

ESVCE



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



PROCEEDINGS OF THE

2010 European Veterinary Behaviour Meeting

Hamburg, Germany

24–26 September 2010

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2010

**European
Veterinary Behaviour
Meeting**

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INCORPORATING

16th Annual Congress of the European
Society of Veterinary Clinical Ethology (ESVCE)

7th Annual Congress of the European
College of Veterinary Behavioural Medicine –
Companion Animals (ECVBM-CA)

Annual Conference of the German Society
of Veterinary Behavioural Medicine and
Therapy (GTVMT)

This collection of papers was first presented at the 2010 European Veterinary Behaviour Meeting comprising the 16th Annual Congress of The European Society of Veterinary Clinical Ethology (ESVCE), the 7th Annual Congress of The European College of Veterinary Behavioural Medicine – Companion Animals (ECVBM-CA) and the Annual Conference of the German Society of Veterinary Behavioural Medicine and Therapy (GTVMT). The meeting took place in Hamburg, Germany from 24–26 September 2010 and was hosted by the GTVMT 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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Contents

6 Prefaces

9 Spoken papers

9 Friday 24 September

71 Saturday 25 September

117 Sunday 26 September

157 Poster presentations

Prefaces

Message from the President of ESVCE

It is a great pleasure to welcome you to the 16th Annual congress of the European Society of Veterinary Clinical Ethology, which is being held in Hamburg, Germany.

This year's event will be held in association with the 7th congress of the European College of Veterinary Behavioural Medicine (ECVBM-CA) and the annual conference of the German Society of Behavioural Medicine (GTVMT).

For this 2010 Hamburg meeting, our boards have attempted to address the feedback from behavioural practitioners with a programme that keeps the balance between research, case reports, and reflections from veterinary behavioural practice. In addition, on Sunday, three excellent speakers, Anne McBride from UK, and Manuela Gernert and Hagen Gasse from Germany, have been invited by GTVMT, adding to the calibre of the event.

Staging a conference with three organisations represents a challenging job in terms of language, culture and communication. For this year's event, the organising committee of the German Behavioural group (GTVMT) has taken on the majority of the work in putting this event together. Therefore I would like to thank the GTVMT team for their hard work and give special thanks to Hildegard Jung, Stefanie Ott and Barbara Schöning without whom none of this would have been realised.

I equally would like to thank the members of the ESVCE and ECVBM-CA boards who volunteered to participate in the scientific committee, and take on other tasks relating to the conference. Finally, I want to thank Sarah Heath, our past President, for her input and guidance as well as for her enormous level of selfless support and commitment to the field.

Finally I would like to express my thanks to the companies who kindly sponsored this event. Without their sponsorship events like this would not be possible. I would like to encourage you to visit their stands in the commercial exhibition during the congress.

On behalf of the ESVCE board, I sincerely hope that you enjoy this congress and I would like to thank you for the interest in the field of behavioural medicine and your support of ESVCE.

Tiny De Keuster

ESVCE President

Message from the President of ECVBM-CA

On behalf of the ECVBM-CA, it is a great pleasure to welcome you to Hamburg for this scientific congress. Year after year, the number of people dedicating themselves to applied ethology and behavioural medicine grows significantly. Thanks to this evolution, the research programmes and thus, submitted papers, increase in number and quality.

Research is crucial to improve our understanding of our patients. Companion species, in common with all animals, can often appear so familiar to us, that we forget that the extent of our knowledge of them is still very limited. Being respectful to animals and paying attention to their welfare begins by trying to understand their specific needs, rather than concerning ourselves with the things that we would like them to need. Thanks to the important work carried out by all our colleagues across Europe and the rest of the world, we begin to know more and we certainly have a more reasonable evaluation of the animals' perceptions and understanding of the world. Each annual congress provides new information and raises new questions and this is what draws delegates from around the world to come and share in these events.

For this year's promising event, we are delighted to be with our German colleagues in the lovely city of Hamburg and we want to thank them for the wonderful organisation of the congress by the local committee from the GTVMT.

Let's enjoy this 2010 annual congress!

Patrick Pageat

ECVBM-CA President

Message from the President of GTVMT

In 1995 the second ESVCE Conference was held in Braunschweig, Germany. It was a one day meeting as a satellite to a bigger congress, and I cannot recollect how many delegates attended. Veterinary behavioural medicine was in its infancy in Germany and the German Society of Veterinary Behavioural Therapy (GTVT) had been founded just three years before. Since then veterinary behavioural medicine and clinical ethology has seen a tremendous upswing. We recently changed our name to the German Society of Behavioural Medicine and Therapy (GTVMT) and have increased our membership tenfold in the last fifteen years while clinical ethologists have become widely recognised as experts.

For GTVMT its a pleasure to have our annual congress together with the 16th Congress of the European Society of Veterinary Clinical Ethology (ESVCE) and the 7th Congress of European College of Veterinary Behavioural Medicine – Companion Animals (ECVBM-CA) – giving an overview about the state of the art in the field. Thinking about Braunschweig is like looking back in time; looking at this year's programme is a promise for the future.

Organising such an event is not easy and I would like to thank all those who have helped, either through practical work or through emotional back-up. I especially thank our sponsors, as without money such a congress would not be possible.

My thanks go to all board members from GTVMT, ESVCE and ECVBM-CA for their dedicated work and the friendly and humorous atmosphere.

We are delighted that many delegates will come to Hamburg from many different countries in order to participate in learning and discussions as well as the meeting of old friends and the finding of new ones. So finally I would like to thank you as delegate: with your participation you make this meeting into a memorable event.

I wish you an interesting and pleasant stay in Hamburg and hope you will enjoy the congress.

Barbara Schöning

GTVMT President

Papers

Friday 24 September

- 11 Risk factors for the occurrence of human directed aggression in the domestic dog
E. BLACKWELL
- 13 Development of a standardised behaviour test to evaluate the influence of dog-owner relationship and dog-owner attachment on the behaviour of the dog – assessment of inter-rater reliability
S. OTT
- 22 Is it possible to predict adult canine behaviour from behaviour as puppies?
M. BAKKEN
- 28 Randomised placebo-controlled trial of behaviour therapy in the treatment of feline idiopathic cystitis
A. SEAWRIGHT
- 30 L-Tryptophan supplementation and its effect on multi-housed cats and working dogs
G. DA GRAÇA PEREIRA
- 36 Medium chain triglycerides help old dogs learn new tricks!
J. CLINE
- 43 Preliminary findings on the effect of tryptophan-supplemented diet and physical activity on blood serotonin concentration in a population of non aggressive dogs
V. M. MARIOTTI
- 46 ‘Stress’ as a factor in inflammatory bowel disease: pilot study to investigate whether affected dogs differ from unaffected controls in their response to novel stimuli
F. MONTE
- 50 Behavioural reactions of dogs in common human-dog interactions: Is being petted always a pleasure?
J. C. HOESSLER
- 55 Dog appeal to people: does it depend on dog features?
C. MARITI

- 61 Training dogs in Schutzhund sports and in protection work in police dog training – a new approach based on positive reinforcement
E. SCHALKE
- 63 Predictive model for dogs with fears and phobias
C. CORRIDAN
- 66 Case report: The use of life-sized video projected images during the treatment of fear related aggression to unfamiliar people
J. PLUIJMAKERS

Risk factors for the occurrence of human directed aggression in the domestic dog

**EMILY BLACKWELL, BETHANY LOFTUS, GEMMA RICHARDS,
FEDERICA MONTE, CHRISTINE BASSE & RACHEL CASEY**

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Introduction

Aggression towards people is an important public health concern (Gilchrist et al. 2008), as well as a welfare issue for dogs. The motivation for dogs to show aggression is widely misunderstood by the dog owning public and media (De Keuster and Jung 2009), with people often ascribing such behaviour to ‘dominant’ characteristics (Bradshaw et al. 2009) or lack of obedience training (Reisner et al. 2007). In this paper a population of dogs was recruited from the general dog owning population to compare the characteristics of owners, particularly the types of training techniques used, and dogs where human-directed aggression is reported. Questionnaires included dog and owner characteristics, information about individual training methods or devices used by owners and formal training classes attended.

Materials and methods

16,484 questionnaires were distributed direct to dog owners, of which 3897 were returned. 86% respondents were female. The dogs were 48% males and 51% neutered. Using UK Kennel Club categories 185 (5%) were toys, 438 (11%) terriers, 205 (5%) utility, 1176 (30%) gundogs, 253 (7%) working and 725 (19%) pastoral breeds. 679 (17%) were cross breeds. Ages ranged from 1–204 months (mean 48). Fifty nine dogs (1.5%) were reported to show aggression to family members, 189 (5%) showed aggression to unfamiliar people in the house, and 132 (3%) showed

aggression to unfamiliar people when out for walks. Kappa analyses suggested that dogs showing aggression in these three contexts were largely independent. Characteristics of dogs showing each behaviour, were therefore separately compared with dogs showing no aggression to people.

Results

Backward stepwise logistic regression models were constructed for each comparison. For aggression to familiar people the final model ($\chi^2=66.843$, $df=17$, $p<0.001$) included owner age ($p<0.005$), dog neuter status*gender ($p<0.05$), breed type ($p<0.05$), dog age ($p<0.05$), attendance at obedience ($p<0.05$) or agility ($p<0.05$) classes, the use of physical punishment ($p<0.01$), electronic bark collars ($p<0.05$) and water pistols ($p<0.05$) in training. For aggression to unfamiliar people in the house the final model ($\chi^2=120.406$, $df=18$, $p<0.001$) included owners previous experience ($p<0.05$), dog neuter status*gender ($p<0.05$), breed type ($p<0.001$), attendance at puppy class ($p=0.001$), owners shutting dogs away ($p<0.001$), using physical punishment ($p=0.001$), choke chains ($p<0.05$) or water pistols ($p<0.005$) in training.

Conclusions

These data shed further light on training techniques, owner and dog related characteristics which may be associated with the occurrence of human directed aggression in dogs. They provide additional evidence to current literature (e.g. Hsu and Sun 2010) suggesting a relationship between the use of punishment based training techniques and aggressive behaviour in domestic dogs.

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Keywords: Dog behaviour; Aggression; Dog training

Development of a standardised behaviour test to evaluate the influence of dog-owner relationship and dog-owner attachment on the behaviour of the dog – assessment of inter-rater reliability

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Introduction

Besides goats and sheep, dogs are among the first domesticated species (Jensen 2009). More than 400 different dog breeds now exist worldwide, bred by humans for very different tasks, e.g. as herding, livestock guarding, or hunting dogs (Räber 2001). Furthermore, so called companion dogs fulfil numerous, albeit often less apparent functions (Veevers 1985). The impact dogs, and a range of other “companion” species, may have on humans, be they healthy or ill people – physically or mentally, young or old people, individuals or social groups, has already been demonstrated in several studies (Friedmann and Thomas 1985; Garrity and Stallones 1998). Conversely, humans may influence a dog’s behaviour, either directly by their own behaviour towards the dog or indirectly by means of breeding, rearing, keeping, and training (Scott and Fuller 1965; Jagoe 1994; Appleby et al. 2002;

Sterry et al. 2005).

Despite the existing literature on the mutual influence of humans and dogs, there are still numerous unanswered questions concerning this topic. The aim of a larger project was therefore to investigate the influence of the dog-owner relationship and the dog-owner attachment on the behaviour of the dog. In line with this aim, the behaviour of dogs can be examined using different methods: in addition to behaviour tests conducted under standardised conditions, or observations in non-standardised environments, an assessment of dogs may be carried out using questionnaires filled in by owners or persons who know the dog well.

In the study presented here, a specific behaviour test to evaluate the influence of dog-owner relationship and dog-owner attachment was developed along with an ethogram. Behaviour tests need to fulfil certain requirements, so called “criteria of good quality”, which every behaviour test should meet to a particular degree and which usually involves objectivity, reliability, and validity (Atkinson et al. 2001; Lienert 1961; Rost 2004). Previous reviews into the field of behavioural testing in dogs found a lack of standardisation and emphasised the need to fulfil these test quality requirements (Jones and Gosling 2005; Diederich and Giffroy 2006; Taylor and Mills 2006). Therefore, the study presented here aimed at evaluating the behaviour test regarding its inter-rater reliability.

Materials and methods

Sixty-two dog-owner teams took part in this study. All dogs were privately kept, purebred German Shepherds, male and female, aged 1 year to 8 years.

