=0.010$). In the treated mares the difference in salivary cortisol concentration before and after the separation was the only parameter to decrease significantly between Day 1 and Day 3 ($P=0.019$), and this was not seen in the placebo treated mares. The treatment effect in the foals was still apparent after six weeks: after the actual weaning the EAP treated foals showed significantly less stress-related behaviour, compared to the other foals ($n=16$, $P=0.034$). There was a significant decrease in duration of unrest behaviours in the horses of the high reactive treated group in the 'clipping' study compared to the high reactive placebo group ($P=0.028$). The treatment effect of EAP on average R-R intervals and the heart rate variability parameter RMSSD became evident after five days of treatment. Unfortunately no clear treatment effect on the physiological parameters could be found in either study.

Conclusions

Equine Appeasing Pheromone could be a useful tool for improving horse welfare during potentially stressful events.

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Keywords: horse behaviour, EAP, weaning, clipping

Trazodone as an adjunctive agent for pharmacologic treatment of canine anxiety disorders

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Introduction

For clinical treatment of canine anxiety disorders, such as separation anxiety and thunderstorm phobia, psychotropic medication may be used in conjunction with a behavioural management plan. Severe cases which are inadequately responsive to conventional treatment regimes, cases that relapse over time, and cases compounded by secondary behavioural diagnoses can be frustrating and distressing to patients and clients. In cases when first line treatment is inadequate, a second pharmacologic agent may be added adjunctively. The objective of this study was to evaluate the efficacy of a novel veterinary agent, trazodone hydrochloride, as an adjunctive treatment for anxiety disorders and to report treatment protocol, dose range, concurrent drug use, adverse events, and therapeutic response in dogs inadequately responsive to a single anxiolytic agent (Gruen and Sherman, 2008).

Trazodone is classified as an atypical antidepressant with anxiolytic and sedative properties (Golden, Bechuck, Leatherman, 1998). It is commonly used as an adjunctive agent over a wide dose range (150 to 600 mg/day), to enhance sleep in humans treated for depression with selective serotonin reuptake inhibitors. Trazodone is classified as a serotonin (5-HT) 2A antagonist/reuptake inhibitor based on its primary pharmacological mechanism of action to antagonise serotonin 2A receptors, and its secondary mechanism to inhibit serotonin reuptake (Stahl, 2000). Trazodone and its active metabolite, *m*-chlorophenylpiperazine (*m*-CPP), have also been shown to have agonistic effects at 5-HT₁ receptors. Recent evidence suggests that trazodone may also increase 5-HT levels by attenuating an inhibitory GABAergic tone in the cerebral cortex, suggesting that its mechanism

of action as an antidepressant and anti-anxiety agent may be distinct from the SSRIs, TCAs, and benzodiazepines (Luparini et al., 2004). Limited information is available on the use of trazodone in dogs (Gomoll, Byrne, Deitchman, 1979; Sherman and Papich, 2009).

Method

Medical records of dogs diagnosed with anxiety disorders at the Animal Behaviour Service of North Carolina State University Veterinary Teaching Hospital and treated with trazodone (1995–2007) as an adjunctive agent were retrospectively evaluated with respect to signalment, primary and secondary behavioural diagnoses, physical examination, haematological data (CBC, chemistry panel), pharmacological management, and outcome.

The general pharmacological treatment protocol was as follows: a tricyclic antidepressant (TCA; clomipramine, amitriptyline, or imipramine), selective serotonin reuptake inhibitor (SSRI; fluoxetine, sertraline, or citalopram), benzodiazepine (alprazolam, lorazepam, clorazepate), or other agent was prescribed using previously published and empirical guidelines. Over time, if these agents proved insufficient to provide adequate relief of anxiety signs, based on the joint assessment of the clinician and client, trazodone was added. Trazodone therapy was started at an initiation dose, half of the initial target dose, for three days because, in a preliminary trial, a small percent of dogs that initially received the full target dose experienced mild sedation or lower gastro-intestinal tract side effects (transient soft stool, diarrhoea). After the initiation dose, the target dose was established as the lowest effective dose needed for behavioural calming. Additional dose adjustments were made empirically over time. All clients were warned not to concurrently administer monoamine oxidase inhibitors, including amitraz products. The health status of all dogs that continued on trazodone therapy was evaluated annually with physical examination, complete blood count (CBC), and chemistry panel.

Results:

Fifty-six privately-owned dogs were included in the retrospective analysis. The study population included 26 spayed females, 29 neutered males, and 1 intact male. Thirty-eight dogs (67%) represented eighteen distinct AKC-recognised breeds, while the remaining dogs (33%) were of mixed breed. The age of the dogs ranged from 11–156 months, with a median of 54 months. Weights ranged from 5.2–45.5 kg, with a mean of 27.3 kg. There were no significant abnormalities prior to treatment with regard to physical examination, CBC, or chemistry panel. Cases were followed for a minimum of 1 month to a maximum of 95 months, with an

average of 24.8 months. Thirty-seven cases (64%) were followed for at least one year following initiation of trazodone treatment. Dogs that continued on treatment were medically evaluated on an annual basis; no significant findings were observed attributed to trazodone therapy.

Anxiety or phobic disorders included generalised anxiety, separation anxiety, travel anxiety, storm phobia, noise phobia, and combinations thereof. As part of their behavioural treatment programme, dogs were initially given psychoactive medications including TCAs (31 cases), SSRIs (21 cases), benzodiazepines (18 cases), the azapirone buspirone (12 cases), the antipsychotic reserpine (2 cases), and the nutraceutical melatonin (1 case). Twenty-one dogs received more than two behavioural medications concomitantly, most commonly an SSRI or TCA combined with a benzodiazepine. The latency to starting trazodone after the initial consultation ranged from 0–228 weeks (mean 21 weeks).

Based on body weight, all dogs initially received trazodone at a low initiation dose, increased to a preliminary target dose, and if needed were empirically titrated up over weeks or months to achieve behavioural calming (Table 1). After the initiation phase, the mean daily target dose for all patients was 7.3 mg/kg/day. The highest dosage given (19.5 mg/kg) represented a case in which trazodone was given both daily and PRN (at the maximum dose allowed PRN). Regardless of body weight, no dog received more than 300 mg of trazodone at one time. The number of dose adjustments made varied by individual, severity of clinical signs, and time on trazodone.

There were three dosing schedules for trazodone used in combination with an SSRI or TCA: once or twice daily (14 cases), *pro re nata* (PRN) anxiety (20 cases), or both daily and PRN (22 cases). Choice of dosing schedule was empirical and depended on the judgement of the clinician. In general, dogs with generalised forms of anxiety disorders were treated with daily trazodone therapy, while dogs with anxiety that appeared more episodic or had recognised triggers, such as thunderstorm phobia, were treated with PRN therapy. Seven dogs with thunderstorm phobia were placed on daily and PRN dosing during the storm season in North Carolina (April through to September).

Client report of therapeutic efficacy and/or continuation of trazodone therapy for at least three months after initial prescription were considered indicators of client-satisfaction with regard to treatment. Using continuation of treatment for greater than three months as a measure of treatment satisfaction, trazodone therapy was useful in the treatment of anxiety for 46 (80.4%) patients. The duration of treatment with trazodone for these dogs ranged from 3–95 months (almost 8 years). Among the 56 cases, reported adverse events included vomiting (1 case), gagging (1 case), colitis (1 case), increased excitement (2 cases), sedation (2 cases), increased appetite (2 cases), and perceived behavioural disinhibition (2 cases). No relationship was found between breed, age, baseline medication, dosing schedule, or trazodone dose and risk of adverse events.

Table 1: Dosage of Trazodone HCl in Dogs (*per os*)

Dog Weight (kg)	Initiation Dosage Range	Target Dosage Range
10	<25 mg, q8–24h or PRN	<50 mg, q8 h–24h or PRN
10–20	50 mg, q12–24h or PRN	100 mg, q8–24h or PRN
20–40	100 mg, q12–24h or PRN	200 mg, q8–24h or PRN
>40 k	100 mg, q12–24h or PRN	200–300 mg, q8–24h or PRN

Note: Dose alone or in conjunction with therapeutic doses of TCAs or SSRIs.

Conclusions

This retrospective study reports the use of trazodone hydrochloride as an adjunctive agent for the treatment of anxiety disorders in 56 dogs over a 12 year period at a veterinary behaviour clinic. Behavioural diagnoses included generalised anxiety, separation anxiety, travel anxiety, thunderstorm phobia, noise phobia, and combinations thereof. Trazodone was used in combination with medications from several drug classes, including selective serotonin reuptake inhibitors, tricyclic antidepressants, benzodiazepines, and azapirone. Observed adverse events attributed to trazodone were uncommon and generally benign. Priapism (persistent penile erection), a rare side effect reported in 1/6,000 and 1/10,000 humans treated with trazodone (Enzlin et al., 2000) was not observed, although all but one of the males in our study were castrated. Serotonin syndrome, a possible sequelae to concurrent use of serotonergic agents, was not observed in our treatment population.

These findings suggest that trazodone hydrochloride is a safe and useful adjunctive agent for the treatment of canine anxiety disorders. This provides an additional therapeutic option for use in cases resistant to conventional treatment. Overall, trazodone, used as an adjunctive agent in combination with other behavioural drugs, was well-tolerated over a wide dose range and enhanced behavioural calming when administered on a daily or as-needed (PRN) basis. Although further controlled studies of dose range, efficacy, and safety are needed, trazodone may provide an additional therapeutic option for use in dogs that are unresponsive to conventional treatment.

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Keywords: anxiety, dog, phobia, trazodone

Pairing of vocal and visual commands during training: does one overshadow the other?

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Introduction

Vocal commands and visual gestures are frequently used together during dog training (Fukuzawa et al., 2005a), although most owners probably focus on verbal stimulus control, this may not be very consistent (Fukuzawa et al., 2005b). This study investigates the effect of training simultaneously with verbal and visual on subsequent stimulus control.

Method

10 dogs (5 bitches, 5 dogs; various breeds; aged 5 months to 6 years) were trained to perform two new novel tasks, a bow and spin, using simultaneous vocal and visual cues on a progressive variable ratio schedule, until an 80% response was achieved on a variable ratio of 1:5 within 2 consecutive blocks of 10 trials. Subjects were then tested during two blocks of 10 trials, in which only one of the cues was given through a single communication channel at a time, balanced for each action and cue type (i.e. 5 of each). Performance was evaluated using a validated 5 point score. After this, two additional tests were undertaken in which each visual cue was given with the opposing vocal cue simultaneously (e.g. vocal cue spin and visual cue bow) and the dog's response recorded. A Wilcoxon signed rank test was used to assess if there was a significant difference firstly in the number of correct responses performed to each cue type (visual versus verbal), and secondly in the type of action performed (spin versus bow). A binomial probability distribution was used to determine the significance of cue type on the behaviour performed when contradictory cues were given.

Results and conclusions

Dogs responded significantly better ($p < 0.05$) to visual cues, but showed no preference in the action performed ($P > 0.05$). All subjects performed the visually cued behaviour in the contradictory cue test ($P < 0.001$ for each coupling). These results suggest that visual cues may overshadow verbal cues during training, and emphasise the need to attend to paralinguistic communication during the training process for reliable subsequent performance (Mills 2005).

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Keywords: commands conditioning, dog, overshadowing, training

Influence of age in understanding human gestures in pet dogs

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Introduction

One of the features that makes domestic dogs (*Canis familiaris*) human beings' best friend is their ability to communicate with them. Several studies show that dogs can understand different cues given by a human experimenter to locate hidden food in a two-way object choice task (Reid, 2009). Dogs seem to be able to comprehend these visual cues from an early age (Riedel *et al.*, 2008; Gácsi *et al.*, 2009). The aim of this study is to investigate the ability of family dogs to use different human cues to locate hidden food and to establish if there is any difference between groups of dogs of different ages.

Method

Thirty seven family dogs (17 males and 20 females) of different breeds took part in this study. All the subjects have been living with the same human family since they were puppies. Three age groups were defined: puppies (11 dogs aged from 2 to 11 months), juveniles (14 dogs aged from 1 to 3 years), adults (12 dogs aged from 4 to 6 years). Each subject was tested in a two-way object choice task to identify its ability to follow different cues (pointing, head turning and glancing) to locate hidden food (dry commercial treats). The test was divided into 3 experimental sessions of 10 trials each. Cues and control trials were given in a mixed standardised order by the same experimenter. The proportion of correct responses for each subject, the subject's behavioural reaction to the human gesture and the latency of reaction to the gesture were calculated. Chi-square test was used to identify differences in understanding human gestures between cues and among the three groups of dogs.

Results

The subjects could spontaneously understand the pointing cue and they followed this gesture to the baited bowl (76% of correct choices, $p < 0.05$), while they were not able to comprehend other cues such as head turning (48%) and glancing (48%). The most frequent behavioural reaction was to go straight to the chosen bowl (63%), this behaviour was shown especially after the pointing cue (82%). On average the subjects took 4 seconds ($p < 0.05$) to reach the bowl if the experimenter was pointing it, while in head turning and glancing trials the latency of reaction was 6 seconds. Test results also showed that, when the baited bowl was pointed adult dogs had a better proportion of correct choices (82%, $p < 0.05$) than puppies (65%) and juvenile dogs (79%). In the pointing trials adults took only 3 seconds ($p < 0.05$) to reach the correct bowl in comparison to juveniles and puppies who took 5 seconds.

Conclusion

In agreement with the literature (McKinley and Sambrook, 2000; Soproni et al., 2002) our results confirm that dogs are able to use the pointing cue to locate hidden food. In particular adult dogs seem better able than others to follow this cue. This could be explained by learning processes during the dog's life.

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Keywords: dogs, human-dog communication, object-choice task.

Effects of human body posture and approach on the flight behaviour of naïve ponies

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Introduction

The way in which animals respond to handling is an important aspect of human-animal relationships (Hemsworth, 2003; Hausberger et al. 2008). In this study, we investigated the effects of one specific aspect of handling horses – namely, human body posture. This is often emphasised in what has been called ‘natural horsemanship’ – an approach to equestrianism which is now becoming increasingly popular (Birke, 2007). Monty Roberts (1996) claims that approaching naïve horses face-on (‘hard’) encourages flight, whereas approaching at 45°, not looking directly at the horse (‘soft’) invites contact. However, apart from the study by Verrill and McDonnell (2008), reporting no effect of eye contact on the ease with which a handler could catch a horse in a pasture, there has been little work examining effects of human body posture on horses.

Method

Our aim in this study was to determine the effects of human body posture and approach on the behaviour of relatively unhandled ponies. Thirty-six loose housed, semi-feral Welsh mountain ponies (26 colts and 10 fillies) aged between 6–9 months were used in two experiments. Ponies were tested in unique groups of two or three in their home barn, with data recorded from the lead pony in each group. Small amounts of food pooled on the straw attracted the ponies, allowing standardised start conditions for each trial. Our first experiment (counter-balanced within subjects) supported the general hypothesis that ‘hard’ approaches

elicited greater alert/flee responses than 'soft' approaches, and we noted a consistent faster speed of approach by the stooge when adopting the 'hard' posture. In a second experiment we tested separately the effects of posture and speed (counter-balanced between subjects) and eye gaze (counterbalanced within subjects) on the ponies' flee responses.

Results

Tense, face-on posture elicited no greater responses than oblique, relaxed posture; and speed per se elicited no greater alert behaviour, but did trigger significantly faster and further flee behaviour. Direct gaze during approach elicited greater alert behaviour from the ponies than when the approaching person's eyes were averted, but had no effect on flee behaviour.

Conclusions

Our data suggest that speed of approach of a handler matters more than specific body posture or eye gaze in relation to the flee responses of horses. This is in contrast to the emphasis placed on body posture and eye contact in 'natural horsemanship' practices. However, the findings of our first experiment suggest that when handlers adopt a 'hard' posture they also automatically move faster, and the effects described in the natural horsemanship manuals may in fact be due to the different speed of movement of handlers. Unlike Verrill and McDonnell's (2008) study, and contrary to the claims made in the natural horsemanship literature, eyes averted from the ponies elicited greater alert behaviour than when eye contact was made. This may be due to the greater unpredictability of others whose attention is focused elsewhere, and warrants further investigation. Fear reactions to handling can compromise both the welfare of young horses during early handling and the safety of the human handler. The findings here support the well established advice that handlers should approach horses slowly and should look at them when doing so.

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Observational learning of secondary reinforcement in the domestic dog, is it possible?

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Introduction

Animals, including dogs, can learn simple tasks through observation. This study aimed to discover whether a secondary reinforcer can be learnt in this way.

Method

16 dogs of mixed age, breed and gender were divided into two groups. Each group was taught a nose target behaviour and task acquisition data was recorded. The task was considered to have been learnt when the dog performed correctly in 80% of attempts over 2 consecutive blocks of 10 trials. The experimental group then observed the model dog undergo clicker conditioning, whilst the other acted as control. After observation, both groups were taught the reverse discrimination task. This was taught using a secondary reinforcer followed by primary reinforcement after a 3 second delay. The task was considered to have been learnt when the dog performed the discrimination correctly in 80% of attempts over 2 consecutive blocks of 10 trials. A Mann Whitney U test was used to assess learning during both phases of the task.

Results

Both groups successfully learnt the target behaviour with no significant differences in time (Mann Whitney $U = 10.00$, $P = 0.600$), rate (Mann Whitney $U = 7.00$,

$P=0.251$) or attempts (Mann Whitney $U=7.00$, $P=0.251$) between groups. The reverse discrimination was not learnt by any control dog within the allotted time (60 minutes), all observation dogs learnt the task. A significant difference in attempts at the task between the two groups was found (Mann Whitney $u=0.00$, $P=0.009$). As all in the control group failed, a binomial probability was carried out to assess the likelihood that all 5 failed individuals should come from the same group. This was shown to be significant at 0.03125.

Conclusions

The results of the study seem to suggest evidence of observational learning of secondary reinforcement in the observer group dogs.

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Keywords: observational learning, secondary reinforcement, dogs

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Owner reported coping styles and occurrence of undesirable behaviours in domestic cats

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Introduction

The welfare of an individual is influenced by its ability to cope with its environment; poor welfare occurs when the animal fails, or is struggling, to cope (Broom 1991). Coping behaviour, the behavioural reaction to aversive situations, is an adaptive mechanism which evolved to reduce physiological measures of stress or to remove an aversive situation in order to restore fitness (Wechsler 1995). Previous studies describe various behavioural responses to aversive situations (Wechsler 1995) and individual variation in capacity to cope (Koolhaas and others 1999). However, authors differ in their classification of these coping responses. Wechsler (1995) classifies these responses into 4 categories of coping strategies; escape, remove, search, and wait. Whereas, many studies suggest a common distinction between just two major strategies (Wechsler 1995), or coping styles, which Koolhaas et al. (1999) define as “a set of behavioural and physiological stress responses which is consistent over time and which is characteristic to a certain group of individuals”. A study which illustrates this dichotomy in environmental control used wild type rats which were tested for their tendency to defend the home cage against an unfamiliar male conspecific and then tested in a shock prod defensive burying test. Aggressive males spent a lot of time burying the electrified prod, whereas non-aggressive males showed immobile behaviour. However, both types of behaviour were equally successful in avoiding further shocks; therefore both coping styles were apparently “successful” (Koolhaas and others 1999).

These two coping styles were originally referred to as active and passive coping,

however, Koolhaas et al. (1999) believe the terms proactive and reactive, respectively, are more appropriate. The results of these studies suggest that individual aggression is related to how the animal reacts to a wide range of environmental challenges; aggressive males appear to react proactively, with little variation in behaviour, whereas non-aggressive, or reactive males, appear to be more flexible and adaptive, and only respond when absolutely necessary (Koolhaas and others 1999). However, these conclusions are in contrast to Wechsler's (1995); he states that only passively coping animals show a consistent coping response in different situations, characteristically reacting to an aversive stimulus with immobility and waiting for a change in the environment; whereas, active coping behaviour incorporates a set of more subtle strategies (Wechsler 1995).

The concept of coping styles has been applied to a variety of species (Koolhaas and others 1999), however, there is some debate over the validity of some of the studies attributing this concept to some species, such as pigs (Jensen and others 1995).

This study aimed to investigate whether a consistent variation in coping style between contexts can be identified from owner report, and if such variation between cats is a risk factor for the occurrence of behaviour problems.

Methods

Questionnaires were distributed to households in five regions of differing population densities and socioeconomics within North Somerset and Bristol as part of a wider study investigating risk factors for aggressive behaviour in domestic cats. Regions in an Ordinance Survey map of the Bristol area were categorised as rural, village, town, low socioeconomic city and high socioeconomic city. Seven rural, four village, three town, and two of each city regions were randomly selected for questionnaire distribution. More rural and village locations were selected to balance sample sizes between region types.

As part of the questionnaire, owners were asked how their cats responded in six different interactive situations: being approached by the owner; being stroked by the owner; being picked up by the owner; in the presence of unfamiliar people; in the presence of other household cats; and in the presence of unfamiliar cats. In each case, answer options included 'proactive' and 'reactive' responses, such as "running away" and "biting and scratching" or "sitting and watching" and "shows no reaction". Owners were also asked the frequency with which their cats had performed a list of common inappropriate behaviours within the last 3 months and whether they considered this a problem.

Results

From the 741 completed questionnaires returned from cat owners, only 4 cats had reportedly not performed an inappropriate behaviour in the last 3 months, whereas, the median number of inappropriate behaviours performed was 6. The most commonly performed inappropriate behaviours were scratching the furniture (82.2% cats), demanding attention excessively (79.4%) and following the owner and tripping them up (61.1%). However, behaviours most commonly stated by owners as problematic were spraying in the house (78.1%), inappropriate urination (69.6%), inappropriate defecation (65.4%), and overgrooming (58.1%).

The coping style of each cat was calculated for the six interactive contexts, and coded as only proactive, only reactive, or a mixed response. The extent to which this style was consistent between the contexts was examined using a Cochran's Q test. The measure of proactive/reactive coping style was not consistent within individuals between contexts (Proactive: Cochran's $Q=263.306$, $p<0.001$; Reactive: Cochran's $Q=121.658$, $p<0.001$; Mixed: Cochran's $Q=213.923$, $p<0.001$).

As coping styles were not consistent, they could not be analysed as potential risk factors for the occurrence of inappropriate behaviours.

Discussion

The results of the Cochran's Q test suggest that cats generally do not have a fixed coping style that is consistent across contexts. This finding suggests that response to each context has a strong learnt component. This is consistent with previous research of feline coping behaviour, where the observed response of cats during interactive tests with people did not necessarily co-vary with the style of responding to the scent of other cats (Casey 2008).

However, although Koolhaas et al. (1999) concede that experiences in adult life may affect behavioural and physiological parameters for a prolonged period, they do not appear to change coping style overall. Although coping styles are generally considered to be stable trait characteristics that originate from a combination of genetic and epigenetic factors in early life, they are not rigid characteristics that only allow individuals to respond according to one style in all situations; if the environment restricts one behaviour so that an animal cannot follow its preferred coping style, then the behaviour is flexible enough to follow the alternative style (Koolhaas and others 1999). This flexibility may go some way to explain the variation in the present results, although to obtain such information via a questionnaire would have been infeasible.

The concept of proactive and reactive coping styles may not be applicable to all species, perhaps because of the differences in population ecology between species, e.g. the dynamic populations, characterised by regular population

crashes, of mice versus the fairly stable maternal units of wild pigs (Jensen and others 1995) and therefore may not be relevant to the domestic cat either. It may be that underlying styles of response of cats are too subtle to be classified into only two categories. Wechsler (1995) suggests that classifying coping behaviour into only two categories may obscure subtle differences in behavioural strategies, which may vary between species and type of aversive situation. An interesting extension to this study would be to reanalyse the data with respect to the four categories of coping strategies suggested by Wechsler (1995).

Although underlying styles of response may occur in cats, tests or owner responses which investigate responses to specific contexts do not appear to identify them. Consequently, the results of such tests cannot reasonably be used as risk factors for the occurrence of specific undesired behaviour. Therefore, the measurement of behavioural responses to specific stimuli appears inadequate in identifying underlying characteristics of personality in cats.

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Keywords: domestic cat, coping styles, inappropriate behaviour

Adherence to advice of horse behaviour counsellors

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Introduction

Behaviour problems are highly prevalent in the domestic horse (Hockenhull & Creighton, 2009a,b) and often the aetiology of these problems lies in a lack of understanding of horse ethology and in particular learning theory (McGreevey, 2004). Suitably educated and experienced horse behaviour counsellors offer a vehicle for educating owners and promoting a thorough understanding of these principles. However, at present the use of such professionals is limited and more typically the horse owning population looks outside of certified professionals for advice (Hockenhull and Creighton, 2008). Providing an effective service would enable appropriately qualified horse behaviour counsellors to promote the use of their services. In turn, this would lead to wider promotion and recognition of the effectiveness of methods based upon a thorough understanding of horse ethology and the correct application of learning theory.

Casey and Bradshaw (2008) found a significant relationship between compliance to treatment and a reduction in the severity of feline behaviour problems. This suggests that adherence to the advice given affects the success of an animal behaviour counselling service. They go on to suggest that in order to adhere to a treatment programme the owner must often make changes to their lifestyle and behaviour (Casey and Bradshaw, 2008). The established science of human behaviour change predominantly lies in the field of health psychology, where huge efforts have been made to change people's behaviour to achieve health benefits (Connor & Norman, 2005). The theoretical background of human behaviour change lies in social cognitive science, where social cognition models have provided valid and reliable tools for predicting behavioural outcomes in a range of settings: for example healthy eating (e.g. Booth-Butterfield and Reger, 2004), smoking cessation (e.g. Kraft et al, 1999) and reduction of heavy alcohol intake

(e.g. Neal and Carey, 2004). The models enable researchers to establish specific cognitive variables that predict adaptive behaviour, and therefore provide a theoretical starting point to explore potential predictors of the behaviour of horse owners.

The aim of this study was to utilise the established theory of social cognition models to determine characteristics of horse owners seeking advice about their horse's behaviour that predicted their adherence to that advice.

Methods

A review of the main social cognition models identified ten cognitive variables that were potential predictors of adherence to horse behaviour counsellors' advice. Researchers have quantified such variables by the use of subjective Likert scales (e.g. Beaudoin and Fernandez, 2007; Frosthalm et al, 2007; Hearty et al, 2007; Schroder et al, 2007), that provide a familiar format that encourages compliance (Neuman, 2000). Following Aiken (1997) and Oppenheim (1992), construction of the items first followed a deductive approach. Definitions of each of the cognitive variables were sought from relevant literature and interviews with the target population. The deductive process to develop the items ensured that they used terms offered by horse owners and riders, and therefore had a recognised meaning within the horse community, thus contributing to their content validity. Internal consistency analyses were used to further validate measures of cognitive variables that had three or more items.

The measure of adherence was based on the University of Rhode Island Change Assessment Scale (URICA; 2007), which is widely used in behaviour change research. It provides general statements about participating in adaptive behaviour that can be modified and applied to a range of settings (e.g. Dunn et al, 2003; Heesch et al, 2005; Strong Kinnaman et al, 2007). The URICA uses Likert scales that respondents rate to demonstrate the amount that they are participating in the adaptive behaviour. Measuring adherence in this way enabled participants to identify even small amounts of adherence, thus reducing the temptation to give false positives which may have occurred should a single and absolute measure have been used. Additionally, the use of Likert scales here also aided respondent comprehension by providing consistency throughout the questionnaire.

The items of the cognitive variables (independent) and adherence (dependant variable) were compiled into a self-report questionnaire. A sample of responses were validated by telephone interviews.

The findings were derived from an opportunistic sample of horse owners with the specific characteristic of being in search of advice on horse behaviour. The sample of participants in the study was not intended to be representative of all horse owners in general, but of this sub-set of the population only. Data were

collected from the clients of horse behaviour counsellors practising in the UK. Behaviour counsellors were found through internet searches, counsellor lists from the APBC and ASAB, word of mouth, and by networking at academic conferences and horse events.

Participants completed the questionnaire before they received the advice (initial cognitive profile), ten days after (changes post-counselling) and at three months follow-up (longer term changes). Data were analysed using correlation analyses.

Results

From the client's initial cognitive profile, less attribution of the horse's behaviour problem to external factors (ie more attribution to factors associated with themselves) and a positive attitude towards horse behaviour counsellors were associated with increased adherence ten days after the counselling. However, those clients who showed the greatest move post-counselling towards recognising an increased value of the outcome of their adherence, or a shift in attribution of their horse's behaviour problem to external factors, were more likely to adhere at ten days. At three months follow-up there were no associations between adherence and the earlier cognitive profiles, but clients who showed a three month increase in positive attitude towards horse behaviour counsellors were more likely to adhere long term.

Discussion

Horse behaviour counsellors may be reasonably confident that those clients who come into the process attributing their horse's behaviour problem less to external factors (e.g. not attributing it to the horse's nature or the facilities they have available), and have a positive attitude towards horse behaviour counsellors will adhere to their advice initially. However, clients' initial cognitive profiles cannot be influenced, but exploring whether they hold these initial characteristics may give horse behaviour counsellors an indication as to whether they will engage in the process, and therefore go on to find it successful. An ability to recognise such clients gives insight into where to invest time and resources so that the service is constructive; and where the service is constructive it is likely to be promoted.

Horse behaviour counsellors do have the opportunity to change a client's perceptions during the consultation. The findings suggest that increasing how much the outcome of adherence is valued by the client predicts initial adherence, and an increase in attitude towards horse behaviour counsellors predicted long term adherence. It is likely that where desired changes in the horse's behaviour are achieved during the consultation, clients will value the outcome to be brought

about from their efforts to adhere, and attitude towards horse behaviour counsellors will become more positive. This suggests that it is not the changes in these cognitive variables that bring about adherence, but rather adhering brings about desired results, and this affects these cognitive variables. Fostering adherence in the first instance is an important element of achieving those desired results, and horse behaviour counsellors need to be aware of the cognitive variables that have the potential to elicit adherence in the early stages of the process. The findings here indicate that developing the client's perception of an external cause of the horse's behaviour problem is key to achieving this; for example emphasising the need to apply ethological understanding to managing the horse's behaviour.

Clients who in their initial cognitive profile attributed their horse's behaviour problem less to external factors adhered more. However, the direction of the association was reversed when the relationship between changes in perceived attribution of the horse's behaviour problem post-counselling and adherence were explored. Extreme perceptions of external attribution (e.g. the horse's nature, facilities) or internal attribution (e.g. lack of own experience, skill) are maladaptive. For example a person who largely perceives an external cause to the problem may be affected by resignation and perceive it un-rectifiable (Hilt, 2004). Similarly where a largely internal cause is perceived the affective cognitions may be associated with self-doubt (e.g. fear, low self esteem, lack of experience), and the individual may perceive that the problem is overwhelming and too large to rectify (Hilt, 2004). When the initial process of referring to a horse behaviour counsellor is undertaken when the owner attributes less to an external cause and perceives that the problem is rectifiable, adherence to advice is high. The reversal in the direction of the relationship may occur once the owner's expectancies about performing the necessary action are added during the communication. Focusing on external attribution during the consultation may negate the need for the owner to address internal factors that may be associated with negative emotions such as fear, and therefore be hard to control. Building the perception of an external cause may give clients an objective focus that enables them to build confidence in their ability to resolve the problem and, in turn, elicits adherence to the advice.

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Keywords: horse; animal behaviour counselling; cognitive variables

Training engagement and the development of behaviour problems in the dog: a longitudinal study

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Introduction

Canine behaviour problems have serious welfare implications as a breakdown of the dog-owner relationship often results in the dog being abandoned, relinquished to an animal shelter or euthanised. In many cases there are also social and legal consequences associated with the ownership of a 'problem dog.'

Behaviour problems can occur at any stage in the dog's life with each stage of development being associated with key physiological and psychological changes. It is the authors' opinion that canine behavioural development can be divided into eight stages (see table 1).

Of these, the first year of a dog's development is most critical. It is during this time that the majority of social and environmental learning takes place and learned behaviour patterns become established. It is also the time in which problem behaviours are most likely to become apparent. The most common age for a dog to be presented to a behaviour specialist is between 6 and 11 months (Lund et al, 1996).

In many cases the development of problem behaviour can be linked to the dog's early experiences during the socialisation period. During this time emotional associations are formed with both living (socialisation) and non-living (site-attachment and social referencing) aspects of the environment. Appetitive or neutral experience of a wide variety of social and environmental stimuli is

necessary for behavioural development to continue normally (Fox, 1978; Scott and Fuller, 1965).

Whilst experiences during the socialisation period are of great importance, both social and environmental learning continue throughout the juvenile period and into adolescence. Dogs with adequate prior experience during the socialisation period may regress and become fearful if exposure to socio-environmental stimuli is not maintained (Dehasse, 1994; Fox, 1978). There is evidence of second phase of heightened sensitivity to fear arousing stimuli at the age of 6 months, around the onset of sexual maturity (Fox, 1972; Serpell and Jagoe, 1995). This is sometimes referred to as the 'secondary sensitive' or 'secondary socialisation' period. It is important to note that an unpleasant experience occurring during early adolescence can leave the dog permanently traumatised (Fox, 1972). As with the onset of sexual maturity, the exact timing of this phase is variable between breeds and individuals. It may be that some breeds or individuals do not go through this 'secondary sensitive period' until later adolescence or that it lasts for a greater or lesser part of the adolescent period (Dehasse, 1994; McBride et al. 1995).

Adolescence can be a problematic time for dog owners. It ends when the dog reaches social maturity which may be as late as 3 years of age in some breeds (Dehasse, 1994). Adolescence is characterised by the development of relative social rank and status (Shepherd, 2002). The dog may begin to test the boundaries set by the owner and assertive or controlling behaviours may develop if allowed (Bailey, 2008; Dehasse, 1994). Increased independence and interest in the environment may also occur highlighting the need for a good foundation of obedience training. Unsurprisingly, this is a high risk time for relinquishment to an animal shelter with the most common age reported as between 7 and 12 months (Miller et al, 1996).

Research into risk factors associated with the development of problem behaviours has focused primarily on experiences during the primary socialisation period. Breeding environments lacking exposure to socio-environmental stimuli, age of acquisition by the new owners, early illness, timing of vaccination programmes and the age of first exposure outside of the owner's home have all been associated with the development of problem behaviour (Appleby, 2002; Jagoe, 1994; McGreevy and Masters, 2008; O'Sullivan et al, 2008; Sterry et al, 2005). Some studies have also gone on to assess the influence of ongoing experience during the first 6 months (Appleby, 2002), management practices (McGreevy and Masters, 2008) and attendance at puppy classes (Sterry et al, 2005).

Puppy classes have become more popular in recent years although the format of such classes varies considerably. Some veterinary practices host puppy parties where the primary goal is often to provide information on caring for the puppy whilst also allowing some opportunities for interaction between puppies. A wide range of puppy classes are provided by pet dog trainers, from classes designed

specifically for obedience training to those that also include focused opportunities for socialisation and social referencing and perhaps specific trouble shooting advice for common 'puppy problems.' In contrast, some trainers prefer not to run specific puppy classes but to integrate puppies into an obedience class consisting of more mature dogs. Alternatively, one-to-one training may provide trouble shooting advice and early obedience training without the opportunities for socialisation with conspecifics.

Table 1: Stages of canine development and their key behavioural changes

Stages	Approximate Age*	Key Behavioural changes
Prenatal	<0	Puppy's subsequent temperament is influenced by genetics and the emotional state of the dam.
Neonatal	0–2 weeks	Early tactile stimulation can influence the later reactivity of puppies.
Transitional	2–3 weeks	Transition from the development of reflexive organisation to social awareness and identity.
Socialisation	3–12/14 weeks	Period of rapid development during which exposure to social and environmental stimuli is essential for normal behavioural development.
Juvenile	12/14 weeks–onset of sexual maturity (6 months)	Foundations for future learning are established by 4 months. Continued exposure to social and environmental stimuli is required to prevent the development of fear-based behaviour problems.
Adolescence	Sexual maturity–social maturity (18 months–2 years)	Social learning continues. Fear-based problems associated with the secondary sensitive period may become apparent. Dogs become increasingly independent which may also cause problem behaviour.
Adulthood	Social maturity–old age (7–8 years onwards)	Most stable stage of development. Problems arising during this time are most likely to be triggered by a specific external event or lifestyle change, or a medical condition.
Old age	Onset old age–death	Associated with a decline in physical and psychological functioning which may trigger the onset of behaviour problems.

*The onset of both sexual and social maturity has been extensively altered via the process of domestication (Fox, 1978) resulting in substantial variation in the onset of each stage between breeds. In general larger breeds take longer to mature both physically and socially (Coppinger and Coppinger, 2002).

There is now growing interest in assessing the effectiveness of puppy classes in the prevention of problem behaviour. Sterry et al. (2005) found that puppy classes produced dogs less likely to growl at or avoid unfamiliar dogs and people away from the home and less likely to growl at visitors. These results indicate that such

classes provide ongoing opportunities for socialisation with both people and other dogs and are effective in reducing behaviour problems associated with fearfulness and aggression.