The behaviour test consisted of 25 situations in which the dogs were confronted with different animate (only humans, no other animals) as well as inanimate (objects and noises) stimuli. Apart from one situation (“person in wheelchair”), the behaviour test comprised situations adopted from already published behaviour tests (Goddard and Beilharz 1984, 1986; Nmeff 2000; Svartberg 2002, 2005, 2006; Svartberg and Forkman 2002; Svartberg et al. 2005).

The test situations applied and the order of testing were as follows:

1. “social contact”
2. “play 1a”
3. “play 1b”
4. “person with long coat and hat”
5. “metallic noise 1”
6. “friendly contact”
7. “ghosts”
8. “toy car”
9. “toy horse”
10. “stranger strokes dog”

11. "chase"
12. "stumbling"
13. "plastic bag"
14. "drunk person"
15. "distance play 2"
16. "metallic noise 2"
17. "person in wheelchair"
18. "distance play 1"
19. "clapping hands/screaming"
20. "staring at dog"
21. "owner plays with dog"
22. "abrupt rise"
23. "shouting at dog"
24. "sudden appearance"
25. "play 2"

For all dogs, behavioural testing was conducted in the same place, a wooded area (200 m x 200 m) which was fenced and therefore inaccessible to the public, and under maximally similar conditions (e.g., order of situations, kind of stimuli, distance between dogs and stimuli).

In each situation, a given dog's behaviour was classified into one of 11 behavioural categories based on the work of Zimen (1971), Feddersen-Petersen and Ohl (1995), and Feddersen-Petersen (2004, 2009).

These behavioural categories were as follows:

- social approach behaviour (towards a test person)
- approach behaviour (towards a test object)
- aggressive behaviour
- flight behaviour
- submissive behaviour (passive submission)
- play behaviour
- chase behaviour
- imposing behaviour
- attentive behaviour
- neutral behaviour
- non-focused state of arousal

Each dog's behaviour was assessed and noted using a standardised recording sheet directly after each situation. The observations for all 62 participating dogs were carried out by the same observer ("S"), and either one of two additional observers ("M" and "A") assessed another 10 and 13 dogs, respectively, simultaneously with "S" but independently, i.e. without discussing their judgement.

Data were analysed using SPSS 15.0. Inter-rater reliability was assessed by

calculating percentage of agreement and kappa coefficient (Cohen's κ) between observer pairs "S and A" and "S and M" for each situation.

Results

For observer pair "S" and "M", percentage of agreement ranged from a minimum of 22.2% to a maximum of 100.0% (\bar{x} = 63.04% \pm 3.72% SD). For Cohen's κ , values ranging from 0.000 to 0.825 (\bar{x} = 0.303 \pm 0.055 SD) were found.

The following levels of agreement (nomenclature according to Thrusfield (1995)) were calculated for these two observers:

- **slight agreement** in 11 situations: "social contact" (77.8%/0.000), "play 1a" (40.0%/0.000), "play 1b" (50.0%/0.000), "friendly contact" (66.7%/0.000), "toy car" (75.0%/0.000), "toy horse" (41.7%/0.176), "stranger strokes dog" (22.2%/0.087), "chase" (41.7%/0.034), "drunk person" (58.3%/0.118), "distance play 2" (58.3%/0.130), "play 2" (37.5%/0.000);
- **fair agreement** in 3 situations: "person with long coat and hat" (46.2%/0.235), "metallic noise 1" (45.5%/0.258), "abrupt rise" (63.6%/0.353);
- **moderate agreement** in 7 situations: "ghosts" (66.7%/0.560), "plastic bag" (83.3%/0.571), "metallic noise 2" (72.7%/0.566), "person in wheelchair" (66.7%/0.467), "clapping hands/screaming" (75.0%/0.438), "staring at dog" (72.7%/0.593), "shouting at dog" (70.0%/0.531);
- **substantial agreement** in 2 situations: "distance play 1" (72.7%/0.649), "sudden appearance" (81.8%/0.686)
- **almost perfect agreement** in 1 situation: "stumbling" (90.0%/0.825).

For one situation, Cohen's κ could not be calculated ("owner plays with dog").

For observer pair "S" and "A", percentage of agreement ranged from a minimum of 28.6% to a maximum of 100.0% (\bar{x} = 78.26% \pm 3.75% SD). For Cohen's κ , values ranging from 0.000 to 1.000 (\bar{x} = 0.610 \pm 0.055 SD) were found.

The following levels of agreement were calculated for these two observers:

- **slight agreement** in 1 situation: "friendly contact" (88.9%/0.000);
- **fair agreement** in 2 situations: "stranger strokes dog" (28.6%/0.222), "chase" (80.0%/0.375);
- **moderate agreement** in 10 situations: "person with long coat and hat" (57.1%/0.500), "metallic noise 1" (62.5%/0.415), "ghosts" (55.6%/0.455), "stumbling" (70.0%/0.444), "drunk person" (66.7%/0.550), "metallic noise 2" (70.0%/0.577), "distance play 1" (71.4%/0.481), "clapping hands/screaming" (70.0%/0.583), "staring at dog" (77.8%/0.526), "abrupt rise" (66.7%/0.565);

- **substantial agreement** in 5 situations: “toy horse” (88.9%/0.769), “plastic bag” (90.0%/0.737), “distance play 2” (80.0%/0.722), “shouting at dog” (90.0%/0.783), “sudden appearance” (85.7%/0.720);
- **almost perfect agreement** in 4 situations: “social contact” (100.0%/1.000), “toy car” (100.0%/1.000), “person in wheelchair” (100.0%/1.000), “play 2” (100.0%/1.000).

For three situations, Cohen’s κ could not be calculated (“play 1a”, “play 1b”, “owner plays with dog”).

Discussion

As the results show, the two pairs of observers (“S” and “M” and “S” and “A”) varied in the agreement of their judgements. This does not only apply to their level of agreement averaged over all 25 test situations. Moreover, this is also true for each single situation and even leads to a very different order of test situations if arranging these according to the degree of agreement reached. For some situations, a look at the two pairs of observers shows similarities in the level of agreement, e.g. for the situations “social contact” or “stranger strokes dog”. For other situations, however, greater discrepancies between the pairs of observers were detected, e.g. for many “play” – and “distance play” – situations.

As all dogs were assessed by the two observers at the same time, the observed disagreement cannot result from differences in the dogs’ behaviour. Rather, two other causes come into consideration for this result. On the one hand it is certainly possible that due to the local conditions, such as the relatively thick forest at times, or the implementation of the test situations and thus the position of the observer in relation to dog, dog-owner and test person, one of the observers may have missed details in the body language of a dog. This may have led to differing judgments of a given dog’s behaviour despite the instructions of the behaviour test to always assess the “display” (Feddersen-Petersen and Ohl 1995; Feddersen-Petersen 2004, 2009) of a dog. On the other hand it is very likely that the experience of the experimenters in observing and evaluating canine behaviour had a major influence. All observers in this study (“S”, “A”, and “M”) were veterinarians who, at the beginning of this study, had been qualified for between two weeks and six months. All three observers had obtained their knowledge regarding canine body language before, during, and after their veterinary education in different ways, e.g. by means of specialist literature, continuing education courses, work experience, or training their own and other people’s dogs.

As no common training of the three observers took place, neither before nor during the testing period, they had to base their assessments on their independently gained knowledge. However, the degree to which the implementation of the different test situations or the level of theoretical knowledge and practical

experience of the observers played a role in causing discrepancies in the behavioural assessments of the dogs cannot be confirmed with certainty. Additionally, observers "S" and "M" differed greater as regards their cultural background than did observers "S" and "A", which may also have had an influence on the judgments of the observers, thus leading to a greater or lesser agreement.

Scott and Charles (1954) calculated the inter-rater reliability and found a reliability coefficient of 0.96 for "activity" between observer and experimenter. De Palma et al (2005) used Kendall's coefficient of concordance to show the agreement between each of two observers and found values of 0.85 for observer pair "CDP" and "EB", 0.89 for observer pair "EB" and "EV", and 0.82 for observer pair "CDP" and "EV"; however, the authors do not clarify which behaviours and/or test situations these values refer to. Concerning the inter-rater reliability, Fallani et al. (2006) in their study report a result of „always more than 91% agreement between three observers; they do not, however, explain the exact procedure in which the agreement was analysed.

When asking 36 or 37 shelter staff to assess sheltered dogs in three situations, Diesel et al. (2008) calculated the inter-rater reliability and found kappa values between 0.04 and 0.56 for the situation "approach to kennel", kappa values ranging from 0.03 to 0.43 for the situation "general handling and grooming", and kappa values between 0.11 and 0.37 for the situation "reaction to meeting other dog".

A comparison between the results obtained in the study presented here and the values calculated by Diesel et al. (2008) is difficult to justify. Diesel et al. (2008) conducted a quantitative assessment of the intensity of the observed behaviours. In contrast in the study presented here the observers had to make a qualitative judgment. Furthermore, the behavioural categories used were very different ("fear-aggressive", "nervous", "indifferent", "well-behaved", "excitable", and "pushy-aggressive" in Diesel et al. (2008)).

In addition to the results of Diesel et al. (2008) presented above, the authors found an influence of experience in the canine field on the agreement between the observers. For seventeen observers with more than eight years of experience in evaluating dog behaviour, they obtained kappa values between 0.12 and 0.72 for the situation "approach to kennel", kappa values ranging from 0.06 to 0.54 for the situation "general handling and grooming", and kappa values between 0.15 and 0.47 for the situation "reaction to meeting other dog". Data on quantity and quality of knowledge which the observers had gained before behaviourally testing the dogs was not collected in detail in the present study. Different levels of theoretical and practical experience, however, may well have influenced the observations and thus the varying levels of agreement between each of the two pairs of observers.

The assessment of reliability and validity of behaviour tests in Hovawarts, Paroz et al. (2008) also found varying levels of agreement. When calculating Spearman's rank correlation coefficient, they obtained values between a minimum of 0.13 for "self-confidence" and a maximum of 0.98 for "calming down". For the calculated

kappa coefficients (Cohen's κ), they received values of 0.79 for "aggressiveness", and 0.71 for "pass/fail". The results, however, also depended on the season in which behavioural testing took place.

A comparison of the results found by Paroz et al. (2008) and the results of the study presented here is also difficult to justify as the observers in Paroz et al.'s (2008) since that study carried out a quantitative rating as opposed to a qualitative rating in the study being presented here. Furthermore, the behavioural "traits" in Paroz et al. (2008) – "self-confidence", "play with handler", "play with stranger", "temperament", "relationship with the handler", "excitability" and "calming down" – differed from the behavioural descriptions used in this study.

Conclusion

In this study, marked differences between the two pairs of observers were found for the inter-rater reliability in 25 test situations within a behaviour test for dogs. The degree to which the implementation of the behaviour test, the personal background of the observers, or their theoretical knowledge and practical experience played a significant role in causing these discrepancies is open to speculation.

The results, however, are enough to justify the use of videotape for future behaviour tests, in order to be able to make repeated assessments of dog behaviour, and to insist that assessments of a dog's behaviour need to be carried out by at least two assessors and the results from both should be in agreement.

The results of this study also point to the importance of critically questioning the knowledge and experience of those who are assessing dog behaviour and establishing education systems to train assessors before final assessments of a dog's behaviour are made. Both of these conclusions are particularly important in cases where the behavioural judgment has serious consequences for the dog, for example in cases involving so-called "dangerous dogs". In such cases outcomes can be as diverse as a lifelong order to be muzzled and/or on-leash, or an order for euthanasia.

In conclusion a standardised scoring system for behavioural testing in dogs is needed to make the extensive research in this field more comparable and to enable researchers to communicate using a common language.

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Keywords: dog, behaviour test, inter-rater reliability

Is it possible to predict adult canine behaviour from behaviour as puppies?

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Introduction

The incidence of serious behaviour problems in dogs can be high, 29% was reported by Lund (2001). In 16–25% of dogs that are euthanised the reason given for reaching that decision is the existence of behaviour problems (Mikkelsen and Lund, 1999). To reduce these percentages we could consider

- 1) improvements to the breeding process
- 2) improvements to the way in which puppies are socialised, social referenced and reared
- 3) improvements in the advice given to owners of puppies, especially those who have a recognisable risk factor for behaviour problems.

This study focuses on how we can evaluate puppies at an early age in order to advise owners about early intervention for behaviour problems. It has been the aim of many studies to analyse whether it is possible to predict adult behaviour from a test at puppy age, especially for working dogs like police dogs, guide dogs and military dogs (e.g. Slabbert and Odendal, 1999, Pfaffenberger et al., 1976). They have focused on the indicator of success as a working dog within their particular field. These tests have had predictive value, but have included several tests, repeated several times, and the predictability is better, the older the animal gets. The studies of puppy tests at 7–8 weeks for dogs that are to be brought up in a domestic family environment, have reported low predictabilities (Goddard and

Beilharz, 1982/1983, Willson et al, 1997, Beaudet et al, 1994). We hypothesise that a behaviour test at 12 weeks will be more predictive, as more puppies have reached the end of the socialisation period, and therefore have achieved a more stable emotional state.

The puppies' emotional state is important during their development, and the more positive emotions they experience, the better their welfare, and the less likely they are to develop behaviour problems later. Research in neuroscience has shown that emotions drive behaviour, and that 4 core emotions are based at different loci in the brain (Panksepp, 1998). Panksepp uses the terms *seeking*, *rage*, *panic* and *fear* for the 4 core emotions, and the positive emotions are gathered in the term "seeking". Rage, panic and fear are the emotions that animals are motivated to avoid.

The aim of this study was:

- 1) to investigate the stability of emotions and behaviours in dogs in the period of 12 weeks to 15 months of age, for the purpose of being able to advise puppy owners on fear and aggression
- 2) to investigate the predictable value of a 12 week test, for the purpose of determining whether a consultation at 12 weeks is useful for this first evaluation.

Materials and methods

We used a cohort design, and a convenience sample of 82 puppies (39 dogs and 43 bitches) and their owners were followed from 12 weeks to 15 months. They were recruited (March 2008–January 2009) via adverts at small animal clinics, dog magazines and websites within the Østfold, Buskerud, Akershus and Oslo counties in Norway. The criteria for inclusion were that dogs were between 11 and 13 weeks of age, of any gender, breed or breed mixture. They should also have been in the new home for at least 1 week. There were no criteria for the owner.

The owners answered questions at 12 weeks, 16 weeks, 6 months, 9 months, 12 months, 15 months covering three topics; demographics, the owners' training methods and the dogs' behaviour (in total 396 questions). Apart from the first questionnaire, the dog owners answered via internet (MAMUT online survey standard, 2008). The dogs were behaviourally tested at 12 weeks of age and 15 months of age (using 16 elements, scoring emotions and behaviours). The 12 week tests were carried out at Jeløy Dyreklinikk, Østfold and the 15 month test was carried out at the University of Life Sciences, Ås, Akershus. The test personnel were 4 ethology students, 2 veterinary surgeons and a dog trainer; 1 male and 6 females. The dog used in the puppy test was a 10 year old male border terrier, and in the 15 months test one female and one male dog in each test (a Golden Retriever (3 years), Labrador Retriever (7 years), Danskvensk Gårdshund-

mixture (2 years), Poodle(5 years) or Labradoodle (2 years). In this paper the focus is on test elements and questionnaire replies relating to fear, friendliness and aggression towards strange dogs and people.

Behaviour test

The *seeking* emotions were defined as:

- 1) latency for contact with person
- 2) intensity of contact behaviour
- 3) the need for use of lures for contact
- 4) greeting behaviour towards other dog
- 5) pulling on the leash towards other dog
- 6) greeting/frustration/anticipatory vocalisations.

The *fear* emotions were defined as:

- 1) appearance of avoidance signals and withdrawal from the stimuli
- 2) appearance of stress signals (e.g. lick snout, turn head or blinking)
- 3) latency to investigation of the stimulus and subsequent normalisation of emotion.

The *rage* emotions were defined as:

- 1) appearance of aggressive signals of staring, barking, growling, snarling or biting towards the stimuli.

The test area for the 12 week tests was located at a veterinary clinic. The test personnel did not greet the puppy or owner until they entered the test area, so that greeting behaviour could be videoed and evaluated in a similar way for all participants.

Questionnaire

The questionnaire was filled in directly before the behaviour test. The owners were asked to rank their dog from 1–9 for friendliness, aggression and fear towards dogs and people. We focused on comparing the same behaviours at different ages. In order to minimise loss of contact for follow-up questionnaires an invitation to answer the questionnaire at each age interval was sent to the owners by Email and three reminders were sent at intervals of 6 days. If the owner had not replied in a given time, the researchers would phone to ask if they would like to reply or exit the study. The participants that did not reply to all questionnaires were excluded from analysis in this paper. Jump 7 (2007) and Excel (2007, Microsoft) were used for statistical analysis. To evaluate relationships between variables, Spearman's correlations were used.

Results

96 puppies and owners were initially recruited to the study. Four of these only completed the puppy test and questionnaires at 12 weeks ($N=2$) and 4 months ($N=2$). The other 10 participants who did not complete exited the study at a later stage, with the majority ceasing to participate at 12 or 15 months of age. The reasons given for a decision to exit the study included euthanasia of the dog ($N=1$), rehoming of the dog ($N=7$), shortage of time on the part of the owner ($N=7$) or inability to contact the owner via phone or Email ($N=2$). Three of the rehomed dogs continued the study with their new owners.

The 82 participants that had replied to all questionnaires are the subject of this paper. 75 of the participants completed the 15 month behaviour test. The dogs (39 dogs, 42 bitches) were from 37 breeds and 10 mixed breeds, ranging from miniature breeds to large breeds. The owners were preliminary families with children ($N=40$, 48.2%) and families without children ($N=29$, 34.0%). 12% of the owners were single. 88% of the puppies were bought from a breeder. The owners varied in experience, from owning their first dog (28.9%), second dog (21.7%), third dog (16.9%), fourth and fifth dog (15.6%) and 16.8% had owned 6 or more dogs. 47% of the puppies lived with other dogs.

Preliminary results from the questionnaires show stability throughout the development process in fear, aggression and friendliness towards people. The 12 week fear, aggression and friendliness scores correlated significantly with the same emotions at 15 months; fear (0.47 , $p < 0.001$), aggression (0.36 , $p < 0.001$) and friendliness (0.43 , $p < 0.001$). Fear towards dogs at 12 weeks did not significantly correlate with the 15 month age, while aggression (0.35 , $p < 0.01$) and friendliness (0.24 , $p < 0.05$) did. Fear towards dogs decreased during development, it was significantly higher at 4 months, compared to 9 (0.36 , $p < 0.001$) and 15 months (0.34 , $p < 0.01$). Results from the behaviour tests support these findings and indicate the same relationships; the 12 week fear, aggression and friendliness scores correlated significantly with the same emotions at 15 months; fear (0.52 , $p < 0.0001$), aggression (0.4 , $p < 0.001$) and friendliness (0.44 , $p < 0.0001$). Fear towards dogs at 12 weeks did not significantly correlate with the 15 month age, while aggression (0.36 , $p < 0.001$) and friendliness (0.24 , $p < 0.05$) did.

Conclusion

The study indicates that adult canine behaviour and emotions toward strangers can be predicted at 12 weeks of age but it has to be noted that these results are preliminary. Stability is observed, but the influence of the owners' training methods and the environment the dog is brought up in, are yet to be analysed. A possible explanation for the results is that the owners contribute to the stability in

this study. However we hypothesise that a more likely explanation is, that despite the owners trying to change fearful and aggressive behaviour, the behaviour is so stable that normal socialisation practices will not have any impact.

The stability of behaviour at 12 weeks has also been identified by Goddard and Beilharz (1986), and a possible explanation is that most puppies have reached the early juvenile stage by 12 weeks. Hence, there is less variation in stage of development by this age. The dogs' fear towards strange dogs was not stable throughout the period 12 weeks to 15 months and we found that the mean fear decreased during the period. A possible explanation is that the puppies had not met many strange dogs at 12 weeks of age, and that the novelty factor outweighed the social factor.

There are limitations when using owner assessment of behaviour and emotions; for example it is probable that owners are more likely than independent assessors to repeat their earlier assessment, thereby increasing the stability artificially. However, the test results found by the test personnel support the questionnaire findings and therefore the owner factor is an unlikely explanation. The use of owner evaluation is widely used in research, and found to be reliable by other researchers (Hsu and Serpell, 2003).

There is potential bias in the convenience recruitment of participants. It is likely that the study participants are more interested in behaviour than the general population. The sample also seems to be skewed towards experienced owners that own more than one dog. This will influence the ability to generalise the results.

The behaviour test and questionnaire used have not been validated. This study is a pilot study, and there is a plan to further assess the validity and reliability of a puppy test at 12 weeks.

A behaviour test should ideally be standardised and implemented consistently every time (UFAW, 1998). For instance the weather and clothing of test personnel will influence the test results. This level of consistency was not the case in this study. The behaviour test was planned to be crude, as the long term aim is to develop a test that can be used in practice, with its many confounders and environmental disturbances.

Since stability has been identified in this study despite the behaviour test's crudeness, we conclude that the implications for the field are that it is advisable to evaluate the puppy at an early age, and start an early behavioural modification programme based on the findings.

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Keywords: puppy test, predictability, stability, canine behaviour

Randomised placebo-controlled trial of behaviour therapy in the treatment of feline idiopathic cystitis

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Introduction

Previous research has focused on the impact of environmental events likely to cause stress or anxiety to cats as important 'flare factors' in the multi-factorial etiology of feline idiopathic cystitis (FIC) (Cameron et al., 2004; Westropp et al., 2006). A previous case control study (Seawright et al. 2009) identified a range of stress inducing environmental factors (e.g. movement blocked by other cats, moving house) as risks for feline idiopathic cystitis (FIC). In this study we investigated the effect of a programme of behavioural therapy on subsequent occurrence of disease in affected cats using a randomised placebo-controlled trial.

Materials, methods and results

42 cat owners were recruited from a referral veterinary hospital, but which were not specifically referred for behavioural advice. Cases were allocated randomly to intervention (n=21) or control groups (n=21) after a full behavioural history was taken to prevent bias. Owners in the intervention group were given a programme of advice to reduce the occurrence/impact of specific stressors on the cat. The control group were offered a behaviour consultation after the end of data collection. Both groups had a placebo tablet to be given to cats weekly. Owners completed a diary, including any signs of FIC and the occurrence of potentially stress inducing events.

Linear regression was used to model the effect of behaviour therapy on the number of days which owners reported signs of FIC in the subsequent six months. Co-variables in the model included risk factors identified in the case: control study (gender, illness, dogs in household, dry food only fed, body condition score, movement restriction, outside access, age category) and severity of FIC signs prior to treatment. Variables included in the multivariate model using a cut-off of $p < 0.2$ on univariate screening were movement restriction, age category, group (treatment/control), and previous severity of FIC. The final model included group (OR=10.87, lower 95%CI=2.145, upper 95%CI=55.05) and severity before treatment (OR=2.19, lower 95%CI=1.89, upper 95%CI=2.52).

Conclusion

These results suggest that behaviour therapy is an important element of the treatment of cats with FIC.

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Keywords: Cat behaviour; Idiopathic Cystitis; Behaviour therapy; Placebo-controlled trial

L-Tryptophan supplementation and its effect on multi-housed cats and working dogs

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Introduction

As a result of changing human lifestyle domestic animals need to adapt to conditions that differ significantly from their natural habitats. Companion animals are increasingly living in the restricted environment of houses and apartments with little or no access to the outside world. Access to an outside environment is a resource and when it is limited this can lead to physical and behavioural disturbances. When living in a confinement environment, the lack of physical space and the absence of activity and environment enrichment are the major causes of stress. This situation can be even more detrimental for cats living within a large population as part of a multi-cat environment and for dogs living in confinement with lack of socialisation opportunities.

The aim of the current study is to evaluate the effect of L-Tryptophan (L-Trp) on the general behaviour of cats and dogs, and also to assess the therapeutic efficacy of short-term supplementation of L-Trp on behavioural responses associated with anxiety and stress related disorders.

When excess L-Trp is supplied to the diet and not used for the purpose of protein synthesis, it may be used as a therapeutic supplement (Koopmans, 2005). L-Trp is the primary precursor of serotonin that has a sedative effect in cases involving pain sensitivity (Tenen, 1967) and aggressive behaviours (Cases et al, 1995; Edwards and Kravitz, 1997) and it is currently used therapeutically in domes-

tic animals. The rationale for the therapeutic use of L-Trp is based on the fact that alterations in the brain L-Trp levels can influence the synthesis of serotonin, a neurotransmitter in the central nervous system. Serotonin has an extremely important physiological function in the body, especially in controlling anxiety. Never the less, serotonin cannot penetrate the hemato-encephalic barrier if its levels are not sufficient. Thus medication with serotonin reuptake inhibitors (Mochizucki, 2004) or the supplementation of one of its precursors can be useful approaches for reducing anxiety symptoms (Koopmans et al, 2005, 2006; Li, 2006).