Duxbury et al. (2003) investigated the effectiveness of puppy socialisation classes run by a humane society. These classes had a standard format of which a large part was dedicated to owner education. They found that puppies attending such classes were more likely to be retained by the owners and, more specifically, that the owners had more realistic expectations of normal canine behaviour.

Owner education and advice on the prevention of problem behaviour is of great importance as both unrealistic owner expectations and insufficient research by the owner are associated with an increased risk of relinquishment to an animal shelter (Landsberg et al, 2003). Gazzano et al. (2007) found that a veterinary behaviourist providing early advice to owners on puppy raising practices reduced the quantity of undesirable behaviours reported at 1 year of age. They also found that, even when this advice was delivered to owners of puppies over 4 months of age (during the juvenile period), it was still effective in preventing the development of problem behaviour.

Interestingly, Seksel et al. (1999) found that attendance at puppy classes had no significant effect on responses to social, novel or handling stimuli although puppies did show improved obedience. However, there were some methodological concerns with this study that may have masked any socialisation and social referencing effects. Seksel et al. concluded that the only value of puppy classes was the production of well-trained dogs. This in itself is a positive result as there is evidence to suggest that command training circumvents problem behaviour (Campbell, 1974; Kobelt, 2003).

Jago and Serpell (1996) found that attending formal obedience training was associated with a reduction in a variety of behaviour problems including possessive aggression, separation problems, escaping and roaming. Indeed, there does appear to be an association with a lack of responsiveness to training/obedience commands and a higher incidence of behaviour problems (Bennett and Rohlf, 2007; Kobelt et al. 2003; O'Sullivan et al. 2008).

Engagement in training also enhances the dog-owner relationship both in terms of the results – a well behaved dog, and via involvement in a shared activity – a partnership. Bennett and Rohlf (2007) report that the owner's perception of their dog's behaviour relates to the dog's level of inclusion in the owner's activities, which in turn is significantly influenced by training engagement.

Lindsay (2000) highlights different levels of training engagement within the dog-owning population based upon the goals of the dog owner. These range from those who engage in training only with a view to improve manageability and control of the dog to those who may be considered enthusiasts, engaging in training to enhance interspecies understanding, bonding and appreciation. The extent to which the human-dog bond is enhanced is therefore dependent upon the goals

and attitudes of the owner.

Owner attitudes towards dog ownership and training are also likely to influence the methods utilised during training. Roll and Unshelm (1997) found that approaches and attitudes to training differed according to the reasons the dog was purchased. Owners of dogs purchased as a companion preferred to utilise reward-based (positive reinforcement/negative punishment) training methods and more forceful techniques (positive punishment/negative reinforcement) were often practiced by owners with dogs obtained for guarding or protection.

Training techniques based upon positive punishment/negative reinforcement are associated with an increased incidence of problem behaviour (Hilby et al, 2004). In particular, such methods have been found to increase the likelihood of aggression, both directed towards the owners (Herron et al, 2009) and towards other dogs (Roll and Unshelm, 1997). In contrast, training techniques based upon positive reinforcement/negative punishment have been found to be more effective at producing obedient dogs (Hilby et al, 2004). The use of food as a positive reinforcer in training is also associated with a lower probability of developing feed-related aggression (McGreevy and Masters, 2008).

Method

The present study used a longitudinal design to investigate early experience and management of the dog throughout the first year and the development of problem behaviour. One aspect of this study focused on training engagement

51 dog owners completed a series of 4 questionnaires provided at the time of first vaccination (A), 6 months (B), 9 months (C) and 12 months (D) of age. Questionnaires B–D included a training engagement section designed to provide information on the type of training engaged in and the training methods utilised since the previous questionnaire. Behaviour was assessed at each stage using the Canine Behaviour and Research Questionnaire (Hsu and Serpell, 2003). C-BARQ responses produced scores on 6 problem behaviour subscales which had been validated by the current authors for this age group (<1 year).

Results

Results showed that dogs attending ‘puppy socialisation/training classes’ or ‘puppy parties/socialisation groups’ prior to 6 months of age had significantly lower total problem behaviour scores than dogs attending some other type of training or not attending training at all. To a lesser extent (although still significant) dogs attending ‘young dogs classes’ between 6 and 9 months of age also showed a reduced incidence of problem behaviour. In contrast, owners who were training the dog themselves had dogs with significantly higher total problem behaviour scores.

Six behavioural C-BARQ subscales were used: attachment/attention seeking (AAS); non-social fear (NSF); dog-directed aggression or fear (DDAF); owner directed aggression (ODA); stranger-directed fear (SDF) and separation-related problems (SRP). Analysis of these individual C-BARQ subscales revealed differential effects of the age at which the dog was trained and the type and methods of training used.

The results of this study will be reported and discussed during the presentation and are currently being prepared for publication (Thompson et al, in prep).

Conclusions

In summary, results indicate that professional training is beneficial in reducing the incidence of problem behaviour and is most effective when engaged in prior to 6 months of age. Furthermore, class formats providing a combination of obedience training, troubleshooting advice and intra-specific socialisation are most effective in producing well balanced dogs.

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Keywords: dog, behaviour, problem, training, puppy

Social stress in rabbits

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Introduction

Rabbits are the third most popular pet in the UK (RWF 2008a) but they are also one of the most misunderstood. Rabbits are a prey species and therefore have very different needs to the predator species we are more used to keeping, such as dogs and cats. Rabbits suffer from various welfare issues such as osteoporosis and poor dentition due to bad husbandry practices (ARRP 2003; BVAAWF/FRAME/RSPCA/UFAW 1993; Drescher 1993). These include an inappropriate diet and inadequate housing (RWF 2008a). Welfare is based on the five freedoms (Webster 2001; Webster 1995). These ideal states are freedom from hunger and thirst, freedom from discomfort, freedom from pain, injury or disease, freedom to express normal behaviour and freedom from fear and distress. The freedom to express normal behaviour can be further implemented by 'providing sufficient space, proper facilities and company of the animal's own kind' (Webster 1995). Therefore in naturally gregarious animals like rabbits it could be assumed that being housed on their own is a potential stressor (John 1990). Due to this assumption various welfare associations suggest rabbits housed on their own are more stressed than rabbits housed in pairs (RWF 2008b) but to the authors knowledge there is little published data to substantiate this.

The stress response is a change in homeostasis (McDonald 2003; Squires 2003) which diverts energy from processes not immediately required such as digestion, to those which aid fight or flight, such as muscle contraction and heightened mental acuity. It occurs in two ways via behavioural and hormonal pathways. Behavioural ways involve trying to get away from the source of the stress and, when this cannot happen, stereotypies may occur. These are behaviours with no benefit to the health of the animal and no goal that are repeated over and over (BVAAWF/FRAME/RSPCA/UFAW 1993; Toates 2001). Behaviour has been studied in laboratory and farmed rabbits to determine the stress related to housing practices (BVAAWF/FRAME/RSPCA/UFAW 1993; Drescher 1994; Europe 2002;

Verga and others 2007). It has been noted that rabbits on their own have displayed various stereotypical behaviours such as biting, chewing or licking of bars, food hoppers, walls and the grid floor (BVAAWF/FRAAME/RSPCA/UFMW 1993).

Hormonal stress response occurs via two pathways the sympathetic autonomic nervous system stimulates catecholamine release and the hypothalamic-pituitary-adrenal axis stimulating glucocorticoid release (Squires 2003). Catecholamines facilitate the fight and flight response allowing the animal to escape the stressor. Glucocorticoids stimulate gluconeogenesis causing a hyperglycaemia (Squires 2003); they also cause protein catabolism and suppress the immune system. Although these processes are initially helpful, in chronic stress situations they become detrimental to the health of the animal (Squires 2003); effects can be seen with long term hyperglycaemia, muscle wastage and immunosuppression with a decrease in the inflammatory response and lymphopaenia (Harcourt-Brown 2003). The only research the author could find into the physiological stress in the rabbit said that corticosterone is in much higher concentrations than cortisol (McDonald 2003; Palme and others 2005), therefore the effects of hormones on the body need to be extrapolated from research in other species. Corticosterone controls the sensitivity and threshold of the body to stress (de Kloet and others 1998). In chronic stress this becomes maladaptive and so in further stressful situations the animal is less able to control the stress response (de Kloet and others 1998; Korte 2001).

In the rabbit glucocorticoids increase the number of coliforms in the gut which is detrimental to health of the animal and can cause enterotoxaemia (Harcourt-Brown 2003; Straw 1988). Gastric ulcers have also been noted and have been attributed to an increase in gastric acidity (Harcourt-Brown 2003). In rabbits, ileus or any gastrointestinal problems are a potential emergency as the animal deteriorates very quickly (Harcourt-Brown 2003).

Glucocorticoids can be found in blood, saliva, urine and faeces (McDonald 2003). Steroid hormones enter the alimentary tract via the biliary system where they are conjugated before they are excreted (McDonald 2003; Squires 2003). Faecal glucocorticoids have been found to be raised in situations of chronic stress and not to be significantly affected by acute stressors (Chinnadurai, S. 2006). There is pulse-like release of corticosterone due to the circadian rhythm and seasonal variation (Lightman 2008; Mostl and Palme 2002; Windle and others 1998), higher in the dry season than in the wet season, in faecal glucocorticoid levels (Foley and others 2001) as demonstrated in other species such as the rat and elephant. As there is a degree of species variation in glucocorticoid metabolism and excretion (Mostl and Palme 2002; Teskey-Gerstl A. 2000) it is therefore not possible to accurately extrapolate which metabolite will be found within the faeces. Therefore, as it has been stated that corticosterone is the main glucocorticoid in the rabbit (McDonald 2003; Teskey-Gerstl A. 2000) this study will measure corticosterone in the faeces in order to assess stress physiologically.

The hypothesis of this research is that rabbits housed on their own will have more stress hormones in their faeces than those in pairs, and a secondary hypothesis is that females have higher levels of stress hormones than males as seen in other species such as the European hare and laboratory mouse (Touma and Palme 2005).

Method

The aim of the project was to obtain objective data to validate this assertion that rabbits are more stressed on their own. Endogenous stress levels as indicated by faecal corticosterone levels, measured by a commercially available enzyme immunoassay (EIA) (Corticosterone EIA 900-097, Cambridge Bioscience), were determined in two groups of rabbits – one group housed singly and the other in pairs. All rabbits were housed in a single establishment and apart from shared or unshared housing all other husbandry conditions were comparable. The rabbits were all healthy, neutered adults that were not subjected to any known stressors within 48 hours. The study group consisted of 39 rabbits, comprising nine single females and ten single males and ten each of males and females from mixed sex pairs. The faeces were collected a few days apart in the mornings to minimise any change due to circadian rhythm. The samples were transported in a cool box and then placed in a freezer until tested to reduce any microbial breakdown (Millspaugh 2003). The samples were homogenised and 0.6g of each sample was tested. The faecal steroids were extracted using SEP-PAK C18 cartridges (Weingrill and others 2004). The EIA was validated for rabbit faecal corticosterone by demonstrating dilutional parallelism to known corticosterone standards. Photometric measurement of the plate was done using the SpectraMax 250 (Molecular Devices, USA) microplate reader at an optical density of 405 nm and blanked against the blank wells.

Statistical analysis was carried out on two variables, housing and sex, by a two-way ANOVA after first log transforming the data to ensure that this was normally distributed (SPSS 16.0 for Windows). Faecal corticosterone concentrations were found to be significantly higher in rabbits housed alone compared to those in pairs ($p < 0.001$) and there was no significant difference ($p = 0.918$) between the sexes. There was no significant relationship between sex and housing ($p = 0.309$).

Conclusions

Since faecal glucocorticoids have been related to chronic stress levels in animals, these results suggest that rabbits housed alone are more stressed than those housed in pairs and that this occurs independently of gender. The lack of significance between the two sexes is reflective of work done in some other species that show that

this is not always a factor effecting faecal steroids (Palme and others 2005; Touma and Palme 2005). Further research could be conducted to see if there is a difference between same sex pairs and mixed sex pairs or in larger groups. The results of this study suggest that on welfare grounds more should be done to encourage rabbit owners to keep their rabbits in pairs.

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Keywords: social, stress, rabbit, corticosterone

Behaviour and welfare in Valdostana calves (Castana and Pezzata Rossa breeds): a comparison of two housing systems

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Introduction

Valdostana Pezzata Rossa and Valdostana Nera are two Italian local breeds (Gandini and Villa, 2003). Selected as milk producers (Fontina cheese) in the Alpine summer pasture system they are dairy breeds with secondary dual purpose (milk beef). The need for housing during the first months is due to land conditions that do not facilitate outdoor rearing and a need to protect the animals from adverse weather conditions.

The aim of this study was to compare two housing systems for calves from the age of two months up to 6 months old: permanent tethering in tie-stall was the traditional system in this local area (TTS= Tethering Tie Stall) before 91/629/EC was revised by 2008/119/EC on the protection on calves and littered loose house pens is the current system according to the actual law (GHP=Group Housed Pen).

Materials and methods

The study was carried out for 4 months (March–June 2008) in two different facilities in Valle d'Aosta; in facility 'A' 6 calves TTS versus 6 GHP and in facility 'B' 6 calves TTS versus 10 GHP; all calves females.

Thirty-four items were video recorded and then analysed, divided into sleep and biorhythms, playing behaviours, socio-environmental behaviours included stereotypes (Hafez, 1969; Mendl, 2001; Van Reene, 2005); according to previous published studies where they were classified as indicators of good or poor welfare.

Statistical analysis SPSS 11.5 t-Test for Independent samples; $p < 0,05$.

Results

Facility A

No significant difference was found between group TTS versus GHP, even though calves in pens sleep more and are less vigilant. Those in the TTS system spend more time acquiring food and those in GHP urinate and defecate significantly more. Those in GHP show significant increase in playing behaviour. Socio-environment interactions and stereotypes/displacement activities are present in both groups, but interestingly tongue playing and tongue rolling are significantly more exhibited by those in GHP, as are tail, ear and teat suckling.

Facility B

Those in GHP spend more time lying down than those in TTS; there is no difference in sleeping time and vigilance. Those in GHP have higher ruminating rate and water consumption. Playing behaviours differ significantly between the two groups (GHP > TTS). In socio-environmental interactions and stereotypes/displacement activities the two groups differ significantly but not univocally for the items included, showing ambiguous results; tongue playing and tongue rolling are exhibited significantly more by those in GHP, as are tail, ear, muzzle and teat suckling.

Conclusions

It is recognised scientifically that calves should benefit from an environment corresponding to their needs as a herd-living species; and therefore they should be reared in groups (Bouissou and Boissy, 2005; Veissier et al., 1998; Verga et al., 2000).

The results of the present study pointed out that in an indoor housing system the behavioural differences statistically analysed were not relevant in tethered versus penned calves, if they have sufficient space for exercise, contact with cattle

and normal standing up or lying down.

Finally the intensive farming systems should comply with the requirements of the welfare of calves as well as consider the socio-economic implications of different systems.

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Keywords: Valdostana Castana, Valdostana Pezzata Rossa, calves, behaviour, welfare

Pilot study to investigate whether a feline pheromone analogue reduces anxiety-related behaviour during clinical examination of cats in a rescue shelter

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Introduction

Minimising stress in cats in a shelter environment has many benefits, including improved welfare, minimising disease recrudescence and transmission, and reducing the time-to-rehoming interval. Cats are most stressed on admission to the facility, when the environment is novel. This study investigated the effect of a synthetic feline facial pheromone (F4, Felifriend, Ceva Sante Animale, France) on anxiety-related behaviour during clinical examinations at a feline rescue shelter (National Cat Centre, NCC, Cats Protection, UK).

The F4 pheromone is shown to reduce the probability of aggressive behaviour [1], making intra- and inter-specific interactions easier [2], to reduce the restraint required to perform clinical examinations [3], and to reduce the restraint required in cats with phobias [4].

Methods

The study was a blinded, placebo-controlled trial using Felifriend (CEVA) or a placebo carrier base without F4 (CEVA). 58 cats admitted to the NCC over a 4 week period were randomly allocated to two groups; one group was exposed to

solution 1 ($n=33$), the placebo carrier base, and one to solution 2 ($n=31$), the F4 solution Felifriend (CEVA). The test product was applied to gloved hands prior to handling cats, according to the manufacturer's recommendations. An independent monitor observed the cats at two points: a preliminary examination and a later veterinary examination within the first week. Behaviour was scored on a seven point scale based on a published cat stress score (CSS) [5]. All additional human-cat interactions, in between the preliminary and veterinary examination were accompanied with the allocated test product. Feral cats were excluded from the study due to risk of conflict leading to aggression on exposure to F4 in the presence of a learned threat. Comparisons were made between the solutions at both examinations. Comparisons were also made between the two examinations for both solutions. Extensive information about each cat's history was collected upon arrival, including information on the previous home, owners, reason for rehoming and travel time to the rescue centre.

Results

In the placebo group ($n=33$), there were 17 females, 15 males, and 1 unknown sex, ranging from ages 1 week to 14 years old. The F4 solution group ($n=31$) had 10 females, and 21 males, with an age range of 12 weeks to 14 years. The Anderson-Darling normality test showed that the data was not normally distributed, and so the average CSS were logged (transformed) to give a more normalised distribution. A significant difference was observed in anxiety-related behaviour (mean CSS 3.7 vs 3.2) between the placebo solution and Felifriend (CEVA) during the preliminary examination (one way ANOVA, $p=0.028$). There were no significant differences in CSS between the solutions during the veterinary examination, or when the examinations were compared for both solutions. No further relationship was found between the other data collected and the CSS.

Conclusions

Felifriend (CEVA) was associated with reduced anxiety-related behaviour during preliminary examination in a novel shelter environment; usage may improve feline welfare in the initial acclimatisation period.

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Keywords: F4, pheromone, behaviour, shelter

Phenotypic determination of noise reactivity in three breeds of working dogs: implications for identifying genomic regions of interest

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Hundreds of years of artificial selection have resulted in an array of size and shape variability in domestic dogs that exceeds that of thousands of years of natural selection in wolves (Sutter et al., 2007; Wayne, 1993, 2001; Wayne et al., 2001). The story of dogs is the story of co-operative work with humans that is likely to be the result of co-evolution and not just domestication (Overall, 2000). Much of the physical variation in dog breeds is a consequence of overt selection for specific suites of behaviours (e.g., coats that are better for dogs who hunt than for dogs who retrieve, and the behavioural patterns that differ with tasks like herding v. retrieving). The working history of domestic dogs is reflected both by traditional kennel club classifications and by clustering analyses used in genetic mapping (Parker et al., 2004; Parker and Ostrander, 2005).

Since breeds represent intense canalisation of genetic variation, we can hypothesise that different breeds may also vary with respect to genes responsible for different biological processes including growth, cognitive development, specialised skills, and liability for the development of behavioural problems. Genetic studies have recently elucidated the mechanisms governing development of sex

differences (size dimorphism) during the growth of female and male Portuguese water dogs (Chase et al., 2005; Lark et al., 2006). In Portuguese water dogs, dogs homozygous for one haplotype are almost always small, while dogs homozygous for the second haplotype are almost always large. Across dog breeds, size is affected by the insulin-like growth factor gene (IGF1) (Sutter, et al., 2007). A single IGF1 variant is found in all small breeds, but is nearly absent from the truly giant breeds, suggesting that – as has been found for other mammals – lack of insulin-like growth factor is associated with small size. Certainly, such richly partitioned information would provide breeders with many opportunities to select for other features that may vary with size.

Certain behavioural pathologies are more common in some breeds than in others, and we know that when the same behavioural pathologies are recognised across breeds that the breed may inform the specific manifestation of the pathology. For example, German Shepherd Dogs with obsessive-compulsive disorder (OCD) most commonly present with continuous tail chasing, while dogs of other breeds suffering from OCD typically present with different symptoms (Overall and Dunham, 2002).

Consistency in performance of desired behaviours in purpose-bred dogs is the result of intense, focused selection on the basis of co-varying traits or associations. Despite this strong selective intervention in the dog, the opportunity is seldom available to formally evaluate the factors that jointly affect both form (structure) and function (behaviour) of the animal (but see Hare and Leighton, 2006). The evaluation of physical form as a phenotype is straightforward compared to the evaluation of behavioural function. This accounts in part for the relative success of studies of heritable somatic conditions (e.g., progressive retinal atrophy, ivermectin sensitivity compared with those focusing on behaviour).

While Border collies exhibit herding behaviours that are more alike when compared to each other than to other herding breeds, there is significant intra-breed variation in how and how well individual Border collies work. The more specific the aspect of the herding behaviour being investigated (e.g., the use of 'eye') the more likely it is that parental and offspring scores for the trait will be similar (Burns and Frazier, 1966). These findings suggest that useful components of behaviours or suites of behaviours are heritable, and should be amenable to examination using molecular genetic techniques.

Today, Border collies are bred for reasons other than utility as working dogs (e.g., conformation, agility). Behavioural variation increases the further removed the dogs are from ancestors bred to work stock. The traditional concept of temperament does not allow for examination of such inter-generational changes, and does not lend itself well to discrete definitions and assessments of specific behaviours, which may well have individual genetic components that are open to variable degrees of environmental influence (Chang et al., 2009). In other words, the traditional concept of temperament provides a relatively poor phenotype on

which to base breeding decisions, and may have tenuous links to the underlying genotypes affecting the behaviour of an individual dog or breed.

The most common behavioural reason for failure in any kind of work programme or for clients' concerns about pet dogs involves some aspect of anxiety, which appears to interfere with their ability to learn complex tasks or to adjust to changing environments and demands. Many dogs who are able to continue to function despite such profound distress may be 'super-normal' – dogs that work despite, not because of, their condition. When breeders select for an extreme in tolerance to any stimulus they almost always produce some dogs that are fearful of exactly the stimulus they were intended to tolerate. This pattern was noted in some of the original research performed on 'improving' behaviour in dogs. In German Shepherd Dogs selected for non-reactivity to gunshots, the mode of inheritance for the trait appeared to be Mendelian, with non-gun-shy dogs (N) being dominant to gun shy-dogs (n), and the heterozygote having some intermediate reactivity (Humphrey and Warner, 1934). These types of data strongly suggest that improvement in behaviour and skills could be effected through (1) accurate behavioural phenotyping for the desirable trait and (2) identification of polymorphic, heritable variation using molecular methods.

The most straightforward way to identify animals that might have special or more acute skills is to (1) identify the phenotype that may be useful, (2) describe its distribution and variation in the population, and (3) using genome scanning techniques, search for patterns of genetic variance that correlate with the behavioural variance detected. Identification of targeted behaviours or behavioural suites, coupled with evaluations of intensity, frequency, and latency, are superior to other evaluation schemes involving scores assigned by humans on scales such as Likert scales. Furthermore, such discrete behavioural information is required if molecular genetic approaches are to offer anything to any type of purpose-bred dogs. This is precisely the approach that we have taken to understanding noise reactivity and phobias in dogs.

Noise sensitivities, fears and anxieties affect a dog's ability to function normally. For pet dogs the issue is the dog's distress. For working dogs the issue is whether reactivity interferes with the dog's ability to work. Noise reactivity is associated and may be co-morbid with many canine and human anxiety disorders and is thought to be important in human conditions where information processing is affected. We examined noise reactivity in three breeds of herding dogs commonly used for work: Australian shepherds, Border collies and German shepherds. We assessed phenotypic variations of dogs with respect to noise/sound sensitivity and analysed these behavioural phenotypes in the context of genetic (single nucleotide) polymorphisms (SNPs) found using Affymatrix chips (canine) and a genome-wide association study (GWAS).

Behavioural and demographic information was collected for 165 Australian shepherds, 211 Border collies and 93 German shepherds. Sixty dogs of each breed

were genotyped. Behaviours were compared using a metric that includes type, frequency and intensity of response, the Anxiety Intensity Rank (AIR score). Reactivity to noise segregates in family lines, although individuals within families may have considerable variation in noise response. The presence and intensity of reactivity varied with age, and this pattern differed across breeds (Border collies sampled were older and more severely affected).

Finally, genotypic correlations can be examined in these populations using two different approaches: case control and quantitative analyses. Case-control and quantitative comparisons of genotypes both produced numerous but different regions of interest, and the region identified depended on the specifics of phenotyping. In all cases, genetic regions purported to be involved in information processing were strongly suggested to be important. An increased sample size, further fine mapping, and sampling from more geographically variable breed populations may resolve these issues.

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Keywords: Canine behaviour, phenotypes, noise phobia, noise reactivity

The role of the hypothalamic-pituitary-adrenal axis in canine aggression towards humans

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Introduction

Canine aggression directed towards humans is the most common reason for the referral of dogs to behavioural practices (Bamberger and Houpt, 2006). Apart from being an important problem of public health (Overall and Love, 2001), dog bites to humans also pose a problem in terms of animal welfare since a significant number of biting dogs are euthanised or abandoned (Mikkelsen and Lund, 2000). In addition, inappropriate punishment and isolation of the dog from the family and visitors are other effects of aggressive behaviour on canine welfare (Hunthausen, 1997). In the clinical setting, several behaviourists highlight that a great proportion of aggressive dogs shows signs of stress during aggressive episodes or comorbid anxiety-related behaviour problems (Bamberger and Houpt, 2006; Reisner et al., 2007; Luescher and Reisner, 2008).

It is suggested that the hypothalamic-pituitary-adrenal (HPA) axis plays an important role in the neuroendocrine control of aggression. The measurement of glucocorticoids in different biological samples (blood, urine, faeces or saliva) has been traditionally used to assess the stress response in several species (García-Belenguier and Mormede, 1993). Regarding aggression, high and low concentrations of cortisol have been related to abnormal forms of aggression in different human subpopulations (Haller et al., 2005; Nelson and Trainor, 2007). In wolves, higher concentrations of faecal cortisol have been detected in dominant

individuals in comparison with subordinates, but this finding was not associated with high rates of aggression in the former (Sands and Creel, 2004).

Recently, other adrenal steroids such as dehydroepiandrosterone (DHEA) and its sulfate derivative (DHEAS) have been proposed to be involved in the neuro-endocrine control of aggression in several species (Soma et al., 2008; Golubchik et al., 2009). These are two neuro-active hormones produced in the adrenal gland and also in the brain, thus receiving the name of neurosteroids (Baulieu and Robel, 1998). Neurobiological actions of DHEA(S) include neuroprotection, neurite growth, and antagonistic effects on oxidants and glucocorticoids. Given the antigluco-corticoid properties of DHEA(S) and the wide interindividual variability in DHEA(S), as well as in cortisol levels, it is suggested that it would be more informative to consider the ratio of DHEA(S) to cortisol rather than their absolute concentrations in order to assess stress (Maninger et al., 2009).

The concentrations of the above mentioned steroid hormones have not been analysed to date in privately-owned aggressive dogs. The aim of the present study was, therefore, to assess the role of the HPA axis in canine aggression towards humans by measuring plasma concentrations of cortisol and DHEA in both aggressive and non-aggressive dogs. The effect of gender was also addressed.

Material and methods

Two Spanish veterinary teaching hospitals (Universidad de Zaragoza and Cardenal Herrera-CEU, Valencia) contributed to the collection of aggression cases. Eighty aggressive dogs (52 males and 28 females) were included in the study. This group consisted of dogs of 23 different breeds and their crosses and 10 small-medium mongrels. These dogs were referred to the Companion Animal Behaviour Services owing to problems of aggression towards people. Diagnosis of aggression was carried out by means of a detailed standard questionnaire concerning the dogs' behaviour and their daily routine. Aggression directed to the family members during competitive or conflict situations was the most common diagnosis (71.5%). Several forms of aggression were detected in 35% of the cases.

The control group was made up of 19 dogs (8 males and 11 females) selected from a random sample of dogs from the hospital's database (Universidad de Zaragoza). They all were healthy and lacked any history of aggression towards humans or other dogs.

Blood samples (3 ml) were drawn into EDTA tubes and centrifuged at 4500g at 4°C for 10 minutes to obtain plasma. Plasma cortisol and DHEA were determined in duplicate using two home enzymoinmunoassay techniques (Chacón, 2004). Concentrations were expressed in ng/ml. The DHEA/cortisol ratio was calculated.

A multifactorial multivariate analysis of variance was carried out to assess the

effect of the factors 'aggression' and 'gender' on cortisol, DHEA and the DHEA/cortisol ratio. Calculations were carried out using the statistical program SPSS 14.0. for Windows (SPSS, Inc, Chicago, USA). $P \leq 0.05$ denoted statistical significance.

Results

Aggressive dogs showed significantly higher concentrations of plasma cortisol than non-aggressive dogs (21.4 vs. 10.6 ng/ml, $P \leq 0.05$). Males showed significantly higher concentrations of plasma DHEA and DHEA/cortisol ratio values than females (DHEA: 90.9 vs. 29.8 ng/ml, $P < 0.05$; ratio: 9.5 vs. 3.8, $P < 0.01$).

Discussion

In the present study, the concentrations of plasma cortisol and DHEA were assessed both in aggressive and non-aggressive dogs. The aggressive group showed higher concentrations of cortisol than the control group. This finding agrees with previous studies in humans that show an association between high cortisol concentrations and affective (hostile-reactive) forms of aggression as opposed to non-affective (instrumental-proactive) aggression, which is characterised by chronic cortisol deficiency (Haller et al., 2005; Nelson and Trainor, 2007). In the realm of canine aggression, it is interesting to note that many aggressive dogs show ambivalent signals during aggressive episodes, which are believed to be an indicative of high arousal (Luescher and Reinser, 2008). In addition, a great proportion of aggressive dogs also display anxiety-related behaviour problems (Bamberger and Houpt, 2006; Reisner et al., 2007). An elevated cortisol level may be related to these clinical findings and suggest a hyperactivity of the HPA axis in the aggressive group.

Regardless of the group, males showed higher concentrations of plasma DHEA and DHEA/cortisol ratio values than females. Several studies have reported higher levels of DHEAS in men than in women (Laughlin and Barret-Connor, 2000; Enomoto et al., 2008) but results regarding DHEA are scarce and conflicting. The mechanisms underlying gender differences in adrenal DHEA and DHEAS levels are unknown (Laughlin and Barret-Connor, 2000). Women suffer disproportionately more stress-related disorders such as anxiety and depression than men, and it has been suggested that interactions between gonadal and stress hormones may be involved in predisposing females to this kind of disorders (Solomon and Herman, 2009). Considering the antigluco-corticoid action of DHEA, which is moreover a prohormone for sex steroids (Maninger et al., 2009), it could be suggested that DHEA levels may play a role in those interactions. In the present study, the lower DHEA/cortisol ratio displayed by female dogs may suggest that these

are less capable of buffering the negative effect of stress.

Another study by the authors showed that 30-day-long fluoxetine treatment induced a trend towards a rise of DHEA/cortisol ratio values both in a group of privately-owned aggressive dogs and in A GROUP of non-aggressive beagles, suggesting an improvement in the well-being of the animals (data not published). These results indirectly fit with those studies showing the beneficial effects of DHEA administration in depression, anxiety and well-being in several human subpopulations (Strous et al, 2003; van Broekhoven and Verkes, 2003). Regarding aggression, some studies in rodents show that the administration of DHEA decreases some forms of aggression (Soma et al. 2008) whereas the experimental augmentation of brain DHEAS increases aggression (Nicolas et al., 2001). The DHEA(S)-induced changes in GABA activity appear responsible for the effects of DHEA(S) in aggression (Soma et al., 2008). Other actions such as its sigma 1 receptor-mediated enhancement of serotonergic neurotransmission (van Broekhoven and Verkes, 2003) may also be involved.

In conclusion, the higher concentration of cortisol in aggressive dogs may suggest a relationship between aggression and stress in canine species. Gender dimorphisms in DHEA and DHEA/cortisol ratios may suggest differences between male and females in buffering against the centrally mediated, negative effects of stress. The role of cortisol and DHEA(S) in mediating canine aggression and the mechanisms underlying gender differences has yet to be fully determined but these findings give a new insight into research on the biological basis and clinical management of behaviour problems in dogs.

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Keywords: Canine; Aggression; Cortisol; Dehydroepiandrosterone.

Are T₄ or prolactin levels good indicators of the state of anxiety?

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Introduction

Recent veterinary literature indicates that prolactin and/or thyroxine (T₄) levels can be considered to be good indicators of anxiety and that this is a frequent clinical finding. This study was conducted with the aim of establishing whether these perceptions are reliable

Method

To avoid any controversy about the variations of prolactin in relation to the oestrous cycle only male dogs were included. The study was conducted on 58 dogs presented at general practice or at behavioural referral practice. All investigators were veterinary behaviourists who had graduated from French National Veterinary schools. Most of them were also running a general practice. Only one was only seeing cases of behaviour disorders at a referral level and therefore did not contribute any cases to the reference sample. The T₄, TSH and prolactin levels from a sample of 'normal' dogs, defined as dogs with neither a diagnosis of anxious state nor a diagnosis of any pathological state, were compared to those of anxious dogs, as diagnosed by the medical and behavioural history taken by the practitioner combined with the dog's score on the EDED Scale.

Results and discussion

The results of the study were interesting and somewhat unexpected.

T₄ and TSH levels were not found to be correlated with a functional diagnosis of anxiety. Some trends were found and it might be supposed that with a larger sample size significance may have been achieved. However, with the current

sample size no significant correlation could be identified.

In contrast a significant correlation was identified with prolactin and this was consistent with the literature. However, although there was a significant difference between normal and anxious dogs, the range of prolactin levels was wider than the one previously described. In addition no correlation was found between the EDED scale and prolactin levels. It is therefore suggested that both tools need to be used to provide a complete picture of the case.

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Longitudinal magnetic resonance spectroscopy changes in aged beagle dogs

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Introduction

Cognitive Dysfunction Syndrome (CDS) is an increasingly common medical condition in pet dogs characterised by age-related changes in behaviour that are not secondary to an underlying medical condition. Similar to human Alzheimer's disease (AD), the clinical manifestations are likely to be related to brain changes, but there is currently no objective tool to predict whether or not CDS will develop. Diagnosis is often made once symptoms are already in their advanced stages and a breakdown of the owner-pet relationship has occurred. Current research is therefore focused on novel diagnostic approaches to identify potential cases of CDS before the cognitive and behavioural symptoms appear. One such area of interest is in the study of the brain using *in vivo* imaging.

Using conventional magnetic resonance imaging, brains of old dogs show cortical atrophy and enlarged ventricles compared to brains of the younger dogs (Su et al., 1998). Furthermore, analyses of specific brain regions were performed by Tapp et al. (2004) on 66 beagle dogs (3 months to 15 years), who reported that increasing age was associated with a decrease in total brain volume, frontal lobe volume and hippocampal volume. The subjects were then divided into 5 age groups: puppies (3 months), young (6 months–3.9 years), middle-age (4–7.9 years), old (8–11.4 years), and senior (>11.4 years) for quantitative comparisons. They reported that decreases in total brain volume appeared only in the senior animals, which also had the smallest frontal lobe volume, and the largest frontoventricular volume.

Frontal lobe volume decreases were also found in the old group. Reductions in frontal lobe volume are also correlated with increased amyloid deposition and impairment on cognitive measures dependent on the frontal lobe, which supports the hypothesis that brain changes are responsible for the behavioural and cognitive changes associated with aging.

In addition to changes in brain structure, increasing age also results in changes in the biochemical composition and metabolism in the brain. Advances in imaging technology have allowed for brain chemistry changes to be monitored via magnetic resonance spectroscopy. In humans, magnetic resonance spectroscopy imaging is used to study various metabolites in the brain in the hope of finding metabolite level abnormalities before symptoms associated with disorders such as Alzheimer's disease occur. Of particular interest are n-acetyl containing compounds (NAA) and myo-inositol levels. NAA is considered to be a marker of neuronal function and myo-inositol is thought to be a glial cell marker. In dogs, we have previously reported levels of NAA to be decreased in senior animals compared to young, which parallels the findings in Alzheimer's patients when compared to age-matched controls. These studies, however, are cross-sectional and do not describe how these markers change with time. The main objective of the present study was to determine changes in brain metabolites following a longitudinal design.

Methods

Magnetic resonance imaging procedures were conducted on all dogs at the Ontario Veterinary College at the University of Guelph, Guelph, Ontario. Prior to imaging, all subjects were anaesthetised and maintained on an isoflurane-oxygen mixture. Subjects were then placed in the magnet in prone position. Proton magnetic resonance spectroscopy was performed with the following specifications: A Press, or point-resolved spectroscopy (Probe-P) with TR=1500 ms, TE=102 ms, single voxel placed in the centre of the brain=8 ml, NEX=256. ¹H-MRS scan time was approximately 8 mins. Magnetic imaging procedures were conducted using a GE-LX 1.5T MRI scanner, LX hardware configuration, 11.0 software level. Aged dogs (n=11, mean age=10.1 years) were imaged at baseline and again after 1.4 years to determine the effects of age on brain metabolite levels.

As a first approximation, the concentrations of each metabolite were determined using the LC Model fitting procedure (Provencher, 1993). The error estimates for the fitting procedure were calculated and peaks with an error of greater than 20% were discarded from the analysis.

To examine changes in metabolites levels with age, a separate repeated measures analysis of variance was conducted for each metabolite using Statistica version 7. A significance level of 0.05 was required for statistical significance. Post-

hoc analyses were done using Fisher's Least Significant Difference test.