In order to improve animal welfare, the decrease or suppression of stress responses and associated stereotyped behaviours may be beneficial. As defined by Casey (2002) anxiety is the emotional response to a stimulus that *predicts* a potentially harmful or unpredictable environment. There is a common stress response resulting from either fear or anxiety. The stress response is an adaptive mechanism that enables an animal to react quickly to an event that changes its homeostatic status. Within the human context, the term “stress” is often used to describe an event or situation that causes chronic negative impact on behaviour, health and welfare (Casey, 2002). Manifestations of anxiety in companion animals include: increase or decrease in grooming behaviour, increase in agonistic behaviours, lower/higher food intake, increased vocalisation or increased marking behaviours (urine, faeces) (Heidenberger, 1997). Usually, these behaviours are associated with the animal’s attempts to adapt to the environment that they cannot control, or to a lack of stimuli. These signals commonly occur in animals with stress related behaviours and when properly measured, by a specific classification system, can lead to an evaluation of the animals’ welfare.

We hypothesized that the supplementation of L-Trp would be associated with less anxiety and stress behaviours and a reduction in excitability and reactivity.

Methodology

A total of 25 multi-housed cats (10 males and 15 females) and 30 working dogs from the National Guard housed in kennels (25 males and 5 females), were observed.

The fact that cats were living in family houses made it possible to evaluate the L-Trp efficacy in a clinical context, which closely mimics the context in which any resulting therapeutic product would be used as part of a treatment plan for companion animals with behavioural disorders. Dogs were selected based on their housing environment (individual kennel) and working procedures which were both judged to be potential contributors to stress related behaviours.

Animals were observed 5 days per week during a period of three and a half months (2 weeks for habituation, 4 weeks without supplementation and 8 weeks

with supplementation). Each data recording session involved 10 minutes of detailed observation per subject, by trained observers providing a continuous focal sample (Altmann, 1974). In order to control, as much as possible, external variables and variations subsequent to the circadian cycle of the species and individuals, the observations were done weekly, except weekends, and at the same time of the day. All data recording sessions strictly followed the same procedures in order to allow valid comparison at different stages. In order to avoid the observers being regarded as socially significant, interactions with the animals were minimised and even during the periods when data was not being actively collected the observers avoided interaction.

The following behaviours selected from the general classification system were observed, recorded and analysed:

1. Cats

Stereotypies, vocalisation, agonistic behaviour, exploration and sustaining behaviours. In addition a continuous recording was made of the cats so that all agonistic interactions and marking behaviours, namely house soiling and scratching could be observed

2. Dogs

Stereotypies, bark and stare behaviours.

This was a double blinded placebo controlled study, where animals were randomly assigned. Half of the group received dietary supplementation of L-Trp starting at the 7th week while the other half received placebo supplementation. The study coordinator was the only person with knowledge of the group compositions and neither the animal carers nor the observers were aware of which dogs were in which groups. Supplement and placebo containers were same in size, shape and colour only identifiable by the lettering A and B. L-Trp daily dose was 12.5 mg/kg administrated with daily meals.

All animals underwent a health check before starting the study and at the end: animals were tested for thyroid hormone levels (T₄ or T₃), kidney functions (urea and creatinine) and liver functions (ALT, AST, FA) and urinalysis and comprehensive haematology were also carried out. There were no significant findings in the results of these tests.

In order to assess the efficiency of the L-Trp, the frequency of behaviours listed above, was compared between different stages. Data were analyzed statistically by SPSS (Statistical Package for the Social Sciences), version 13,0 (Pallant, 2001). Non parametric tests were used. Wilcoxon Signed Rank Test was used to evaluate differences between stages. The comparison between placebo and L-Trp groups was carried out using Mann-Whitney U Test. The probability resulting from each test was considered statistically significant when $p < 0,05$.

Results

In cats, after L-Trp supplementation all the stereotypies (Wilcoxon Signed Ranks Test: $n=13$, $z=-3,062$, $p<0,01$), vocalisation (Wilcoxon Signed Ranks Test: $n=13$, $z=-1,544$, $p>0,05$), agonistic behaviour (Wilcoxon Signed Ranks Test: $n=12$, $z=-3,071$, $p<0,01$), exploration (Wilcoxon Signed Ranks Test: $n=13$, $z=-3,180$, $p<0,01$) and sustaining (Wilcoxon Signed Ranks Test: $n=13$, $z=-3,182$, $p<0,01$) behaviours decreased.

In the same way house soiling (Wilcoxon Signed Ranks Test: $n=25$, $z=-2,971$, $p<0,05$), scratching (Wilcoxon Signed Ranks Test: $n=25$, $z=-2,718$, $p<0,05$) and agonistic interactions inside the group significantly decreased (Wilcoxon Signed Ranks Test: $n=25$, $z=-2,936$, $p<0,05$).

A more detailed analysis of data showed that stress related behaviours including avoidance, threat, fighting, displacement activity, staring and vocalisation decreased significantly in animals supplemented with L-Trp. However, the decrease was only statistically significant for threat, displacement activity and stare.

In dogs, all the stereotypies (Wilcoxon Signed Ranks Test: $n=14$, $z=-0,943$, $p>0,05$), bark (Wilcoxon Signed Ranks Test: $n=14$, $z=-1,415$, $p>0,05$) and stare (Wilcoxon Signed Ranks Test: $n=14$, $z=-3,191$, $p<0,01$) behaviours decreased. A more detailed analysis of data showed that stress related behaviours such as sit-stare, stand-stare, stand-barking, lay down-stare, barking, circling, wall jumping, tail chasing, self-mutilation and circling-barking, highly decrease in animals supplemented with L-Trp. However, the decrease was only statistically significant for stand-stare, stand-bark, lay down-stare and for circling-barking.

A difference was identified during the supplementation stage between the placebo and L-Trp group, but that difference was not statistically significant. This can be explained by the fact that the studied species are social animals and the major part of the behavioural repertoire refers to social interactions, affiliative or agonistic, that involve at least two animals. Changes in the behaviour of some individuals can have an affect on the whole group and as a result individuals who were not on L-Trp dietary supplementation may show some behavioural changes in response to those individuals whose behaviour changed due to the supplementation. This conclusion also affects the general welfare of the group.

Some stress related behaviours only exhibited by a single animal would benefit from a different statistical approach as it would necessitate individual evaluation. Some statistical differences for these particular animals' behaviours may be falsely interpreted because they are diluted in the general group's analysis.

Discussion

These results suggest that L-Trp supplementation alters the frequency of stress related behaviours and decreases anxiety signals. Consequently L-Trp supplementation can be regarded as a very efficient tool to assist in the treatment of some behavioural disorders in cats and dogs as part of a behavioural therapy programme. As the L-Trp supplementation reduces some of the animal's anxiety signs, this suggests that it is also beneficial in improving their welfare.

These findings may help to improve knowledge about stress related disorders in companion animals and also provide a basis for further research in companion cats and dogs living in restricted environments. Further investigation into the use of classification systems, especially in studies of social behaviour in these animals as well as in clinical categorisation of the different forms of stress disorder behaviours, could be beneficial in better understanding subsequent group interactions which are designed to preserve the social bonds in cats and dogs.

Further areas of research concerning L-Trp supplementation would include assessing the influence on learning processes and concentration in dogs during training classes and repeating studies on group living cats using two groups, one with supplementation and the other receiving placebo. In order to improve the analysis of L-Trp supplementation effect on animal welfare it would be beneficial to include measurement of cortisol and other hormonal parameters in future studies.

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Keywords: L-tryptophan; stress; cats; dogs

Medium chain triglycerides help old dogs learn new tricks!

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Introduction

Dogs' cognitive function, like that of other mammals, becomes impaired over the course of ageing (Adams et al. 2000; Tapp 2006). Decline in energy metabolism is a common feature of ageing in animals, and is one of several processes that are closely associated with age-dependent cognitive decline. Rapport et al. (1982) found that brain glucose metabolism was reduced by up to 30% between 3 and 12 months of age in rats. London et al. (1983) reported that brain glucose metabolism in dogs was significantly reduced at 6 years when compared to one year old dogs. Further changes occurred later in life, but in a manner that varied between brain structures. Age-associated reduction in cerebral glucose metabolism is a common feature in aging, and the process involved may be progressive, starting around the middle age. Metabolic decline contributes to cognitive decline associated with aging. One possible means of counteracting deficits in cerebral glucose metabolism is by nutritional supplementation. Henderson (2004) has proposed that dietary supplementation with medium-chain triglycerides (MCTs) can be used to increase brain levels of metabolites which serve as alternative energy sources. MCTs are converted to β -hydroxybutyrate and acetoacetate in the liver and, to a lesser extent, by astrocytes in the brain. These metabolites could then be used by neurons as an alternative energy source to alleviate the deficit in glucose metabolism. To partially test this MCT supplementation hypothesis, Reger et al. (2004) provided an MCT supplement to patients with Alzheimer's disease and reported an improvement in cognitive function in a subset of subjects that were

negative for the apolipoprotein E ϵ_4 allele. They also found that cognitive improvement correlated positively with serum levels of β -hydroxybutyrate.

The purpose of this study was to determine if MCTs could improve cognitive function and delay the progression of cognitive impairment in ageing dogs.

Material and methods

Animals, diets and blood (β -hydroxybutyrate levels)

Animals Twenty-four Beagle dogs (10 males and 14 females) ranging in age between 7.5–11.6 years old, with at least 6 months of previous cognitive test experience were used in the present study. All dogs were provided with environmental enrichment consisting of toys, beds and the opportunity to play outside alone or with other dogs on a daily basis. Housing temperature and humidity were held relatively constant by automated temperature control and continuous ventilation.

Diets The control diet was a commercial super premium-type product for adult dogs (Nestlé Purina products: ~ 32% protein, 19% fat; 3% fibre). The test diet was formulated by adding 5.5% MCTs. Both diets were isocaloric and contained the same levels of protein, fat and carbohydrates. The dogs were fed once daily and provided free access to water. The study lasted 200 days.

Blood (β -hydroxybutyrate levels) Jugular blood samples were collected 2-h post feeding for the evaluation of (β -hydroxybutyrate, CBC and clinical chemistry panels prior to the start of the study, at approximately day 100 and at day 200.

Cognitive tasks

Three cognitive tests (landmark test, egocentric test and variable oddity test) were used to evaluate the effect of MCTs on cognitive function in the senior dogs. Each test was performed sequentially and chosen to evaluate specific functions of the brain which have previously been identified to be sensitive to changes with increasing age. The three cognitive tests were developed to assess learning ability, visuospatial function and attention. Baseline cognitive assessment evaluated the performance of the dogs on each of the three cognitive tests. Each dog was ranked and the ranking used to place subjects into two cognitively equivalent groups.

In the first test protocol, learning ability, memory and visuospatial function were assessed using a landmark discrimination learning protocol. These tasks are intended to assess allocentric spatial ability or the dogs' ability to use external "landmarks" to localise objects in space. Previous work (Milgram et al. 2002) has found that performance with the landmark protocol is sensitive to age.

The landmark discrimination protocol included three separate tasks: landmark-0cm, landmark-1cm, and landmark-2 cm (Taha et al. 2005). This protocol

started with the subjects being trained to approach one of two objects based on their proximity to an external landmark (land-o). The subjects were tested on successively more difficult versions of the same general problem. Each time the dogs were able to successfully discern that the food reward was associated with the landmark, the object containing the food reward was moved 1 cm away from the chosen landmark. Dogs were then re-tested to see if they were still able to associate the landmark with a food reward. In this and subsequent tasks, food inaccessible to dogs was placed in the bottom of the object associated with non-reward in order to prevent the dogs from responding based on olfactory cues. Dogs were able to obtain a food reward if they displaced the correct cover closest to the defined landmark. The test objects were placed 25 cm from the dog to allow for a brief inspection interval, enabling the dogs to see the spatial arrangement on the tray. The tray was then presented to the dog, and the dog was allowed to respond within 60 seconds. In this and all subsequent levels of the landmark test, the dogs were required to respond to the object closest to the landmark to obtain a food reward.

The second test protocol focused on egocentric spatial ability or the dogs' ability to orient objects in their environment in relation to the position of their own body (Milgram et al 1994). The protocol first examined the ability of the dog to selectively respond to an object based on proximity of the object to its left or right side and second, to reverse its original response.

The egocentric protocol had three phases, a preference phase, an acquisition phase and a reversal learning phase. The preference phase consisted of presenting the dog with 2 identical objects both of which covered food and provided a reward on each trial. The side chosen most frequently was designated the dog's preferred side, and assigned to be the positive side for the initial acquisition phase of testing. Thus, if the dog chose the object to its left most frequently, then the dogs' left side was designated its preferred side. For the acquisition (original learning) phase, dogs were shown the same objects from the preference phase but presented in 2 of 3 positions- left, centre or right. Dogs were rewarded for choosing the object closest to their previously determined preferred side.

All dogs were given two reversal tests (reversal 1 and reversal 2). The reversal phase was initiated following completion of initial learning and was identical to that followed during the acquisition phase except that the rewarded position was switched to the opposite side. Thus, if the object closest to a dog's left was rewarded in acquisition testing, the object closest to its right was rewarded in reversal 1 testing. After dogs passed reversal 1 testing, they were then tested on reversal 2 testing, which was identical to reversal 1 testing, except that the rewarded position was switched to the originally preferred side.

The final test to assess attention and concept learning was a variable oddity test during which dogs were asked to identify the odd item out of a group of similar items.

The task involved an acquisition and distractor phase. The first phase, or acquisition phase, required the senior dogs to learn to selectively respond to one particular object out of a choice of two in order to obtain a food reward. In the distractor phase, each trial consisted of presenting to the dogs one, two, three, or four objects, including the object that they had been trained to respond to during the acquisition phase. All distractors had non-accessible food in them to prevent dogs from making decisions based on olfactory cues. Alternative objects served only as distractors, and the number of distractors varied from 0 to 3. The correct object was always the one associated with reward in the initial two-choice discrimination problem. On each test session, the subjects received 3 trials with 0 distractors, 3 with 1, 3 with 2 and 3 with 3. Both accuracy and speed of responding were used as dependent measures that were indicative of attention-dependent processes. Concept learning was assessed through the dogs' ability to accurately indicate the previously trained object in the face of multiple distractors.

Results and discussion

Dogs fed the diet containing MCTs had significantly higher blood (β -hydroxybutyrate levels in non-fasting conditions at approximately day 100 and at day 200 which indicated that the MCTs from the diet were being absorbed and circulated throughout the body and presumably to the brain to be used as an alternative energy source.

Dogs fed MCTs had significantly improved performance on the landmark 1cm and 2cm tests ($p < 0.05$) with marginal significance on landmark-0cm test ($p < 0.10$). Landmark-0cm tests are relatively easy for dogs to learn and involve memory and simple discrimination skills. Landmark-1 and 2 cm tests are more difficult tasks for dogs because these tests require the dog to utilise allocentric spatial discrimination (orientation of objects in the environment) and memory skills. MCTs seem to help preserve the senior dogs' ability to orient between objects in space. Significant improvements were observed within one month of initiation of MCT feeding. The relevancy of this to the dog owner is that MCTs improved complex learning ability, trainability, and cognitive performance of senior dogs.

Egocentric acquisition of task learning depends on spatial memory (ability to remember the orientation of things in the environment) and is easy for dogs, whereas egocentric reversal learning is more difficult and relies on executive function (ability to change strategies or adapt) and concept learning skills. Though there were numerical differences in the simple egocentric acquisition test, and the reversal-1 test, there were no significant differences between senior dogs fed control diets or diets with MCTs ($p > 0.05$). However, there was a significant improvement in the reversal-2 test for MCT-fed dogs ($p < 0.05$). These data suggest

that MCTs are overall helpful in preserving the senior dogs' ability to remember spatial relationships but are especially useful for preserving more complex skills such as adaptation (requiring executive function) and concept learning. Senior dogs that retain these cognitive functions should be better able to cope with variations in day to day life and adapt to changes like new people or places.

In the acquisition phase of the variable oddity attention task, the MCT-fed dogs committed fewer errors than controls, but the differences were not significant ($p > 0.05$). The control-fed dogs performed more poorly than the MCT-fed dogs when there were 2 or 3 distractors. Performance was similar when the groups were only presented with one distractor. These results indicated that more distractors led to poorer performance, which is consistent with the concept that the task provides a measure of selective attention. Although the groups did not differ in initial learning, differences did occur during the distractor phase ($p > 0.05$ for 3 and 4 distractors) suggesting that MCT supplementation improved the dogs' ability to focus their attention on the previously trained object. Improved attention span could result in the senior dog having more interest in its environment and potentially more interactivity with family members. Preserving concept learning skills through MCT addition to the diet could help maintain flexibility of senior dogs' thinking processes.

Collectively the cognitive assessment data showed that performance of the MCT supplemented dogs was superior to that of controls on the land-1cm and land-2cm tasks, the egocentric learning and reversal task, and the variable object components of the attention protocol. By contrast, smaller and statistically insignificant group differences were noted in the land-0cm task, the egocentric discrimination learning task, and the object discrimination phase of the attention task. A primary difference between the tasks that showed significant treatment effects and those that did not is task difficulty: the more difficult tasks were the ones that showed the more significant effects. Previous research has shown a similar link between task difficulty and a cognitive modifying intervention like enrichment (Head et al. 1998).

Loss of polyunsaturated fatty acids involved in maintaining neural structure is another consequence of ageing (Freemantle et al. 2006). Beyond serving as an alternative energy source for the brain, the cognitive-enhancing effects of MCT's may relate to brain distribution and concentration of polyunsaturated fatty acids (Taha et al. 2005), that are involved in maintaining neural structure and known to decrease during ageing (Freemantle et al. 2006).

Conclusion

Up to 50% of European dogs are over the age of 7. The physical signs of ageing are apparent and easier for owners to recognise, and subsequently seek treatment

from the veterinarian. Changes in brain physiology and metabolism however, are more subtle but certainly real. The clinical symptoms associated with those changes occur well after there have been significant physiological changes which make “turning back the clock” very difficult. At this point, there is no way to reverse the physical changes to the brain tissue like increased ventricle size, loss of brain mass or amyloid plaque deposition. However, based on this study, it is possible to improve energy delivery to the ageing brain and thereby improve its cognitive function.

(HB levels increased in the blood of senior dogs fed diets containing MCTs resulting in key improvements in cognitive function like memory, executive function and attention.

Senior dogs fed MCTs had improved memory and learning ability. London (1983) reported changes in brain glucose metabolism, specifically of the frontal cortex and hippocampus as dogs aged. Milgram (2003) indicated that dogs have more difficulty learning new skills as they age. Based on the results of this study, dogs over 7 years of age fed diets containing MCTs had improved memory, trainability and learning capacity. This can be important for owners of dogs over 7 who still want to engage in new activities requiring these cognitive skills.

The ability of senior dogs to cope with day to day life can be taxed, particularly if there are physical limitations later in life like joint disease. However, better cognitive adaptability and ability to change strategy for example, deciding to exit the house via the door with the least number of steps to the garden, could help improve quality of life as dogs’ age. Dogs fed diets containing MCTs had improved executive function (ability to change strategy) as well as improved concept learning skills.

The dogs in this study fed the diet with MCTs had improved attention. It is possible that dogs with improved attention will engage in their environment more, leading to more brain stimulation from interactions within their environment. It is well known in human cognition that people who actively exercise their mind appear to maintain cognitive function later in life.

In summary, healthy senior dogs who lead enriched lives fed a complete and balanced diet with MCTs had significantly improved cognitive function. The proposed mechanism is that MCTs are metabolised into (HB which is a highly efficient alternative energy source for the glucose-deprived ageing brain cells. A series of cognitive evaluations indicated that dogs fed MCTs had improved attention, memory, learning capacity and ability to adapt (an executive function process). Though this study was intended to address slowing the inevitable cognitive decline of health ageing dogs, it is possible that a diet supplemented with MCTs will have positive effects on dogs with mild to moderate canine cognitive disorder as well. Further studies would be required to confirm this hypothesis.

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Keywords: dog, aging, cognition, MCT's

Preliminary findings on the effect of tryptophan-supplemented diet and physical activity on blood serotonin concentration in a population of non aggressive dogs

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Introduction

Serotonin is involved in aggression and anxiety, and a diet low in tryptophan or with high levels of neutral amino-acids has been reported to decrease the central levels of serotonin and increase the expression of aggression and impulsiveness in several domestic animals (Bosh et al, 2007; Edwards et al, 1997; Kaplan et al, 1994; Sève, 1999; De Napoli et al, 2000; Grimmet et al, 2005; Koopmans et al, 2005 and 2006; Cakiroğlu et al, 2007; Berda et al, 2007).

Moreover, brain levels of serotonin in humans and other species can be increased by physical activity (Dey et al, 1992; Ernst et al, 2006).

In this study we analysed the effects of tryptophan-supplemented diet and regular physical activity on concentration of serotonin and other blood biochemical parameters in a population of non aggressive dogs.

Materials and methods

This study involved 16 dogs maintained in controlled conditions in the animal

facilities of the Autonomous University of Barcelona between February and July 2009. All dogs were fed with a low protein diet: in addition, 8 dogs received a supplement of tryptophan (study group) and 8 did not receive it (control group). In each group 4 dogs did exercise for 42 days (running in a treadmill machine for 30–40 minutes 3 times per week) and 4 dogs did not. Data were analysed using ANOVAs repeated measures and mixed models procedures with SAS.

Results

Tryptophan plasma concentration decreased in dogs fed a low protein diet ($p < 0.005$). Serum concentration of serotonin significantly increased in dogs who did physical exercise ($p = 0.003$).

Conclusions

These results suggest that feeding management and exercise can significantly influence the serum concentration of serotonin in dogs.

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Keywords: dog aggression; serotonin; tryptophan; physical exercise

‘Stress’ as a factor in inflammatory bowel disease: pilot study to investigate whether affected dogs differ from unaffected controls in their response to novel stimuli

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Introduction

Inflammatory bowel disease (IBD) is a collective term for any inflammatory disease of the gastrointestinal (GI) tract with Crohn's disease and Ulcerative Colitis being the two most common forms of IBD in humans (Summers et al., 2003). The symptoms of IBD, which can either be chronic or occur repeatedly, are characterised by inflammation of the large and/or small intestine (Summers et al., 2003). The ultimate causal factors for the occurrence of GI disorders are still unknown. The occurrence of IBD is thought to be connected to environmental factors, genetic factors and in some cases, bacteria (Fiocchi, 1998).

Furthermore, psychological factors and environmental stressors are also believed to influence the manifestation of GI disorders (Murray et al., 2004), with alterations in the gut regulation (Mayer, 2000), with gut sensitivity, permeability of the gut epithelium (Santos et al., 1999), and frequency of relapses (Mauder, 2005) being increased by stress.

IBD is also a serious and common condition in dogs, which is diagnosed on exclusion of other causes of clinical signs. Treatments are usually symptomatic including a change of diet, and the use of immunosuppressive drugs. There is currently not much research on the interaction between stress and the occur-

rence of IBD in dogs. One study has shown how the artificial administration of corticotrophin-releasing hormones (CRH) alters the motility of the intestine of dogs (Pappas et al., 1985). CRH is one of the hormones released by the HPA system as a mechanism to restore homeostasis in the body and is also shown to increase the permeability of the gut membrane (Santos et al., 1999; Alverdy et al., 2005). The results of this study lead to the suggestion that when dogs are exposed to common stressors, they are more susceptible to the development of GI disorders like IBD, and possibly have more frequent relapses if already diseased.

This pilot study investigated possible differences in behavioural responses between dogs affected by IBD and GI disease-free dogs, when exposed to environmental stressors. The hypothesis was that a variation would be found between the two groups with respect to their initial response to novel stimuli, as well as the rate at which habituation to them occurred.

Materials and methods

The case group of 14 dogs (10 male, 4 female) were diagnosed with IBD after investigation at a referral veterinary practice. The 15 control dogs with no active GI disease (8 male, 7 female) were recruited through an orthopaedic referral service. Ages ranged from 6–144 months. Each dog was pre-habituated to a test room for two minutes, removed briefly, and then returned for another two minutes after the addition of two traffic cones to the room. Exploratory behaviour, activity, and latency to approach the new stimuli were measured: activity was classified as moving around in the room, sniffing around, sniffing on the same spot, or barking. This test, determining how the dogs reacted to the cones placed in the centre of the room after being familiarized with the room, aimed to identify any differences in response to unexpected stimuli.