Results

Six metabolites were detected in dogs: creatine, n-acetyl aspartate, glycerophosphocholine, myo-inositol, total choline and total n-acetyl. Of these, only total n-acetyl levels decreased significantly from baseline ($F_{(1,10)} = 8.6571$, $p = 0.014728$). Also, there was a trend for n-acetyl aspartate alone to decrease with time ($F_{(1,10)} = 3.3323$, $p = 0.097901$). All other metabolites did not change significantly between the two time points.

Discussion

The current study suggests that changes in brain metabolites can be used to monitor age related brain changes in real time. Specifically, the current study indicated that total n-acetyl decreases in a 1.4 year time frame in aged dogs. Decreases in total n-acetyl levels have been linked to cognitive dysfunction in Alzheimer's disease in humans, and, therefore, these results suggest that cognitive dysfunction may be progressing in this group of dogs. Although we did not examine behavioural or cognitive correlates in the current study, the data encourage a better understanding of how these brain metabolites correlate with functional changes. Additionally, the data support the use of MRS as a tool for biomarker endpoints in drug research. Overall, magnetic resonance spectroscopy may be a useful tool if it is shown that biomarker levels predict later changes in behaviour and cognitive function.

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Keywords: Imaging, Beagle, Aging

The effect of feline interdigital semiochemicals with primers in relation to scratching marking

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Introduction

Scratching behaviour is commonly associated with cats but is seen by many owners as one of the most unacceptable nuisance behaviours in this species. Most owners misunderstand the significance of the behaviour, seeing it simply as a means for the cat to control the length of its claws. Several authors have described the role of scratching in territorial marking with an association of visual (scratches) and olfactory signalling. The purpose of this double blind study is to assess the primer effect for scratch marking of interdigital feline semiochemicals.

Method

An analogue of feline interdigital semiochemicals was tested on 16 cats. These domestic cats were described by owners as scratching intensively. For each cat, owners were asked to choose a 'target area' which was a place where the cat engaged in intensive scratching activity. Two cardboard scratching posts were fixed at 60cm on either side of the target area. Each of these was sprayed daily with a placebo (solvent) or semiochemical solution. The assessment parameter was the total number of scratches, during the 7 days of the study, counted by putting a piece of paper on half the scratching surfaces. Comparison was made using the Mann-Whitney test.

Results

The scratching post sprayed with the semiochemical was significantly more frequently used by the cats when compared to the target area ($p < 0.05$) and in a very highly significant way ($p < 0.001$) when compared to the placebo sprayed scratching post.

Conclusions

Scratching is a normal way for felines to communicate and approaches which enable this behaviour to be redirected into appropriate locations pose an interesting alternative strategy to declawing. The appropriate application of a semiochemical appears to be an effective method for achieving this and highlights the role of chemical communication in this behaviour.

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Keywords: cat, feline interdigital semiochemicals, scratching behaviour, territorial marking

The maternal Cat Appeasing Pheromone: exploratory study of the effects on aggressive and affiliative interactions in cats

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Introduction

Cats lack post conflict mechanisms for repairing bonds after aggression and the behaviours of avoidance and tolerance are shown during conflict management. The pheromones produced by the mammary complex have an appeasing action on offspring and adults in different species and are useful to maintain the cohesion between offspring.

The aim of this study is to evaluate the effect of maternal Cat Appeasing Pheromone (CAP) on aggressive and affiliative interactions of adult cats living in a permanent group.

Method

The aggressive and affiliative interactions of 16 cats were evaluated during a standardised test: the introduction of a conflict of interest. The experimental design was as follows: two parallel groups of 8 subjects were standardised in respect of sex and degree of kinship. The study was a randomised double blind placebo controlled procedure. Two independent observers analysed the video of the cats (Spearman's $\rho > 0.9$). A total of 24 encounters between all the possible pairs of cats in each group, were recorded. The CAP or placebo treatment was applied on both cats

involved before each encounter. For ethical reasons, we did not force confrontational encounters between the cats.

Results

The CAP group showed an increased duration of affiliative interactions ($df=1$; $Z=1.299$; $p=0.1939$) and time spent in proximity ($df=1$; $Z=1.645$; $p=0.0999$) and a lower threat rate ($df=1$; $Z=-1.506$; $p=0.1319$) compared to the placebo group (Wilcoxon two-sample Test). In the CAP group, affiliative interactions were also maintained after the conflict of interest introduction ($df=11$; $S=21$; $p=0.1099$; Wilcoxon signed-ranks test).

Conclusions

In spite of obtaining non significant differences between treatments, these results showed useful information about the effect of CAP on affiliative and aggressive interactions between cats. These preliminary results offer an interesting base for investigating the effect of CAP in a post aggression context for potential clinical use in feline behavioural medicine.

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Keywords: aggression, cat, cat appeasing pheromones, post conflict behaviour

The effects of varying floor area on the behaviour of pet rabbits (*Oryctolagus cuniculus*)

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Introduction

Domestic rabbits are used for a range of purposes including laboratory research, meat production and as pets or companions. There are housing and welfare recommendations for laboratory and meat animals in the UK (e.g. Home Office 2009; DEFRA 2009) but there are yet to be official guidelines produced for the care and housing of pet rabbits. There are a wide variety of commercially available housing options for pet rabbits. For example, hutches can range from single level to multi-tiered enclosures, from 0.2m² to 1.24m² in surface area and from 0.3m to 1.8m in height (Mullan and Main 2005). The variation in pet rabbit housing combined with a lack of research concerning the behavioural needs of companion rabbits makes it difficult to identify key welfare issues and develop appropriate guidelines for the care and housing of pet rabbits.

Rabbit welfare guidelines for laboratory and meat animals tend to emphasise the importance of space and the ability of the rabbit to be able to perform species typical behaviour patterns, such as stretching, rearing and hopping at least 3 paces (Morton et al 1993; Council of Europe 2006). However, many hutches designed for pet rabbits potentially inhibit or prevent these behaviour patterns. Additionally, singly housed laboratory rabbits in smaller enclosures show limited ethograms compared to group housed rabbits living in large enclosures (Bell 1984; Stauffacher 1995). This raises the concern that current pet rabbit housing may not provide sufficient space, resources or social stimuli to allow adequate expression

of locomotor and comfort activities, environmental interaction and social behaviour (Meredith 2005). Spatial restrictions that influence the execution of behaviour are generally thought to cause frustration and have an impact on welfare, whilst in rabbits restriction of natural movement has also been shown to cause permanent abnormalities of the skeleton (Drescher 1992). Rabbits are now the third most popular pet in the UK, behind cats and dogs, and with over 1.4 million being kept in 1995 (McBride 1998), the welfare of a large number of animals could potentially be compromised.

It is therefore important to determine the spatial requirement of pet rabbits so that appropriate housing can be provided. The objectives of this experiment are 1) to record the behaviour patterns of rabbits in different sized enclosures and 2) to determine if rabbits exhibit rebound effects when transferred from smaller to larger enclosures.

Materials and methods

The effect of varying floor area was investigated in 19 rabbits, including small or dwarf breeds, medium or standard breeds, large and giant breeds. During the trial all rabbits were fed a pellet feed and given fresh hay, water and vegetables daily. The bedding consisted of a layer of newspaper covered by shredded paper and a shelter was always provided.

The rabbits were individually housed in floor pens could be manipulated into 3 different sizes.

1. Small: $0.60\text{m} \times 1.47\text{m} = 0.88\text{m}^2$, approximating the size of a standard rabbit hutch.
2. Medium: $1.14\text{m} \times 1.47\text{m} = 1.68\text{m}^2$, an intermediate size, equivalent to 18 square feet.
3. Large: $2.28\text{m} \times 1.47\text{m} = 3.35\text{m}^2$, a larger pen size equivalent to 36 square feet.

Cameras were positioned in front of the pen to provide side on view of rabbit and directly above of the pen to provide an overhead view of position in pen and behaviour. Each rabbit was recorded in each size treatment for 24-hour periods using Time Lapse VCRs with infrared lights set up to allow for night vision.

Behavioural data were collected from video recordings by focal animal instantaneous scan sampling every 30 minutes. In addition, the number of hopping bouts and number of hops per bout for five 10 minute periods for each of the pen sizes for ten rabbits were collected at approximately 1000h, 1500h, 2000h, 0100h and 0600h.

Continuous behavioural sampling was performed following transfer to new pens. The durations of discrete activities and the frequencies of the number of hops, rears, rear alerts, entries into the shelter and hops on to the top of the shelter

were recorded for a 2 hour period.

Data were transformed when necessary to achieve normality where necessary. Data were analysed in SAS using mixed model analysis with the repeated measure being rabbit.

Results

Pen size did not affect consumption or maintenance behaviour. However, rabbits spent more time sitting inactive and lying in the small pen than in the large pen and interacted less with environmental resources in the small pen than in the medium and large pen.

Rabbits performed more bouts of locomotion in the large pen, followed by the medium pen, with the fewest bouts of hopping in the small pen. Rabbits performed the highest number of hops per bout in the large pen than in the medium or small pens.

There was no evidence of rebound effects on consumption, time spent inactive, number of hops, number of sit alerts, number of entries into a shelter, number of jumps on top of the shelter and number of interactions with other environmental resources. There was an effect on the amount of time spent active, with rabbits increasing their activity levels in the first 2 hours after switching from a smaller pen to a larger pen. The frequency of rear alerts was similarly affected, with rabbits performing more rear alerts after switching from a smaller pen to a larger pen.

Discussion and conclusions

Pen dimensions did affect rabbit behaviour, with smaller enclosures restricting some behaviour patterns. In the small pen, rabbits were more frequently observed inactive whilst in larger pens they engaged in more environmental interaction. This suggests that rabbits in smaller enclosures are not only less active, but also may not make full use of any environmental resources such as chewing/rubbing objects or foraging devices. Rabbits also show rebound in activity and rearing when pen size is increased, which provides further evidence that motivation to express exploratory behaviour or environmental monitoring may be inhibited in rabbits in smaller enclosures. In the long term increasing opportunities for locomotion and environmental interaction may help decrease inactivity-related problems such as obesity (e.g. Ichinoseki-Sekine et al 2009) and bone injuries/deformities (Drescher, 1992).

In conclusion, it appears that small pet rabbit enclosures including many that are commercially available would not provide enough space for rabbits to adequately express a number of activities and may consequently threaten pet rabbit welfare. Access to a larger enclosure where increased activity can be performed

would therefore improve pet rabbit welfare.

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Management routine risk factors associated with handling and stable-related behaviour problems in UK leisure horses

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Introduction

The management systems imposed on domestic horses in the western world are often far removed from the environments for which their evolutionary predecessors were so well equipped (Goodwin, 1999). Since their domestication, the role of horses in human society has changed considerably; however, the way in which horses are housed and managed has often failed to do the same. Horses are more commonly confined, socially isolated and food restricted than most production animals (McGreevy, 1997) and this has serious implications for their welfare.

Horses can exhibit a range of unwanted and abnormal behaviours, for example biting or stereotypies, many of which can be attributed to a suboptimal environment and management regime (Kiley-Worthington, 1997; McGreevy, 2004; Zeitler-Feicht, 2004). The demographic of horse owners is changing towards new and increasingly urbanised leisure owners who may lack the experience to cope with behavioural problems and may have restricted access to land and facilities (Leckie, 2001; Henderson, 2007); both representing potential welfare concerns. Leisure horses make up the majority of the equine population in the UK (Kiley-Worthington, 1997; Leckie, 2001), yet there are little quantitative data available regarding the day-to-day management of these horses and the prevalence of behaviour problems within this population.

The aim of this study was to generate data on how leisure horses in the UK are housed and managed. Information about handling and stable-related problem

behaviour and its prevalence within this population was also collected with a view to identifying associated management routine risk factors.

Method

A large-scale Internet survey of leisure horse owners was used to collect data on individual horses in their care. Owners were asked to report on their horse's management routine as it was during the week prior to completing the survey, which was intended to reduce recall bias. As management practices commonly vary across seasons, the survey remained online for a full calendar year to ensure that data were generated for all seasonal variations. In addition to providing details on their horse's management routine, owners were asked to rate how frequently their horse displayed twenty different behaviour problems by rating the frequency of performance on a 1–5 scale, which ran from never to often. The behaviour problems included in the survey were comprised of behaviours that may be seen during routine handling procedures, e.g. pulling faces or biting when groomed or tacked-up, as well as problems that are often related to the stable, such as weaving, bed eating and aggression. The survey was granted ethical approval by the Departmental Ethics Committee for the Department of Psychology at the University of Chester.

Owners were recruited from a variety of sources, both online via Internet discussion forums and equestrian websites, and through more traditional media such as announcements in the local press and national equestrian magazines, as well as mailshots to livery yards.

Demographic information provided by survey participants was used to compare the sample generated by the survey with published information about this population of leisure owners and horses. The survey data were found to be representative of the wider leisure horse population.

The data were analysed in SPSS version 14 for Windows (SPSS Inc., USA). Principal components analysis was used to identify any correlations between behaviour problem variables and so reduce the number of dependent behaviour variables for further analyses. Associations between these new behaviour problem components and management routine risk factors were explored using univariate and multivariate logistic regression analyses.

Results

Data were collected for 1230 horses with 82% of these expressing one or more behaviour problems. The majority of owners rated the behaviour problems at a relatively low frequency on the 1–5 scale, indicating that although many horses had problems they were seen at a relatively low frequency. Principal components

analysis extracted five distinct behaviour problem components, indicating that the behaviour problems were not displayed at random but share a common underlying cause. The prevalence of the five behaviour problem components within the population varied from under a quarter of the sample displaying locomotor stereotypies to just over half displaying issues during routine handling procedures. Frustration behaviour and abnormal oral/ingestive behaviour were both seen in approximately half the horses sampled, while a third of horses displayed problems comprising the aggression towards people component.

Logistic regression analyses were used to explore associations between each of these behaviour components and details of management routine. Time spent stabled was associated with an increased risk of issues during handling, abnormal oral/ingestive behaviour and aggressive problems. Features of the turn-out group were risk factors for all behaviour problem components except aggressive behaviour, with an established turn-out group containing 7–9 other horses associated with the least problems. Frustration behaviour had the largest number of associated risk factors and these primarily represented an increased risk when full social contact was thwarted in the field and stable.

Discussion

Handling and stable-related behaviour problems are highly prevalent within UK leisure horses, albeit at low frequencies, and the findings of the principal components analysis indicate that these behaviours are not being displayed at random. This has important implications for owners. There can be a tendency to dismiss some behaviour problems as a learned response for food or attention, a habit picked up from a past home or even to blame the horse itself for being 'mad' or 'stupid' (Kiley-Worthington, 1987). However, these findings suggest that this is unlikely to be the case. The grouping of individual problems into five separate components implies that the problems within each component are related by a common aetiology; consequently, the cause of even minor problems should be investigated by owners to help prevent further problems arising.

The management routine risk factors identified by the logistic regression analyses varied across components, however some key themes emerged. The length of time the horse spent stabled per day was associated with an increased risk of three of the five behaviour problem components, which supports the findings of other studies (e.g. McGreevy et al., 1995; Redbo et al., 1998). This finding has implications for the welfare of leisure horses in the face of the recent trend towards year-round stabling (Anon-BETA, 2006). The BETA National Equestrian Survey (Anon-BETA, 2006) reported a twofold increase in the number of horses being stabled to some extent throughout the year since 1999, perhaps as a consequence of the limited availability of land for turn-out. Time spent at grass and the

opportunity to form proper social relationships are both key risk factors, with traditional stabling practices at odds with these. The increasing urbanisation of leisure horses must be addressed by management practices, such as group housing, that permit full social relationships when turn-out is limited.

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Keywords: horse; management; behaviour problems

Equipment and training risk factors associated with ridden behaviour problems in UK leisure horses

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Introduction

Over the last decade the number of people riding horses for leisure purposes has increased considerably and this trend is predicted to continue (Anon-BETA, 2006). The majority of leisure horses are primarily owned to be ridden (Anon-BETA, 2006) and any factor that renders the horse unfit for purpose can result in it being sold on by the owner, surrendered to an equine welfare charity or euthanised (McGreevy and McLean, 2005). Ridden behaviour problems are potentially dangerous for both horse and rider and as a consequence, horses displaying these problems are likely to be at greater risk of relinquishment and euthanasia than those with any other behavioural issue. Potential risk factors for ridden behaviour problems have been suggested, yet so far few studies have been conducted to quantify these or to ascertain the prevalence of these problems within the leisure horse population.

This study employed a large-scale Internet survey to address this deficit and to identify associated risk factors from the equipment and training practices used by leisure horse owners.

Method

An Internet survey was designed to generate horse level data regarding the type of equipment used on the horse, the regularity with which professional services (i.e.

saddler, farrier and equine dental technicians) were utilised and the type of training techniques employed by the owner. Owners were also asked to rate how often their horse performed fifteen different ridden behaviour problems over the previous week using a 1–5 scale which ran from never to often. A range of behaviour items were used including moving off before asked when the rider mounts, bucking, shying and rushing at jumps. A not applicable option was provided in case the horse had not had the opportunity to perform certain behaviours, for instance if it had not been jumped during the previous week. The rating scale questions were followed by an open-ended question asking whether the behaviour scores provided were typical for that horse in general, as pilot testing revealed that owners were more comfortable reporting problems with their horses if they were able to put them in to context. The survey was online for a full calendar year to account for any seasonal variations in practices. The survey was granted ethical approval by the Departmental Ethics Committee for the Department of Psychology at the University of Chester.

Leisure horse owners were recruited from a range of sources to complete the survey. Online recruitment strategies included posting invitations on Internet discussion forums, announcements on equestrian websites and emails to riding clubs. More traditional recruitment methods were also employed to help generate a more demographically representative sample, and these included mailshots to livery yards, and announcements in both the local press and national equestrian magazines. The final survey sample was found to be representative of the wider leisure horse population when demographic information regarding the horse and owner were compared to the published data available for this population.

Analyses were conducted in SPSS version 14 for Windows (SPSS Inc., USA). Principal components analysis was used identify correlations between ridden behaviour problem variables. The ridden behaviour problem components identified were then used as the dependent variables for univariate and multivariate logistic regression analyses to explore associations between these problems and equipment and training risk factors.

Results

Behaviour data were collected for 791 individual horses. There was a high prevalence of relatively low grade problems with 91% of ridden horses exhibiting some form of problem behaviour under saddle. Horses with a greater number of problems tended to be rated higher up the rating scale for their performance, indicating that the problems were also displayed more often by these horses. Principal components analysis extracted four components, each comprised of problems with a distinct theme and providing evidence that these problems have an underlying association. Problems connected to not slowing down or resistance to the

rider's aids were reported for over 80% of horses, expressions of physical discomfort were seen in nearly two-thirds of horses sampled while just under a quarter displayed extreme conflict behaviour. The fourth component was comprised of problems solely related to jumping and only horses that had had the opportunity to jump during the previous week were included in the analyses for this component. Over a third of these horses had displayed some form of jumping-related problem during the previous week.

Risk factors associated with each of the four behaviour problem components were explored using logistic regression analyses and three key themes emerged. Saddle-related factors were associated with all four components. There was a reduced risk of problems when saddles cut away from the shoulder were used and when the owner was involved in checking the fit of the saddle themselves. Foot-care and shoeing practices, including the time elapsed between farrier visits and whether shoes were used, were associated with an increased risk of discomfort behaviour, not slowing/resistance problems and jumping issues. Lastly, factors indicative of an outcome-centred approach by riders, including the use artificial aids, such as martingales, draw reins, whips and spurs, and traditional training techniques, were associated with an increased risk of all four behaviour problem components. Conversely, using more horse-centred approaches, for example by spending time in with the horse outside of work situations, reduced the likelihood of problems occurring.

Discussion

These findings indicate that behaviour problems under saddle are highly prevalent in the UK leisure horse population, which has considerable welfare implications. Although some of the fifteen problems that owners were asked to rate may reflect a training issue rather than a behaviour problem per se, all fifteen behaviours have been attributed to expressions of conflict, pain or frustration (Zeitler-Feicht, 2004; McGreevy and McLean, 2005). These findings endorse the need for riders to investigate the underlying causes of ridden behaviour problems, even if the problems are relatively low grade in nature, as tackling the behaviour itself without addressing the cause of the problem leads to escalating severity and number of problems.

The grouping of problems in to distinct, meaningful components illustrate that these behaviours are not being displayed at random, but are related by a common aetiology. The analyses provide indicators of the most likely causes, including factors relating to the saddle, footcare and the approach of the rider. The use of three or more artificial aids was associated with an increased risk of not slowing down/resistance problems, expressions of physical discomfort and extreme conflict behaviour. While the use of these items may reflect the owners approach to

dealing with the problem rather than being responsible for its development, the use of such gadgets does not appear to be effective in eliminating ridden behaviour problem and may in fact be adding to them (McGreevy, 2007).

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The effects of a novel feeding device on the behaviour of domestic cats (*Felis silvestris catus*)

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Introduction

Feeding practices in the domestic cat tend to concentrate around bowl feeding of an unnatural prepared food, such as concentrated pellets or prepared meat, both of which take very little time to consume. In addition, presentation of food commonly occurs just once or twice a day and usually in amounts greater than a cat can (or should) eat in a single meal (Kaufman *et al.*, 1980). Such feeding methods do not encourage natural feeding behaviours often observed in the free-ranging cat population, for example, locating, capturing, killing and processing food items. This is particularly true for those cats who reside within confined environments that prevent or limit hunting opportunity. Additionally, the cat is designed to eat small quantities at a time (Young, 2007) and several physical/medical problems associated with meal feeding of larger quantities have been observed including vomiting related to gorging food, obesity and increased potential for struvite crystal formation in the urine (Finke and Litzenberger, 1992).

Attempts have recently been made to modify the feeding practices of confined cats with authors often recommending feeding strategies that aim to increase species-appropriate behavioural repertoires and alter feeding time budgets (e.g. Holmes, 1993; McCune, 1995; Overall and Dyer, 2005). However, scientific investigation into such strategies is lacking. The current study examined the effects of a novel feeding device (commercially available) on the feeding behaviour of 22 domestic cats housed in a cattery facility.

Method

Twenty-two cats were provided with their usual morning food ration (25g) of a commercially available dried diet split evenly between 1) their normal feeding method of free access bowl feeding and 2) a novel feeding device known as 'Pipolino' for a single exposure of 80 minutes. The 'Pipolino' is a commercially available feeding device developed to roll along the ground when manipulated. Such movement of the 'Pipolino' causes dried food to be dispensed through holes in the device (which can be changed in size to increase the difficulty of delivery) and thus the cat has to work to obtain food. Since this was the first exposure for the cats to the Pipolino, it was set on the easiest setting (i.e. largest holes) to allow the animals optimum opportunity to obtain food from the device.

All cats were neutered domestic short hairs with the exception of three neutered pedigrees (1 Korat, 1 Bengal and 1 Asian) and a neutered domestic long hair. The population was skewed towards females (17 females, 5 males) and age range was from 1 year 4 months to 10 years 8 months. The cats were socially housed in groups of 4 (with the exception of two housed as a pair), however only one cat per pen was exposed to the feeding trial at a time, thereby eliminating any social influences such as resource competition. The two feeding methods (bowl and 'Pipolino') were presented to cats within the exercise section of their pens, an area that cats were readily habituated to feeding in. During the 80 minutes of exposure to food bowl and 'Pipolino', cats were filmed from a bird's eye view using a ceiling mounted camera. Duration and frequency measures were recorded for food interest, food consumption and exploration of each feeding device separately (i.e. bowl versus 'Pipolino') using behaviour analysis software Observer XT 7.0. In addition the weight of food consumed and each cat's initial preferred feeding device was recorded. Statistical analysis was performed on SPSS 14.0 and comprised two within-subject tests of differences (Wilcoxon-signed ranks test) to investigate the difference between Pipolino and feeding bowl in both duration and frequency of interaction. Interaction comprised of olfactory interest in bowl/'Pipolino', physically manipulating bowl/'Pipolino' and eating from bowl/'Pipolino'.

Results

Overall, cats appeared to favour gaining food from their food bowl than the novel feeding device with all cats eating from the food bowl but only seven gaining food from the 'Pipolino'. However, general interest in the 'Pipolino' was more widespread with 19 of the 22 cats exhibiting olfactory interest towards the device on at least one occasion, (range 1–33 times). For 5 of these cases, interest was prior to investigating their food bowl.

Of those 7 cats that did acquire food from the 'Pipolino', this was done so only after they had eaten all their bowl fed food ration, thus showing free food was favoured over earned food. Within-subjects analysis of this sub-population of 7 cats revealed no significant differences in weight of food consumed from bowl versus device (Wilcoxon signed-ranks test, $P=0.180$) with 5 of the 7 cats eating the entire available food ration from both bowl and 'Pipolino' suggesting success at gaining food from the 'Pipolino' was on a par with gaining their food ration from the bowl.

However, it did take cats significantly longer to gain food from the 'Pipolino' than the bowl (Paired-samples t-test, $P<0.01$) and they did so in a significantly greater number of visits to the device (Wilcoxon signed-ranks test, $P<0.05$) suggesting that the aim of increasing number of feeds of smaller size was achieved. For example, the average time spent by the seven cats gaining food from the device was approximately 10 minutes 30 seconds whereas from the bowl, this average time reduced to approximately 3 minutes 20 seconds.

Finally, two behavioural styles of obtaining food from the device were observed; 1) pushing device with the head and 2) pawing the device. While cats exhibited both strategies, 6 of the 7 cats used pawing as a favoured strategy.

Discussion

This was the first exposure the cats had ever had to the 'Pipolino' and while their long-term previous history was unknown, it was known that the cats has no prior experience with any problem-based feeding devices during their stay within the cattery, of which duration was approximately 6 months. Thus, it is possible that these results simply show that a single exposure of 80 minutes to a novel feeding method was not long enough for all the cats to problem solve. Neophobia is an unlikely explanation for the lack of use of the 'Pippolino' since 86% of the cats approached and investigated the device. It has been documented that cats learn by trial and error learning, observation (John et al, 1968) and imitation (Warren, 2007). In this study, cats could not learn by observation as visual access to the external area of the pen where the feeding trial was performed was blocked thus preventing cats from seeing others use the device. Trial and error learning was possible although the time period may have been limiting. In addition, it has been documented that cats learn to perform tasks most commonly if they are in their best interest (McVea and Pearson 2007, Warren, 2007), i.e. in this case if there is no free food available. However, freely available food was presented to the cats in a bowl and for all the cats that fed from both the bowl and the 'Pipolino', all food from the bowl was eaten first (e.g. they are opportunistic feeders and will chose free access food over earned food as supported by Koffler and Coulson, 1971.) Thus, those cats that didn't eat from the 'Pipolino' may have felt sufficiently satiated after

the bowl feed thus giving them little motivation to further explore the 'Pipolino'. Finally, novelty may have also had an influence over its limited use since the cats had no prior exposure and thus no prior learning of the 'Pipolino'.

Future work investigating the use of the 'Pipolino' with no free access food available and of longer duration would be of value. Furthermore, individual differences in problem solving ability are likely to exist and as with all potential enrichment strategies, the influence of such differences on enrichment success is an area lacking investigation.

For those seven cats that were successful in obtaining food from the 'Pipolino' they did so in shorter and more frequent feeding bouts in comparison to the bowl and therefore the 'Pipolino' was successful in altering their feeding time budget to one closer to that of a free-ranging cat (i.e. promoting the more natural *ad libitum* feeding pattern). It also led to the expression of behaviours not normally observed in normal bowl feeding, these being the pushing of the device with the head and the pawing of the device. While pawing is often expressed in the cats' natural hunting sequence with pawing of prey occurring with both live and dead prey, pushing the prey with the head is not documented. Thus, the 'Pipolino's ability to encourage species-specific behaviours associated with hunting is limited to the part of the hunting sequence associated with manipulating prey. One of the advertised goals of the 'Pipolino' is to encourage activity, a goal of particular importance to promote both the physical and psychological welfare of the confined cat who often exhibits inactivity and resultant excessive weight gain. While the 'Pipolino' encouraged more activity than the food bowl did, this activity was limited. Despite all 7 cats using both methods to obtain food from the device, 6 of the 7 cats preferred pawing to pushing with their heads. Pawing of the device actually presented itself as part of a fairly static behavioural sequence where the cat moved the 'Pipolino' from side to side while maintaining a sitting position. Thus the search and locomotory parts of the hunting sequence were not successfully promoted by the device.

Conclusion

Provided that they have learnt to use the 'Pipolino' feeding device, it was shown to hold some benefits to confined cats in terms of encouraging more natural feeding time budgets patterns (e.g. promoting *ad libitum* feeding) and behaviours (e.g. working for food, more specifically utilising the paw to obtain food). However, further work is needed to fully explore the environmental enrichment potential of this device for confined cats.

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Effects of food substrates on reliability of salivary cortisol measures in dogs in training context

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Introduction

Salivary cortisol has been widely used as a means of assessing stress in dogs (Beerda et al 1988; Schalke et al 2007), though several authors have questioned whether handling and the use of food/chews can affect measures (Kobelt et al 2003, Dreschel and Granger 2009). We investigated effects of food on salivary cortisol measures in a handling/training context.

Methods and results

For the first study 10 dogs were used to investigate if food introduced unpredictable variation in salivary cortisol. For each dog tested, a control sample was taken, followed within 30 seconds by a sample with cheese (n=10), sausage (n=5) or chicken (n=5). Cortisol assayed with food tended to be lower (2.14 ± 0.12 ng/ml) than controls (2.59 ± 0.23 ; $t=2.08$, $p < 0.05$). This may be due to dilution of samples by greater production of fluid, or because food contamination reduces the efficacy of ELISA. There was a high positive correlation between the measures from cheese samples and their controls (Pearsons $r=0.922$, $p < 0.001$), but no correlation with the sausage and chicken.

In the second study, we used cheese to encourage salivation and 10 dogs were used to investigate changes in salivary cortisol following training. Dogs responded to three common vocal commands; “come”, “stay” and “leave”, together with a fourth command of the owner’s suggestion, each given by the owner, and by a person unfamiliar to the dog. Saliva was sampled before training, then at 10, 15, 20 and 25 minutes following start of training. There was no difference in salivary cortisol measures between samples, but a high concordance across samples (Kendall’s $W = 0.858$, $p < 0.001$).

Conclusions

Our data suggests cheese does not introduce unpredictable variation in salivary cortisol measures, and consequently may be a more appropriate aid to encourage salivation than sausage, chicken or meat flavoured rope (Dreschel and Granger 2009).

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Keywords: Saliva cortisol; Dog training

A case-control study of the risk factors for feline idiopathic cystitis

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Introduction

Feline idiopathic cystitis (FIC), also known as idiopathic Feline lower urinary tract Disease (iFLUTD), is the most common medical cause of elimination change in the cat, and hence is an important differential diagnosis when investigating cats presenting with inappropriate elimination (Kruger et al., 1991; Buffington et al., 1997; Gerber et al., 2005). Many of the presenting signs shown by FIC patients are related to pain; such as vocalisation and signs of distress during urination and pacing before urination in anticipation of the pain. Cats with FIC appear to sometimes associate the pain of urination with the specific location in which they have urinated, leading to series of repeated changes in the location of urination. Male cats may also change their posture from a squat to standing up as squatting bends the urethra, which may cause further discomfort on urination (Seawright, 2007).

Recent research has focused on the impact of environmental stressors as an important 'flare factor' in the multi-factorial etiology of this condition (Cameron et al., 2004). During periods of emotional arousal, there is increased activity in the sympathetic nervous system (Makino et al., 2002; Westropp et al., 2006), either by a central trigger (increased activity in the locus coeruleus) or local bladder triggers (e.g. low urine pH) which stimulates C fibers (pain fibers) in the bladder wall, causing release of substance P. Substance P can result in pain, vasodilation, increased bladder wall permeability, submucosal oedema, smooth muscle contraction and mast cell degranulation (Theoharides et al., 1995).

Further evidence for the role of stress in this condition comes from evaluating the physiological stress response systems in cats suffering from FIC. Evaluation of the hypothalamic-pituitary-adrenal (HPA) axis by assessing the response

of the adrenal glands to exogenous ACTH revealed a hypersecretion of cortisol, followed by a blunting of the adrenal cortex response and several case studies have revealed cats with FIC to have small adrenal gland size (Westropp et al., 2006 and 2003). Under normal circumstances cortisol should inhibit sympathetic nervous system outflow, acting as a negative feedback inhibiting its own release. However, in individuals suffering from extreme chronic stress, this system becomes disrupted (McEwen 2000).

The production of stress hormones in response to an acute stressor is adaptive, enhancing the animal's ability to physically respond to the stressor, and facilitating the formation of memories of stimuli or contexts associated with strong emotions (McGaugh, 2000). However, this can be maladaptive when stress hormones are overproduced, or not 'shut off' after response to a stressor (McEwen, 2000). The causes of such changes are both direct, when the corticosteroid acts directly on the hypothalamus to influence the activity in the HPA axis (Casey 2002), and also genomic, involving the altering of relative proportions of different affinity glucocorticoid receptors (De Kloet and Derijk 2004). There is, therefore, a progressively reduced negative feedback effect of cortisol on the hypothalamus, leading to a heightened HPA axis response to stressors.

In addition to changes in the HPA axis, chronic exposure to stressors results in complex chemical and structural changes in multiple brain regions. Repeated exposure to stressors initially appears to result in adaptive plasticity within the brain which is reversible once exposure to the stressor is removed, and provides a significant resilience to aversive situations (see McEwen 2000 for a review). However, prolonged repeated exposure to stressors leads to changes which are more difficult to reverse, such as increased excitability of neurons within the amygdala (Shekhar et al., 2005). These changes result in an individual that responds immediately to a potentially stressful situation with a heightened emotional response and heightened activation of the sympathetic nervous system.

Behaviourally, chronically stressed cats are often hypervigilant, and appear to respond immediately to novel or mildly aversive stimuli (Casey, 2002). Heightened HPA and sympathetic nervous system responses to aversive events lead to the changes in bladder wall integrity as described earlier. Clinical experience suggests that the period between exposure to a stressor and clinical signs is relatively short (Seawright et al., 2007). It is therefore important in such cases to identify which factors are causing the animal to suffer from the changes associated with chronic exposure to stressors, as well as those that are aversive enough to precipitate bouts of disease.

A previous case-control study found that case cats were more likely to be male, overweight and pedigree than the control population, but also found that several stress factors were 'flare factors' associated with the onset of a bout of clinical signs (Cameron et al., 2004). In this study, the environmental factor that was the most influential on bouts of disease was living with another cat in a household in which

there was conflict. Another case control study conducted in New Zealand over a 2-year period from 1991 to 1993 found that low activity levels, the use of a litter tray coupled with restriction indoors, a high number of rainfall days in the month preceding the appearance of clinical signs, stress factors such as moving house within the last 3 months or the presence of more than one cat in the household, and a diet high in dry cat food were all risk factors for lower urinary tract signs (Jones et al., 2007).

Methods

This larger study compared potential environmental risk factors for FIC using 69 clinical cases and 166 controls. The sample was collected from 20 veterinary practices in the UK over the course of a year. FIC was diagnosed in the case cats by excluding other causes of lower urinary tract signs (Kalkstein et al., 1999). The minimum work up to be included in the study involved a physical examination, routine haematology and biochemistry, urinalysis including bacterial culture, and imaging of the urinary tract, to include double contrast cystography and ultrasonography. Cases were excluded if they showed evidence of any other systemic disease or urinary tract abnormality.

Control cats were selected from the practice database using random number generation and were matched by age category (0 to 18m; >18m to <8yrs; ≥8yrs to <12yrs; ≥12yrs) using estimations of the expected age distribution of FIC cases from previously published data/retrospective records and selecting a similar percentage of control cats in each age category. Controls were also matched for month of year. At the beginning of the month, a random number generator was used to identify 25 numbers, each representing a control cat. Once a control was selected, a covering letter, questionnaire and prepaid return envelope were sent to the owner of the control cat. A total of 300 questionnaires were posted during the course of the year and 166 were returned completed.

The questionnaire contained information about; the signalment of the cat, the experiences and environment of the cat during its early life, its health, and body condition score. The questionnaire also asked for details of the current household composition, including details of other animals in the household, as well as the cats' relationship and interactions with them. The owner was asked to provide information about, the lifestyle of the cat, including outdoor access along with details of the cat's current environment, such as information about various items of equipment such as litter trays and food bowls.

Questions about the cat's toileting habits were included to ensure that control cats were not showing signs of changes in their elimination behaviour.

Results

Univariate screening found 17 factors significant at the level of $P < 0.02$. These factors were included in a backward conditional logistic regression model. The final model was statistically significant $\chi^2 (15, N = 235) = 138.138, p < 0.001$, and hence able to distinguish between case and control cats. A Hosmer and Lemeshow test confirmed goodness-of-fit. Between 44% (Cox and Snell R square) and 63% (Nagelkerke R square) of the variance in the occurrence of FIC was explained by the model. The model had a specificity of 71%, and a sensitivity of 90%. Significant (at $P < 0.05$) factors increasing risk of FIC in the final model were: gender of cat, males having an increased risk (Odds Ratio 6.29); cats having had an injury (OR 9.12); owners having moved house within the last year (OR 6.66); owners also having one or more dogs (OR 3.73); cats having movement in the house restricted by other cats (OR 7.07); cats having no access outside compared to unlimited access (OR 6.67); cats having dry food only compared to wet (OR 5.16), and cats with a body condition score > 3 (OR 5.058).