Subsequently, all dogs had a novel sound test, designed to investigate how the dogs would react to a novel sound that was played at them at the end of the other trial. The sound was repeated at regular intervals until orientation ceased, this being taken as indicative of habituation. Although the sound used was likely to be novel to most dogs, it was played at the volume of everyday noise to avoid causing a fear response. The protocol included the removal from the study of any dogs which showed either a greater startle response than orientation, or which increased their response to the sound (i.e. became sensitised) on second exposure. In this study, no dogs were removed for either of these reasons. For this test the recorded data was the presence or absence of orientation towards the sound, and in the number of repetitions of the sound needed before the dogs stopped orientating (i.e. the number of repetitions to habituation). The hypothesis was that the dogs that were affected by GI disorders would be more likely to orientate to the sound on first exposure, and would also need more repetitions to habituate to it,

than the control dogs.

Characteristics of dogs in the two groups were compared non-parametrically using chi-squared and Mann Whitney U tests. Comparisons between IBD and control groups found no differences in terms of age or sex.

A mixed between-within analysis of variance was performed for the activity levels of both the first and the second two minutes of the experiment, since the data were normally distributed

Results

Groups differed in the latency to approach the novel visual stimuli (cones) in the familiar room (Mann Whitney U 23, $Z = -2.539$, $p < 0.05$). There was overall no difference in the total time spent close to the cones between the two groups. It was found that 100% of the experimental dogs and only 60% of the control dogs orientated towards the sound; differences also occurred between the IBD group (mean 3.08, SD 1.188) and control group (mean 2.29, SD 1.326) in the number of sound presentations prior to habituation ($t(25) = 1.628$, $p = 0.116$). Although not significant, the effect size was moderate to large (eta squared 0.106) suggesting further investigation of this parameter with a larger sample size.

Conclusions

The results suggest that the dogs in the IBD group took longer to approach the new cones in a room that they had previously been accustomed to. This may indicate an increased level of anxiety in these animals about approaching a novel or unexpected stimulus. The GI dogs were also more likely to respond to the first presentation of the sound, also potentially indicating a higher level of anxiety. The IBD group also needed on average more repetitions before habituation, although this finding was not significant. This study highlights the importance of determining the relationship between the presence of GI disorders and the response of dogs to potentially stressful events. This is potentially very valuable with respect to the treatment of clinical cases, as well as in the prevention of conditions such as IBD in susceptible individuals.

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Keywords: Inflammatory bowel disease (IBD), Gastrointestinal (GI), Stress, Novel object tests

Behavioural reactions of dogs in common human-dog interactions: Is being petted always a pleasure?

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Introduction

Most people show their affection by initiating physical contact. In the interaction with pets this often means petting, hugging, cuddling, or even kissing. Petting dogs has been shown to have positive effects on human health and well-being, as it decreases blood pressure and heart rate (Baun et al., 1984; Vormbrock and Grossberg, 1988), and increases the immune defence (Charnetski et al., 2004). Generally, people assume that dogs enjoy being petted, too, and the responses of some dogs provide support for this assumption, such as tolerating it in a relaxed manner or even insisting on being touched. Being petted may also serve as positive reinforcement in dogs; accompanied by heart-rate deceleration (Kostarczyk and Fonberg, 1981). However, some dogs appear less relaxed even though they may tolerate physical contact and others even actively try to avoid it (Donaldson, 1995). Being handled by unfamiliar humans can sometimes result in behavioural and physiological stress responses (Palestrini, 2005).

The reaction of dogs to handling depends on genetics and early experience, including socialisation with humans, as well as physical and mental health and

context (is there a possibility to back off?), and many dogs develop preferred individual strategies to cope with handling (Heath, 2005). Some dogs may be reactive only when their freedom of movement is temporarily constrained, or when intruded upon while resting or sleeping (Lindsay, 2001). Other dogs tend to show discomfort during all close interactions or when specific parts of their body are manipulated. Dogs usually use complex subtle body language to communicate. In some situations, this communication also includes physical contact, mostly to impress, provoke or intimidate the opponent. Some human gestures might have a similar effect on dogs, even if they occur in a different context. Perhaps, dogs respond to these gestures, because in dog-dog interactions physical contact serves fundamentally different functions, as it is mostly used as a status-indicating display or even a serious physical threat (Breuer and Schaal, 2006). Dominant canine postures and behaviour include standing over, putting head or paws over back or body of subordinate, body slamming, grabbing the muzzle or neck of the subordinate, pushing, bowling over, and mounting. Problems may occur when the human handler performs gestures that the pet interprets as dominant signals that are inappropriately performed by a human (Landsberg, 2003).

According to Lindsay (2005) typical tactile triggers of aggressive responses are:

- putting a collar on a dog or grabbing the collar
- directly approaching, reaching for a dog
- picking up, manually restraining (e. g. lifting, rolling on side, grabbing scruff, clamping muzzle), or physically threatening a dog
- touching a dog in particular places (e. g., top of the head, shoulder, belly, feet, or hindquarters)
- giving unwelcome affection or petting

Often the human handler may not even notice the discomfort, leading to dangerous situations with the dog. Children, especially, lack the capacity to identify avoidance or threat behaviour in dogs, and tend to underestimate the danger arising, because they are more careless and inexperienced in their interactions with dogs (Weiss et al., 1998). This may be one of the main reasons why children are the most frequent victims of dog bites (Gershman et al., 1994).

Varying advice has been given for safe contact with dogs. Some advice specifically addresses children, while other guidelines may apply to all human-dog-interactions. Landsberg (2003) recommends teaching children to avoid making contact around the eyes, ears, and the head; to pet the dog along its side, or to hug the dog. Parents are therefore advised to teach their children to scratch dogs on the chest or on the side of the neck instead (McConnell, 2006), or on their shoulders (Peachy, 2004). According to McConnell (2006) dogs may generally dislike their paws or hindlegs being touched and pats on the top of their heads. Apparently dogs are more tolerant of contact on the sides of their heads,

under their ears and chins, on their chests and bellies, and at the base of their tails. However, De Keuster et al. (2005) state, that there is no concluding evidence yet concerning how to safely pet and play with dogs.

The aim of this study was therefore to investigate dogs' behavioural and physiological responses to several tactile stimulations and mild forms of restraint by an unknown human.

Material and methods

The participating dogs ($n = 47$) were privately owned pets. The dogs, tested separately, were of varying breed, gender, age, life history and obedience training state. The dogs were not pre-selected. The test consisted of two test sessions in a test/retest schedule, whereby each dog was exposed to nine different interactions with an unknown person, each one being performed for a period of 25 seconds.

These nine trials were randomised and comprised of:

1. Petting the dog's chest
2. Holding the dog's paw
3. Stroking the dog's head
4. Covering the dog's muzzle
5. Holding the laying dog on the ground
6. Scratching the dog at the base of its tail
7. Petting the dog on the side of its chest
8. Holding the dog on its collar
9. Laying a hand on the dog's neck

The assistant was instructed to give no other, potentially threatening signals. Each test sequence started with the assistant offering the dog a treat to motivate it to approach her.

The inter-trial-interval was set at 60 seconds and the test-retest interval was 10 minutes. The complete test sequences were videotaped and analysed on the basis of a comprehensive ethogram with the software INTERACT® 8.1 frame-by-frame.

Besides the dog's motor response (mobile/stationary) and display (defensive/submissive, neutral, offensive), its individual coping strategies (e.g., avoidance, freezing, aggression, submissive signals, displacement activities) were recorded. To examine a potential connection between the behavioural reactions of the dogs and the test sequences, descriptive statistical and variance analysis of SPSS 17® was conducted.

Results

Several significant differences between the dog's reactions towards human interactions could be stated on the basis of behaviour monitoring. Interestingly, the diversity of the dog's behavioural reactions was much more visible in the period between the test sequences.

97.9% of the participating dogs tolerated the assistant's actions during the test sequences. Only one case of severe warning signals lead to abortion of the test. Most of the dogs accepted the offered treats and approached or stayed near the assistant willingly. One tried to hide underneath a table for most of the time, 21.3% (n=10) refused to take treats after specific actions of the assistant. The majority of dogs displayed a defensive or submissive body posture and facial expression during all physical manipulations.

Discussion

Our results support the theory that some human-dog-interactions might be perceived by dogs as potentially threatening, even though the test situations resembled daily situations that can often be observed with family dogs. Whether specific behaviour reactions can be related to emotional strain will be evaluated with the help of simultaneously collected physiological data in a second project. We expect to deduce recommendations for safe human-dog interactions from this study, although there will have to be additional research to be able to phrase precise guidelines.

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Keywords: dog, human-dog-interaction, petting, status-related behaviour

Dog appeal to people: does it depend on dog features?

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Introduction

Humans have an innate affinity for animals: in fact man easily identifies a hidden animal in a picture (Shepard, 1996), and tends to attribute an animal shape to objects (Eibl-Eibesfeldt, 1993). Since the time of primitive man humans have considered animals as possible mediators with nature, and experienced mixed feelings towards them such as admiration, fear and desire of food (Malinowski, 1976). The affinity for animals, called zoomorphism, is already apparent in children and, according to Wilson (1984), is the consequence of an innate biophilia. Pets seem to have a particularly great appeal to people; Serpell (1986) hypothesised that it depends on their neotenic features, through which they engage a 'parental deceit' to man's cost; human specialisation in parental behaviour seems to play an important role in creating anthrozoological relationships.

Starting from these assumptions and from some anecdotes, it has been hypothesised that being accompanied by an animal could facilitate social contact between people, especially strangers. Messent (1985) asserts that companion animals can affect human social interactions through different mechanisms:

- **novelty and interest:** the movement of animals is a stimulus that strongly draws people's attention;
- **envy and self-esteem:** an animal can be desirable, stimulating the interest of a stranger, but also protection by the owner;
- **mechanism of innate release:** as children, small furry animals can motivate caretaking behaviours in humans, described by Lorenz (1943) as baby schema. Cohelo (1980) observed that even baboons are interested in other animals, to the point that a female adopted a kitten and utilised it as social facilitator;

- **common interest:** people who have a great interest in animals have a high probability to interact with each other. Messent (1983) for example found that walking a dog in an area usually used for this purpose facilitates interactions between people. Moreover, in cases where both people were dog owners, conversations were significantly longer;
- **improve others' judgment:** the presence of an animal allows other people to quickly come to certain conclusions about the owner, making him/her more likable. Thus it can shorten the latency before starting a more interesting conversation. For example Lockwood (1983) found that people accompanied by animals, both domestic and wild, were judged as more friendly, happy and courageous, as well as being less tense. Similar results emerged in a study of Rossbach and Wilson (1992), where people photographed with a dog were rated happier, more relaxed, safer and therefore more approachable. Guttman (1984) also revealed that children owning a dog enjoy a higher status and they are the individuals that classmates would prefer to consult when they were in need of help or advice;
- **ice breaker:** a companion animal can actively initiate a social interaction, e.g. going toward a person. Smith (1993) reported that dogs are more likely to elicit responses in people rather than to delay them;
- **social lubricant:** as it is socially acceptable to stroke and talk to animals, this can facilitate owner-stranger interaction. This term, introduced by Mugford and M'Comisky (1975), was used to describe the effect experienced by older people after acquiring a pet budgerigar. As a result of previous literature it is now well accepted that being accompanied by a dog can increase the number and quality of greetings and transitory social contacts which occur. This effect is widely experienced by disabled people. Studies into the socialising effects of assistance dogs have demonstrated that people in wheelchairs are more frequently smiled at, spoken to, and acknowledged when with their dogs (Eddy et al., 1988; Mader et al., 1989). Benefits due to qualitative and quantitative improvements in interactions have been also reported for blind (Deshen and Deshen, 1989) and deaf people (Hart et al., 1987). Similar effects have been found for able-bodied people with dogs in many different conditions (Messent, 1983; Hunt et al., 1992; McNicholas et al., 1993; Wells, 2004; Guéguen and Ciccotti, 2008).;

The aim of the current research was to assess whether differing dog features affect the appeal they have to people. This was achieved by investigating whether average adult dogs have a different appeal to people compared to puppies and dogs belonging to breeds generally regarded as dangerous.

Materials and methods

Ten dogs were involved. Two were puppies (PU), 1 Labrador Retriever and 1 Border Collie, aged 3 months. In order to create a category of average adult dogs, six adult dogs (AD) participated: two of them were small (1 Border Terrier-like mixed-breed and 1 Chihuahua-like mixed-breed), two were of medium size (1 black Labrador Retriever and 1 Small French Pointer-like mixed-breed), and two were large (1 Golden Retriever and 1 Estrela Mountain Dog-like mixed-breed). In the category of dogs potentially seen as dangerous were two adult Pit Bulls (PB), 1 black and 1 brown. Each dog was accompanied by a handler, well known to the dog, and the handler was changed in different sessions in order to reduce the individual influence of the person handling the dog.

Handlers were eight girls, 20 to 30 year old, of medium height and weight, sporty dressed; they were instructed to keep the dog on the lead, with a neutral posture of waiting, without seeking attention from passers-by. If the dog attracted a pedestrian's attention, the handler had to maintain a natural behaviour, without starting nor avoiding an interaction with the stranger. All dogs were well socialised to people, quiet and accustomed to stand or sit unobtrusively at the experimenter's side and ignore or not seek attention from passers-by. Sessions were carried out in a green area of Pisa (Italy), in a street where people go for walks, sometimes with dogs, but the street is also used by people who are walking to a nearby car park. Therefore it was not a place dedicated to dogs, but nor was it unusual to meet one there.

People who had just passed in front of a dog-handler couple were asked by a researcher to participate in the research. The researcher interviewed people about 50 meters away from the dog, and their answers were used to fill in a 15 multi-choice item questionnaire. For each dog, 60 to 70 questionnaires were filled in, in total 642: 136 for PU, 383 for AD and 123 for PB. In order to unambiguously assess the behaviour of passers-by, their passage in front of the dog-handler couple was recorded using a hidden videocamera. An interaction with the dog was recorded whenever passers-by stopped, attended, and either spoke to or petted the dog (as suggested by Fridlund and MacDonald, 1998); otherwise the interaction was rated as showing interest but not stopping, not showing any interest, and staying at distance. An interaction with the handler was recorded in cases where the stranger spoke to her. The use of two tools to measure dogs appeal to people (questionnaire based data and video based data) allowed the gathering of a range of data regarding their feelings and behaviour toward the dog they met, and enabled us to better assess dog appeal to participants.

Results

It emerged that 81.0% of passers-by noticed the dog, confirming that dogs usually draw people's attention, but there were no differences between the three groups (PU 83.1%; PB 82.9%; AD 79.6%). Puppies were considered by respondents as more tender than AD (69.9% *versus* 28.2%; $X^2 = 58.319$; $p = 0.000$) and PB (10.8%; $X^2 = 74.598$; $p = 0.000$), and AD more tender than PB ($X^2 = 11.826$; $p = 0.000$). In addition PU stirred up more happiness than PB (6.2% *versus* 0.0%; $X^2 = 4.713$; $p = 0.030$); AD also tended to make passers-by happier than PB (4.3%; $X^2 = 3.218$; $p = 0.073$), but no difference was found in this respect between PU and AD ($X^2 = 0.318$; $p = 0.573$).

More passers-by felt indifferent to the dog when they passed in front of PB (36.3%) rather than AD (20.0%; $X^2 = 10.202$; $p = 0.001$), that in turn left more people indifferent than PU ($X^2 = 9.071$; $p = 0.003$). Pit Bulls scared more people compared to AD (10.8% *vs* 4.9%; $X^2 = 3.472$; $p = 0.062$) and PU (0.9%; $X^2 = 8.179$; $p = 0.004$); however AD did not cause more fearful responses than PU ($X^2 = 2.630$; $p = 0.105$).

Participants were also asked whether, in their opinion, dogs could facilitate interactions between people, and their answers did not vary depending on the kind of dog they had just passed (PU 91.2%; AD 91.4%; PB 91.1%). More respondents stated that they desired to interact with PU (45.1%; $X^2 = 11.133$; $p = 0.000$) and AD (37.7%; $X^2 = 7.173$; $p = 0.007$) rather than with PB (22.5%), but no difference emerged between PU and AD. Passers-by actually engaged with young dogs (16.8%) more often than with PB (6.9%; $X^2 = 4.102$; $p = 0.043$), while AD was between the two (10.5%) and did not statistically differ from other groups. More people stayed at distance when they met a Pit Bull compared to passing in front of a puppy (12.7% *versus* 3.5%; $X^2 = 5.038$; $p = 0.025$), and similar results emerged for AD compared to PU (9.2%; $X^2 = 2.956$; $p = 0.086$).

The number of interactions between strangers and dog handlers were quite low on average (4.0%), therefore no statistical difference was found comparing the three groups and their effectiveness as social facilitators. However, a trend was observed, PB acting less as social facilitators compared to AD (2.9% *versus* 4.3%) and PU (4.4%). This result reflects Well's findings (2004), where the catalyst effect of a Rottweiler emerged as inferior to that of a puppy and an adult Labrador Retriever. This concordance is probably the consequence of Pit Bulls and Rottweilers both being perceived as dangerous breeds (Podberscek, 1994). In fact people tend to associate a certain temperamental trait with a specific canine breed, and they operate a spontaneous trait transference from dogs to owners (Mae et al., 2004).

Conclusions

Due to the different feelings and behaviour people have when passing in front of differing types of dogs, it can be concluded that dog appeal to people is strongly affected by their features. It emerged that puppies and Pit Bulls are at the two extremes of the dog appeal to people axis: people preferring puppies and feeling and behaving in a more positive way toward them when compared to adult dogs of different features. Often people do not like Pit Bulls, and register more negative feelings and behaviours when meeting one.

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Keywords: appeal, dog, Pit Bull, puppy

Training dogs in Schutzhund sports and in protection work in police dog training – a new approach based on positive reinforcement

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During the last years, efforts have been made to train dogs by means of positive reinforcement. In different areas of dog training, as well as in behaviour counselling, training methods based on positive reinforcement are largely applied. In more traditional dog sport disciplines, however, these training methods are less well known.

In a recent study (Salgirli 2008; Schalke et al. 2009; Schalke et al. 2010), 8 of the 20 dogs belonging to one group of police dogs and 3 of the 22 dogs belonging to a second group of police dogs were evaluated as showing a submissive posture during an obedience session. During this obedience session, the dogs were on a lead attached to a standard collar, and the handler was not allowed to correct the dog even if it was making a mistake. The discrepancy between these two groups of dogs as regards their degree of submission may have been due to different ways of training the dogs, i.e. one of these groups of dogs was presumably trained in a much more structured and therefore less stressful way than the other group of dogs.

In this presentation, a new, well-structured training approach for police dogs, using positive reinforcement and the clicker as secondary reinforcer, will be demonstrated by means of video recordings. The presentation will show that the clicker can be a very convenient device for training dogs – not only as detection

dogs, where the clicker is already widely employed, but also for Schutzhund sports and for protection work in police dog training. By means of video sequences, the conservative way of training dogs in these disciplines as well as a new method of training will be compared, and the differences between both approaches will be explained with regard to learning theories. The information given on the training method and its practical application presented here will be helpful for everyone who is asked for assistance by their clients.

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Keywords: dog training, Schutzhund sports, protection work

Predictive model for dogs with fears and phobias

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Introduction

This study contributed to a larger study investigating the influence of dog owner expectations on development of a successful human: dog bond (Corridan, 2010). Behavioural problems have been identified as a significant contributory factor in failing HDB (DiGiacomo et al, 1998; Salman et al, 2000 and New et al, 2000).

The current study involved development and reliability testing of a statistical model which identifies variables predicting dogs likely to demonstrate fearful or phobic behaviours towards people, objects, situations or noises.

Materials and methods

Current dog owners (n=630) 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 two groups: dog owners reporting that their dog had demonstrated fearful or phobic behaviours on one or more occasions over the two weeks prior to sampling (N = 403, 64%) and owners of dogs that had not (N = 227, 36%).

Results

Univariate analysis (chi-squared test) revealed that 1/10 demographic variables, 18/66 dog activity item variables and 7/8 behaviour problem variables differed

significantly at $p \leq 0.01$ between these two dog owner groups. These variables were then entered into a binary logistic regression using a manual entry method. The final model revealed 5 strongly predictive variables which differentiate dogs with or without a problem with fears or phobias.

Dogs reportedly considered to be 'like a child or family member' were more likely to demonstrate fearful or phobic behaviours (Odds Ratio, OR=2.4). Increasing the frequency of exposure to potentially scary experiences increased the risk of inducing fearful or phobic behaviour in dogs. Dogs who have some control over when they are able to chew toys, chews or bones are less likely to have fearful or phobic behaviour compared to dogs whose owners either control or share control over chew items. Dogs who behave hyperactively or have difficulty with their training or owner control are more likely to behave fearfully as well (OR=10.2 for hyperactive dogs and OR=2.7 for dogs with training difficulties).

This predictive model was tested for reliability (sensitivity and specificity) using a sample of relinquishing dog owners (N=50), recruited at the time of surrendering their dog to an animal shelter. When the predictive model for fears and phobias was tested using the relinquishing dog population, 100% of whom were reported to exhibit one or more behavioural problems, model fit, predictive power and reliability were improved, indicating the reliability of the model.

Conclusions

The relationship between the frequency with which dogs are exposed to potentially scary experiences and the resultant increase in the odds ratio of dogs demonstrating fearful or phobic behaviours is worthy of further investigation, including documentation of the inciting cause of the fearful responses, the intensity of response from the dog and the behaviour of the owner during these situations. Current fear prevention protocols often involve increased exposure to potentially scary experience in a controlled manner, but their impact needs careful evaluation.

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Keywords: fear, phobia, dog

Case report: The use of life-sized video projected images during the treatment of fear related aggression to unfamiliar people in the house

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An intact male Chihuahua, 2 years old, was referred by a veterinary surgeon for continuously (several hours) barking at unfamiliar visitors and occasionally snapping or biting when they made a sudden movement, tried to touch or give a food treat to the dog or walked away from him. No bite wounds or bruises were caused.

The dog was adopted at the age of 12 weeks from an environment in which exposure to a large amount and variety of stimuli had been restricted. From the onset he was anxious and fearful of novel social and non-social stimuli. He mostly avoided interactions with unfamiliar people. From the age of approximately 6 months he started to display the problem behaviour, which subsequently increased in intensity and frequency.

The behaviour was diagnosed as fear related aggression to unfamiliar people caused by a lack of socialisation with unfamiliar people early in life (Appleby et al. 2002). It was decided to support the behaviour therapy with medication (Clomicalm 2 mg/kg q12) (Bowen and Heath 2005, Crowell-Davies and Landsberg 2009) and pheromone therapy (DAP diffuser and spray) to help the dog to adapt in the fear inducing situations (Pageat and Gaultier 2002, Bowen and Heath 2005, Crowell-Davies and Landsberg 2009). The treatment goal was to invite unfamiliar people to the house without the dog continuously barking at them or trying to bite the visitors.

During the first training session systematic desensitisation and counter conditioning techniques were used in combination to reduce the fear response (Bowen and Heath 2005). The counsellor offered treats to the dog while the intensity of the stimulus was diluted by dropping food treats on the floor, but not speaking or looking at the dog and putting no pressure on it to approach or to cope with an approach (Bowen and Heath 2005). The session was stopped after approximately one hour because no progress was made. The treatment options were revised.

The owner trained the dog in the home environment to retreat into a safe haven on command. The safe haven was placed in the consultation room (7 x 3 m) during the next training sessions at approximately three to four metres from the fear eliciting stimulus to give the dog the opportunity to increase the distance to the fear eliciting stimulus and block the sight of it by withdrawing in the safe haven voluntarily or on command when he started to bark.

Pongrácz et al. (2003) reported that dogs perceive life-sized video projected images of a person. Pluijmakers et al. (2010) established that puppies in the third and fifth week of life orientate towards and observe a television screen displaying video images and their accompanying sounds and elicit more orientations and physical or vocal reactions compared to video images displayed without sound (Pluijmakers 2005).

In the following session the dog was exposed to life-sized images of the counsellor projected onto a wall of the consultation room using a multimedia projector (Sanyo PLC-XU55). It was expected that this would decrease the salience of the fear eliciting stimuli sufficiently to create an opportunity to change the dog's coping strategy from barking, to at least withdrawing, but ultimately observing and approaching the images without barking.