In this study, cats with FIC were more likely to be male, overweight and fed on a dry food only diet. FIC cats were also more likely to have suffered an injury in the previous 6 months before the bout of cystitis or have moved house in the previous year before the bout of cystitis. Case cats were more likely to live with one or more dogs, to have their movement restricted in the house by another cat and to have no outside access.

Discussion

As found previously, cats suffering from FIC were more likely to be male (Cameron et al., 2004, Kruger et al., 2001). This could be because male cats are more likely to develop urethral obstruction and therefore be presented at the veterinary practice and receive full medical investigation, which was a requirement for inclusion in this study.

Case cats were also more likely to be overweight than the control population, again agreeing with previous findings (Cameron et al., 2004). It has been suggested that cats with FIC may be more overweight than the control population due to inactivity and that this may be an indication of chronic stress (Cameron et al., 2004). Being fed a dry diet has also previously been found to be a significant risk factor for FIC (Jones et al., 1997).

Cats suffering from FIC were also more likely to have suffered from an injury within the previous six months. The most common injury was a cat bite abscess, suggesting conflict with other cats. Having their movement restricted within the household by other cats within the previous month was also a risk factor for FIC. These findings both support the suggestion of Cameron et al (2004), that bouts

of disease may be associated with anxiety about other cats. Research in other species has suggested that psychosocial stress is one of the most potent influences on the stress response system, and a potent cause of changes associated with chronic stress (McEwen, 2000; Honess and Marin, 2006). Given the limitations on ability to display complex visual social signalling in the domestic cat because of their largely asocial ancestral history (Casey and Bradshaw, 2005), it seems logical that the stress associated with social interaction is particularly relevant in this species.

Owners moving house in the last year was also a significant risk factor for FIC previously seen (Jones et al., 1997). Moving house is likely to also cause anxiety for cats due to the change in environment, but also due to the need for cats that go outside to establish a home range in an area that is potentially already occupied by other cats, which may lead to increased conflict.

No access outside was also a risk factor for cats developing FIC compared to unlimited or limited access outside. This could be due to the frustration of the normal behaviour repertoire.

Conclusions

Results support those of previous studies, and suggest specific aspects of the environment that may cause stress and precipitate bouts of disease. This information is important in the prevention and treatment of clinical cases.

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Validation of a cognitive test battery for cats

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Introduction

The prevalence of cognitive dysfunction amongst senior cats has been determined in one study of 154 cats 11 years and older, evaluated at their annual health care visit to be 28% of cats aged 11 to 14 and 50% of cats 15 years of age and older. The most common signs were altered interactions with owners, alterations in activity including aimless activity and increased vocalization (Gunn-Moore et al, 2007). This finding is consistent with several reports of pathological brain ageing in cats. Specifically, cats demonstrate beta-amyloid deposition and what may be considered early neurofibrillary tangles, both considered hallmarks of Alzheimer's disease in humans (Head et al., 2005; Gunn-Moore et al., 2006). Additionally, synaptic function loss and cholinergic deficits are reported with aging (Levine 1987a; Zhang 2005). Collectively, this supports the hypothesis that cats develop Alzheimer's-like disease. Since medical conditions can cause many of the same clinical signs, cognitive dysfunction can only be diagnosed when any medical causes for these signs such as pain, sensory decline, and neurologic, endocrine, metabolic and infectious (FeLV, FIV, toxoplasmosis) diseases are ruled out.

We have developed a battery of cognitive tests for dogs that permit us to objectively assess changes in cognitive function with age. We have reported consistent age related deficits in executive function (Tapp et al., 2003), short-term working memory (Studzinski et al., 2006), and complex learning (Milgram et al, 2002). Unlike dogs, objective measures of cognitive decline are not consistently reported in aged cats. Levine (1987b), for example, found that aged cats performed better than young cats on spatial reversal learning. On the other hand, eye-blink conditioning is impaired with age (Harrison and Bushwald, 1983). Currently, a battery

of neuropsychological tests that examine domain specific alterations in cognitive function has yet to be developed.

The aim of this study was to validate a test battery for cats modelled after neuropsychological tests that we developed for dogs. The tasks were intended to assess a variety of cognitive domains, including associative learning ability, executive function, visuospatial learning and working memory.

Materials and methods

Kittens ($N=16$; 4.5 ± 0.1 months at the start of the study) were tested over a period of 6 months on the following tasks: positional discrimination learning and reversal in a T-maze; object discrimination and reversal learning; and a delayed-non-matching-to-position task (DNMP). The cats were fed twice daily and were provided with water ad libitum. All procedures were approved through the local Animal Care and Use Committee.

For t-maze testing, a wooden t-maze was used in which subjects moved from the start box, to a runway with a left and right choice into the goal box, where a reward could be placed. After acclimation to the apparatus, the kittens were given a preference test in which both left and right goal boxes were rewarded. For the positional discrimination learning, kittens were required to learn to go to their preferred goal box at least 70% of trials. After learning this, the rewarded goal box was switched for the reversal and an identical learning criterion was used. Number of errors on each test was used to analyse learning.

For the remaining tasks, a feline adaption of the apparatus we use for dogs (Milgram et al., 1994) was used. Briefly, the cat was placed in a box and could access a tray through adjustable gates. The tester would present the tray to the kitten by lifting a hinged door and sliding the tray into the kitten's view. The tray had three positions which could be rewarded. Depending on the task, one or two objects would be presented on the tray and the kitten had to displace the object to attain the food reward. Incorrect objects were baited with the same food to avoid olfactory based responding. Training procedures, similar to those used with dogs, were provided before testing to acclimate the kittens to the test apparatus and to teach them to move objects to obtain the food reward beneath.

The object discrimination and reversal tasks were conducted as previously described in dogs (Milgram et al., 1994). A preference test was given with two objects presented randomly over the left and right positions for 10 trials. The preferred object was rewarded during the discrimination learning phase and the non-preferred object was rewarded on the reversal phase, which occurred after kittens learned the discrimination problem. Learning required consistent responding at 70% correct and errors to criterion were used as the learning measure for the analysis.

Each trial on the DNMP consisted of two presentations (Chan et al., 2002). During the first, a block was presented over one of the three positions. After the kitten responded by moving the block and obtaining a food reward, the tray was withdrawn and a 5 s delay was initiated. After the delay, the second presentation consisted of two identical blocks; one in the same position as the initial presentation and the other over one of the two remaining positions. Responding to the latter resulted in food reward. An identical learning criterion as above was used.

Results

All subjects completed the positional learning and reversal task and more errors were committed on the reversal phase [$F(1,15)=22.78$; $p<0.001$]. An identical, but less robust, pattern was seen on the object discrimination and reversal task [$F(1,15)=3.82$; $p=0.070$]. This pattern was identical to what we observe in dogs, regardless of age, and is consistent with the greater cognitive demand imposed by reversal learning, which provides a measure of executive function. In the current study, we were able to test only 5 kittens on the DNMP within the timeline of the study and only one of these kittens was able to learn the DNMP; testing in the remaining kittens was not complete.

Discussion and conclusion

The results of this study demonstrate the feasibility of developing valid neuropsychological assessment tests for cats that produce data consistent with that obtained in other species. Similar to the findings in dogs and other species (Tapp et al., 2002), more errors were committed on both versions of reversal learning compared to the respective discrimination learning phases. This finding was important because it is consistent with the greater demands of reversal learning, which requires animals to modify a learned response and is considered a measure of executive function. Executive function is a high level cognitive ability that is consistently impaired with aging in many mammals including rodents, dogs, non-human primates and humans. Only 1 kitten of 5 in the current study learned the DNMP; testing was incomplete in the remaining kittens. We've subsequently been able to establish that cats are reasonably proficient in learning a two-component version of the DNMP in which only the lateral food wells are used and can be successfully tested on additional tasks based on our canine battery. To date we have been successfully trained approximately 30 cats on the DNMP task. On average, in comparison to dogs, cats may be less food motivated and their performance is somewhat more variable so that greater attention is needed to factors such as tester, environment and feeding schedule.

Collectively, these data indicate a comparative cognitive approach among dogs,

non-human primates, rodents and humans is feasible with the use of similar tasks. The results also support the use of a battery of cognitive tests that will allow us to establish domain specific effects of aging on feline cognition.

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Keywords: Cognitive tests, feline cognition, learning

Behavioural, legal, medical and welfare implications of the DDA in the UK – a case history

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Introduction

In the United Kingdom, four breeds of dog are prohibited under the Dangerous Dogs Act 1991, namely the Pitbull terrier, the Japanese Tosa, the Dogo Argentino and the Fila Brasileiro. Of these four breeds, the Pitbull terrier is the only one to which, for practical purposes, the law applies. Subsequent to a High Court ruling in the case of Dunne and Brock in 1993, the prohibited nature of the Pitbull terrier breed was expanded to include ‘type’: in other words, any cross-breed dog which conformed substantially to the American Dog Breeders Association show standard for a Pitbull terrier. In 1997, up to which time destruction was mandatory under the law, an amendment was made to the UK DDA, which allowed for Pitbull Terriers or types to be entered onto an exempt register under a Contingent Destruction Order, as long as certain criteria were met. The dog must be shown not to present a danger to the general public, it must be muzzled and on lead at all times in a public place, it must be sterilised, microchipped and tattooed for identification purposes, and be insured for third party liability.

Case history

On 23rd January 2008, two dogs, a 4 year old male, Zeus, and 2 year old female, Brandy, both entire, were seized by police from the owner’s home as they were suspected of being Pitbulls or types thereof. Both dogs were family pets living with a one year old child and his parents. Neither dog had shown any untoward behaviour previously to people of any age or other dogs and were described as the ‘best dogs ever’ by their owner. Although the owner was adamant that his

dogs were Staffordshire Bull terriers, both dogs were subsequently identified by a police-designated expert as having a 'substantial number of characteristics' of the Pitbull terrier type. This was despite the fact that the female dog, Brandy, was deemed to be too aggressive for any of the detailed examination or measurements to be taken in order to accurately assess her conformity with the ADBA standard. As the means of disputing type are costly and outcome, in terms of saving a dog's life, by no means assured, the owner subsequently pled guilty to the offence as charged and a behavioural assessment of both dogs was requested to ascertain whether either dog presented any danger to the general public. If the assessment were to reveal sociable and tolerant dogs, then this evidence could be used in court in an appeal against destruction. If successful, the dogs would be allowed to enter the UK register of exempt breeds.

By the time of my ostensibly purely behavioural examination, in June 2008, both dogs had been kept separately and in solitary confinement at police-designated kennels for six months. Although the dogs had been adequately fed, the standard of boarding accommodation left much to be desired. Neither dog had received any veterinary examination or treatment during their confinement. The dog Brandy was described by the kennel owner as a 'sly one' whose kennel could not be approached without eliciting an aggressive display and was unable to be handled owing to her aggression. This proved not to be the case. Once presented with a lead, her obvious excited anticipation of a walk precluded any potential fear or aggression. As soon as she was removed from her kennel, however, severe motor and sensory neurological deficits were immediately evident. She displayed a high stepping forelimb gait, forelimb ataxia, knuckling and crossing over of the fore limbs, and frequently fell over, either directly in front of her or to the side, such that she was unable to stand or walk for any length of time. Such abnormalities were exacerbated by movement and change of direction. A brief neurological examination revealed possibly heightened pain and withdrawal reflexes of the left hind limb, relatively normal reflexes in the left fore but non-existent pain or withdrawal reflex in the right fore. In my opinion, though by this stage only so much water under the procedural bridge, Brandy did not in any way conform to the ADBA standard for the Pitbull terrier.

Contrary to the beliefs of those purportedly responsible for her care, she showed no aggression whatsoever throughout the examination and positively craved and enjoyed close physical contact. She was immediately tolerant of the fitting of a basket muzzle, which would be a necessary part of any future control order. It would seem therefore that her staggering and in-coordinate movements against her kennel gate had been interpreted by kennel staff as 'aggressive' behaviour and her need for veterinary attention had gone completely unrecognised. Both for the welfare of the dog and in view of the imminent court hearing, an accurate and urgent diagnosis of her condition became of paramount importance. This obligation overrode the requirement for an assessment of her behaviour and

temperament, which was in any event not feasible, owing to her severe physical disabilities.

Her symptoms initially led to a suspicion of L2 hydroxyglutaric aciduria (L2 HGA), a rare autosomal recessive genetic condition associated with the Staffordshire Bull Terrier breed (Scurell et al., 2008). As it, to my knowledge, has not been recorded in the Pitbull Terrier, a positive diagnosis would have repercussions in terms of the validity of the breed identification carried out for this dog and for any other similar dogs in her predicament. Consultation with the Animal Health Trust in Newmarket confirmed that diagnosis of the condition is based upon clinical findings and duration of symptoms, blood sampling for full haematology and biochemistry, CSF tap, genetic testing for the recessive gene and MRI scanning. The obvious course of action in any other context would have been that the dog be referred and transported to the AHT for treatment. But despite the fact that a thorough diagnosis and appropriate treatment was not compatible with Brandy staying where she was, this request was denied by the police on the grounds that Brandy was 'evidence' in a criminal trial and could not be moved. All appeals to the effect that, of all the repertoire of clinical diagnostic requirements, the dog's most immediate needs were for humane care, understanding and companionship, fell upon stony ground.

As the kennels had no regularly attending veterinary surgeon, itself a breach of their terms of license, I returned two days later to take blood samples which were then delivered to the Animal Health Trust. These initially revealed a markedly raised CPK level, indicating muscle damage, which is compatible with, though not diagnostic for, L2 HGA. Genetic confirmation of this condition was not to be expected for another three weeks, only shortly before the trial itself. In the interim, representations were made by the police that, as they were going to be pressing for a Destruction Order anyway, it 'would be a kindness' to the dog for her to be destroyed before the case came to court. My reply was that, if this were to happen, it should be for the right reason – because she was suffering from an incurable disease rather than being in any way 'dangerous'. Again, pleas for her to be transported into specialist neurological care were refused but the insistence upon a Destruction Order was retracted, in view of my favourable behavioural conclusions regarding Brandy's temperament. The suggestion was then made by the police that, to expedite her acceptance onto the exempt register, arrangements should be made for her to be spayed while in kennels. In response, it was pointed out in no uncertain terms, that no veterinary surgeon in full possession of Brandy's history and the facts, should consider such a non-essential (in welfare and ethical terms rather than legal) surgical procedure justified in such a disabled and debilitated animal.

On 1st July, 4 days prior to the court appeal, confirmation was received from the AHT that Brandy had two copies of the normal gene and was therefore clear of L2 HGA. It was successfully argued in court that she, along with her companion

Zeus, should be allowed to live and the conditions of a Contingent Destruction Order, including neutering, were imposed upon both dogs. Accurately diagnosing Brandy's condition therefore became an absolute priority before subjecting her to surgery. Owing to lack of available police transport, I collected Brandy the next day from kennels and took her to Chester Gates Referral Hospital, where it was arranged that the owners would be allowed to see her. A lesion of the cranial spinal cord and/or brainstem was suspected by the attending clinician. An MRI scan carried out under general anaesthesia revealed a subarachnoid cyst at C2 (Sessums and Ducote 2006). The likelihood of success following surgical intervention is reported as decreasing markedly once symptoms have been evident for more than four months (Skeen et al., 2003). In view therefore, of the duration of symptoms and its extent, this lesion was deemed inoperable. Brandy was euthanised immediately. A death certificate was then demanded by the police to assure them that she had not been 'spirited away' by either me or her owners.

This case highlights the welfare implications of UK dangerous dog legislation and its tragic consequences, not only for the dogs concerned, but also for their owners, in a legally imposed system where a dog is considered to be simply property and evidence, rather than a sentient being for whom all those in contact with her have a responsibility. It would therefore seem that the practical results of dangerous dog legislation are at odds with, and routinely contravene, the requirement for the 'duty of care' imposed by the UK Animal Welfare Act 2006. As a consequence of this anomaly, Brandy suffered severe social deprivation and the fatal progression of an ignored condition, which might have proved amenable to treatment, had it been noticed and diagnosed earlier. The owners saw their dog, who had committed no offence other than to appear of a certain conformation, for the first time in 6 months, only to have to give permission for her euthanasia.

Conclusions

We must question the effectiveness of any law which seeks to impose criminal status upon the owner of a dog simply on account of its physical conformation and which, at the same time, is evidently doing nothing to reduce the incidence of dog bites (Shepherd, K., 2009). This case also brings into question the expertise of those routinely identifying dogs as Pitbull types on behalf of the police and the severe limitations, both practical and financial, that owners suffer in being able to question their decision. It is also an extreme example of the link between medical and behavioural symptoms and the importance of accurate and timely diagnosis. To achieve this, it is absolutely essential for veterinary surgeons to be involved in the diagnostic process of any symptoms presented via the behavioural route.

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Development of the Canine Five Factor Model of Personality (CFFM) and Monash Canine Personality Questionnaire-Revised (MCPQ-R)

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Dogs have many roles in our societies from beloved companions to valued working partners. However, dogs can also present danger to humans. Barking, growling, lunging and biting are all canine behaviours which are frowned upon and can result in dire consequences for dogs convicted of displaying them. Tolerance for behaviours that are normal for dogs but dangerous for humans is low. There is therefore a need to be able to assess dogs to identify those that have a tendency to display desirable and undesirable behaviours.

Assessments of canine behaviour have tended to concentrate on the absence or presence of discrete behaviours, such as biting or barking (Netto and Planta, 1997) but this approach ignores the fact that many behaviours are displayed in response to a wide range of motivations. Biting, for example, is observed during play, in response to fear provoking stimuli, in defence of resources such as food, or in defence of puppies (Overall, 1997). The tendency of an individual to display any particular behaviour is affected by the interplay of their genetics or temperament, experience and the current environment. This means that an individual dog may display different discrete behaviours in the same situation or the same behaviours in different situations. Measuring whether a dog displays an undesirable behaviour, such as biting, in a test situation, therefore, may not indicate the tendency of a dog to use the behaviour in other situations. What is needed is the ability to measure broader characteristics of an individual that affect how they behave in a more comprehensive sense.

Describing the full range of differences in behaviour between individual dogs is a daunting task. However, psychologists have been examining individual

differences in human behaviour for many years. There are several theories to explain differences in behavioural tendencies among people, which are usually attributed to the underlying psychological structures which make up what is called the individual's personality. Personality can be considered the combination of temperament and experience. It is generally accepted that individual people show different behaviour in different situations. However, most people can be partially described by their tendency to generally behave in a particular manner. A person who typically greets everyone with a smile and warm welcome can be described as friendly, while one who avoids meeting people can be considered shy or even aloof. This tendency of people to display characteristic behaviour patterns is described by the construct of personality (Phares and Chaplin, 1997, p. 9).

Two essential ideas arise from existing definitions of personality. First, personality is relatively stable across time and different situations (Costa and McCrae, 1992a); even though the exact behaviours displayed may differ due to the effects of affect, motivation and needs, previous learning and the current environment (Ahadi and Diener, 1989). For example, a conscientious person may display this personality characteristic by handing class work in at school on time as a child and by being punctual to work as an adult. While the behaviours are different, the overall way of responding is consistent for the individual in the different situations. Second, personality characteristics are not simply static attributes of persons but have consequences for the person in the way they interact with the social world (Buss, 1992). A shy person, for example, may be considered aloof because they do not speak with work colleagues easily and so may be left out of plans for social events.

One widely accepted theory for describing and organising personality in humans is the Big Five Model (BFM) which describes people using five independent dimensions, labelled Surgency (often referred to as Extraversion), Agreeableness, Conscientiousness, Emotional Stability (Neuroticism) and Intellect (Openness to Experiences) (Digman, 1996, p. 13).

It is generally accepted that the construct of personality can be usefully applied to non-human animals, ranging from invertebrates, such as octopus and squid (Mather and Anderson, 1993; Sinn et al., 2001), through the vertebrate phyla to chimpanzees (King and Figueredo, 1997).

Canine personality has been investigated using various methodologies, ranging from behavioural assessments (Wilsson and Sundgren, 1997a; Svartberg and Forkman, 2002) to questionnaire-based studies (Goodloe, 1996; Hsu and Serpell, 2003). The results have been mixed and no consensus has been reached regarding the content and number of canine personality dimensions. None of the methodologies have produced a widely accepted, validated and reliable test that could be carried across fields of canine work or into the general population of companion dogs. This may be because the research has been conducted with the aim of developing a better guide, working, military or police dog (Goddard and Beilharz, 1984;

Weiss and Greenberg, 1997; Wilsson and Sundgren, 1997b; Murphy, 1998) and has thus focused on specific traits important in these roles, rather than exploring the full depth and breadth of canine individual differences. While some research has attempted to identify individual differences in characteristics, such as Hart and Hart (1985) and Coren (1998), this research has typically relied on breed descriptions rather than descriptions of individual dogs. This is problematic because the research in working dogs has clearly shown that not all dogs of any given breed are equally suited to specific occupations.

So while the construct of personality appears to have value when applied to dogs, research has been limited to attempting to identify dimensions and traits important to individual research goals rather than attempting to describe the full depth and breadth of canine personality. A model for describing canine personality as fully as possible would be valuable for understanding canine behaviour, selecting dogs with desirable traits for companionship and managing dogs in our communities. This paper will review the development of the Canine Five Factor Model (CFFM) of personality and the Monash Canine Personality Questionnaire (revised) (MCPQ-R) for measuring the dimensions identified in the model.

The CFFM and MCPQ-R Development

The CFFM and MCPQ-R were developed using a method based on the one used to develop the BFM for humans. The psycholexical hypothesis, used in the development of the BFM, was applied to dogs. This states that behavioural differences or traits considered important to people are encoded in everyday language (John, 1990). It was felt this was a valid application of the hypothesis, as people and dogs have lived intertwined for thousands of years and most people are familiar with dogs. As well, it can be dangerous to have contact with dogs and a short hand manner of describing the behavioural tendencies of dogs would be valuable for people.

As described in Ley *et al* (2007), 203 personality adjectives thought to be applicable to dogs, for example energetic, shy, amiable and bold, were identified by the researchers using dog breed standards, dog breed books and dog websites and focus groups consisting of dog owners, dog breeders, dog trainers, both professional and amateur, veterinarians and psychologists who owned dogs.

This list of personality adjectives was presented to 92 Australian dog owners who were asked to rate on a 6 point scale, with 1 being 'really does not describe my dog' and 6 being 'really describes my dog', how well each word applied to their dog. After analysis 67 words were considered useful for describing behavioural differences in dogs. These words were used in a study with 1016 Australian dog owners. The methodology was identical to the pilot study. After principal components analysis (PCA), 48 words describing 5 personality dimensions were

identified (Ley et al., 2007).

A second study, reported in Ley et al (2009), was conducted to test the findings of the first study. Confirmatory Factor Analysis and Structural Equation Modelling (SEM) with an independent sample of 455 Australian dog owners and the original 1016 participants revealed a more stable, shorter solution, resulting in the 26-item Monash Canine Personality Questionnaire – Revised (MCPQ-R). Five dimensions were identified: Extraversion, Motivation, Amicability, Training Focus and Neuroticism.

The first dimension is labelled Extraversion and, in the MCPQ-R, contains the words hyperactive, lively, energetic, restless, active, and excitable. Training Focus is the second dimension and appears to combine perceived intelligence with trainability. This factor is operationalised in the MCPQ-R with the words biddable, trainable, reliable, attentive, intelligent, and obedient. The third dimension is Motivation. The MCPQ-R measures this dimension with the words opportunistic, tenacious, persevering, determined, assertive, and independent. The fourth dimension, as measured by the MCPQ-R, contains the words friendly, non-aggressive, easy going, relaxed and sociable and is labelled Amicability. It describes the extent to which a dog tolerates other individuals of any species. The final factor is labelled Neuroticism and the MCPQ-R scale for this dimension contains the words nervous, timid, fearful and submissive.

The data from the 455 dog owners were also used to test the validity of the questionnaire by comparing demographic information from the owner and physical descriptions of the dogs with their personality ratings (Ley et al., 2009). Owner characteristics of age, sex, education level, and location and type of housing were all compared with canine personality ratings. Almost none of the owner characteristics had a systematic relationship with the personality ratings of the dogs. This is of interest because it adds weight to the claim that canine personality is most likely a valid construct, reflecting differences inherent within individual dogs rather than the effects of environmental influences associated with different ‘types’ of owners. The only exception to the finding of a lack of association between canine personality ratings and owner characteristics was with respect to owner age, which was negatively associated with scores on the Extraversion subscale. This requires more investigation to identify if this is a consistent relationship or if there are other factors affecting this relationship.

Canine physical characteristics of Australian National Kennel Council (ANKC) breed group, age, weight and height were compared with the personality ratings to assess if they had any systematic effects on personality ratings. Significant relationships between some personality dimension ratings and physical characteristics were identified, although none were consistent across all the personality dimensions.

A third group of 65 dogs was used to test the reliability of the questionnaire using Inter-Rater Reliability and Test-Retest Reliability protocols (Ley et al.,

2009). Two people who knew the dog well were asked to independently rate the dog using the MCPQ-R. Six months later, administration of the MCPQ-R was repeated with the same dogs and dog owners. Results from 40 dogs were returned in the second data collection. The results for the inter-rater reliability analyses show that all correlations were positive and significant. The results from the Test-Retest study also support canine personality as a stable characteristic of dogs.

The test-retest format for assessing reliability is rarely reported in animal personality studies. However, in human personality research, test-retest results are considered important for assessing the reliability of a personality inventory (Costa and McCrae, 1992b). The results of the correlations for the test-retest reliability analyses show that all correlations were positive, as expected, and all were significant at $P < 0.001$. Again all values were higher than 0.6, suggested as demonstrating good reliability for the results.

Discussion

The MCPQ-R was developed using a robust series of steps based on methodology used in the development of the widely accepted human BFM. The psycholexical hypothesis used to develop the BFM was applied to dogs as it was thought that humans had evolved a short hand method of describing the behavioural tendencies of dogs. It does not feel odd to describe a dog using personality adjectives and this can be protective for people who may encounter the dog. It is useful to know if an individual dog is fearful or friendly.

As a point of difference from earlier dog personality studies, no expectations about the number or nature of canine personality dimensions were made before the data were collected, allowing the dimensions to emerge from the data. The five dimensions of the Canine Five Factor Model identified by the process, Extra-version, Motivation, Training Focus, Amicability and Neuroticism, have parallels with dimensions found in other canine studies. The Extraversion factor of the CFFM appears to be measuring energy levels, described by Wilsoson and Sundgren (1997a) as Lively Temperament and as Energy Level by Serpell and Hsu (2001). Svartberg and Forkman's (2002) Curiosity/Fearfulness factor shows similarities with the CFFM's Neuroticism dimension in assessing fearful behaviour. The Amicability factor of the CFFM has similarities with factors expressing an element of social interaction identified in other personality studies of dogs (Cattell and Korth, 1973; Svartberg, 2002; Gosling et al., 2003). Lastly, the CFFM's Training Focus dimension has similarities with the Compliance factor identified by Goodloe and Borchelt (1998), both describing how well the dog works with humans.

An important point in the development of the CFFM and the MCPQ-R is that the method used did not restrict the assessment of the dog to a single place or

time as is done with tests that measure discrete behaviour. As they completed the MCPQ-R participants were able to draw on their knowledge of their dog's behaviour in all situations they had observed over all the time they had owned it. This gives a broad description of the behavioural tendencies of the dog rather than a single unit measure of discrete behaviour. Assessment of personality considers the combination of temperament or genetic component that affect the expression of an individual's behavioural tendencies and the individual's experiences. Thus, personality assessment may give the best prediction of future behaviour.

The validity study showed that the personality dimensions have validity, although some relationships need further investigation. The results from the two reliability studies support the MCPQ-R as reliable for assessing canine personality.

The Test-Retest Reliability study supports canine personality as a stable characteristic of dogs but work is needed to understand the subtle changes in personality that occur as dogs develop and age. It is recognised that humans, while maintaining an overall personality profile throughout their lives, show subtle differences over their life time (Conley, 1984).

More studies are needed to explore the stability of the personality dimensions identified by the CFFM over time and the consequences these dimensions have for dogs in the way they interact with the social world. A large study of Australian dogs is currently underway that aims, among other things, to identify canine personality profiles associated with stable bonds between dog owners and their dogs.

The CFFM describes canine personality using five dimensions, labelled Extraversion, Motivation, Amicability, Training Focus and Neuroticism. A 26 item owner administered questionnaire, the MCPQ-R, measures how dogs vary along these dimensions. Initial validity studies suggest the MCPQ-R was not measuring irrelevant characteristics, such as owner education, or dog sex. Initial reliability tests support the MCPQ-R as a reliable test for measuring differences in canine personality as rated by the dogs' owners. The CCFM offers a unifying model for canine personality and the MCPQ-R is an easily administered questionnaire for describing the personality of the domestic dog.

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Feeding routine risk factors associated with pre-feeding behaviour problems in UK leisure horses

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Introduction

Domestic horses are typically provided with a diet and feeding regime that differs markedly from their evolutionary requirements (McGreevy, 2004). Modern feeding practices have been implicated as risk factors for a number of physiological and behavioural problems (Davidson and Harris, 2002). In addition, various anticipatory behaviours can be performed prior to feeding and are subsequently reinforced by the arrival of food. Such behaviours are often viewed negatively by owners and once established may be performed in contexts outside of feeding that are associated with high levels of arousal, for example prior to turn-out (Cooper and McGreevy, 2002).

Despite concerns being raised about the physiological and behavioural consequences of some modern feeding practices, there are little data available regarding the feeding regime and diet of leisure horses in the UK. The aim of this study was to generate data on these practices as well as quantify the performance of feeding-related behaviour problems in UK leisure horses and to identify feeding practice risk factors for this behaviour.

Method

Leisure horse owners were asked to complete an Internet survey about their horse's feeding regime. To minimise recall bias they were asked to provide details of the regime as it was during the week prior to the survey's completion. The survey was online for a full calendar year to account for seasonal variations in feeding practices. The survey covered the feeding of concentrate diets and forage, as well as a section exploring the horse's daily routine outside of feeding, for example the time spent stabled, out at grass and being exercised. Owners were asked to rate how often their horse displayed nine different behaviours prior to receiving concentrate feed or forage. Behaviour items included pawing, kicking/banging the door, head nodding and weaving on a rating scale running from 1 (never) to 5 (often). The survey was granted ethical approval by the Departmental Ethics Committee for the Department of Psychology at the University of Chester.

Owners were recruited from a number of different sources, using both the Internet and more traditional means, in an attempt to generate a representative sample of the UK leisure horse population. Details of the study and the survey URL were sent to riding clubs and livery yards via emails and postal mailshots. Notices were posted on online discussion forums and announcements published in the local press and national equestrian magazines. Demographic information from the horses, and owners, making up the survey sample were compared to published information about these populations and found to be representative of the wider leisure horse population.

The data generated by the survey were analysed in SPSS version 14 for Windows (SPSS Inc., USA). Principal components analysis was used to identify any correlations between pre-feeding behaviour problem variables and so reduce the number of dependent behaviour variables for further analyses. Associations between these new pre-feeding behaviour problem components and feeding routine risk factors were explored using univariate and multivariate logistic regression analyses.

Results

The survey generated behaviour data for 890 horses. Of these, 70% performed some form of pre-feeding behaviour problem. Principal components analysis identified three groups of problems which were all relatively similar in their prevalence: pre-feeding frustration behaviour was reported in just under half the horses sampled, pre-feeding stereotypies were reported for 10% less than that and between the two lay aggressive pre-feeding behaviours.

Feeding routine risk factors associated with each of the behaviour components were explored using logistic regression analyses. Forage availability was associated with two components; restricted access increased the risk of frustra-

tion behaviour, while feeding *ad lib* reduced the risk of pre-feeding aggression. Pre-feeding stereotypies were affected by the frequency concentrate feeds were provided and the presence of other horses during feeding, with a reduction in risk if the horse was fed concentrates only once per day with no other horses present when it was fed. The type of concentrate and forage provided was not associated with any of the behaviour problem components. The use of multiple dietary supplements, including nutritional calmers, was associated with an increased risk of pre-feeding aggression and stereotypic behaviour. The performance of behaviours often attributed to feeding tit-bits by hand, so-called mugging behaviours, was associated with an increased risk of all components, suggesting these behaviours are indicative of generic feeding-related problems. Outside the feeding routine, participating in regular work reduced the occurrence of all three behaviour problem components.

Discussion

Pre-feeding behaviour problems are associated with feeding routines at odds with the horses' evolutionary requirements. It is unusual for a horse to voluntarily fast for longer than 3–4 hours (Ralston, 1986), yet this is what many domestic horses endure when their forage intake is intentionally restricted or does not last through the night. Cause and effect relationships cannot be determined from the findings of surveys such as this. However, there is sufficient evidence in the literature to show that restricted feeding can cause physical and psychological problems (Davidson and Harris, 2002; McGreevy, 2004). The associations found between restricted feeding of forage and pre-feeding behaviour problems by the current study illustrates the negative impact this practice can have on the horse's behaviour. The manner in which concentrate feeds were provided was associated with pre-feeding stereotypies, rather than what was fed. The reduction in risk when the horse was only fed one concentrate meal per day was not surprising considering that the behaviours loaded on to this component, e.g. weaving, are anticipatory in nature and displayed most frequently prior arousing events such as feeding and turn-out (Cooper and McGreevy, 2002; McAfee et al., 2002). The reduction in risk associated with feeding the horse alone may reflect the lower level of arousal in this situation where there are no misleading cues from neighbouring horses being fed and no excitement from other horses to stimulate the horse.

The often extensive use of nutritional supplements by owners is a concern especially if they are being used to resolve health or behavioural issues at the expense of seeking professional help or spending time to resolve the problem. Furthermore, the effects of some nutritional supplements and the interactions between them when multiple supplements are used (Davidson and Harris, 2002) are little understood and hence they should be used with caution until there is

more evidence to support claims of their effectiveness and safety.

The performance of mugging behaviours appears indicative of wider feeding-related problems and owners should be alerted to reconsider their overall feeding practices when these behaviours are displayed rather than dismissing them as attention seeking or bad manners.

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Keywords: horse; feeding practices; behaviour

Can standardised behaviour tests predict suitability for use in horses?

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Introduction

Standardised behaviour tests have the potential to improve horse welfare by enabling the selection of horses suitable for a particular role. A range of tests are found in the scientific literature where the authors make such claims. However, with notable exceptions (e.g. Visser, 2002; Seaman et al, 2002), authors have failed to establish the reliability of their tests (e.g. Wolff et al, 1997; Anderson et al, 1999) or the validity of their claims (e.g. Mackenzie and Thiboutot, 1997; Hausberger and Muller, 2003); and where these issues have been addressed the findings are inconsistent. Some studies have shown standardised behaviour tests to be invalid measures of general behavioural tendencies (e.g. Seaman et al, 2002), but others have found more promising results (e.g. Visser, 2002). Such inconsistencies in the literature may be due to methodological issues or to the age and experience of the horses used in the studies, and it remains to be demonstrated that behavioural tests have a utility to the wider industry where horses are often selected for particular roles as adults. Here we aimed to identify a set of behavioural tests that can be readily applied in the horse industry, that generate reliable behavioural responses, and that are valid indicators of suitability for a role in adult horses.

Materials and methods

Police horses were used as the test group, as they have a specific role that encompasses a wide range of tasks and they are selected for training as adults from the general domestic horse population. Selecting horses with the ability to cope with

the demands of this critical job currently depends in the UK upon the subjective opinion of an assessor who selects horses for six-weeks of probationary training. Therefore an objective method of behavioural assessment would be a useful addition to this initial selection.

The standardised behaviour tests examined in this study were derived from literature where authors made claims regarding their validity as predictors of a horse's behavioural tendency (or temperament) that could be used to select an animal for a particular role. The standardised behaviour tests incorporated the techniques reported in the original account, but were modified to make them feasible to those working in the equine industry. They included social isolation and stranger approach tests, where a free moving horse was isolated in a familiar indoor arena for three minutes, after which an unfamiliar person approached the horse without interaction. Two reactivity tests included an unexpected loud noise (percussion shaker) close to but out of sight of the unrestrained horse, and a sudden fast moving object (an automatically opening umbrella). In-hand tests included reaction to a stationary novel object and attempting to lead across a large plastic sheet, as an unusual surface test.

Reliability of responses to these tests was established by repeating the tests at three week intervals on 33 riding horses. As behavioural responses could not be predicted prior to conducting the tests and because more than one response was possible for each test, the horses' reactions were videoed and a set of behaviour measures developed *post hoc*. These measures included different forms of locomotion, latency to approach or touch objects, distances between horse and challenges, and postural expressions. Response coding was assessed for inter-observer reliability and shown to be high for all test responses.

SPSS v14 was used to analyse the data. Categorical data were analysed for agreement between the horses' responses on test and retest using Kappa (K) for binary variables and weighted Kappa (Kw) with three or more ordinal response categories. The interpretation of Kappa values were adapted from Altman (1991, P. 404) as 0.80–1.00 = very good, 0.61–0.80 = good, 0.41–0.60 = moderate, 0.21–0.40 = fair and < 0.20 = Poor. Continuous variables were analysed for limits of agreement (Altman, 1991). Secondary analysis using Wilcoxon's signed-ranked test was conducted to determine if the horses showed any indication of habituation to the test stimuli.

Results

The majority of behaviour tests generated moderately reliable behavioural responses between test and retest three weeks later, with only the reactivity tests showing good or better reliability. There was some evidence that the horses habituated to static stimuli, with a longer latency to touch and a reduction in time

spent touching and exploring on the second trial. It was found that the horses did not habituate to the majority of the measures for the reactivity tests, which is consistent with unpredictable loud noise and sudden movement (Domjan, 2003). Behaviour tests with moderate between trial reliability, or lower reliability that could potentially be explained by habituation, were included in the validity testing.

Validity testing compared police horses' responses to the reliable behaviour tests with their handlers' ratings of their performance on key aspects of police horse work. This subjective scale of suitability for police horse work was developed from interviews with mounted police instructors and yard managers. The reliability of each item on the scale was established by assessing the agreement between two raters for each horse, who were officers or trainers familiar with the horse, and was found to be moderate or better for each item. Scores on items relating to particular roles within police horse work were combined to provide a set of indices of performance that indicated the horse's suitability as a police horse.

The behavioural responses of 24 fully trained police horses were measured for each of the reliable behaviour tests. Bonferroni corrected Spearman's rank-order correlations were used to explore associations between the horses' responses and their ratings of suitability for use as police horses. Correlations were interpreted for using the guideline provided by Sprinthall (cited in Martin and Bateson, 1993, P. 144) as 0.9–1.0 = very high, 0.7–0.9 = high, 0.4–0.7 = moderate, 0.2–0.4 = low and < 0.20 = slight. The results revealed moderate associations between the horses' responses to the reactivity tests (unexpected noise and sudden moving object) and their suitability scores. Responses to all the other behaviour tests had only poor associations with suitability scores.

Conclusions

These findings show that responses to the standardised behaviour tests were not good predictors of the wider performance of police horses. This may be because the tests used here were unsuitable as indicators of behavioural tendencies, but other tests may be; or because behavioural responses shown in standardised tests cannot be generalised as behavioural tendencies that reflect likely responses to the wider challenges in horses' working lives. The tests used in this study were derived from claims made in the literature regarding their usefulness as predictive tests and encompassed challenges that represent the range of tests that are reported in the literature, so it is unlikely that they were an accidental selection of tests that did not generate predictive behaviour. However, research into the learning ability of horses demonstrates good stimulus specific memory (e.g. Hanggi, 2005) and poor ability to generalise (e.g. Christensen et al., 2008), suggesting that responses shown were reflections of the animal's past experiences with situations that are

similar to the test environment rather than reflections of the animal's general behavioural tendencies. This may have been particularly so for the tests involving static objects where rapid habituation to non-aversive stimuli has been shown (Christensen et al, 2008), but less so for the reactivity tests where habituation to moving objects is much less rapid (Christensen et al, 2006).

The reactivity tests revealed both stronger re-test reliability and stronger association with police horse performance. The unpredictable stimuli in these tests generate autonomic responses that are less influenced by past training and experience, and so may better reflect the horse's underlying response tendency. Such tests may have some validity in measuring a horse's suitability where reactivity is an important element of performance. For example low reactivity is desirable in mounts for novice riders and for therapeutic riding horses, whereas high reactivity is a bonus in advanced competition horses.

In conclusion, when behaviour test reliability was established and reliable measures of validity were used, the findings of this study indicate that standardised behavioural tests are not valid predictors of suitability for use in adult domestic horses.

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Keywords: horse; behaviour test; reactivity test; temperament.

Evaluation of a training programme for police interview assistance dogs

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Introduction

In a pilot project of the police of Lower Saxony, Germany, a dog took over the mediator role between victim and police officer during police interviews with children and teenagers. Positive effects regarding victim protection in the form of maximum relaxation of the victim were found (Frels and Nolte 2004). The dog used in the pilot study is no longer alive.

In order to render the use of further dogs possible, a special behaviour test was developed in a previous study (Knipf 2008). Its purpose was to assess the suitability of dogs as police interview assistance dogs. The study did not produce a suitable police interview assistance dog. However, four of the 27 tested dogs were regarded as conditionally suitable. They displayed appropriate as well as conditionally appropriate behaviour in the test situations but no behaviour that would have rendered them unsuitable.

As conditionally appropriate behaviour may be improved by training, the results of this first study were used to develop a training concept for police interview assistance dogs. In the study presented here, conditionally suitable dogs were trained following this concept. The aim of the study presented here was to develop a particular training programme for police interview assistance dogs and evaluate the success of this training programme in producing dogs suitable for this work.

Method

In order to test the dogs' suitability as police interview assistance dogs, a particu-

lar behaviour test was developed. This test, developed in a previous study by Knipf (2008) consisted of 53 test-situations belonging to the following six sections: (a) general veterinary examination, (b) frustration test, (c) obedience test (with the owner and with the test-leader), (d) dog-human-contact, (e) dog-environment-contact, and (f) particular behaviours of children in police interviews. The dog owner was present only during the first three sections of the test. The dogs' display in the test situations was recorded and classified into the following five behavioural categories: agonistic behaviour, withdrawal, submission/signs of insecurity, social approach behaviour, or socio-neutral behaviour. Depending on the dogs' behaviour in the different situations, the dogs' suitability was scored according to the following scale: score 1: appropriate behaviour in the given test situation, i.e. dog is unconditionally suitable, score 2: conditionally appropriate behaviour in the given test situation, i.e. dog is conditionally suitable, score 3: inappropriate behaviour in the given test situation, or profound abnormalities in the general veterinary examination, i.e. dog is unsuitable as police interview assistance dog.

Forty dogs, purebreds and crossbreds, aged 1–14 years, participated in the first test. They were owned by police officers, and were kept as companion dogs and not as police dogs. Ten of these dogs, again purebreds and crossbreds, aged 1–7 years, underwent a specific training programme which was compiled with special regard to each dog's results in the first test. After the termination of the training programme, the ten dogs were reassessed using the same behaviour test and scoring system.

Data were analysed using SAS 9.1. Differences between pre-training and post-training test scores were calculated using McNemar's test. Values of $p < 0.05$ were regarded as significant, values of $p < 0.01$ as highly significant.

Results

In the pre-training test, no dog received score 1 in all test situations, and thus no dog was regarded as unconditionally suitable. Six dogs were assigned score 2 at maximum and therefore considered conditionally suitable. Four dogs displayed behaviour categorised as score 3 and were therefore unsuitable as police interview assistance dog. As these four dogs showed behaviour belonging to score 3 in only one or two test situations, and as they did not react with agonistic behaviour, they were nevertheless included in the training programme.

In the post-training test, again no dog received score 1 in all test situations, and thus no dog was regarded as unconditionally suitable. Seven dogs were assigned score 2 at maximum and therefore considered conditionally suitable. Three dogs displayed behaviour categorized as score 3 and were therefore unsuitable as police interview assistance dog.

In the pre-training test, the dogs were assigned score 1 in 28.6%–70.9% of

the test situations, score 2 in 29.1%–67.8% of the test situations, and score 3 in 0.0%–3.6% of the test situations. In the post-training test, the dogs reached score 1 at maximum in 53.6%–81.8% of the test situations, score 2 at maximum in 18.2%–46.4% of the test situations, and score 3 at maximum in 0.0%–3.4% of the test situations. From pre-training to post-training test, the performance of four dogs improved significantly ($p = 0.0194$) or highly significantly ($p = 0.0016$, $p = 0.0006$, $p < 0.0001$). Five dogs improved non-significantly ($0.1088 \leq p \leq 0.4669$). One dog performed worse ($p = 0.7477$).

Conclusions

The dogs participating in this study were kept as companion dogs, were from various breeds, and had varying histories as regards rearing conditions and previous training. The owners, all police officers, took part in the study voluntarily; they conducted the training sessions in their leisure time and not while they were on duty. The results show that the training had an influence on the dogs' behaviour, i.e. the dogs improved with regard to their suitability as police interview assistance dogs. The time available to the dogs' owners in this study was not sufficient; a more intense training, however, may well produce unconditionally suitable police interview assistance dogs.

Establishing police interview assistance dogs as a particular type of service dog and re-considering their breeding, rearing, and training might be necessary to produce suitable dogs while also meeting animal welfare criteria. Moreover, providing police officers with time for training sessions while they are on duty might further improve the training of the dogs, which again would be consistent with animal welfare.

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Keywords: police interview assistance dog, behaviour test

Predicting separation problems in dogs: development of a practical test for rehoming centres

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Introduction

Separation-related behaviour problems in dogs are categorised as unwanted behaviours that only occur when a dog is separated from its owner. The most common behavioural signs are; destructive behaviour, often occurring near the site of the owner's most recent departure; various types of vocalisation; and inappropriate elimination (McCrave, 1991; Lund and Jorgensen, 1999). Less obvious signs include not eating when left alone, sitting immobilised by door or window, not playing with toys, restlessness and repetitive behaviour. The dog may also show a physiological response to separation from its owner such as excessive salivation, trembling, tachycardia, hyperventilation or vomiting (Schwartz, 2003). Dogs may exhibit any one or a combination of these symptoms when left alone (Nack, 1999; Flannigan and Dodman, 2001).

Separation-related behaviour (SRB) is often poorly tolerated by dog owners (Van der Borg et al., 1991; Bailey, 1993) and is a common reason for dogs to be referred for behaviour therapy, making up between 20 to 40% of the referral population in USA (Voith and Borchelt 1996; Simpson 2000). In addition, a survey of the general dog owning population in the U.K. suggested that more than a quarter of all dogs have shown some form of separation-related behaviour (Bradshaw et al., 2002). Despite these figures being surprisingly high, they are likely to be an under-representation of the total numbers of dogs that show this type of behaviour. Unless evidence of destruction or toileting is present, or neighbours complain about vocalisation, separation-related problems can remain unnoticed by owners. In an

unpublished pilot study (Blackwell and Casey, 2003b), dogs that were not considered to have separation-related behaviour problems were video recorded when left by their owners: a surprising 15% of dogs showed at least one behavioural sign associated with separation problems. The occurrence of separation-related behaviour is therefore a considerable welfare problem for dogs in the U.K.

Given that separation-related behaviour is relatively common in pet dogs, and poorly tolerated by owners, it is unsurprising that separation-related problems have been identified as a major behavioural reason for relinquishment of dogs (Marston and Bennett, 2003; Bailey, 1993; Miller et al., 1996). In the U.K. it is estimated that 33% of all dogs handed into rescue and rehoming centres because of behaviour problems are related to separation (Bailey, 1992).

Previous research developed a test for predicting whether dogs in rehoming centres were likely to develop separation-related behaviours upon rehoming (Blackwell et al., 2003a). The test developed was 86% effective at predicting separation-related behaviour following rehoming. However, attempts to 'roll out' this test for practical use in the shelters proved problematic due to the amount of staff time required to carry out the testing, and the number/complexity of measures required. The aim of this study was therefore to identify whether reducing the length and complexity of the test itself would affect the reliability of the test in predicting the occurrence of separation-related behaviour. Shortening the test would make it more applicable for staff at rehoming centres.

Methods and results

On entry to the rehoming centres, dogs were assigned to one of three groups (A, B and C). Allocation to groups was initially random, but allocation to balance the groups for age category, breed and gender commenced part way through data collection. All three groups had one day of familiarisation with the tester and test room which consisted of a short walk, 5 minutes spent carrying out simple training exercises, 5 minutes in the room with the tester and 5 minutes spent playing with the tester. Dogs were habituated on the day before the test day and were tested between 9–12 days after entering the rehoming centre. Dogs in the first group (A) were tested as in the previously reported study (Blackwell et al., 2003a). Dogs in groups B and C had reduced levels of interaction with the tester before being left alone, as detailed in Table 1.

Table 1: Description of amounts of interaction in the three test groups

Group	Time in test room	Time spent playing	Following test	Time left in room ALONE
A	5 mins	5 mins	1 min	5 mins
B	1 min	5 mins	0	5 mins
C	1 min	0	0	5 mins

A total of 140 dogs were tested across 2 rehoming centres, 93 at Bristol Dogs and Cats Home and 47 at West Hatch RSPCA. Sixty-eight of the dogs (49%) were males; 84 (60%) were entire and 42 (30%) were neutered, the remaining 14 (10%) having unknown neuter status. 78 (56%) of the dogs tested were strays, 57 (41%) were gifted dogs, and the origin of 5 (4%) was unknown. 56 (40%) were pure breeds 84 (60%) cross breeds. Ages of dogs ranged from 6 to 144 months, with a mean age of 39 months.

Prior to combining data sets from study sites, the characteristics of dogs in each were compared. No significant differences were found with respect to age category, breed status (pure breed or cross breed) or gender. However, significantly more dogs in Bristol were strays (Bristol 77, West Hatch 1, $\chi^2 = 83.967$, $df = 2$, $p < 0.001$), and entire (Bristol 65, West Hatch 19, $\chi^2 = 15.139$, $df = 2$, $p = 0.001$). Since stray dogs are held for 7 days to enable owners to claim them, and only then neutered prior to rehoming, the origin and neuter status of dogs are likely to be related at the time of testing. No significant difference was found between study sites with respect to the duration of separation-related behaviours. However, the latency to show any active separation-related behaviours after the tester left the room was significantly different between sites, with a longer latency before active signs of SRB at the Bristol site ($t = -2.399$, $p < 0.05$). These differences between study sites were taken into account in later analyses.

Numbers of dogs were balanced between groups (Group A $n = 47$; Group B $n = 47$; Group C $n = 46$). To ensure that the allocation to treatment groups had resulted in balanced groups the three groups were compared post-hoc. No significant differences were found between the three groups with respect to dog gender, age category, neuter status, origin or proportion of pure/cross breeds. There was also no significant difference in the number of dogs in each group between the two RSPCA centres: because of this the data from the two study sites could reasonably be combined for comparisons between groups.

Follow-up questionnaires were sent to owners 12 weeks post rehoming. Thirty-one dogs could not be followed up after testing. Reasons for this included: dogs not having been homed; euthanasia of dogs; dogs having been moved to a different shelter; new owners having returned dogs; and new owners not being contactable. Of the remainder, 81 owners returned their questionnaires and 28 did not (75 % return rate).

Excluding those who reported signs whilst they were present as well as

absent, 22 (28%) of owners who returned questionnaires reported some form of separation-related behaviour. In 19 cases signs of SRB started within a few days of dogs arriving in their new home, 15 on the first time that dogs were left. Dogs that developed separation-related behaviour after rehoming showed a significantly longer duration of combined separation signs during testing (mean duration for 59 dogs not showing SRB on rehoming 6.53 sec., and mean duration for 22 dogs developing SRB 8.78 sec.) using an independent samples t-test ($t(79) = -2.289$, $p < 0.05$). Testing therefore appears to distinguish between dogs likely to develop signs of SRB after homing from those that do not.

SRB duration was calculated from the dog's behaviour while left in the room alone. This comprised duration in seconds spent vocalising (barking, whining or howling) and duration in seconds spent scratching the door as these were the two most frequent behaviours observed upon social isolation.

Effect sizes from ANOVA of SRB duration in tests and SRB outcome after homing were comparable between treatment groups (η^2 0.18, 0.09 and 0.10 respectively), suggesting that minimal interaction prior to temporary isolation retains the validity of the test. Groups were therefore combined to examine specific test elements which were predictive of SRB on rehoming.

Variables were entered into a backward stepwise logistic regression model. The model was statistically significant $\chi^2 = 31.11$ (5 df, $N = 79$), $p < 0.001$ with a specificity of 91% and a sensitivity of 62%. Dogs were 27 times more likely to show signs of SRB on rehoming if they both barked and stood by the exit point for more than 40 seconds ($OR = 27.025$, $p = 0.035$). Howling for more than 10 seconds was found to be predictive of SRB ($OR = 16.766$, $p = 0.006$) as was scratching the door for more than 10 seconds ($OR = 13.351$, $p = 0.001$).

Discussion and conclusion

This study was deliberately conducted at two adoption centres with very different environments and populations of dogs. At West Hatch, the majority of dogs are gifted to the centre whereas Bristol takes in many more stray dogs. Bristol has less space and is a much busier and noisier centre, with members of the public having free access to kennel blocks.

At West Hatch the facilities are spread out much more, access to kennel blocks is more restricted, and the environment is generally much quieter. The conditions of test rooms also differed considerably between sites. In Bristol the test room was located in the middle of the kennel area, where people and other dogs were passing, and dogs could also hear movement in the staff room above. At West Hatch, the test room was located well away from the kennel area and there was minimal other noise to distract dogs from the activity of the tester.

The fact that the site was a significant factor in the final model predicting the

occurrence of SRB is therefore not surprising. However, identifying behavioural signs during testing which are predictive of SRB despite these differences, suggests that such findings are likely to be robust across different rehoming centres and testing conditions.

The results of this study suggest that shortening the test to one minute interaction in the test room prior to social isolation does not affect the predictive validity of the test. The study has also identified simple measures for staff to take during testing which are over 90% specific and over 60% sensitive at predicting separation problems. These findings make the test quicker and simpler to conduct within the rehoming centre environment. The results also identify the specific behavioural signs shown by dogs during testing which indicate a likelihood of separation problems after homing. These are: howling at all during separation, scratching the door for more than 10 seconds, and both barking for more than 40 seconds and standing at the door for more than 40 seconds. These variables are predictive despite testing being conducted in study sites with very different populations of dogs, test room conditions and homing policies, suggesting that findings are likely to be robust across different rehoming centres.

The test is now in the process of being trialled at RSPCA centres. The application of this test will allow staff to identify dogs likely to develop separation problems and rehome them accordingly with adopters willing and able to follow behavioural advice and therefore reducing the risk of dogs being returned to the centres.

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Keywords: Dog, separation-related behaviour, rehoming centres, temperament testing

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The human-animal bond: role of anthropomorphism in diversity and variation

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Adams et al (2007) suggested a predictive model based on the dimensions of empathy, attachment and sexual attraction to differentiate between zoophilia and bestiality (animal sexual abuse). This paper develops this model by considering the role of anthropomorphism. It is known that anthropomorphism changes 'normal' care giving practices of pet owners (White, 2007). We suggest that anthropomorphism may have a significant effect on the human – animal bond by blurring the lines between sensual and sexual feelings (zoophilia) for a family pet (Adams, 2006).

Karpman (1961) describes zoophilia as human sexual excitement through stroking or fondling animals. Serpell (1996) suggests many pets share the same bed as their owner, sleep on their lap and interact with their owner in an affectionate and intimate way, which may or may not be sexually arousing to the owner.

Attachment bonds in human dyads are often characteristically dependent on engaging in physical intimacy and body contact (Prato-Previde, Fallani, & Valsecchi, 2006).

The flexibility in the human sexual response system, highlighted by Diamond (2006) considers that sexual orientation and sexual attraction are variable and can be influenced by attachment. This attraction can be irrespective of a predisposing sexual orientation. Thus, the formation of an attachment bond can lead a predisposed heterosexual to become sexually attracted to a same sex person.

Likewise, where anthropomorphic attitudes are high and attachment bonds are formed with an animal, these could develop into a more sexually attractive relationship on the part of the human. This is an extension of the erotic plasticity of the human sexual response and may or may not be acted upon in any manner

that compromises animal welfare. Therefore we suggest that zoophilia is a physical and sensual dimension of human-pet relationship occasionally overflowing accepted boundaries, rather than a deliberate calculated process of sexual deviance or animal abuse.

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Assessing canine temperament related to aggression

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Introduction

Canine aggression is one of the most frequent behaviour problems being presented to veterinary behaviourists, as it may result in serious injuries and thus bring tremendous impact on the society. For example in the United States more than 4.7 million dog bites are reported annually (Sacks et al., 1996) and over 1000 people per day are sent to hospital emergency departments because of dog bites (Gilchrist et al., 2003). One of the classifications of canine aggression is based on the target, i.e., owner-directed, child-directed, stranger-directed and dog-directed aggression. Each of these aggressive tendencies is likely to be differently composed of various temperament factors including fear and reactivity. If we can assess accurately the aggression related temperament factors, we would be able to provide more appropriate treatment in our behaviour clinic.

Materials and methods

As a first step to establish the evaluation method for temperament factors underlying aggression, we conducted a questionnaire survey to dog owners at dog shows organized by Japan Kennel Club in 2008 and 2009. In this study we focused on fear and reactivity as candidate temperament factors and chose three dog breeds, Shiba Inu, Labrador Retriever and Chihuahua, because they have different tendencies in showing aggressive behaviours (Takeuchi & Mori, 2006). Questionnaire sheets contained questions about general information, 14 items about the dogs' responses to humans, sounds and small animals, and 6 items about

aggression toward owners, children, strangers and dogs. Owners were asked to score their dogs' response with 5-point frequency scales (1 = never, 2 = occasionally, 3 = sometimes, 4 = often and 5 = always). In total, owners of 91 Shiba dogs, of 109 Labrador Retrievers and of 100 Chihuahuas volunteered to fill out the questionnaire.

Results

At first, factor analysis was conducted using 14 items in each breed, and then factor scores calculated as the average of the questionnaire items comprising each factor were compared between the calm dogs (showing never or occasionally aggressive behaviour: scale ≤ 2) and the aggressive dogs (showing aggressive behaviour more frequently: scale ≥ 3) in the Shiba breed. The factor analysis resulted in extraction of three factors, i.e., 'reactivity to small animals (F1)', 'fear of human (F2: negatively loaded)' and 'reactivity to sound and movement (F3)', consistently from all the three breeds. The fourth factor, 'fear of sounds (F4)' was extracted only from Labrador Retrievers and Chihuahuas. In addition, F1, F2 and F3 were composed of the same items among the three breeds, whereas F4 had the same composition between the two breeds. Cronbach's alpha coefficients for the four factors were as follows: F1, 0.754; F2, 0.863; F3, 0.705 in Shiba dogs, and F1, 0.833; F2, 0.841; F3, 0.671; F4, 0.546 in Labrador Retrievers, and F1, 0.808; F2, 0.859; F3, 0.658; F4, 0.753 in Chihuahuas. The Shiba dogs showing owner-directed aggression had significantly higher F3 scores ($P = 0.0414$, by Wilcoxon rank sum test), while those with child-directed and stranger-directed aggressions had lower F2 scores (child-directed aggression, $P = 0.0039$; stranger-directed aggression, $P < 0.0001$) and higher F3 scores (child-directed aggression, $P = 0.0362$; stranger-directed aggression, $P = 0.0199$) as compared with calm individuals, respectively. No such difference was found regarding the dog-directed aggression.

Conclusions

These results suggest that the temperament factors such as fear and reactivity may contribute differently to owner-directed aggression as compared to stranger (or child)-directed aggression in the Shiba Inu breed.

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Keywords: temperament; aggression; dog; questionnaire

Effect of kennel door design on vocalisation in dogs

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Introduction

Noise levels in dog kennels are a concern for those working in this environment and the dogs within, since it may cause hearing damage and public disturbance. The effect of visual contact with conspecifics and humans outside the kennel on noise levels remains unknown. It may be important to allow dogs to readily see what is happening to allow them to settle, but this may also increase frustration and noise.

Method

This study examined the effect of obscuring the bottom portion of the double-panel glazed kennel doors on noise levels from the dogs within a 12 unit block. This intervention effectively prevented continuous visual access to the centre of the kennels, although access was possible by looking over this barrier. Baseline noise was recorded prior to entry into the kennels by an experimenter who then followed a standard route within the unit until the dogs habituated to their presence (habituation test). This was determined from noise levels sampled every 5 seconds returning to within baseline levels on 12 successive occasions. Four replicates of each condition were undertaken using an extended ABBA design, with at least a week between tests. Data were tested for normality (Kolmogorov-Smirnov) and a two-sample t-test used to compare the effect of the intervention on time taken for habituation to occur, number of bouts of vocalisation, mean and peak noise levels during the habituation test, having established that the number of dogs in the kennel ($n = 8-13$) did not correlate with measures of noise level or habituation.

Results

Mean time taken for the dogs to habituate (692.5 vs 358.8s) and number of vocalisation bouts (29 vs 13.75) were both significantly ($p < 0.05$) greater in the transparent conditions. There was no difference between the two conditions in the mean volume (58.61 vs 60.23dB) or peak volume (85.7 vs 88.2dB) during habituation.

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Feline behavioural problems: an epidemiological study in a cat population

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The popularity of cats as pets is generally believed to be due to the fact that they offer affection and companionship, but they are easier to care for than dogs (Zasloff, 1994; Overall, 1997). According to the literature house soiling is the most frequently presented feline behavioural problem (Overall 1997; Horwitz, 2002) followed in second place by feline aggression (Palacio et al, 2007; Heath, 2002). The aim of this study was to analyse the most frequently presented feline problem behaviours in a cat population of Milan through the observation of many variables.

We studied 87 cats presented to the behavioural clinic. The data were collected via a questionnaire used for the purpose of behavioural consulting. The behavioural problems were divided in three categories with respective diagnoses of: house soiling (inappropriate elimination or marking), aggression (interspecific and intraspecific) and other problems. We analysed common (age, sex, age of adoption, origin, environment and other animals) and specific variables for house soiling and aggression. We carried out a retrospective descriptive epidemiological analysis.

The majority of cats (48%) presented with house soiling and the diagnosis of inappropriate elimination related to litter tray usage was made in 69% of these subjects. Most of the house soiling problems involved urination (66%).

Aggression was shown by 35% of the cats. In 53% of these subjects the aggression was interspecific. In relation to interspecific aggression problems offensive aggression was the most frequent diagnosis (56%) whereas in relation to intraspecific aggression about 79% of cats showed social conflict aggression.

In the context of aggression problems males were more frequently presented than females (70%) and 37% of the cats were adopted before 50 day of age with the

majority of these cats presenting with offensive aggression.

Variables including age, sex and adoption age were found to be more significant in relation to problems of aggression than house soiling problems. These preliminary results have important implications in relation to the development of preventative measures but in order to improve the application of the results it will be necessary to do a further study to compare this population with a control population.

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Keywords: cat, house soiling, aggression

Preventing separation problems in re-homed dogs: improving owner compliance

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Introduction

Separation-related behaviour is a common reason for adopters to relinquish or return dogs to re-homing centres (Bailey, 1992). Behaviours perceived as problematic to their owners commonly include destructive behaviour, inappropriate elimination and vocalization (Blackwell et al., 2006; McCrave, 1991).

In our previous research (Blackwell et al., 2005), we validated a programme of advice designed to reduce the occurrence of separation problems in the dogs once at their new homes. This project examined the relative effectiveness of different methods of delivering the advice to people adopting dogs from a re-homing centre.

Materials and methods

An opportunity sample of 207 dogs re-homed by Bath Cats and Dogs home (RSPCA) were included in the study. At the time of adoption dogs were assigned alternately to three groups. All adopters were given generic behavioural advice previously found to reduce the occurrence of separation-related behaviour in the new home, but the format in which the advice was delivered varied between groups. One group of adopters were given written behavioural advice only, the second were given the same advice, but delivered verbally, and the third group of adopters received the behavioural advice both verbally and in writing.

Questionnaires were sent to the adopters 12 weeks after re-homing to identify the occurrence of any separation-related behaviour and examine the adopter's

compliance with the behavioural advice. In addition to providing information about their dog's behaviour when they were present, adopters were required to report the presence or absence of target behavioural signs when their dog was left alone. Questions were also included to assess the adopters' compliance with the behavioural advice, for example adopters were asked to report their reaction upon returning home to find evidence of inappropriate toileting or destructive behaviour to assess their compliance with the recommendation to avoid punishing their dog upon returning home.

Results

135 adopters (74%) returned completed questionnaires. In total 15 % (n = 19) of the re-homed dogs that were regularly left alone were reported to show some form of separation-related behaviour. The majority of adopters (98%) reported a single behavioural sign.

Efficacy

The efficacy of the treatment advice was examined by comparing the incidence of separation-related behaviour following re-homing. Whilst fewer dogs in the verbal only advice group and verbal and written advice group were reported to show separation-related behaviour after 12 weeks in their new homes than those in the written advice only group, this was not statistically significant ($\chi^2 = 1.57$; $df = 2$; $p = 0.457$). There were also no significant differences between treatment groups for compliance either with respect to gradually increasing the time for which the dog was left alone ($\chi^2 = 4.21$; $df = 2$; $p = 0.12$), or not punishing the dog upon returning home ($\chi^2 = 1.00$; $df = 2$; $p = 0.604$).

Discussion

Although giving preventative advice verbally does appear to have some increased effect on the subsequent occurrence of separation problems in re-homed dogs over written presentation alone, and some adopters may benefit from this form of presentation, the effect is minimal compared to the difference between written advice alone and no advice. Overall owner compliance was still disappointing and further investigation as to the reasons for this would be beneficial. It is possible that compliance was low in adopters who were practically unable to follow the advice about gradually building up the time for which the dog was left alone, or those who had very fixed opinions about the requirement to punish dogs for unwanted behaviour. In which case a better matching of dogs 'at risk' of separa-

tion-related behaviour to adopters with the time and motivation to follow the behavioural advice may prove highly beneficial.

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Keywords: Compliance; Dog behaviour; Human-animal bond; Separation-related behaviour

Can behavioural problems lead to neurological abnormalities?

A case report

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Introduction

It is widely accepted that some diseases may lead to behavioural changes. Reports of behavioural conditions contributing to the development of diseases are much less common and are usually restricted to a few conditions, such as feline idiopathic cystitis and hepatic lipidosis. In contrast, there is a well known condition in humans called hysterical conversion. In this paper, we report a case of an obsessive-compulsive disorder (OCD), which appeared to be the consequence of a neurological disorder that was preceded by a stressful event and resolved after behavioural modification. To the best of our knowledge, this is one of the very few cases of neurological abnormalities caused by stress reported in the veterinary literature.

Clinical information

A 3 year old neutered indoor male Siamese cat was presented to our clinical service with significant agitation and self-directed aggression. The most important clinical and neurological findings were tail mutilation, left foreleg knuckling and absence of right nasal sensation. Laboratory findings included CBC and basic biochemistry profile, which were both normal and FIV/FelV test, CSF analysis

and non-contrast Rx were also normal. Other results included pre-feeding bile acids: 4.0 $\mu\text{mol/L}$ ($<12 \mu\text{mol/L}$) post: 33.3 $\mu\text{mol/L}$ ($<25 \mu\text{mol/L}$). tT4: 38 ng/ml (7.8–38.1 ng/ml) and fT4: 42 ng/ml (6–26 ng/ml). Abdominal ultrasonographic examination was normal. After that bile acids profile was repeated and all the results were within normal limits (pre 4.0 $\mu\text{mol/L}$ ($<12 \mu\text{mol/L}$) post: 12.1 $\mu\text{mol/L}$ ($<25 \mu\text{mol/L}$). The cat was treated for hyperthyroidism and idiopathic epilepsy with no effect. Owners refused permission to perform a nuclear magnetic resonance and we decided to institute behavioural therapy for OCD. Treatment consisted of: environmental and management modification, including important environmental enrichment, habituation and counterconditioning to noise and unfamiliar people, avoiding involuntary reinforcement of inappropriate behaviour and reinforcing calm behaviours. Pharmacological treatment was instituted with clomipramine (1 mg/kg sid) and pheromonotherapy with Feliway®. After two months of treatment, behavioural changes, neurological and analytical alterations disappeared.

Conclusions

In the present case report psychological factors, and more precisely an important acute stress, seem to have contributed to the development of behavioural, neurological and physiological changes. Commonly, when medical alterations are detected, environmental factors are ruled out. In humans there is a pathology named hysterical conversion in which neurological and sensorial dysfunction are preceded by an stressful event and treatment is based on behavioural modifications^{1,2,3}.

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Keywords: cat, obsessive-compulsive disorder, neurological abnormalities, hysterical conversion.

An epidemiology study on travel anxiety and motion sickness

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Car travel can be stressful for many dogs. Most frequently reported symptoms are vocalisations, restlessness or signs including panting, trembling, salivation and vomiting (Doring-Schatzl and Erhard, 2004). These symptoms could be fear induced as a result of insufficient or bad experiences with car travel, but they could also result from motion sickness. However, the distinction between these two forms is not very clear. Moreover other possible motivations for the symptoms such as excitement of an unbalanced dog or barking in the context of territorial behaviour (Doring-Schatzl and Erhard, 2004) may also be implicated. Little research has been published on this topic (Gandia Estellés and Mills, 2006; Frank et al., 2006). A general practice in the USA reported that around 10 to 15 per cent of animals they examined suffered from motion sickness (Osgood, 1978). In the UK it was found that 23 per cent of household dogs were restless when they travelled (Mills and Mills, 2003). This study involved a survey of travel related-problems in dogs in Italy.

155 dogs, male and female, ranging in ages from 6 months to 12 years, and of different breeds took part in this study. Owners were asked to complete a brief questionnaire on their dog's signalment and history, on its behaviour during travel and on characteristics of the transport. The questionnaires were collected at different places: a behavioural clinic, a veterinary clinic, a private practice and among veterinary students. Answers to the questionnaire were scored, absolute and relative frequencies were calculated and expressed as a percentage. Chi-square test was used to identify differences both in signs shown by dogs and among some characteristics of the transport.

43.6% of dogs involved in the study had travel-related problems. About half the

dogs (47.7%) showed panting, 43.1% were restless and 40% vocalised ($p < 0.05$). Trembling, attention seeking and frequent swallowing were exhibited respectively by 26.2%, 29.2% and 20% of dogs ($p < 0.05$). 29.2% of the dogs vomited ($p < 0.05$). Owners reported that 24.6% of dogs had ears back, 18.5% had crouched body posture and 18.5% had tucked tail ($p < 0.05$). The percentage of dogs with travel related problems was higher in data collected at a behavioural clinic and among veterinary students compared to those collated at a veterinary medical clinic ($p < 0.05$). Half the owners (50%) of dogs with travel-related problems used a device during the travel to comfort the dog (like toys, blankets, pets) compared to 28% of owners of dogs without travel-related problems ($p < 0.05$).

Our results show that travel-related problems affect a high percentage of dogs. It appears that the veterinary students and owners of dogs with behavioural disorders are more sensitive to the problem than other owners. The popular belief appears to be that travel-related behavioural change is not a real problem or that the selection of an appropriate solution for this problem is not a priority, even though this research suggests that it is a common problem of potential significance both for the dog's welfare and for the quality of the dog-owner relationship. More research is needed to assess the link between anxiety, fear and motion sickness.

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Keywords: fear, anxiety, motion sickness, dog car travel

Comparison of factors limiting acquisition versus retention of companion dogs

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Introduction

This study considers the similarities between the reasons people feel unable to acquire a dog, despite the wish to own one (potential dog owners – PDO) and the factors which result in relinquishment for owners choosing to surrender their dog to a canine rescue shelter (relinquishing dog owners – RDO). Historically much emphasis has been placed on the importance of awareness of the cost of keeping a dog, although behaviour problems often feature as a primary cause for relinquishment.

Method

Current non-dog owners, selected from a random street survey population who stated that they would like to own a dog if their current circumstances were different ($n = 234$), were asked to identify the main reason preventing them from acquiring a dog. These responses were then compared against a sample population of 100 current dog owners at the time of surrendering their dog to a rescue shelter who were asked the primary reason for their decision to relinquish ownership of their dog.

Results

Chi Squared analysis revealed that available time was identified as the biggest issue for both sample populations (PDO: 36%/RDO: 35%). Canine behavioural

problems were also the main problem for a further 35% of RDO, whilst they fail to be mentioned at all by any of the PDO population.

Conclusions

These results highlight the importance of emphasising not only the time commitment associated with responsible dog ownership but also the significance of canine behaviour problems. The potential impact and therefore importance of prevention of these behavioural problems should be a priority in the advice given to new or potential dog owners.

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The effects of handling foals at ‘optimal periods’ on behaviour and training

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I. Introduction

It is now widely accepted that early life experiences strongly influence adult animal behaviour. Exposing horses to extra handling appears to result in beneficial characteristics of the horse, which are likely to affect future behavioural responses such as fearfulness, interaction with man (Heird *et al.*, 1986), learning performance (Nicol, 2002) and manageability (Lansade *et al.*, 2005).

Handling experience appears to have a strong influence, even though questions still remain concerning the existence of ‘sensitive’ or ‘optimal’ periods in the horse.

Hess (1973) first defined these optimal periods as the periods of time when an animal has the greatest sensitivity to environmental stimuli and therefore readily responds to teaching. In these sensitive periods a special plasticity of the central nervous system (CNS) occurs, which appears to make learning faster and easier (Scott *et al.*, 1962). For this reason it is important to identify the optimal time-frames, named periods, to handle young horses.

Any reorganisation period when stress is added, can become one of these special sensitivity periods. Miller (1991), renowned for his work on ‘imprint training’, and some other authors, favour the neonatal period as the ideal handling period.

However, even though the neonatal period appears to be an important time for establishing a good relationship between man and horse, there can be potential

problems associated with handling foals at this age. For example early handling can result in difficulties relating to the relationship between mother and foal and there is also a risk of developing an inappropriate relationship between man and foal resulting in difficulties in communication with the horse at a later stage.

An alternative optimal period which can be considered is the period immediately after weaning (Figueiredo *et al.*, *in press*). It is common practice in animal production for weaning to be performed artificially and abruptly and the separation of mother and young can result in significant alterations in social and physical environments which induce stress. Lansade *et al.* (2005) illustrated the beneficial effects of handling foals twice a day for 12 days just after weaning and in this study we set out to confirm whether the same benefits can be maintained with 3 handling sessions.

Our aim was to correlate positive behavioural responses from the horses with tests which assess different behavioural motivations such as fearfulness and emotionality. 'Emotionality' was quantified and defined early last century, as the set of behavioural and physiological changes an animal can face in an anxiety inducing situation (Mal and McCall, 1996; Houpt, 1981). We have defined 'interaction with man' and 'manageability' as 'ease of being handled or controlled' (Lansade *et al.*, 2005); and 'gregariousness' (Wolf *et al.*, 1997).

Some tests that were developed in the past with the purpose of determining animal emotionality and temperament have been criticised for a variety of reasons. Often those tests were developed using non objective methods or following limited numbers of trials, which did not take into account the necessary variables to establish whether behavioural responses gave consistency across time.

II. Experimental tests

To identify the existence of 'optimal periods' we tested the effects of early handling sessions during three specific periods of the foal's life. Lusitanian foals ($n=40$) were assigned to one of four groups. The first group ($n=8$) was handled as neonates (NF), the second ($n=9$) at weaning (WF), the third ($n=12$) during the first month (OF) and the last group ($n=11$) was left unhandled and served as a control (CF).

The foals participated in 4 training sessions (when they were trained to lead) following the handling periods and 1 month post-weaning. Testing occurred twice: once just before the training sessions started, and again just after they were completed.

1. Emotionality test

This test assesses the foal's isolation reaction (Mc Lean, 1997) the reaction to contact (Houpt, 1981) and the quality of each contact, ie how and where the foal

allows contact to be made (Figueiredo *et al.*, *in press*).

2. Training sessions

Behavioural responses are evaluated over 4 sessions during which the changes in responses to a repeated situation are evaluated. Each foal is evaluated concerning its level of obedience to basic instructions at the beginning and at the end of each session. The foal ends this learning stage ready to perform a trot display.

3. Final learning test

A week after the last learning session the foals are submitted to behavioural evaluations in an unknown environment. These aim to assess:

- i. the achieved learning performance
- ii. the quality of the foal's relationship with man
- iii. the generalisation of learning ability in new locations and situations.

This test is made in 3 phases.

Phase I: Evaluate gregariousness and reaction to men.

Phase II: *Runway test* – evaluate manageability and fearfulness utilising a neophobia test (Boissy and Bouissou, 1995). This is preferable to an open field test, as fear reactions in an unknown environment cannot be totally separated from a social isolation effect.

Phase III: Evaluate manageability and movement regularity (Wolff *et al.*, 1997).

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Keywords: horses, early life, sensitivity, learning

International co-operation in applied ethology courses

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During the last decades there has been a notable growth in the necessity for the application of scientific principles to modify animal behaviour for the ultimate benefit of both the animal's and the owner's welfare. Consequently there has been an explosive growth in the number of practitioners and institutions providing courses related to animal behaviour and animal behaviour therapy (de Boo and Knight, 2006).

Regrettably, so far there has been relatively little standardisation of the diverse courses provided within and between countries (de Boo and Knight, 2006). An international collaboration and standardisation of courses, ensuring the highest professional standards could be of benefit to anyone who consults with the public. It would allow professionals, and pet-owners, to select behaviourists with proper qualifications and skills and promote the further sophistication of the scientific methods employed to modify animal behaviour (Wickens et al. 2007).

The Catholic University College Ghent, Belgium strives to promote an international cooperation between all institutes that offer such courses. Possibilities can be the exchange of programmes and course material, but also the exchange of lectures. The latter being financially supported by the European authorities in a 'teaching exchange programme' (LLP programme: Higher Education (Erasmus)). International cooperation can be based on ECTS files with mutual recognition of results. Students could therefore fulfil parts of their education at different institutions. This would enhance their international experience. An exchange between different approaches and professions, leading to mutual understanding, respect and collaboration would be an extra benefit of this kind of education.

Joint research programmes can promote the quality of the research and the international collaboration, resulting in a more efficient use of means and funds. The development of such an international initiative can be beneficial for other quality control organisations such as ASAB (Wickens et al. 2007). The Catholic

University College Ghent invites other institutions interested in collaboration on a postgraduate level to contact them.

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Assessing horse performance: a comparison between trainers and judges' behaviour evaluations

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In show-jumping horses, personality proved to be a good indicator of animals' performance (Visser, 2003), but empirical systems, commonly used to assess personality, seem to be unreliable (Mills, 1998). In Italy, breeding selection of Maremmano horses is based on Performance Test (PT), where a judge scores individual performance and temperament. The aim of this study was to compare the horses' behavioural assessments given by trainers, who work daily with the animals, with judges' final evaluation, with the aim of optimising horse selection.

During the PT training period, Apprehensiveness, Impulsivity, Serenity, Sociability, Trainability were scored daily on a 10-point scale in 11 Maremmano female horses by their four trainers (TR₁, TR₂, TR₃, TR₄). After the training period, an external Judge (JUD) scored each horse's Temperament, Technique and Athletism. General Linear Model and Least Square Means tests explored differences among trainers, training days and horses. Spearman Correlation test explored agreement between trainers, median trainers' scores (TR_{tot}) and JUD scores.

Trainers, training days and horses had a significant effect ($p < 0.05$) on behaviours, which improved along the training period. Trainers' scores were correlated (TR₁/TR₂, $p < 0.001$; TR₁/TR₃, $p < 0.001$; TR₁/TR₄, $p < 0.01$; TR₂/TR₃, $p < 0.001$; TR₂/TR₄, $p < 0.001$; TR₃/TR₄, $p < 0.001$), suggesting they had a similar perception of horses' behavioural traits. No correlations between TR_{tot} and JUD

Temperament scores were found, with the exception of a negative correlation for TR₃ and TR₄ ($p < 0.01$). JUD Technique and Athletism scores were negatively correlated with TR_{tot} Trainability scores ($p < 0.001$), but positively correlated with TR₁ Technique ($p = 0.0094$) and Athletism ($p = 0.0121$).

The difference between ratings expressed by trainers and judges raises questions regarding the validity of the actual PT scoring system for selecting best-performing animals. The validation of a standardized scientific method to predict performance would be the best way to objectively select Maremmano horses.

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Keywords: show-jumping horses; behaviour; temperament; performance.

Repeated assessments and other measures of canine behaviour: a cautionary tale

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Temperament is often defined as a suite of stable behavioural attributes that are largely believed to have reliable and consistent genetic components. This definition is derived from original descriptions of behavioural tendencies pioneered by dog fanciers who wanted dogs that they could breed and use to do specific tasks requiring specific classes of behaviours. Unfortunately, in the process of codifying this definition, behavioural descriptions were made to fit into a concept of suitable versus non-suitable ‘temperament’ for a given task, without any consideration as to whether the original definition was either accurate or useful. This approach is still used to categorise, select, and train many military, police and detection dogs, although it has never been validated.

‘Temperament’ is currently more broadly defined as differences in behaviour between individuals that are relatively constant given similar evaluation situations (Taylor and Mills, 2006). In this context, evaluations of temperament have sought to understand, for example, how early performance during training is linked to individual or clustered ‘temperamental measures’ in a way that is predictive of later performance (e.g., success or failure for executing particular tasks) (Svartberg and Forkman, 2002; Svartberg, 2002). Unfortunately, the insights made by these studies have been modest, mostly because there is little evidence to support validity or reliability for any of these temperament tests (Murphy, 1998; Jones and Gosling, 2005; Diederich and Giffoy, 2006; Taylor and Mills, 2006).

The difficulties associated with temperament testing arise because neither

standard behavioural responses nor easily measurable physiological responses are well represented by either linear response models or by other commonly used predictive measures. Some of the problem may be due to the fact that assessments of behaviours are 'soft' and lack reliability or repeatability. Such problematic data are characteristic of evaluations that use (1) questionnaires based on one's impression of a behaviour or (2) tools based on behavioural evaluations using scales or ranks. This same set of concerns pertains to evaluations of pet, rather than working dogs, and these criticisms of the techniques and measures used to evaluate pet dogs are also relevant to purpose-bred dogs (Taylor and Mills, 2006).

We analysed a series of data collected using some standard 'temperament' tests for purpose-bred dogs and one truly ethological provocative test. Behavioural assessments range from study-specific rating/scoring systems to direct observation and measurement of behaviour. Four studies each used varying measures and techniques and each approach had problems.

Purpose-bred dogs of one group were tested 4 times per year in 3 situations in which their response was scored with respect to the following: novel environments, specific desirable behaviours and some aspect of focus. It was unclear whether the test provided the information that was sought because validation was lacking. Additionally, no more information was gained from 3 assessments than would have been gained from one, and scores at one test period did not correlate with scores from another.

In an evaluation of repeated measures of hip scores from a group of purpose-bred dogs, one measurement provided the same information as did multiple assessments because scores at all ages were highly correlated. This pattern occurred despite the fact that hips were evaluated 4 times during the ontogenic shifts that occur in the first year of life. Data were lacking to indicate whether hip score was predictive of any performance trait.

In an evaluation of another group of purpose-bred dogs, all observed behaviours were included in the ethogram. Behaviours were analysed for differences between and within the group of adult dogs and the puppies. Randomisation tests showed that the variation in both adults and puppies was quantifiable and that puppy behaviours mirrored adult behaviours. Successful classification of the dog with respect to the trait of interest could be accomplished by assessing just one behaviour for the adults, and another for the puppies, rather than the 25 behaviours that were used.

A final example focused on comparing a blinded ethological assessment of the dogs with one done by multiple observers using a defined scoring system. All dogs were from the same purpose-bred dog facility. The behaviours exhibited by the dogs did not correlate with the scored assessments.

Considerations for such studies must include independence of the variables evaluated; validation of the assessment tool including assessments of auto-correlations; the use of scaled, rather than categorical data; and whether there

is an independent assessment tool against which to compare such results. It is possible to avoid such pitfalls and improve such systems.

Finally, any test designed to assess canine behaviour must address the issues of standardization, validity, reliability and repeatability of selection procedures. These assessments represent a scientific standard that allows one to evaluate how believable and consistent the data are, and whether similar data can be collected from other groups and compared in a meaningful way across groups.

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Keywords: Canine behaviour, temperament, temperament test, purpose-bred dog

Are domestic dogs able to calm conspecifics by using visual communication?

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Introduction

Communication in dogs is crucial to identify individuals, maintain relationships and reduce competition. In recent years, much attention has been paid to the so-called calming signals. In 1997 Rugaas listed some dog behaviours that in the author's opinion were able to calm receivers. Since then, many dog trainers and behaviourists have used them in their practice, but to our knowledge no research was done in order to assess if such signals really have a calming effect.

The aim of the current research was to scientifically assess the use of the so-called calming signals, in order to establish whether they have a communicative and calming role.

Materials and method

Five-minute meetings between dogs were carried out inside an outdoor fenced area (5 x 5 m). Dogs were in couples and off-leash, both owners were present within the fence but instructed not to interact with the dogs.

Twenty dogs (10 males and 10 females) were involved in encounters with conspecifics. They were previously assessed by an animal behaviourist in order to exclude subjects whose involvement could be unethical, such as dogs known to show interspecific open aggression.

Each dog met four receivers: a female and a male familiar dog, and a female and a male unfamiliar dog. All the 80 encounters (400 minutes) were videorecorded

from two different points. The 21 evaluated signals were taken from those suggested by Rugaas (1997): turning head, looking elsewhere, half-closing eyes, turning on other's side or back, licking nose, freezing, moving slowly, play bow, sitting, sitting and turning on other's back, laying down (sternal decubitus), yawning, sniffing the ground or wall, approaching the other dog curving, waving low tail, cowering, licking the other dog's mouth, blinking, smacking, raising a forelimb and low urination. In the current research two signals belonging to the list presented by Rugaas (1997) were not considered: going between, because in this study there was not a third dog, and pretending to ignore that the other dog exists, as it may be too subjective to assess.

Videos were analysed in order to identify: total number of emitted signals; type of interaction (close up, at a distance of more than 1.5 the length of the dog, no interaction between subjects at the moment of emission); intention shown by the receiver immediately before the emission (aggressive, playful, neutral and other); the receiver's behaviour immediately before and after the display.

Results

In total 1213 signals were observed. The emission varied from low (0: low urination, smacking; less than 20: half-closing eyes, slow movements, play bow, sitting, sitting and turning on other's back, sternal decubitus, yawning, curving, waving low tail, licking other's dog mouth, raising a forelimb) to medium (between 20 and 130: turning on other's side or back, sniffing ground or wall, cowering) and high values (more than 130: turning head = 135; freezing = 155; licking nose = 227; looking elsewhere = 431).

It emerged that the evaluated signals were used almost exclusively when dogs were interacting (99.78%), especially when close up (77.18%), even though the time spent at close distance represented 41.58% of the total time videorecorded and the dogs stayed far from each other for 43.22% of the whole time. This result suggests that the evaluated signals really do play a communicative role.

It was also observed that the emission occurred mainly in neutral interactions (74.46%), while display in aggressive and playful interactions corresponded to 7.01% and 10.62% respectively. This result may change significantly in cases where dogs involved were known to show open aggression toward conspecifics.

On 62 occasions, receivers showed an aggressive behaviour followed by the emission of the analysed signals; in 77.05% of cases they led to a reduction of the receiver's aggressiveness (assessed by the scale suggested by Shepherd, 2002).

Discussion

These results confirm the hypothesis that most of the evaluated signals do play a specific role in canine communication, namely calming the receiving dog and therefore reducing the chance of displaying open aggression.

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Keywords: aggressive behaviour, calming signal, communication, dog.

Horse personality profiles and performance

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Introduction

Horses play a significant role in animal assisted therapy, they are trained and employed by the police and military, and used in sports (Potter et al., 1994; Anderson et al., 1999). In all these situations horses' suitability and performance are fundamental and behavioural or personality traits may determine their success (Visser et al., 2001; Visser et al., 2002). Horses in therapy are required to be placid and calm, friendly and approachable, which may not be desirable for horses in sports (Worth-Estes, 1952; Hutson and Haskell, 1997; Visser et al., 2003; Buckley et al., 2004). In this poster we will report on the personality profiles of individual horses, rated as high and low performers by their trainers.

Methods

38 horses from three different stables were rated on a nine point single item performance scale ('1 = poor performer - 9 = excellent performer') and horse personality traits, generated by 24 familiar and experienced raters, using Repertory Grid Technique.

Results

Inter-rater agreement on horse performance was significant for all horses (Stable 1: mean $W = 0.242$, $p < 0.05$, Stables 2 and 3: mean $W \geq 0.375$, $p < 0.001$). Personality profiles of the highest and lowest performers indicate that most high performers were rated as 'nice', 'gentle', 'easy to work with', 'easy to handle' and 'patient', and

most low performers as 'difficult to handle', 'inexperienced', 'immature', 'tense', 'nervous', 'scared', 'hesitant', 'impatient' and 'unsociable'.

Conclusion

Individual personality profiles of the best and the poorest performers in each stable indicate that it is not only one personality trait but rather a combination of traits that is associated with high or low performance in horses.

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Keywords: Equine Personality; Performance; Horse Personality Profile; Repertory Grid Technique

Retrospective study of dogs from a behavioural referral practice showing aggression toward unfamiliar people either in the home or on walks (n = 40)

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Introduction

Aggression by dogs toward unfamiliar people is a common owner complaint (Denenberg et al. 2005), often resulting in injury to people. Aggressive behaviour can occur in the home or toward individuals that are encountered on walks. Underlying motivations include territorial defence, fear related aggression and poor socialisation (Mertens 2002). Other concurrent problems may be present and contributory, including anxiety related behaviour problems and lack of good owner control.

Materials and methods

Patient records from the author's practice from January 2007 through September 2009 were examined. All patients showing aggression toward unfamiliar people either at home or on walks were initially selected for examination. Records were included if aggression toward unfamiliar people was the primary complaint, diagnosis and problem targeted for treatment. Records were not excluded if other behaviour problems were the primary diagnosis and selected for treatment. Forty cases were selected for inclusion into the study and selected variables from the

patient record were put into a database. The owners were contacted by telephone (3 phone calls at different times of day), and if not reached by phone, contact was attempted by e-mail and postal letter. Of the initial 40 cases selected responses were obtained from 18 cases (45%); these were included in the final analysis. Owners were asked questions about treatment modalities prescribed, their use and asked to rate the helpfulness of the treatment modality on a 5 point subjective scale. Treatment modalities included “nothing in life is free” (Voith 1982), sit/stay, settle and relax, head collars, confinement, avoidance of triggers, classical counter-conditioning to stimuli and an escape response. Owners were asked if they used the treatment modality and if it was still in use at the time of the survey. Owners were also asked to rate improvement in the targeted problem behaviour and overall rating for the consultation.

Results and discussion

Most owners surveyed continued to use some treatment modalities and rated the improvement as good overall. Various characteristics of the patients were tabulated and examined to establish parameters of the patient population. Source of dog was examined with a statistically significant number of dogs (.01 level) in the study obtained as a stray or rescue. Certain treatment modalities continued to be used quite frequently: avoiding triggers (81%), nothing in life is free (94%), settle and relax (66%), and sit/stay (88%). Seventy seven percent continued to use the head collar provided at the consultation.

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Keywords: aggression; dog; behaviour; unfamiliar people

Salivary and faecal cortisol as measures of stress in horses

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Introduction

Horses have to cope with their management and captive environment on a daily basis. As coping strategies are employed, behaviour and physiology alter to maintain homeostasis (Barnett and Hemsworth, 1990). If these adjustments are demanded too frequently or for too long the welfare of the horse could be diminished. Valid measures of stress are therefore needed to determine over-all stress levels and to identify stress triggers.

Levels of cortisol reflect HPA-axis activity which is stimulated during stressful events to enable the 'flight or fight' response to occur. Circulating cortisol is either bound to corticosteroid binding globulins (CBG), or unbound and free to pass out of blood capillaries to gain access to target tissues (Alexander and Irvine, 1998). Cortisol can therefore pass into various body tissues and excreta (Mostl and Palme, 2002) enabling non-invasive sampling to take place so avoiding further stimulation of the HPA-axis.

We validated an enzyme-linked immunoassay (ELISA) for horse salivary and faecal cortisol and validated these as indicators of acute and over-all stress levels in riding horses. Enzyme-immunoassays can be affected by variables causing imprecision and inaccuracy (Diamondus and Christopoulos, 1996) and cortisol physiology may vary between species. It is therefore necessary to immunologically and biologically validate an assay for the species and medium.

Method

Saliva was swabbed using sterilised cotton wool flexi-swabs (Medical Wire and Equipment Co (Bath) Ltd) every 30-minutes (0900 to 1600hrs) over three days in

N = 15 horses. To validate salivary cortisol as an indicator of stress in horses swabbing took place before and after light exercise (N = 8) and before, during and after an environmental stressor. Stressors included 10-minute exposure to routine husbandry or training methods such as noise of electric clippers or social isolation.

Faeces were collected by hand within two minutes of excretion from horses (N = 9) every time they defecated between 0800 and 1700hrs including during exercise. Following collection faecal samples were frozen. Sampling took place over three stabled working weekdays and at rest turned out to grass during the weekends over three consecutive weeks. Stabling (Christensen et al., 2002) and exercise (Foremann and Ferlazzo, 1996) have been identified as potential stressors to horses hence their use as biological stressors here.

Following thawing cortisol was measured in saliva and faecal samples by competitive antigen capture ELISA (modified from Smith and French, 1997).

Results

Immunological validity of the assay was demonstrated by high specificity, accuracy, precision and sensitivity (0.156 ng/ml).

Biological validity of salivary cortisol was demonstrated by a diurnal decline ($F_{4,1,56,8} = 2.58$, $P = 0.023$, 1-tailed after Huynh-Feldt correction for Sphericity) and elevation post-exercise ($t_7 = 3.452$, $P = 0.006$, 1-tailed). There was a trend towards elevation following the 10-minute exposure to an environmental stressor but this was not statistically significant.

Faecal cortisol was biologically validated by the absence of diurnal variation and the presence of a 24-hour excretion lag. Faecal cortisol increased significantly in the presence of known stressors (stabling and exercise) compared to when they were absent (turn out to grass and rest) ($t_8 = 1.906$, $P = 0.047$, 1-tailed). Evidence of physiological adaptation to the presence of stress over the week existed, but this trend was not statistically significant.

Discussion

Specificity of the immunological assay demonstrated the assay's freedom from interference by substances other than cortisol. The assay reflected an accurate quantitative measure by a good recovery rate of cortisol spikes from dilutes of both mediums. Low assay variation between replicates within plates and between existed, and a good level of sensitivity was achieved.

The diurnal pattern of salivary cortisol mirrored the morning cortisol peak followed by late afternoon trough reported in blood plasma (Irvine and Alexander, 1994; Alexander et al., 1996). Such a diurnal pattern was absent in faecal cortisol perhaps due to this medium representing an average of circulating cortisol

(Harper and Austad, 2000) rather than a point sample as salivary cortisol offers. A 24-hour excretion lag was established agreeing with published literature (Palme et al., 1998). Faecal samples therefore represented events that took place 24-hours earlier.

The increase in salivary cortisol seen after exercise mirrored the increase seen in plasma cortisol following exercise. There was a trend towards elevation of salivary cortisol following exposure to the 10-minute stressor. This result was not significant perhaps because the stressors used were not in fact stressful enough therefore not sufficiently stimulating the HPA-axis.

The significant increase in faecal cortisol concentration during weekdays as compared to weekends, when horses were rested and turned out to grass, suggested stabling and exercise to elevate stress levels. It was however noted that horses adapted to such stressors with faecal cortisol concentrations declining towards the end of the horses' working week.

The assay therefore showed both salivary and faecal cortisol to be valid non-invasive measures of HPA-axis activity in horses but highlighted differences for their use. Salivary cortisol showed marked diurnal and ultradian rhythms, a lag of 20–30 minutes from stressor to peak together with sensitivity to environmental disturbance. Salivary cortisol may therefore only offer point of time sampling for the effects of stress on horses since measures maybe confounded so quickly by other variables.

As with salivary cortisol large individual variation was noted in faecal cortisol concentrations but this may have been contributed to by the sampling protocol. Faecal steroids can be unevenly distributed within the total faecal mass and degradation can be rapid (Millsbaugh and Washburn, 2004). Samples representative of the total faecal mass must therefore be collected and frozen immediately post excretion. If careful sampling protocols are followed faecal cortisol may offer a way of assessing on-going stress levels as concentrations represent an average of circulating cortisol.

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Keywords: horse, cortisol, saliva, faeces, stress

Study into the effects of attendance at formal training on the presentation of aggression related behaviour problems in dogs in a referred population

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Introduction

The aim of the study was to determine whether there is an association between attendance at formal training sessions and the presentation of aggression related behaviour problems in a referred population of dogs. 308 dogs that had been referred to a behavioural medicine referral practice were analysed. 177 of the dogs had been to some form of formal training and 131 had been to no training whatsoever.

Data was collected from the patient records that were completed by the veterinary surgeon during the consultation. Information regarding the type of training (if any) was recorded along with the age of onset of training and the category of behaviour problem for which the patient was presented. In this study, aggressive behaviour was categorised with respect to the target of the behaviour – familiar dogs, unfamiliar dogs, familiar humans and unfamiliar humans. Aggression was defined as growling, snapping, snarling, lunging, biting and/or threatening barking (Horwitz, 2002). Statistical tests including Chi-squared analysis was used to test whether the proportion of aggressive to non-aggressive dogs was independent of whether they were trained or not and logistic regression was used to look at the effect of training, gender, neutering and breed category in combination, on aggression.

Results

The study found that 63.6% of all the aggressive dogs referred to this practice had been to some form of formal training, whilst only 42% of non-aggressive dogs had been trained. Odds ratios at 95% confidence intervals showed that the chance of a dog being aggressive is 2.3 times greater in trained dogs compared with non-trained dogs and logistic regression showed that a significant relationship between aggression and training is present, even when gender and neuter status are taken into account.

The type of aggression for which the dog was referred was then compared with attendance at training, and age of onset of any training. Results showed that aggression towards unfamiliar dogs and unfamiliar humans was most common in dogs whose onset of training was less than 16 weeks and aggression towards familiar humans was most common in dogs that had been to no formal training. Aggression towards familiar dogs was comparatively uncommon but also occurred most frequently in dogs that had been to no formal training.

Different breed categories were compared to see if they affected aggression and the results showed that **trained** pastoral dogs and gundogs were four times more likely to display aggression if they were trained ($P = 0.01$).

Discussion

This study identifies training methods as an important potential factor in the presentation of aggression related behaviour problems in dogs and shows little evidence for the role of two commonly cited factors namely gender or neuter status.

The behavioural medicine approach **suggests** that aggressive behaviour is multifactorial **and that individuals who are insecure and anxious are at increased risk of developing these responses**. Lack of training and structure may favour these emotional states, but training using mixed negative and positive signals may be equally detrimental.

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Keywords: dog, training, aggression

An experimental case study of two aggressive dogs: the effectiveness of behavioural modification programme using systematic desensitisation and counter-conditioning

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Introduction

Many dogs show aggressive behaviours such as growling, barking, lunging, snapping or biting when they encounter other dogs or unfamiliar people (Haug, 2008). In order to reduce their levels of responsiveness, a combination of systematic desensitization and counter-conditioning (SDCC) is commonly recommended as a method of behavioural modification (e.g. Reid 2007, Beaver 2009), however, very few demonstrated the changing process with actual data. In this study we examined the effectiveness of a series of training sessions based on SDCC in two aggressive dogs.

Materials and methods

Two castrated male dogs were recruited as subjects. A seven-year-old Pembroke Welsh Corgi was often aggressive towards other dogs and a four-year-old Chihuahua showed aggression towards unfamiliar people. Thirty-minute structured training sessions using SDCC were carried out per day for 10 days within one

month training period at the university. During a session a handler who was familiar to the subjects let the dog sit and relaxed while another dog or a person appeared in the test room. The subjects were offered food treat and the distance was decreased when they did not show aggression. The distance in which the subjects showed any aggressive behaviour was measured before, after, and during the training period. Based on the greatest distance measured at the pre test, an intact male dog and a male student were chosen as stimuli for training sessions.

Results

The corgi showed a slight decrease in the distance without aggression during the training period, whereas the Chihuahua kept relaxed even when the stimulus person stayed close in 5 days. However, the distance with aggressive responses was longer for all types of stimuli tested for both subjects at the post test as compared to the pre test.

Discussion and conclusions

The results suggested that such implementation of training programme using SDCC was not only ineffective to reduce responsiveness but could also have an adverse effect of sensitisation. Although this method of behavioural modification is theoretically valid and often used for aggression and fear-related problems in dogs (Haug 2008), a caution is needed in its use and the choice of a right stimuli for exercises.

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Keywords: dog, desensitisation, counter-conditioning, aggression

Anxitane reduces fear of human in a laboratory study in dogs

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Introduction

Dogs are often referred to veterinary behaviourists for problems related to fear and anxiety (Denenberg et al., 2005). In addition to disturbances in the pet-owner bond, health can also be affected (Clark et al., 1997; Hennessey et al., 1998; Hennessey et al., 2001; Dreschel and Granger, 2005; Frank et al., 2006; Pageat et al., 2007). Therefore, effective treatment of anxiety and fear is important both for the health of the pet and to ultimately restore the bond between owner and pet, but there is limited availability of effective products.

Anxitane (Virbac Animal Health, Fort Worth, Texas) is a nutraceutical containing l-theanine, an amino acid found in green tea that is reported to reduce anxiety in clinical studies (Berteselli and Michelazzi, 2007; Kern, 2005). The primary objective of the current study was to compare the effects of Anxitane to placebo on fear of humans in laboratory dogs.

Methods

Seven Beagle dogs served as normal controls for baseline comparisons and 10 Beagle dogs were selected from the colony based on fearful behaviour toward humans as determined by a veterinary behaviourist. The 10 fearful dogs were randomly divided into two groups of 5 subjects and assigned either to treatment or placebo. After 8 weeks, these anxious dogs were re-assessed to determine the

effects of the treatment. Dogs weighing less than 10 kg received 25 mg of Anxitane twice daily and those weighing more than 10 kg received 50 mg twice daily.

The open field and human interaction tests (Siwak et al., 2001) were used to objectively score behaviour. In the open field, distance travelled and inactivity was measured. In the human interaction test, a human was placed in the centre of the arena and human approach and interaction was scored. Twenty-four hour activity levels were measured with the Actiwatch system (Siwak et al., 2003). The Mann-Whitney U-test was used for all statistical comparisons using the Statistica 6.0 (Statsoft Inc., Tulsa, OK) analysis package.

Results

The anxious animals, compared to normal animals, interacted with the human for less time at baseline [$U=5$, $p=0.003415$]. The anxious animals tended to spend less time near the human and interacted less frequently, but this was not significant.

No treatment differences were found in the anxious dogs on the open field test measures or on 24 hour activity levels. By contrast, the treatment group spent more time near [$U=3$, $p=0.047203$] and interacting [$U=2$, $p=0.028281$] with the human than placebo. They also showed increased interaction frequency with the human [$U=2$, $p=0.028281$].

Discussion

The main findings of the current study were that Anxitane significantly improved measures of human approach and interaction compared to placebo in anxious dogs and that anxious dogs showed reduced interaction with an unknown human compared to normal dogs. Collectively, the current data indicate that Anxitane should benefit dogs that demonstrate fearful behaviours, and also supports the clinical data for the use of Anxitane in treating anxiety related behaviours.

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Keywords: Animal model, Anxiety, Fear

Evaluation of behavioural characteristics of dogs with owner directed aggression through the C-BARQ

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Introduction

Canine aggression towards household members is a frequent problem that can have dangerous consequences for people and may impair the welfare of dogs. A better knowledge of the individual characteristics of dogs presenting owner directed aggression would help to improve the treatment and prevention of this problem. The aim of this study was to evaluate the behaviour of dogs with owner directed aggression through the Canine Behavioural Assessment and Research Questionnaire (C-BARQ).

Materials and methods

The study was performed at the Animal Behaviour Service – Barcelona School of Veterinary Medicine (ABS). Forty six dogs were evaluated through the C-BARQ, which was completed by the owners before the behavioural consultation and included 101 items grouped into 13 factors. The questionnaire asked owners to indicate how their dogs respond to a variety of stimuli and common events. For the analysis, subscale scores were calculated as the average score of the items included in each factor. Correlations between the subscale owner directed aggression and the rest of the variables were determined by the Spearman Rank coefficient.

Results

Forty four questionnaires were suitable for analysis. According to the results dogs with owner directed aggression were more prone to show attachment and attention seeking behaviour ($r=0.463$, $p=0.002$) and more likely to be excitable ($r=0.387$, $p=0.01$) than dogs that did not show owner directed aggression.

Conclusions

The relationship between the behavioural characteristics of attachment, attention seeking behaviour and excitement and canine aggression towards owners warrants further research since it has the potential to influence the outcome of behaviour modification programmes.

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Keywords: canine, aggression, owner, test

The relinquishment of rabbits to rescue shelters in Canada

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Introduction

In the US, it is estimated that 18.2 million small animals are owned as pets, many of which are rabbits (American Pet Product Manufacturers Association 2006), thus the potential for pet rabbits to become unwanted and relinquished to shelters is significant. While most surveys of animal relinquishment to shelters have focused on dogs and cats (Salman et al 1998), studies into the reasons why pet rabbits (*Oryctolagus cuniculus*) enter shelters are scant. Such studies have the potential to facilitate the development of educational materials for prospective and current rabbit guardians who may be at risk of surrendering their pets. This in turn, could lead to a reduction in the number of rabbits that are likely to experience poor welfare as a result of confinement (Drescher 1992). In response to this issue, this study describes a survey of rabbits admitted to and adopted from rescue shelters in Canada.

Method and results

Thirty shelters (members of the Canadian Federation of Humane Societies) were surveyed. Over a three-year period, these shelters received a total of 2466 rabbits. The majority of admitted rabbits (52.1%) were female (Binomial, $p < 0.05$). Age at admittance ranged from newborn to 14 years, the modal age being 1 year (24.5%), with age distribution being positively skewed (Skewness = 2.8). Almost half (47.8%) of admitted rabbits were surrendered by their owners, whilst the remainder were strays (38.1%), transferred from other shelters (8.3%), seized by humane officers (3.9%) or born at the shelter (1.9%). Most rabbits (94.7%) were relinquished due to the owner's circumstances and 5.3% due to behaviour problems. Of those relinquished for behavioural reasons, 26% dug in the yard, 20%

were aggressive towards other rabbits, 11% chewed on inappropriate objects, 11% were aggressive towards people, 7% were too active, 7% were escaping, 6% were not good with children, 6% were spraying / marking, 4% were house-soiling and 2% were generally destructive. Within one year of adoption, 5.5% of rabbits had been returned to shelters, 42.2% due to behaviour problems and 57.8% due to the owner's circumstances.

Conclusions

The results provide a valuable insight into the reasons why rabbits are relinquished and thus how educational materials may help to support rabbit-guardian relationships and improve rabbit welfare.

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Keywords: rabbits, behaviour, shelters, relinquishment

The fate of cats adopted from rescue shelters in Canada

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Introduction

The percentage of animals returned to rescue shelters following adoption is a frequently used measure of adoption success (Kidd et al 1992), with both behavioural problems and owner factors being cited as common reasons for relinquishment (e.g. Miller et al 1996). However, the fate of animals that remain in the community is often overlooked. In response to this issue, this study evaluated the fate of kittens one year after their adoption from shelters in Canada.

Methods

Subjects were kittens ($n=583$) adopted from thirty rescue shelters (members of the Canadian Federation of Humane Societies) between the ages of 2–4 months. When these kittens reached one year of age, their guardians were requested to complete a questionnaire regarding their cat. A proportion (8.7%) of guardians were not contactable, either because they had moved or the contact details provided to the shelter were invalid.

Results

Of the guardians that were contacted, 67.8% responded to the survey; of these, 9.8% no longer had their kittens. Of these 35 kittens, 8 had been killed in road traffic accidents, 7 had been returned to the shelter, 4 had gone missing and presumed dead, 4 had been given away, 4 killed by coyotes, 1 killed by a dog, and 7 others due to illness. When asked whether they were likely to keep their kitten, 85.2% of those guardians who still had their cats reported 'Definitely Yes', 1.7%

'Yes', 0.3% were 'Unsure', 0.3% reported probably not and 1.1% reported definitely not. Gender, neuter status and coat length were not identified as risk factors for accidental death before one year of age, however kittens that were given access to the outdoors were five times more likely to have an accidental death than kittens that were kept indoors (7.8% outdoor versus 1.6% of indoor kittens; $X^2=5.69$, $df=1$, $p<0.05$).

Conclusions

Advising guardians on the implications of allowing cats outdoors should be an important area of education for rescue shelters.

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Keywords: cats, rescue shelters, adoption

Results on the use of Dog Appeasement Pheromone (DAP) collars in a selection of Australian dogs with anxiety disorders

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Introduction

Dog Appeasement Pheromone (DAP) has been shown to be effective in managing a variety of anxiety disorders in dogs (Pageat et al 2005). Currently DAP is only available in the diffuser form in Australia. However, DAP collars have been shown to be effective in managing anxiety disorders as well as to assist with learning in dogs in other countries (Denenberg 2008). The DAP collars were prescribed for selected clients by a specialist referral practice in Sydney, Australia to assess their usefulness in the Australian dog population as many Australian dogs spend much of their time outside, making it difficult to use the DAP diffuser or DAP spray. The DAP collar was used in conjunction with behaviour modification and other medication if deemed necessary to address the dog's anxiety and therefore any associated welfare issues.

Materials and methods

During the three hour long behavioural consultation each dog was assessed by one of the veterinary behaviourists to determine its suitability to participate in the study. The selected dogs were prescribed the DAP collar for a variety of diagnoses involving anxiety. Some of the dogs were already on medication, others were also prescribed other medications such as fluoxetine, or a DAP diffuser to assist with treating the problem as would be expected to be the case in veterinary practice.

Each of the owners were shown how to correctly fit the collar and were given advice with regard to bathing and swimming the dog. The clients participating in this study agreed to fill in a weekly report over a period of four weeks on their impressions on the effectiveness of the collar. The responses of the last fifty owners of dogs for whom the collar was prescribed were assessed.

Results

To date 32 clients have returned the questionnaires. Dogs ranged from 1 to 11 years in age and the majority were purebred animals ($n=25$). There were relatively comparable numbers of males ($n=14$) and females ($n=18$) with all animals neutered except for one male and one female that were entire. One subject was euthanased shortly after beginning the trial due to severe anxiety so is not included in the results. Another completed the questionnaire monthly (with multiple collars) rather than weekly so only the results after one month were included.

Many dogs had multiple diagnoses (range of 1 to 6 diagnoses per dog with a mean number of diagnoses per dog of 2.16). The main diagnoses were generalized anxiety (56%), separation anxiety (15%), and noise phobia (18%).

There was some concern expressed by the owners about how the dogs may respond to the collar however, the majority of owners ($n=18$) reported no reaction from their dog upon first fitting the DAP collar. Five owners noted an initial response from the dog in the form of sniffing, sneezing, scratching or rolling once it was in place.

Twelve owners felt that their dog was possibly calmer or less edgy soon after the collar was fitted, with one of these owners reporting that it appeared that the dog had been sedated.

At the end of the four week period twenty five owners felt that their dog's anxiety had improved, one felt there was no change, one felt that their dog had deteriorated and five were uncertain if a change had occurred. The reasons the owners gave about why they were uncertain if there was an improvement due to the collar were: the dog also started behaviour modification; other medications were prescribed or the dose was increased over the same period ($n=4$); and there was a reduced challenge to the dog ($n=1$, lack of storms with noise phobic animal). Interestingly, one owner who was uncertain if the collar had helped commented that at the end of the month the dog began to sleep next to the DAP diffuser rather than in the owner's bedroom where she had previously slept.

Six owners expressed concern that their dog's behaviour deteriorated again during the last week of the four week period and they felt that the collar was less effective. In four of these cases a new collar was prescribed and when the new collar was fitted the dog's behaviour improved again.

Discussion

Pheromones are used by animals to communicate messages between members of the same species. The appeasing pheromone released by the lactating bitch (3–5 days after giving birth) is used to communicate reassurance and help bond the puppies to the mother. As puppies get older and start to explore their new world this pheromone is believed to help the puppies achieve emotional stability.

DAP is said to mimic the properties of natural appeasing pheromone and help prevent fear and stress related signs in puppies and adult dogs. It has been used to help settle puppies in new homes (Gaultier, 2008, Taylor et al 2007), assist in training puppies (Denenberg et al 2008), assist in training adult dogs (Schroll et al 2005), treat separation anxiety (Gaultier et al, 2005), treat fear of noises such as thunderstorms and fireworks, (Levine et al, 2008, Sherman et al, 2008), manage fear of objects or people (Pageat et al 2005), assist when moving house (Gandhi Estelles et al, 2006) and decrease stress and barking in kennel shelter dogs (Tod et al, 2005).

The dogs in this study were prescribed the DAP collar to assist in the management of anxiety disorders, noise phobias, separation anxiety, fear of people and excessive vocalisation.

In this study 78% of owners felt that the DAP collar had helped in the management of their dog's anxiety in the four week period that the collar was worn by the dog. This is similar to studies indicating the effectiveness of DAP conducted in other countries. It should be noted that as many dogs that live in Australia spend much of their time outside the DAP collar is likely to be more useful than the DAP diffuser or DAP spray in managing anxiety related disorders in that context.

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Keywords: Dog Appeasement Pheromone, Dogs, Anxiety Disorders

Shelter dog behavioural assessments: behavioural coding and personality

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Introduction

An accurate assessment of a shelter dog's behavioural tendencies is critical in order to make appropriate and safe placements. A common assessment technique measures a dog's reaction to specific, standardised scenarios (for a review, see Svartberg, 2007 and Jones and Gosling, 2005). Coding of the dog's behaviour varies widely from test to test, from simple dichotomous coding (observed/not observed) to more complicated scales covering a range of behaviours. However, all assessment instruments should enable the detection of underlying personality factors crucial for appropriate placement. Dichotomous coding has been neglected in dog personality research since the field has been closely modelled after human personality research which typically uses rating scales.

Method

One standardized behavioural evaluation based on dichotomous behaviour coding is the Match-Up Behaviour Evaluation. In this assessment, 38 behaviours are measured (observed/not observed) during 18 scenario sub-tests. In order to determine the ability of the Match-Up Behaviour Evaluation to detect underlying personality characteristics, an analysis of the results of 668 dogs, performed over 3 years, was conducted. There were 328 male dogs, 268 female, and 76 were unidentified. Although results of the individual sub-tests are used when placing dogs, the current analysis focused on behaviour across all the sub-tests so that the focus was on relatively stable personality traits. Therefore, the number of times each

behaviour was observed were counted and summed across all 18 sub-tests; behaviours, which ranged in frequency from 0 (never observed) to 18 (observed in all 18 sub-tests), were subjected to principal components analysis with varimax rotation.

Results

The analysis yielded 11 factors, accounting for 57.3% of the variance. Eleven factors is more than is typically seen in personality studies, although the last 6 were comprised of three or fewer behaviours so may be justifiably dropped. The number of sub-tests may have contributed to the large number of factors.

Conclusions

Results of the factor analysis suggest that dichotomous behavioural coding of scenario-based assessments is a viable option when assessing dog behaviour, one that may be easier to implement and standardise upon than interval scaling of a range of behaviours. Further research is needed to determine which behaviours and sub-tests are most important and predictive of a dog's behaviour in the home.

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Keywords: dog; personality; temperament test; shelter

Epidemiological study of behavioural disorders in elderly dogs

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Introduction

Ageing is an irreversible and inevitable process that leads to brain function degeneration and can affect the behaviour of the dog (Houpt, 1981; Milgram, 1994; Landsberg, 1997; Bain, 2001; Heath, 2003). Although the causes of behavioural disorders are essentially the same both in geriatric and in young animals, old age may aggravate them (Horvitz, 2001). Also, the 'cognitive dysfunction syndrome' (CDS) is an important ageing-related disease, characterized by neurodegenerative alterations of the nervous central system, which leads to cognitive disorders (Landsberg, 2005). The aim of the present study was to provide a descriptive statistics of the behavioural disorders most often diagnosed in elderly dogs and to evaluate the role of the CDS.

Methods

Clinical records of 270 dogs older than 7 years presented for a behaviour problem at the Animal Behaviour Clinic of the Autonomous University of Barcelona were analysed. Information about age, breed, gender and neutering status, characteristics of the owner and the environment, behaviour problems and signs of ageing were obtained for each dog.

Results

We selected in our database all dogs older than 7 years ($n=270$). Elderly dogs made up 16% of the total population presented for behavioural consultation and only 10 patients were affected by CDS. 74,3% of owners detected and noticed at least one behavioural problem in their dog, two problems were noticed in 19,8% of cases, three in a 4,6% and four in only 1,3%.

There were 67,9% male and 32,1% female dogs: only the 25,7% were neutered. This is the breed distribution of our dog population:

Table 1. Elderly dog breed distribution (expressed as percentage)

Breed	Distribution (%)
Terriers	9,1
German shepherd	8,6
English Cocker Spaniel	6,5
Catalan shepherd	3,5
Poodle	3,3
Golden/Labrador Retriever	3,0
Schnauzer	2,9
Alaskan/Siberian Husky	2,8
Malamute/Samoyedo	
Rottweiler	2,2
Belgian shepherd	1,6
Doberman	1,2
Bobtail	1,2
Bull Mastiff	1,1
Other breeds	11,4
Pure breeds	58,4%
Mixed breed	41,6%

The mean age of our dog population was: 78,5% between 7 and 10 years old, 19% between 10 and 13 years and 2,5% older than 13 years. The average was 8,6 years.

Dogs came from: another family (33,7%), pet shop (11,8%), breeder (11,4%), street (11%), animal shelters (7,2%) and in 2,9% the origin was unknown.

In regard to diagnosis, aggressive behaviour, particularly towards people, was the most frequent disorder diagnosed by veterinarians, followed by vocalisations and excessive barking, separation anxiety-related symptoms, housesoiling, phobias and compulsive disorders.

In the following bar chart you can observe the distribution of behaviour problems presented by our population of dogs:

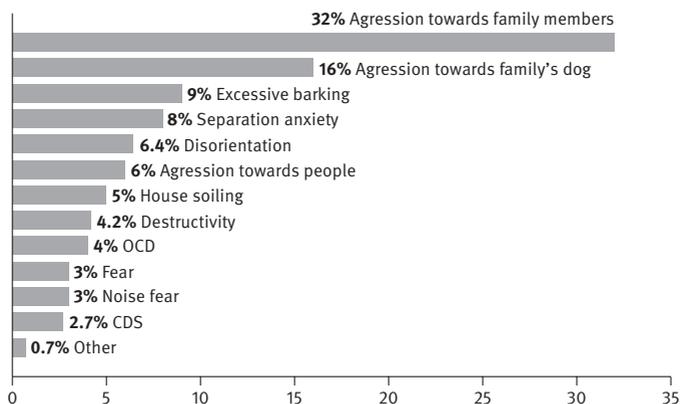


Table 2. Symptoms and behaviour problems diagnosed in elderly dogs

The high percentage of aggression was due to a higher sensitivity of owners towards such disorders. These results show a strong similarity in some case reports (Landsberg, 1997), but not in others, where one of the most frequent problems was separation anxiety (Chapman, 1990; Nielson et al, 2001). It has to be noticed that the present study took into consideration not only the diagnosis but also the symptoms: in fact, excessive barking, housesoiling and destructiveness were reported in the graph are included among general symptoms of separation anxiety as well.

A clinical problem was found in 5 cases of aggression reported by the owner: in these cases a pathology may possibly increased the aggressive tendency of the dog.

However, in some cases (18,9%) the main problem reported by owners, and which motivated the behavioural consultation, didn't correspond to the behaviourist's final diagnosis.

Moreover, symptoms associated with cognitive decline and suggesting a CDS (increased dependance by the owner, changes in the interaction with people, sleep-wake cycle alterations, housesoiling) weren't, in the majority of cases, recognized by the owner.

In relation to the diagnosis of Cognitive Dysfunction Syndrome, the percentage of this problem in the examined dogs may have been underestimated since it was considered only a physiological ageing process or owing to the difficulties in differential diagnosis (such as towards neurological disorders). A survey of veterinarian found that only 7% of owners of older dogs spontaneously report such problems to their veterinarian (Landsberg, 1997).

Clinical signs that might be associated with CDS were observed in our population sample: the 67% of dogs were positive at decreased interactions with owners, in 50% appeared confusion and disorientation, as well as housesoiling, in 35%

the sleep-wake cycle alteration and depression/apathy in a 17% of the total cases. As a matter of fact, in the 11- to 12 year-old dogs, 28% were positive for at list one category of CDS symptoms and the 68% in 15- to 16-year-old dogs (Nielson, 2001). In the following pie chart, you can observe the percentage of owners that recognised at least one symptom of CDS during their dog's life:



Table 3. Symptoms of CDS in our population of dogs

Conclusions

Aggressive behaviour was a sign present in more than 60% of our cases and it represented one of the most frequent behavioural problems in population of dogs of the present study as well, being easily to be recognized by owners and diagnosed by the veterinarian. On the contrary, CDS is hard to diagnose due to the fact that the owner often underestimates or considers normal its symptoms because of the dog's ageing, as demonstrated in previous observations (Houpt, 1981; Landsberg, 2005).

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Keywords: dog; elderly dog; behavioural disorders; cerebral ageing; cognitive dysfunction syndrome

Domestic dogs display calming signals more frequently towards unfamiliar rather than familiar dogs

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Introduction

Rugaas (1997) described as ‘calming signals’ certain dog behaviours that calm receiving subjects and thereby avoid overt aggressive encounters. The aim of the current research was to assess whether the display of the so-called calming signals differs according to the familiarity of dogs involved in the meeting.

Methods

The sample used was composed of 20 dogs (10 males and 10 females) who met conspecifics within an outdoor fenced area (5 x 5 m). In all of the encounters dogs were in pairs and off-lead, but both owners were present within the fenced area and instructed not to interact with the dogs. Subjects were previously assessed by an animal behaviourist in order to exclude subjects known to show overt inter-specific aggression for ethical reasons.

Each dog met four conspecifics: a female and a male familiar dog, and a female and a male unfamiliar dog. Each 5-minute encounter (80 meetings for a total of 400 minutes) was video recorded from two different points and then analysed in order to measure the total number of emissions of the signals.

Results

21 signals from among those suggested by Rugaas (1997) were examined: turning head, looking elsewhere, half-closing eyes, turning on other's side or back, licking nose, freezing, moving slowly, play bow, sitting, sitting and turning on other's back, laying down (sternal decubitus), yawning, sniffing the ground or wall, approaching the other dog curving, waving low tail, cowering, licking the other dog's mouth, blinking, smacking, raising a forelimb and low urination. In the current research two signals listed by Rugaas (1997) were not considered: going between, because there were only two dogs in each meeting, and pretending to ignore that the other dog exists, as the assessment may result too subjective.

Analysing the videos, it was found that the total number of emissions was more than doubled when the dogs meeting were unfamiliar to each other (848 vs 365). This suggests that facing an unknown subject is more challenging and needs a clearer communication regarding intentions.

Comparing the display of single behaviours between familiar and unfamiliar dogs, a very similar trend was observed for most behaviours, with a tendency to higher values when dogs did not know each other. Some signals were rarely or never displayed in either meeting scenario (low urination, blinking, smacking, licking other's dog muzzle, slow movements, play bow, sitting, sitting on other's side or back, sternal decubitus, yawning, curving, waving low tail and raising a forelimb); some others were displayed nearly twice as often during meetings between unfamiliar dogs, even if values were not high (sniffing ground or wall: 28 vs 18; turning on other's side or back: 43 vs 26; turning head: 95 vs 40; licking nose: 168 vs 59) and therefore they did not lead to statistical differences. Looking elsewhere (265 vs 166; $\chi^2 = 21.938$; $p = 0.000$) and freezing (135 vs 20; $\chi^2 = 24.027$; $p = 0.000$) were significantly more frequent in encounters between unfamiliar dogs.

Conclusions

Interspecific communication in dogs seems to vary according to familiarity, the difference being more one of degree rather than of nature. This study shows that a higher number of calming signals (especially specific ones, such as looking elsewhere and freezing) are displayed when a dog meets an unfamiliar dog.

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Keywords: aggressive behaviour, calming signal, familiar dog, unfamiliar dog.

Analysis of the cooperation between veterinarian behaviourists and dog trainers in resolving canine behavioural problems

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Introduction

In recent years behaviour counselling for pets has become a very important issue for veterinarians. In particular, co-operation between veterinary behaviourists and dog trainers with the aim of resolving canine behavioural problems is a relatively new strategy which is considered by many people to be controversial. The efficacy of this co-operative approach has not been studied until now. The aim of the current research was to assess the extent and effectiveness of the co-operation between veterinary behaviourists and dog trainers in a centre where both professionals were available.

Method

One hundred and sixty case reports of dogs, presented at the Centre for Behavioural Counselling for Pets at the University of Pisa (Italy), were analysed. Dogs belonged to 37 different breeds (the most frequent being German Shepherd Dogs, Dobermans and Labrador Retrievers) or were of mixed breed; 59.4% were males and 40.7% females; the age varied from 4 months to 11 years (39 ± 31 months).

Reports referred to dogs displaying different behavioural problems visited by two veterinary behaviourists in the presence of different known, reliable and qualified trainers.

Results

In 45.6% of cases the veterinary behaviourists involved in the research suggested that the owner would benefit from the assistance of a qualified and reliable trainer during the behavioural therapy.

Comparisons between Group 1 (dogs for which the veterinary behaviourist suggested the assistance of dog trainers) and Group 2 (dogs for which the veterinary behaviourist did not suggest the assistance of dog trainers) were made using χ^2 test ($p < 0.05$) and t test ($p < 0.05$).

It emerged that the veterinary behaviourist deemed the intervention of a dog trainer as more advisable in cases of aggressiveness towards other dogs (16 vs 4; $\chi^2 = 9.361$; $p = 0.002$) and overactivity (22 vs 11; $\chi^2 = 6.390$; $p = 0.011$). No propensity was found to refer to a dog trainer for the following problems: aggressiveness towards people (26 vs 31); fear, phobia and anxiety (19 vs 27); separation related problems (1 vs 4); depression (1 vs 1); and repeated activities (0 vs 4).

Comparing the age of Group 1 and 2, it was found that the assistance of a trainer was more common for younger dogs (32.0 ± 26.9 vs 44.0 ± 33.9 months; $t = -2.440$; $p = 0.016$). This result may be due to the importance given by veterinary behaviourists to preventative and early interventions.

Regarding the breed, a trend of having more Dachshund in Group 2 (0 vs 5; $\chi^2 = 2.809$; $p = 0.094$) and more Great Danes in Group 1 (4 vs 0; $\chi^2 = 2.900$; $p = 0.089$) was noted. This suggested that a veterinary behaviourist prefers to seek the assistance of a dog trainer when a large dog is involved, while a small dog is considered to be easier to manage even if it is problematic.

In cases where previous coercive training had been used by the owner or dog trainers not involved in the current research, the veterinary behaviourist considered it necessary to collaborate with a dog trainer who did not use such methods (12 vs 3; $\chi^2 = 6.429$; $p = 0.011$). It is well documented that coercive training does not help in preventing and resolving behavioural problems, and can often worsen them (Mills, 1997), trigger aggression (Bowen and Heath, 2005) and create problems with the owner (Schilder and van der Borg, 2004).

When considering only those cases with a known follow up, the advice of being assisted by a trainer was rejected by 27.5% of the owners ($n = 11$), most of them for reasons such as saving money or having euthanised or rehomed the dog. Among those who did seek the assistance of the trainer, 67.8% ($n = 23$) obtained an improvement, compared to 32.3% ($n = 6$) who did not resolve the problem (no change or worsening).

Conclusions

Co-operation between veterinary behaviourists and both reliable and expert dog trainers appears to be common when the two professionals have the opportunity to work together. Results seem to suggest that this kind of co-operative approach is helpful in resolving canine behavioural problems, although it is still not fully accepted by dog owners.

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The pedigree dog – aesthetics versus ethics and law

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Introduction

Selective breeding of the domestic dog *Canis familiaris* has resulted in greater morphological diversity than in any other single species (Clutton-Brock, 1999). Initially this selection was to satisfy functional requirements; however, the inception of dog shows in the mid 19th century gave weight to the aesthetic perspective and in the late 20th and early 21st century this has become paramount.

Pedigree dogs are morphologically far removed from their progenitor the wolf, and some dogs appear to have paid a high price, as selective breeding has led to the existence of over 350 known diseases and conditions in pedigree dogs (Gough and Thomas, 2005). Whilst the UK Kennel Club, and many breed clubs, recognise there is a need to ensure both the physical and behavioural health of pedigree dogs (Kisko, 2007), many breed standards are still linked to specific problems.

Method

This study adapts the four principles of bioethics (Beauchamp & Childress, 1994) – beneficence, non-malificence, autonomy and justice – to welfare ethics, and considers whether the practice of selectively breeding pedigree dogs to meet breed standards is compatible with these four principles. A questionnaire sent to the secretaries of 167 national breed societies investigated the society views of ethical aspects of dog breeding, through an understanding of the current practices of breed clubs. 42 (24%) responses were returned, and 22 (13%) codes of ethics and rule books were submitted. Qualitative analysis was conducted on the content of the breed society's published rule books and codes of ethics.

Results and conclusions

Although efforts are being made to improve the health of pedigree dogs, current codes of ethics, rule books and breed standards do not fully satisfy the principles of welfare ethics, and only 21.4% considered these would be affected by the provisions of the UK Animal Welfare Act 2006. These ethical issues need to be considered by the pedigree dog world and have implications for the show standards for other species (CAWC, 2006)

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Keywords: Dog; breeding; showing; aesthetics; ethics

Foreign body ingestion in dogs and cats: preliminary studies

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Introduction

The purpose of this study was to investigate the possible causes of foreign body ingestions reported in literature and to assess the impact of related behavioural diseases.

Methods

13 dogs and 5 cats (presented in 2007) which had undergone surgical removal of foreign bodies were first carefully checked through clinical examination, and then a behavioural test was performed to investigate the behavioural status in these patients.

Results

Significant differences were found in relation to the age of the patients and the type of the ingested foreign body, whereas no remarkable differences were found among patients of different breeds and sexes.

In the part of the study performed on dogs, the incidence of behavioural diseases was distributed as follows: nine patients showed symptoms related to Hypersensitivity Hyperactivity Syndrome (69%); one patient showed symptoms related to Sensory Deprivation Syndrome (8%); one patient showed symptoms related to Sociopathic Disease (8%) and two patients did not show any symptoms related to a behavioural disease (15%). In five patients a pre-anxiety level was assessed (38%), and in three patients an intermittent anxiety was reported (23%). Five did not show any pathological condition (38%).

In the study of cats, we found four patients showing symptoms related to Hypersensitivity Hyperactivity Syndrome (80%) and two patients showing a pre-anxiety state. Only one feline patient without any symptoms related to behavioural disease was found in this study.

According to the clinical and behavioural tests performed in this study, the author excluded several diseases which could have caused the ingestion of foreign bodies, like CNS disease, portosystemic shunt, lead poisoning, rabies, liver disease, malabsorption syndromes, lack of sodium and copper, depletion of vitamins – trace elements, altering the metabolism of CCK-B., iron deficiency anaemia and nutritional deficits.

Conclusions

The presence of behavioural diseases observed in these patients (especially Hypersensitivity Syndrome–Hyperactivity) suggests that they play a role in causing the ingestion of foreign bodies in dogs and cats.

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Keywords: dog; cat; foreign body; Hypersensitivity Hyperactivity Syndrome

Effectiveness of L-Theanine and behavioural therapy in the treatment of noise phobias in dogs

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Introduction

Noise phobia is a profound fear response to an unexpected, loud and sudden noise and it is one of the most frequent canine behavioural problems.

The aim of this study is to investigate whether the administration of L-Theanine (Anxitane™), associated with a behavioural therapy programme, can attenuate symptoms of specific noise phobias in dogs.

Methods

20 noise phobic dogs underwent behavioural examination and were then divided randomly in two groups.

- **Group A:** 10 phobic dogs that received a standard behavioural therapy programme associated with the administration of Anxitane™.
- **Group B:** 10 phobic dogs that received only a standard behavioural therapy programme.

Blood samples were taken from all dogs to evaluate cortisol levels before and after therapy. These cortisol values were compared with cortisol levels of a control group of 10 dogs without behavioural problems.

The response of the dogs to audio stimulation was evaluated by the owners through a specific questionnaire identifying the most frequent symptoms of noise phobia.

All data were analysed in order to evaluate the degree of improvement of dogs with or without the administration of Anxitane™.

Friedman test was used to analyse the variations of behavioural score during the therapy while the cortisol values were evaluated by Wilcoxon test.

Results

Both groups A and B showed a statistically significant decrease ($P < 0.05$) of the total score of behavioural signs during the therapy.

The two groups of dogs (group A and B) were then considered separately in order to verify possible differences between dogs treated with or without Anxitane™.

Group A showed a significant decrease in panting, lip licking, yawning, attention seeking, vocalisation and compulsive behaviours ($P < 0.05$).

There were no statistically significant differences in cortisol levels between the groups.

Conclusions

This study suggests that L-Theanine can be used as a support for behavioural therapy in the treatment of specific noise phobias in dogs.

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Evaluation of sheltered dangerous dogs

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Introduction

Canine aggression is a very common complaint and carries with it significant consequences in terms of public safety. A dog can be defined 'dangerous' when it endangers the physical and/or psychological integrity of humans or other living beings. In Italy, with the national law 281/91, the government regulated the management of stray animals by making it illegal to kill dogs unless they were seriously or incurably ill or proved dangerous. Therefore it is very important and necessary to detect the degree of dangerousness in dogs in order to identify and consequently to avoid any risk to public safety.

Study aims

This study aimed to define an objective method to assess the dangerousness of sheltered dogs. Until now there were no parameters available to guide the veterinarian in the evaluation of dangerousness in dogs and to give an objective process (based on scientific guide-lines) through which decisions to resort to euthanasia could be made. Without this process there is a risk that the law can be interpreted either in a too restrictive way or a too liberal manner leading to too many or too few cases of euthanasia.

Method

A work group composed of health authority and University specialists have designed an assessment report with some behavioural and physical parameters (gender, size, age, mandibular morphology, adaptation in the shelter, clinical pathologies that can trigger aggressive behaviour in dogs) and a range of tests which are used to predict the dog's behavioural reaction. Among the behavioural parameters, this assessment takes into account the dog's aggressiveness towards man and the level of reactivity towards other dogs.

In the first phase of the study the test person approaches the dog but remains outside the kennel, in order to evaluate its body posture, facial expression, vocalisation and movements. If the dog reacts aggressively to the test person, the behaviour is analysed to determine whether the response is offensive or defensive, predictable or unpredictable. At the end of the behavioural test, the test person gives a score from 0 to 4 for every variable to evaluate the dog's level of dangerousness. The value 0 indicates no dangerousness; the value 4 indicates the highest level of aggressive behaviour.

The same variables (body posture, facial expression, vocalisation and movements) are then evaluated with the test person inside the kennel.

In the second phase of the study, the same dogs are tested during a clinical examination in order to evaluate the dogs' reaction to human manipulation and in this phase attention was focused on aggressive behaviour. At the end of the clinical examination the test person gives a score from 0 to 4 for every variable to evaluate the dog's level of aggressive behaviour.

During the last phase of the study the dogs' behaviour towards other dogs was investigated and a value of 1 was given to indicate a positive interaction and the value 4 to indicate an aggressive reaction.

In addition to the scores allocated as a result of the test the assessment report also allocated a specific score for previous dog bite incidents with a known history.

The total score of the different tests allowed us to identify different degrees of dangerousness which are referred to as: no dangerousness, a potential level of dangerousness and a proven level of dangerousness.

This scoring system is currently being evaluated.

This assessment report is now employed at the short term shelter of Milan (Italy) and we are testing most of dogs housed in this shelter with this tool.

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Attention seeking behaviour in dogs – what owners love and loathe!

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Introduction

Attention seeking behaviours (ASBs) in the dog have received little scientific attention, although it has been said that “All dogs seek attention from their owners to some extent” (Bowen 2002 p.119). Some may be seen as endearing while others may be more problematic. The aim of this study was to describe the range of ASBs used by dogs, assess demographic associations and differentiate those that are seen as endearing versus annoying.

Method

Initial interviews of owners were used to generate a list of 26 ASBs and their context, for inclusion in an owner survey with largely closed items. 130 questionnaires were completed.

Results

The most commonly reported ASBs were: stands and stares (70.8%), hovers around and follows (64.6%), wags tail (62.3%), nudges with head/muzzle (60.0%), barks (54.6%), puts head on lap (54.6%), whines/squeaks/whimpers (50.8%) and paws (50.8%), least common were growls (10%), chases tail (7.7%), begs/sits up

(7.7%). Behaviours ranked as most endearing were: head on lap, tilting of the head, standing and staring, while most annoying were: barking, growling, jumping up and whining/squeaking/whimpering. 25 respondents commented that the most endearing behaviour could become annoying. This related most to putting the head on the lap. The reportedly most effective ASBs were barking and putting the head on the lap. ASBs were most often reportedly used when owners were nearby and the dog wanted to play (70.0%), the dog was hungry (56.9%), needed the toilet (55.4%), or the owner was paying attention to other dogs (52.3%). Chi-square tests on demographic associations with ASB and its context found few significant ($p < 0.05$) relationships even without statistical correction for multiple testing. The sex of the dog influenced the expression of ASB when wanting to go out for a walk. The age of the dog was associated with ASBs in the presence of food, need for the toilet and when people arrived in the home.

These results highlight the need to teach owners consistent interactions with their dog, since intermittent reinforcement of behaviour because it is endearing at one time and annoying at other times will result in a more enduring response that is harder to manage and may also cause stress for the dog. In addition some of the most annoying ASBs, such as barking, were also deemed to be some of the most effective, which would also impact on their reinforcement. The data do not provide much evidence for sexual dimorphism in dogs in relation to ASBs.

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Assessing potential thermal stress in pigs during transport in hot weather – continuous physiological monitoring

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Introduction

During road transportation livestock are exposed to a range of potential stressors that may compromise their welfare, reduce production efficiency and increase mortality. A major problem is the transport thermal micro-environment. In order to assess the physiological consequences of thermal challenges in transit it is necessary to monitor the deep body temperature of the animals in addition to other indices of physiological stress. The recording of deep body temperature (DBT) under commercial transport conditions is challenging. Radio-telemetry systems have been developed for this purpose but are often insufficiently robust for continuous use on commercial vehicles, on long journeys, under thermal stress conditions.

Method

The present study describes the development and application of both a novel, implantable deep body temperature data logging system for use in livestock

during commercial transportation and a surgically implantable radio-telemetry package. The systems have been employed to continuously record DBT in groups ($n=8$) of adult pigs and lambs under hot weather conditions in Spain in summer. Two types of journey have been examined, journeys (6) of 8 hours duration, typical of those to slaughter (in Spain) and journeys (7) of 3 days duration, typical of the export of breeder pigs (UK to Spain). The thermal micro-environments on the vehicles and the ambient conditions have been recorded throughout every journey and these variables have been correlated with physiological stress responses with particular emphasis upon the thermoregulatory status of the animals in transit.

Results and conclusions

Significant ($p < 0.05$) changes in body core temperature were observed on many journeys but did not indicate undue thermal stress or poor welfare on any journey. The data obtained in this way form the basis of predictive models facilitating the definition of 'acceptable thermal envelopes' for the commercial transportation of adult pigs thus allowing for the provision of a sound, fundamental scientific basis for transport welfare legislation and for the proposed revision of the European Transport Regulation.

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The effects of Novifit on cognitive function in aged dogs

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Introduction

Canine cognitive dysfunction (CDS) is a diagnosis based on age-related behavioural changes for which other medical causes are excluded. Both cognitive dysfunction and medical conditions may co-exist in senior dogs, making it difficult to determine which is responsible for the clinical presentation. Clinical signs of CDS include disorientation, alterations in interactions with humans or conspecifics, sleep-wake cycle alterations, house soiling, changes in activity levels and anxiety (Landsberg and Araujo, 2005). The underlying cause of these behavioural changes is thought to be related to alterations in brain function. Pathological brain aging in dogs includes deposition of beta amyloid, cortical atrophy, reductions in markers of neuronal health, and alterations in neurochemical signalling (Araujo et al, 2005a; Araujo et al, 2005b; Head et al, 1998; Tapp et al, 2004). In the laboratory, we are able to identify both age-related and pathology-related changes in cognitive function using neuropsychological tests developed for assessing cognitive function in dogs (Tapp et al., 2004). The objective of the current study was to evaluate the efficacy of Novifit (S-Adenosyl-L-Methionine-Tosylate Disulfate [SAM-e]), a novel supplement to be utilized in the management of cognitive dysfunction syndrome (CDS), using the laboratory model.

Methods

The subjects consisted of 14 aged (9.2 to 12.8 years) Beagle dogs from the CanCog Technologies colony. Baseline performance on a variable-delayed non-matching to position task (DNMP) was used to divide the subjects into two equivalent groups of 7 subjects. Following a 15-day treatment wash-in, cognitive function was assessed using the following tests: object discrimination learning and reversal, attention, and DNMP. Subjects on Novifit were dosed as per label instructions.

The procedures for the DNMP have been described elsewhere (Studzinski et al., 2006). Briefly, each trial consists of two presentations. On the first presentation, an object is presented over one of three positions. The second presentation occurs after a delay and consists of the same object presented in duplicate; one in the same position and the other in one of the two remaining positions. The choice of the novel position is correct. Variable-delayed DNMP testing used delays of 5, 55, and 105 s, which occurred equally over an 18 trial test session. Dogs were tested on DNMP for 5 days during baseline and ten days during treatment.

For, the discrimination and reversal learning task (Tapp et al., 2003), subjects were required to learn that choosing a certain object was always associated with a food reward. One test session of 20 trials was administered daily. Initially a preference test was administered, followed by the learning and reversal phases, which collectively were conducted over a maximum of 30 days. In the preference test, the object chosen most frequently was considered the preferred object. The preferred object was rewarded during the discrimination learning phase. For reversal phase, the non-preferred object was rewarded. Subjects learned the task when an a priori learning criterion was reached, which required subjects to respond correctly at least 70% of the time.

The day after subjects completed the object discrimination reversal or after the maximum number of sessions was reached, they were tested on the attention task. For this task, the object that was rewarded during the discrimination reversal phase continued to be rewarded. Each test session consisted of 12 trials and subjects presented with 0, 1, 2 or 3 non-rewarded objects, which served as distracters, in the presence of the rewarded object. For the first 7 sessions, the negative stimulus used in the reversal task served as the negative stimuli on the attention task (same condition). The positive stimulus remained unchanged during the subsequent 7 sessions, but the negative stimulus was switched to a novel object (different condition).

Results

No effect of treatment or time-point was found on the DNMP. On the object discrimination task, several subjects were not able to pass the reversal phase.

Consequently, only errors committed over the first 10 reversal sessions were used. The total number of errors to pass was used to analyse the learning phase. Both an effect of task [$F(1, 10) = 36.8417$; $p = 0.000120$] and a task by treatment interaction [$F(1, 10) = 5.3846$; $p = 0.042738$] were found. The task effect was due to increased errors on the reversal compared with learning. The task by treatment interaction was due to the treatment group showing greater improvement from the learning to the reversal phase compared to controls, which suggests a treatment-related improvement in executive function.

To reduce the learning confound on the attention task, data from the last four sessions of each attention task were used in the analysis and subjects that did not achieve a minimum average score of 75% correct on the two-object presentation, which is consistent with our learning criteria, were excluded. The data suggested a drug-related trend consistent with the hypothesis that the treatment may improve executive function. For the two-object presentation, the treatment group showed higher performance levels than placebo in the different condition, but the opposite effect during the same condition. Post-hoc Fisher's test indicated that performance in the placebo group deteriorated marginally on the different task compared to the same task [$p = 0.075587$]. By contrast, performance in the treatment groups increased from the same to different task, although this difference was not significant.

Discussion

The current study examined the effects of Novifit on various cognitive processes including memory, attention, learning ability and executive function. Although the design of the study limited the number of subjects that were able to reliably learn the reversal problem and achieve adequate levels of performance on the attention task, the analyses excluding these subjects revealed potential cognitive enhancing effects of Novifit. Specifically, the data on the discrimination learning and reversal tests suggest that Novifit may improve executive function. This interpretation was supported by findings that Novifit may have improved performance on a sub-test of the attention task under the different condition. Overall, the results suggest that Novifit may be effective in canine cognitive dysfunction syndrome by improving a dog's ability to cope with change. Further studies to better understand these effects are warranted.

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Keywords: Cognitive dysfunction syndrome, Laboratory model, Supplement

Review: Relevance of stimuli used in canine behavioural testing with regards to proximal causality of dog bites

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Introduction

Over the past 10 years, awareness regarding social implications of dog bites has increased (Overall and Love, 2001; Rosado et al., 2009). Certain canine tests gauging aggressive and social behaviour claim to predict and therefore help prevent bite accidents (Netto and Planta, 1997; Lucidi et al., 2005). In this study, we investigated whether factors, presumably associated with dog bite accidents, are in fact applied as test stimuli in aggressive and social behaviour tests.

Method and results

A 'Web of Science'-based literature review (1990–2008) rendered 244 publications about dog bite accidents and 34 about canine aggressive and social behav-

four tests. Results of the former type of articles showed that the majority of bite accidents happened in the home environment and the victims, consisting proportionally of more children than adults and of more boys than girls, were bitten by a familiar dog. Bite accidents involving children were most common during play interaction, but studies often failed to mention if incidents resulted from direct provocation. Moreover, several causal factors appeared to interact in one bite accident.

Next, the review of 34 articles considering dog aggressive and social behaviour tests revealed that, most commonly, a test presented up to 10 stimuli. However, the majority of these did not seem to be directly related to hugging, cuddling or playing with the dog, which are identified in dog bite accident reports as important eliciting factors. In addition, stimuli in tests were only administered for a couple of minutes, leading us to question whether they are representative for situations in which bite accidents occur.

Conclusions

Based on these results we conclude that additional scientific research regarding the causal factors of dog bite accidents is needed in order to make reliable conclusions about the validity of current dog behaviour testing and its ability to predict which dogs are likely to bite.

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Keywords: Behavioural testing, dog bite, proximal causality, social interaction

Equine-assisted intervention programs in Veneto (Italy)

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Introduction

Equine-assisted interventions (EAIs) include equine-assisted activities, equine-assisted therapy (EAT), and equine-assisted learning/education (Kruger and Serpell, 2004; Lajoie, 2003; Samuels et al., 2006). The purpose of this study was to gather information on EAIs in Veneto and identify possible welfare problems.

Method and results

Out of 112 riding stables, 72 (64%) were reached by telephone. The questionnaire consisted of 67 questions on selection, training, working conditions and welfare.

Eighteen yards (25%) organise EAIs with a total of 76 horses or ponies. Seventeen involve a therapist (11 with a psychologist) and can be qualified as EAT.

All yards select kind and quiet horses. None deem previous veterinary examination necessary. All horses are regularly vaccinated and de-wormed because it is compulsory in Italy. Age is never the main selection criterion. However, ponies tend to start at a younger age (6,5 versus 13 years, $Z = -3.7$, $p < 0.001$; Mann-Whitney-U), and to be younger (13 years vs. 18; $Z = -4.3$, $p < 0.001$; Mann-Whitney-U) than horses. Retirement age varies depending on health.

Thirty-six of the horses or ponies have worked in EAIs for more than 5 years. Although working conditions in EAIs are very diverse, none of the horses get

specific training, apart from habituation sessions to EAI stimuli in 6 yards. Workload varies from 1 to 10 30-minute sessions per horse per week. In 17 yards the same animals also work as riding school horses.

All horses are housed in individual stalls. Horses have free access to a paddock in two yards. In 12 yards access is restricted to part of the day. The public has no access to the stables or paddocks in 9 yards.

Possible discomfort or stress is never systematically assessed. Disobedience, stopping, mild bucking and increased latency in obeying aids are the most frequently reported problems. Nine yards report aggressive reactions towards some clients (threats through flattening ears, vocalising, backing). These are sources of concern and warrant further investigation.

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Keywords: Horse, Equine-assisted intervention, welfare

Preliminary study on the effects of a simple form of food enrichment on horses' reactivity

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Introduction

Environmental enrichment, in the form of an increased variety of forages, has been shown to be able to modify horses' behaviour, decreasing stereotypy performance (Thorne et al., 2005). However, practical considerations may limit the use of this practice in many yards. The aim of this preliminary study was to assess whether a very simple form of food enrichment, i.e., the provision of chopped carrots in a different bucket at the same time as concentrate meal, had any effect on non-stereotyping horses' behavioural and physiological responses to two environmental challenges.

Method

Eight non-stereotyping horses (4 mares, 3 stallions, 1 gelding; aged 3–11 years) were involved in this study. They were subjected to two standardised experimental procedures involving environmental challenges twice: one after five days of normal routine (control conditions) and one after five days of enrichment (enriched conditions). Half of the horses were assessed first in control conditions whereas the others were assessed first in enriched conditions. The procedures were performed at the same hour and were carried out in the same sequence in both conditions.

The two environmental challenges consisted of:

- a. blindfolding the horse for 10 minutes;
- b. offering palatable, but unreachable (i.e., in a bucket covered by a net) food for 5 minutes.

Before and after each experimental procedure, rectal temperature, heart rate (by Polar), infrared thermography values (of eyes and of the skin directly behind labial commissure), serum cortisol and plasma ACTH concentrations (by chemoluminescence) were measured. Behaviour during the experimental procedures was video recorded and evaluated by continuous recording using the J-Watcher program. The experimental procedures were carried out in the box stall in which the horse was usually stabled.

Wilcoxon tests were used for comparisons.

Results

Horses showed oral behaviour (nibbling, biting chewing, licking lips, $Z=1.96$; $p<0.05$) more frequently and pawing ($Z=2.2$; $p<0.05$) less frequently when blindfolded at the end of the enrichment period than at the end of the normal routine period. Moreover their heart rate ($Z=2.24$; $p<0.05$), and cortisol concentration ($Z=2.1$; $p<0.05$) increased less during the same test. No other differences were seen between the two conditions.

Conclusion

It is concluded that simple forms of food enrichment may be a promising area of research in order to find practical ways to influence horses' reactivity.

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Keywords: Horse, Reactivity, Enrichment

Chemical communication in birds: recent findings

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Introduction

Birds are often considered to be creatures which concentrate on the use of auditory and visual input. A dramatic contradiction to this approach lies in the normal development of the olfactory cavities and bulbs as illustrated by Bang and Cobb (1968) by studying over 100 different avian species. Since such pioneering research, several authors have described different odorous secretions in birds and identified their functions during sexual and maternal behaviour as well as in detecting and avoiding predators. Assuming our need of a better understanding of the sensory world of animals for an accurate evaluation of possible behaviour problems, this paper describes the state of the Art in this neglected field.

Review of the literature

As a result of anatomical and physiological research, birds are no longer seen as anosmic animals and the complexity of their olfactory system and capabilities is well described. Scents play a role in food location in kiwis, vultures or petrels (Balthazart and Taziaux 2009) but also in recognition of familiar places like the nest in chicks (Porter et al, 1999), petrels and relatives (Hagelin, 2007). Moreover, chemical signals have been shown to play a major role in predator detection (Roth et al, 2008), in sex recognition (Bonadonna et al, 2009), in specific partner recognition (Bonadonna et al, 2007) and in mother-hen to chick communication (Pageat, 2003). The uropygial gland (preening gland), is a major producer of odorous secretions (Bohnet et al, 1991) but some other glands are also involved. These secretions do not only play a role as primers but also as releasers of hormonal secretions (Madec, 2008). Maternal uropygial secretions are responsible for

attracting the chicks when facing a stressful event (Madec et al, 2008), modulating the corticosterone release and modifying the heterophil to lymphocyte ratio and protecting the growth of the chicks against the detrimental effects of stress.

Conclusions

The recent development of our understanding of avian chemical communication provides new possible strategies in the management of bird welfare in both pet and livestock species. Using chemical communication can be a promising way to enrich the environment of captive wild birds as well as to improve the quality of life in poultry.

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A comparison of puppies and adult dogs in a problem solving task

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Introduction

Recently there has been a considerable increase in the number of studies on dogs' socio-cognitive abilities. As noted by Miklosi (2004), dogs are interesting study subjects for the possibility of looking at both the genetic influence on behaviour by studying breed differences, and the ontogenetic factors i.e. taking into consideration various aspects of a dog's life history. In this study we used the 'unsolvable task' paradigm similar to that used by Miklòsi (2003), based on a different testing apparatus, to compare puppies and adult pet dogs.

Method

Twenty adult dogs and twenty 4 month old puppies, matched for breed, were tested. The test consisted of three 'possible' trials in which dogs could obtain food by manipulating a plastic box, followed by an 'impossible' trial in which obtaining food became impossible.

All trials were video-recorded and the following behavioural categories scored:

1. interaction with the apparatus;
2. interaction with the owner/researcher;
3. gazing at the owner/researcher;
4. gazing at the box;
5. barking
6. other.

Potential differences in behaviour between puppies and adults were evaluated considering the first solvable trial and the unsolvable trial.

Results and conclusions

Results showed differences in the first trial in the frequency of gazing, where adult dogs gazed at the researcher more frequently than puppies (Mann-Whitney test, $z=2.12$, $p=0.03$) and spent more time gazing at humans ($z=1.9$, $p=0.047$). In the unsolvable trial adults gazed at the box more often than puppies ($z=1.98$, $p=0.047$), whereas puppies interacted with the owner more often ($z=2.06$, $p=0.04$) and for longer periods of time ($z=2.06$, $p=0.03$). Results are discussed with reference to ontogenetic and phylogenetic aspects influencing the dog's performance in a socio-cognitive task. Furthermore cognitive tests in puppies may be potentially useful in predicting the occurrence of behavioural problems.

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Keywords: dog; age differences; problem solving; communication; gazing.

Environmental, individual and triggering aspects of dogs presenting with psychogenic acral lick dermatitis

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Introduction

Acral lick dermatitis constitutes a skin condition primarily recognised in dogs. Affected animals show an excessive and chronic licking of the limbs, especially the carpus and metacarpus (Horwitz and Neilson, 2007), leading to hair loss and skin irritation progressing onto ulceration and infection. From allergies to neuropathies, multiple factors can lead dogs to repetitively lick and chew their limbs (Landsberg et al, 1997). When psychological components (e.g. anxiety, boredom, frustration, compulsion) underly the problem, the condition is considered to be psychogenic.

Method

Owners of 20 dogs with psychogenic acral lick dermatitis of chronic progression admitted to the dermatology service of the university veterinary hospital, were asked about several aspects of their dogs' (1) environment – both physical (e.g. permission to stay indoors) and social (e.g. promotion of routinely dog-human play), (2) individuality (e.g. occurrence of 'anxious' temperament) and (3) supposed 'triggers' (e.g. attachment disruption). Diagnosis was made throughout physical and subsidiary examinations and after interviewing the owners, individual treatment recommendations were provided.

Results

The vast majority of the dogs were of large breeds. Despite the fact that all dogs but one lived in houses (as opposed to flats), 70% had small sized available areas (under 50m²) and 64% were not allowed to stay inside the house. Socially, none of the owners played with their dogs on a routine basis and most of the dogs (i.e. 70%) were never taken for a walk. All the owners considered their dogs to have an 'anxious' character and in the case of 13 dogs, at least one supposed 'triggering' non medical component (e.g. death of a canine companion) was identified.

Conclusions

As with other stereotypic behaviours, environmental restrictions as well as lack of appropriate social interactions are critical factors in the development of psychogenic acral lick dermatitis in predisposed animals. Previous morbid skin conditions seem to be uncommonly associated with onset of the problem.

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Video infrared thermography technique in dogs

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Introduction

Stress induces reactions in animals including behavioural and physiological modifications. The biological available responses include behaviour as well as the activation of the autonomic, neuroendocrine and immune systems, which interact and allow the organism not to be overwhelmed by pathogenic challenges (Moberg, 2000). The main problems in measuring body and skin temperature are associated with difficulty in recording without inducing other stress reactions due to presence of or handling by humans. Thus, infrared thermography may be used to remotely assess skin temperature without interfering with the animal's behavioural reactions (Stewart, 2005).

Method and results

In the present study the research activity has been focused on defining a new method to measure thermal images by using an infrared camera, Avio TVS 500 microbolometric uncooled system, operating in long wave range, using a video-recording technique. This technique allows us to verify the skin temperature, during the natural behaviour of the animal, without interfering with their emotional state. Single thermographic images have already been used in veterinary medicine as a diagnostic tool but to the authors' knowledge, thermographic videos have never been done on dogs (Ludwig, 2007).

Our aim was to verify the possibility of recording proper thermographic videos of 18 German Shepherd Dogs and 2 Labrador Golden Retrievers, submitted to a TAN (Natural Attitude Test) test and to investigate their significance.

We have been successful in creating digital videos thermography for the entire duration of tests and the next step will be the statistical analysis of each video image.

Conclusions

The results of the present pilot study are promising in order to optimise the video-thermography technique. The possibility to obtain continuous information about skin temperature evolution related to the blood flow may be very useful in order to study the emotional and physiological status of dogs (Vianna, 2005).

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Keywords: video infrared; skin temperature; dog; stress

Effect of training on behavioural reactivity and neurotransmitters levels in drug detection dogs

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Introduction

The aim of this research was to investigate the effects of training on behavioural reactivity and plasma and platelet neurotransmitter levels in order to evaluate some variables influencing dog behaviour and responsiveness to training (Marelli, 2008; Riva, 2007).

Methods

Twenty dogs were studied (18 German Shepherd Dogs; 2 Labrador Retrievers), both sexes were represented and the dogs ranged in age between 12 and 24 months. All the dogs were born, reared, housed and trained in the same facility. The dogs were studied before and after training (six month period), data and samples were collected twice. The behavioural reactivity of the dogs was scored according to a standardised test by Svartberg (Svartberg, 2005), which is a test for working dogs established to evaluate natural dog attitudes. The dogs' reactions to tests were scored from 1 (fearful/over reactive) to 5 (Confident/playful). The test included 7 variables analysed through 18 situations: Sociability (eagerness, cooperation,

reaction to physical contact), Playfulness (eagerness, cooperation, reaction to physical contact), Activity level (passive situation, activity level), Chase (chasing, grabbing), Aggressiveness (interest towards stranger, aggressive behaviour), Metallic Noise (startle reaction, exploratory behaviour, avoidance behaviour, approach behaviour), Gunshot (avoidance reaction). Plasma samples were analysed by HPLC to evaluate Epinephrine (E), Norepinephrine (NE), L-DOPA, Homovanillic Acid (HVA), 3,4-Dihydroxy-phenylacetic Acid (MHPG), 5-Hydroxy-indolacetic Acid (5-HIAA); and Serotonin (5HT), 5HT and 5-HIAA were evaluated in platelets too (Riva, 2008). Statistical analysis was carried out using Kruskal-Wallis non parametric ANOVA and GLM; training, breed and sex were the independent variables (SAS[®], 2008).

Results

Behavioural reactivity analysis revealed significant differences at different levels for breed, sex and training. All the dogs after training showed an increase in shy behaviour with a stranger ($P \leq 0.01$), Labradors were more confident than German Shepherd Dogs. Differences before and after training were calculated for platelets 5HT and 5-HIAA levels ($P \leq 0.01$; $P \leq 0.05$), lower levels were found after training (Jiansong 2009). Plasma L-DOPA level revealed significant differences between sexes ($P \leq 0.05$), with higher concentrations in males.

Conclusions

The results show the effects of training, sex and breed on behavioural reactivity and neurotransmitter levels underlining the importance of an accurate selection of dogs for drugs detection training (Rooney, 2007).

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Keywords: temperament test; drugs detection dogs; serotonin; training

Comparison of stress and learning effects of three different training methods: electric training collar, pinch collar, and quitting signal

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Introduction

The application of aversive stimuli in dog training, in particular via electronic training collars, is a highly controversial issue. Supporters claim that they are a reliable means for eliminating self-rewarding behaviour (Christiansen *et al.* 2001), and are applicable over greater distances and with less risk of stress and injury compared to mechanical devices, such as choke chains. Opponents cite the risk of incorrect or abusive use and the temptation to use electric shock collars without thought or time given to alternative training methods, regardless of the fact that their use is associated with pain and fear (Schilder & Van Der Borg 2003).

There are many studies examining stress and learning effects of electronic training collars. However, a scientific study comparing other training methods with electronic training collars considering these parameters is non-existent to our knowledge. The present study aimed at investigating and comparing three training methods for dogs: trained quitting signal (QS), pinch collars (PC), and electric training collars (EC).

Method

This study was performed on forty-two Malinois, trained as police dogs. Every dog was subjected to each of the three training methods, QS, PC, and EC. Six subgroups were created using a randomised cross-over design, i.e., one subgroup for each of the six possible sequences of training methods, and the dogs were randomly assigned to one of these six subgroups.

The experiment was conducted on three test days. Per test day, one training method was applied per dog. The given training method was applied to the dog exactly when displaying disobedient behaviour in a standardised test situation. Learning effects were assessed by applying the method up to three times, with one hour interim time between repetitions. Stress effects were assessed by use of behavioural responses and salivary cortisol values.

Statistical analyses were conducted using SPSS 16.0. Differences concerning salivary cortisol levels and learning effects between training methods were analysed using paired-sample t-tests. Values of $p < 0.05$ were regarded as significant, values of $p < 0.01$ as highly significant.

Results

The results show that concerning behavioural responses, the application of PC was more stressful for the dogs than the application of QS and EC. Concerning salivary cortisol levels, QS was the most stressful training method (QS compared to EC: $p = 0.1785$; QS compared to PC: $p = 0.0294$; ES compared to PC: $p = 0.2006$).

The results also demonstrated that in the given test situation the previously trained QS, representing a form of negative punishment, was not sufficient in stopping dogs from showing unwanted behaviour. In contrast to this, both EC and PC produced highly significantly better learning effects than QS ($p < 0.01$). EC produced better learning effects than PC ($p = 0.16$).

Conclusions

The results lead to the conclusion that efficient training methods for training under high levels of arousal must ensure particular criteria in order to comply with animal welfare principles: good timing, association with misbehaviour only, and correct intensity. Debates about training methods can only be reasonable when they consider all factors affecting training, i.e. training aids, trainers, and training conditions.

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Keywords: Dogs, stress, learning effect, electronic training collars, alternative training methods

A comparison between a direct and an indirect method for assessing aggressiveness in dogs

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Introduction

The aim of the current study was to determine the validity of a test for the direct assessment of aggressive behaviour in domestic dogs using a previously validated questionnaire for indirect dog behavioural assessment (by owners).

Method

A convenience sample of ninety-eight owner-dog pairs were enrolled in the study. A modified C-BARQ questionnaire (Hsu and Serpell 2003) for the evaluation of canine fearful and aggressive behaviour was administered to owners. Subsequently, their dogs were evaluated directly for aggressiveness using the standardized SAB test (Planta and De Meester 2007). Scores for 8 distinct C-BARQ subscales were recorded: Stranger Directed Aggression (SDA), Owner Directed Aggression (ODA), Dog Directed Aggression/Fear (DDAF), Familiar Dog Aggression (FDA), Trainability (T), Stranger Directed Fear (SDF), Touch Sensitivity (TS) and Attachment/Attention Seeking (AAS). Based on their SAB test results, dogs were divided into either aggressive or non-aggressive groups according to established guidelines (Van der Berg et al 2003).

Results

Analysis of the results of the two methods of assessment indicated that dogs that were categorised as aggressive on the SAB test obtained significantly higher (more aggressive) scores on the CBARQ subscales SDA (one-way ANOVA, $p < 0,001$), FDA ($p = 0,006$) and ODA ($p = 0,025$) than the dogs in the non-aggressive group.

Conclusions

Using the information from this study the authors believe that several components of the SAB test could be used as a valid tool to provide decision-makers with objective evidence for the evaluation and management of aggression in dogs.

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Keywords: dog; temperament test; fear; aggression

The use of an intermediate bridge versus leaving the trace interval unfilled in animal training (dogs)

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Introduction

This study was conducted to investigate whether the use of an intermediate bridge during operant training in dogs would significantly affect the number of trials taken to learn a nose touch behaviour and its subsequent extinction, when compared to leaving the trace interval unfilled.

Method

Twelve dogs of varying ages, gender and breed were randomly divided into two treatment groups of 6 dogs per group. Each group was taught a reversal discrimination task with successful behaviours followed immediately by a distinct click followed by a primary reinforcer according to a continuous schedule of reinforcement. A five second interval followed the click before the primary reinforcer was delivered. In the treatment group the trace interval was filled with lower volume clicks at a rate of 1 click per second, in the control group silence was maintained. The task was assessed to have been learnt when a correct response was achieved in 4 successive trials using a validated 5 point scoring system. Extinction of the response then followed where no reinforcement or signalling was delivered and the number of responses made was recorded.

Results

The effect of the treatment was assessed using a Mann-Whitney U test. There was no significant difference ($p > 0.05$) in the number of trials required for response acquisition, but there was a difference in extinction ($p < 0.05$). The results indicate that the use of an intermediate bridge increased resistance of the trained behaviour to extinction but did not reduce training time.

Conclusions

The findings of this study, deserve further investigation as they may have important implications for animal training where a secondary reinforcer is used, specifically where temporal contiguity is low.

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A conceptual study about 'animal-assisted interventions' in Antwerp (Belgium)

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Introduction

For the past 20 years, a growing number of health care facilities and educational settings have started 'animal-assisted intervention' programs (AAIs). These initiatives include 'animal-assisted therapy' in which client oriented therapeutic goals are set and progress records are kept, as well as 'animal-assisted activities' without specific goals for each client and 'animal-assisted learning' in which teachers have educational goals for each student (Lajoie, 2003; Kruger and Serpell, 2004). The aim of this study was to map the prevalence and the most common logistical issues for AAIs in Antwerp, a Belgian province.

Method

We collected data from 284 institutions (146 elderly homes, 18 centres for palliative care, 30 clinics, 65 institutions for people with challenges and 72 centres for youth at risk) using a semi-structured telephone interview.

Results

Eighty-five percent of the facilities offer AAIs, mainly involving residential or visiting animals that provide for various activities. Animals involved are dogs (36%), horses/ponies (20%), farm animals (15%), rodents (11%), birds (10%), or cats (4%). Other species (<1%) are dolphins, snakes, fish, spiders, falcons, snails, foxes and a ferret. Fifty-eight percent of the AAIs had goals such as improving physical activity (16%), cognitive skills (15%), psychological abilities (13%), rendering activities more interesting (11%), reaching individual goals and improving social contact (8%). Forty-two percent of the programs kept records on either the animals themselves or the work they perform. Twenty-five percent of the respondents reported occasional negative effects on the animals involved.

Conclusions

Problems differ widely between programmes and include various forms of animal neglect, animal abuse, and aggression towards the animals, stress signals, hiding and running away from clients. One report describes even the death of a chased animal and another one cannibalisation of the animal. These results constitute a source of concern and warrant further investigation.

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Keywords: animal-assisted interventions, animal-assisted therapy, social interaction, welfare

Is it wise to involve animals in prisons and rehabilitation programmes? A study conducted in Flanders (Belgium)

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Introduction

For about 25 years prisons in the United States and South-Africa have used animals in rehabilitation programmes (Strimple, 2003). Studies have shown positive reports but there has also been evidence of a link between animal abuse and violent behaviour towards humans (Hines, 1983; Ascone, 2001). This leaves us wondering whether these programmes can guarantee the welfare of the animals involved. The aim of this study was to gather information on programmes for offenders in Flanders.

Method

In Flanders (Belgium) there are 32 facilities, of which 15 prisons and 17 rehabilitation centres which are responsible for prisoners. Twenty-nine (91%) of them replied to our telephone-survey.

Results and conclusions

Twenty-three (79%) facilities offer animal-assisted interventions (AAIs). Institutions either work with shelter animals (17%) or have residential animals (83%). The latter are farm animals (56%), parrots (19%), cats (8%), dogs (6%), fishes (6%), turtles (2%), or gerbils (2%). Only two of the AAI-programmes exclude prisoners with psychotic problems or those showing aggression towards the animals. One programme included only offenders with severe psychiatric diseases. AAI goals differed widely: learning to show affection, breaking down psychological barriers, facilitating social contact, developing working skills, developing a daily work rhythm, facilitating social skills, etc. All programmes focussed solely on the prisoners and none kept records on the animals in a systematic way. Six (25%) facilities report occasional negative effects in an anecdotal way: management problems, negligence with feeding procedures, breeding without permission of the guards, bite accidents involving rabbits and dogs, stress signals, hiding and running away from prisoners, etc. These results constitute sources of concern and warrant further investigation.

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Keywords: animal-assisted intervention, animal-assisted therapy, prison, welfare

Dog owners' opinions on dog breed aggression

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Introduction

Lay people's opinion had a key role in promoting laws restricting the ownership of particular dog breeds. This approach was criticised as lacking scientific soundness. This study explored the opinion of a sample of Italian dog-owners in order to highlight possible pre-conceptions about specific breeds.

Method

409 dog-owners (229 males, 180 females), owning a dog belonging to Argentine Dogo (Dogo), Yorkshire Terrier (York), German Shepherd (GSs), Rottweiler (Rott), Labrador Retriever (Lab) or English Setter (Setter), were recruited through dog breed associations and asked to score people-directed aggression shown by each breed on a 5-point Lickert scale (1 = no aggression; 5 = high aggression).

Participants also indicated their knowledge of each breed: Owner (owning a dog belonging to one of the six afore-mentioned breeds), Non-owner (owning a dog belonging to one of the remaining five breeds). Non-owners were then divided into those with direct knowledge of the breed, Non-owner-yes and those without knowledge, Non-owner-no. Kruskal Wallis and Mann Whitney tests explored the differences among participants.

Results

Dogo was the least known breed (22.2% participants) and German Shepherd the most (67.4%). Except for Setters Owner category people scored their dogs as significantly less aggressive than Non owners.

Non-owner-no individuals scored Setters significantly more aggressive than the people knowing the breed. According to the classification by Owners the most aggressive breed was the German Shepherd (score median 2.1), followed by the Dogo (2.1), Rottweiler (2.0), Yorkshire Terrier (1.9), Setter (1.4) and Labrador (1.1), while the order as noted by Non-owner category individuals was Rottweiler (3.4), Dogo (3.2), German Shepherds (2.9), Yorkshire Terriers (2.8), Setters (1.5) and Labradors (1.4).

Conclusions

Non-owners' answers may depend on cultural stereotypes and mass media information. Owners are less likely to hold preconceptions, but might promote a good image of their breed. Rottweilers and Dogos were identified as potentially dangerous breeds in Italian legislation, which may possibly explain the Non-owners' classification to some degree.

In a study where these breeds were behaviourally tested a different order for people-directed aggression was recorded with the list from most aggressive to least aggressive being as follows: Rottweiler, German Shepherd Yorkshire Terrier, Dogo Argentina, Labrador and Setter (Diverio and Tami (in press)). This seems to support the existence of negative preconceptions of the Dogo.

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Hemispheric asymmetry of the cerebral blood flow in a Beauceron dog with pathological anxiety

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Introduction

Hemispheric asymmetry of the regional cerebral blood flow (rCBF) has never been described in dogs. Such left-right imbalance in rCBF has been repeatedly reported in humans with different behavioural disorders, mainly major depressive disorder and panic disorder. These individuals show respectively a left hypofrontality and a right hyperfrontality. There is evidence for a major implication of the right hemisphere in producing negative emotions in humans.

Case report

This case report describes a 2 year old male castrated Beauceron dog of 55 kg bodyweight, diagnosed by a diplomate of the European College of Veterinary Behavioural Medicine – Companion Animals, as a dog with pathological anxiety. The dog showed severe anxiety symptoms (hiding, flight, excessive panting and salivating, restlessness) in social, non-social, and new situations. The age of onset of symptoms was 6 months. Increased symptom frequency and severity was

noticed, even in situations that had not previously been eliciting anxiety symptoms.

Two consecutive Single Photon Emission Computed Tomography (SPECT) scans were performed with an interval of 12 months. Both scans were performed using a triple head gamma-camera. Acquisitions started 40 minutes after an intravenous injection of the tracer ^{99m}Tc -ECD (Neurolite®), reflecting the cerebral blood flow at time of injection. The dog was not receiving any drugs previous to the first scan.

Images of the first scan revealed a clear left-right imbalance of the rCBF, with a lower left hemispheric perfusion (all cortical areas) compared to the right hemispheric blood flow. After 12 months of treatment with fluoxetine (60mg SID for the first 3.5 months, then 40mg SID until now) on which the dog responded very well (anxiety decreased in all situations which had previously been associated with severe symptoms), the second ^{99m}Tc -ECD scan was performed. This scan revealed a normalisation of the brain blood flow, without any rCBF asymmetry. The behavioural improvement combined with rCBF normalisation after pharmacotherapy of this canine anxiety case is in line with human results.

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Keywords: Cerebral blood flow; Single Photon Emission Computed Tomography; Anxiety; Brain imaging

Qualitative analysis of dog behaviour modification training sessions

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Introduction

Canine aggression is one of the most common behavioural problems and can be affected by a combination of genetics, environment (Blackwell *et al*, 2008) and phenotype (age, breed, gender or neutering status) (Borchelt, 1983; Lund *et al*, 1995; Jagoe & Serpell, 1996; Stafford, 2007). In order to try and reduce the tendency for aggression, behaviourists have different tools such as changes in environment and education systems, castration, drugs, behavioural modification (Sherman *et al*, 1996; Hsu & Serpell, 2003). The aim of the study is to evaluate the efficacy of the behaviour modification training sessions carried out for a group of aggressive dogs at the Animal Behaviour Service of the Veterinary Teaching Hospital of the Autonomous University of Barcelona.

Material and methods

Animals: We selected 40 dogs presented with a history of aggression towards people and other dogs and treated by behavioural modification between April and October 2008. The outcome of 368 training sessions carried out on those dogs was analysed. Owners evaluated their pets during the treatment and the specialist evaluated all dogs before and after the treatment.

Data and collection: Five questionnaire models were filled out. Three questionnaires were filled out by the owner: one before starting the behaviour modification, one during the second and the following sessions, the last one at the end of the treatment. Evaluations by the behaviourist were performed during the behavioural consultation and later in each behaviour modification class. This allowed the specialist to assess the evolution of the animal's problem throughout all the sessions, the score of the dogs performing the exercises, and finally the opinion of the owner about the problem, as well as the reasons for stopping the sessions.

Statistical analysis: Microsoft Office Excel 2003 was used for data analysis, including descriptive and inferential statistical (based on square the Chi-square tests).

Results

Within the study population, the majority of dogs fit the following profile: adult (> 25 months of age) purebred male, with aggression towards other dogs as the main reason for treatment.

The majority of the owners agreed not to set a time limit for seeing results during the therapy, indicating that they would wait as long as necessary. However, we noticed that owners stopped attending sessions in spite of the dog not being totally rehabilitated (Figure 1). This is probably due to the fact that many owners are satisfied with even partial improvement in terms of their dog's behaviour and they did not feel the need to continue.

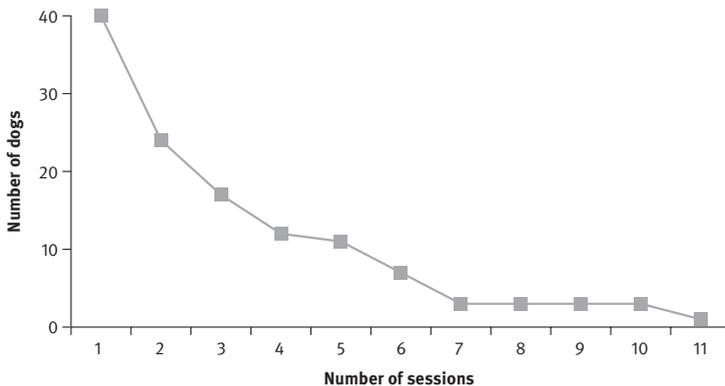


Figure 1. Owners accomplish behavioural modification sessions during the first weeks, but by the 3rd week the frequency of attendance decreases. Only 10% stay in treatment until the dog has improved.

Thirty seven percent of the owners considered the problem totally solved and stopped attending the sessions. However 63% suspend or change the treatment

before resolution (Figure 2). Several owners noticed major differences in their dog's behaviour depending on whether the exercises were performed in the sessions rather than at home. So they requested for sessions at home in order to adapt the exercises to their surroundings.

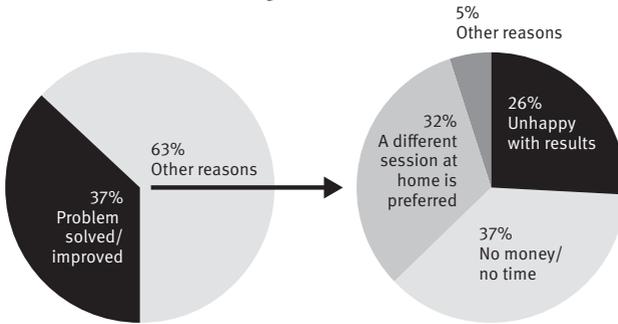


Figure 2. Reasons why the owner stopped attending the behavioural sessions (left) and more detailed explanations (right).

It was observed that the dog performed better and obtained better results when the owner understood the exercise and did it correctly (Figure 3).

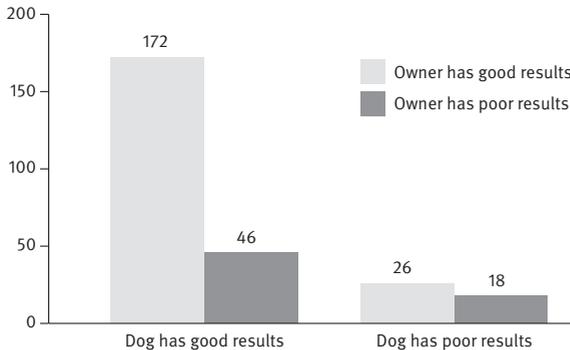


Figure 3. Relation between the marks obtained by the owner and the dog, expressed in numbers indicating the frequency of exercises performed. When the owner understood the exercise and did it correctly, the majority of times also the dog did the exercise well. When the dog had poor results, it was observed that there was a connection with his owner also performing the exercise poorly ($p = 0.053$).

It was noted that if the owner was involved with the treatment, and worked daily with his pet, the dog had better marks than if the owner worked just sporadically with the dog (Figure 4).

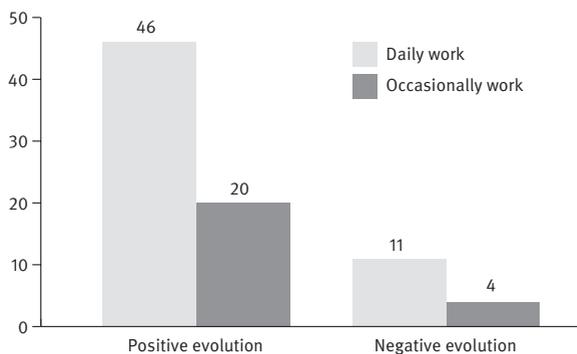


Figure 4. Evolution and efficacy of the behavioural modification training sessions are related with the frequency of the owner's work ($p = 0.05$).

On the other hand, dogs that were aggressive towards other dogs needed more sessions than dogs that were aggressive towards people, and in both cases by the fifth session 85% reached the goals raised in the sessions.

Females obtained better results than males, probably because the majority of males presented aggression towards other dogs, and females towards people, which had better evolution (Figure 5).

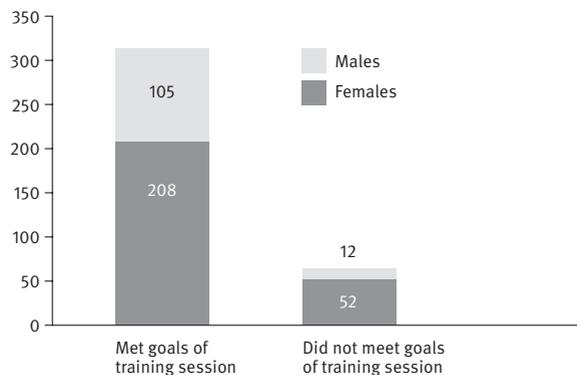


Figure 5. Number of exercises done by males and females, with the marks they obtained. Females had better marks. Nearly the 80% the females used to meet goals of the training sessions, while male dogs had lower marks ($p < 0,05$).

Conclusions

According to our results, female dogs respond better than intact males to the training sessions. Dogs with aggression towards people improve more and faster through behavioural modification than dogs with aggression towards other dogs.

Individual sessions seem to be more effective than group sessions, although more expensive. During the ethological practice preceding behaviour modification sessions it would therefore be useful to inform the owner about the percentages of goals achieved in each session (85%), the importance of the owner's daily work with the dog and the prognosis of the animal's evolution (relating to the sex and the diagnosed problem).

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Keywords: Dog aggression, training, behaviour modification

Relationship between dog owner behaviour and dog attachment security in the strange situation

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Introduction

The aim of this study was to determine if owner behaviour predicted dog attachment security in Ainsworth et al. (1978) Strange Situation Test.

Method

Fifty-two owners/dogs participated in 8 x 3 minute interaction episodes: dog/owner; dog/owner/stranger; dog/stranger; dog alone; and reunions dog/owner. Data was collected through continuous time sampling of owner behaviour (talking to dog, touching dog, responding to attention seeking and command giving) and dog attachment behaviour (secure base effects, proximity seeking, comfort seeking, distress, and latency to play/explore).

Results

Four dogs clusters (*k*-means Cluster Analysis) resulted:

- Secure ($n=16$) (moderate greeting duration, low distress behaviours when alone, moderate comfort seeking from owner, ability to rebound quickly to play and explore);
- Insecure/Anxious ($n=10$) (high activity, high distress, low comfort seeking);

- Insecure/Passive ($n=16$) (high levels of distress, high comfort seeking, low activity levels), and
- Avoidant ($n=9$) (low responsiveness to owners, low greeting duration, low distress and low comfort seeking).

Between group ANOVA with Bonferroni corrections revealed significant differences for owner talk ($F_{(3, 47)}=3.64, p=.02$) and owner touch ($F_{(3, 47)}=5.16, p=.01$). Owners of Avoidant dogs ($M=16.88, SD=4.55$) talked to them significantly more than dogs in the Insecure/Passive ($M=11.70, SD=2.67$) or Anxious clusters ($M=13.26, SD=3.19$), but petted them significantly less ($M=11.35, SD=6.03$). Passive dogs were petted significantly more ($M=17.73, SD=3.59$).

Conclusions

The results suggest that attachment insecurity is associated with low levels of owner talk and high levels of touch, and a weak owner/dog bond characterised by dog avoidance, by high owner talk and low owner touch. Attachment security is characterised by moderate owner talk and low touch. These results could be used to moderate owner behaviour during stressful events such as veterinary examination in order to reduce dog insecurity.

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Keywords: dog attachment; Strange Situation test; human/dog bond.

Formal training and the development of aggression in dogs

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Introduction

Canine aggression is a concern on the grounds of both public safety and animal welfare (Bennett and Rohlf, 2007). A previous study by Ingram (2008) suggested that the development of adult dog aggression is associated with attendance at puppy training classes. The aim of this study was to explore potential risk factors related to the experience of dogs at puppy classes for the development of adult dog aggression.

Method

Experiences of dogs in training classes were recorded retrospectively onto a closed responses questionnaire from owner recollection during a behavioural consultation. The sample consisted of N = 47 adult dogs referred to a veterinary behaviour practice in NW England for aggression problems and a control population of N = 22 dogs referred for non-aggression problems. Chi squared analyses were used to determine associations between features of the training that relate to potential risk factors identified in the research literature or from clinical experience, and the targets of aggression, motivators for aggression, and contexts of aggression (or none).

Results

Dogs that started training at less than 16 weeks were statistically more likely to develop human-directed aggression. Where dogs in training were all off-lead at the same time there was an association with the development of offensive aggression; and the use of punishment in training classes was associated with the development of offensive and play-related aggression.

Conclusions

These data suggest that key features of dog training classes may predispose dogs to problems of aggression in adulthood and these features should be avoided in the organisation and running of classes. Further investigation is needed to determine the causation behind these risk factors so that advice on avoiding them can be given to owners and dog trainers to reduce the prevalence of dog aggression.

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Keywords: dog; training, aggression