The salience of the projected images was gradually increased. Initially the dog was exposed to photographs of the counsellor in a standing position taken from different angles (back, side and front) without sound. Then video images with sound while sitting reading a book and turning the pages but not speaking were introduced, followed by video images in a sitting position, while moving and talking. The owner sat next to the safe haven. The dog was asked to go into his safe haven immediately when he started to bark. He was reinforced for withdrawing into the safe haven voluntarily and for approaching the projected images or observing them from any distance or position without barking. He was encouraged to approach the images by throwing food treats in the direction of the images.

When the projected images were replaced by exposure to the counsellor the systematic desensitisation and counter conditioning techniques could be applied successfully in combination with sending the dog to his safe haven. After a two hours session the counsellor was able to speak and walk around in the room while being followed by the dog. The barking decreased to very occasional brief barks.

A second training session, in which the same procedure was applied but with another person, was performed later during the treatment period, with the

counsellor present in the room. After one hour of training, the dog could be exposed to the person sitting and talking, behaving like a normal visitor, while the dog most of the time was next to the owner or on her lap, observing the person without barking.

The total treatment took three months. During this period another four training sessions, each of approximately one hour, were carried out. Systematic desensitisation and counter conditioning techniques were also applied by the counsellor without using video images but concentrating on real life situations during which people touch or bend over the dog suddenly or walk away from him. The coping strategy of the dog gradually changed from withdrawing into the safe haven to sitting under the chair of the owner or on the owner's lap.

As no volunteers were available to help with training in the home situation between the sessions the owner practiced in the house using 'stooges' being a 'life-sized' doll placed in different locations for short periods and changing its appearance by putting on other clothes regularly. The dog was encouraged to approach by placing food treats around the doll, reinforced for observing the doll from any distance and sent to his safe haven when he started to bark.

At the end of the treatment period the owners were able to invite unfamiliar visitors to the house or take the dog to another environment where unfamiliar people were present without the dog barking at the person(s) continuously. Most of the time he lies on the owner's lap observing the visitors or approaches the visitor to get a food treat. Occasionally he might bark briefly but this can be stopped by calling him back to the owners.

This case study suggests that the use of life-sized video projected images, in combination with training to increase the distance to the stimulus, might be useful to reduce the salience of a fear eliciting stimulus and can be applied in the initial treatment of some cases of fear related aggression to unfamiliar people.

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Keywords: video projected images, fear related aggression, systematic desensitisation, counter conditioning



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Papers

Saturday 25 September

- 73 Can we use a doll as tool for predicting the behaviour of adult dogs toward children?
G. ESKELAND
- 77 Learned helplessness in a Jardine's parrot; longitudinal observational case study
E. A. WALSH
- 82 Risk factors for inappropriate urination and urine spraying in domestic cats
R. CASEY
- 85 The veterinary project: "He won't bite! – How to avoid dangerous situations with dogs"
U. FALBESANER
- 89 The Blue Dog – Challenges in marketing dog bite prevention
T. DE KEUSTER
- 92 Studies for classifying abnormal-repetitive behaviours in dogs
P. KAULFUSS
- 97 A practitioner's perspective on continuing professional development in communication skills and personal competence
G. ESKELAND
- 100 Lack of activity hypothesised as the main cause of behavioural problems in dogs and cats
J. DEHASSE
- 103 Does the response to, and recovery from, a threatening olfactory stimulus vary between cats of different coat colours?
M. HEARD
- 105 First social isolation for puppies: evidence of significant stress thanks to physiological and behavioural indicators
A. COZZI
- 107 Effect of early events on the response to stress in puppies
S. LE BRECH

109 Harmonease® reduces noise induced fear and anxiety in a laboratory canine model of thunderstorm simulation; a blinded and placebo controlled study

G. M. LANDSBERG

111 Behavioural patterns and welfare implications in Valdostana Brown (Castana Nera) calves

M. C. OSELLA

Can we use a doll as tool for predicting the behaviour of adult dogs toward children?

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Introduction

Research has shown that a doll can be used as a tool to predict adult dogs' aggressive responses to children (Netto and Planta, 1997). The aim of this study was to investigate whether a doll could be used at a twelve week behaviour test to predict the subsequent reaction of those dogs to children when the dogs were 15 months old.

Materials and methods

We used a cohort design and a sample of 82 puppies (39 dogs and 43 bitches) and their owners were followed from 12 weeks to 15 months. They were recruited from the Østfold, Buskerud, Akershus and Oslo counties in Norway during the period from March 2008 to January 2009 via adverts at small animal clinics, in dog magazines and on websites. The criteria for inclusion were that dogs were between 11 and 13 weeks of age, of any gender, breed or breed mixture. They should also have been in the new home at least 1 week. There were no criteria for the owner. The owners answered questions at 12 weeks, 16 weeks, 6 months, 9 months, 12 months and 15 months covering three topics; demographics, the owners' training methods and the dogs' behaviour (in total 396 questions). The first questionnaire was answered in person but subsequently the dog owners responded via the internet (MAMUT online survey standard, 2008). The dogs were behaviourally tested at 12 weeks of age and 15 months of age (16 elements, scoring emotions/behaviours). The 12 week tests were carried out at Jeløy Veterinary Clinic, Østfold and the 15

month test was carried out at the University of Life Sciences, Ås, Akershus. The test personnel consisted of 1 male and 6 females of whom four were ethology students, two veterinary surgeons and one a dog trainer. In this presentation the focus is on test elements involving presentation of a doll (human-like in size and appearance; Nicola 68cm, o,686321 from Götz puppenmanufaktur) and questionnaire replies regarding reactions to children.

Behaviour test

The start of the test component is when the puppy is taken, on a lead, to the room with the doll seated in a chair. When the puppy orientates towards the doll, the lead is taken off. The puppy is now free to investigate, while the owner and tester remain passive. If the puppy investigates and goes to the doll, the puppy is praised, and the owner follows the puppy to the doll. If the puppy is reluctant to investigate, the owner is told to wait for 5 seconds. After the 5 seconds, the owner is asked to take two steps ahead toward the doll and then wait for a further 5 seconds. If the puppy is still reluctant to investigate, the owner moves near to the doll, but stands passively. If the puppy is still reluctant, the owner is asked to squat beside the doll, and eventually touch and talk to the doll regardless of whether the puppy shows no sign of investigation, or shows fear and aggression. Before the test component is finished, the puppy should show signs of returning to a neutral emotional state (which indicates an ability to balance itself after an emotional experience). Whenever the puppy investigated the doll, it was rewarded by praise and/or titbits.

The study also looked at the relationship between two other novelty test components (in addition to the doll) and aggression towards children. One hypothesis was that it was the novelty of the doll, more than the human-like appearance, which predicted the reaction towards children. The two other variables which were investigated were reaction to sound and reaction to walking over corrugated iron.

The doll was also used in the behaviour test at 15 months of age, and the correlations between fear of the doll at 15 months and the fear and aggression towards children were also analysed. The test area for the 12 week tests was located at a veterinary clinic.

Behaviour test

The seeking emotions for the doll were defined as

- 1) latency of contact with the doll
- 2) intensity of contact behaviour
- 3) need for owner support in the seeking.

The fear emotions were defined as

- 1) appearance of avoidance signals and withdrawal from the doll
- 2) appearance of stress signals (e.g. lick snout, turn head or blinking)
- 3) time for emotional release (measured as the latency between investigation of the stimulus and subsequent normalisation of emotion).

The rage emotions were defined as

- 1) appearance of staring, barking, growling, snarling or biting towards the doll.

Questionnaire at 15 months

The owners were asked to rank their dog from 1–9 for friendliness, aggression and fear towards children. The procedure to minimise loss to follow-up was to send an e-mail with an invitation to answer the questionnaire at each age interval. Three reminders were sent at intervals of 6 days. If the dog owner had not replied in a given time, the researchers would phone to ask if they would like to reply or exit the study. The participants who did not reply to all questionnaires were excluded from analysis for this presentation. SPSS 18 (2009) and Excel (2007, Microsoft) were used for statistical analysis. To evaluate relationships between variables, spearman's correlations were used.

Results

The 82 participants who had replied to all questionnaires are the focus for this presentation. 75 of the participants completed the 15 month behaviour test. The dogs (39 dogs, 42 bitches) were from 37 breeds and 10 mixed breeds, ranging from miniature breeds to large breeds. The owners were mainly families with children (N = 40, 48.2%) and families without children (N = 29, 34.0%). 12% of the owners were single. 88% of the puppies were bought from a breeder. The owners varied in experience. Some owned their first dog (28.9%), some their second dog (21.7%), some their third dog (16.9%), some their fourth and fifth dog (15.6%) and 16.8% had owned 6 or more dogs. 47% of the puppies lived with other dogs. We found a significant correlation between fear of the doll at 12 weeks and aggression toward children at 15 months (0.35, $p = 0.01$). There was no significant relationship between fear of the doll and fear of children, or aggression towards the doll and aggression towards children. When we compared the puppies' curiosity towards the doll with their friendliness towards children at 15 months, we found a significant correlation (0.21, $p < 0.05$).

To test whether the human-like appearance was important, we also analysed the relationship between 1) a sound test and 2) a novelty surface test (corrugated

iron) and the same reaction towards children. There were no significant relationships between fear and aggression related to the sound or surface test, and fear or aggression towards children at 15 months. We also analysed the relationship between reactions towards the doll at 15 months and the fear and aggression toward children at 15 months. There was no significant relationship between the curiosity or aggression towards the doll and the friendliness towards children. However, there was a significant relationship between fear of the doll and fear of children ($0.26, p < 0.05$), and curiosity toward the doll and aggression toward children ($0.27, p < 0.01$).

Conclusion

The study shows that where the 12 week old puppy is fearful of a human-like doll, there is an increased risk of developing aggression towards children at 15 months of age.

The explanation for this reaction could be

- 1) the puppies perceived the doll as a child
- 2) the puppies' fear reaction towards novelty in general is associated with aggression toward children
- 3) the puppies' fear reaction towards a source of novelty "with eyes" is associated with child directed aggression.

This study analysed the effects of a human-like doll, a sound test and a surface test as potential predictors of subsequent adverse reactions to children. Further investigation is needed to see whether a figure "with eyes" could predict the same reactions. A possible explanation for why fearful behaviour at 12 weeks predicts aggression but not fear in the 15 month old dog, could be that the emotion of "rage" emerges later in development. The implications of this study for the field are that it is beneficial to test puppies' behavioural reactions at an early age (12 weeks) and start an early behavioural modification programme based on the test findings.

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Keywords: aggression, children, human-like doll

Learned helplessness in a Jardine's parrot; longitudinal observational case study

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The complex physiological and psychological needs of wild parrots are expressed and satisfied through interactions with their environment such as foraging, locomotion and maintenance of complex social relationships.

Social relationships are structured and maintained through allogrooming, flocking and night roosting, nesting and rearing of young, foraging, locomotion, flying and climbing and defensive strategies. Parrots are a prey species and assume camouflage by living high up in the forests.

Parrots live in large groups; many form lifelong pairs with high nest fidelity. Siblings may also form strong bonds with resulting demonstrative affiliative behaviours (Eberhard, 1998, Snyder et al., 1987).

As parrots have not been domesticated, captive parrots retain these requirements for adequate welfare. Many captive environments do not meet such needs with the result that captive birds will almost always suffer (Engebretson, 2006, Matson and Koutsos, 2006, Lantermann, 1998, Meehan and Mench, 2006, Wiepkema and Koolhaas, 1993, Young, 2003).

Stress may also result from commonly accepted husbandry practices. For example, one such practice, wing clipping (Luescher and Wilson, 2006), removes the most basic instinctive defense mechanism: the flight response (Glendell, 2007), but not the internal motivation to fly.

The development of repetitive or stereotypical behaviour in parrots as an attempt to cope with adverse welfare conditions is well documented (Bergman and Reinisch, 2006, Van Zeeland et al., 2009). However some cease interaction with their environment entirely and may enter a state of learned helplessness (LH) (Walsh et al., 2008a, 2008b). To date there has been little investigation of LH in parrots and even less regarding recovery.

The theory of LH suggests that exposure to uncontrollable aversive stimuli causes an animal to perceive that behaviour and its consequences are not contingent, to expect that this would apply to future settings and as a consequence to lose, its motivation to respond (Seligman and Maier, 1967, Maier and Seligman, 1976, Peterson et al., 1993), which results in passive behaviour). A case of LH is characterised by a non-contingency between action and outcome leading to the expectation of non-contingency for the future and passive behaviour (Peterson et al., 1993). Very importantly, The only observable manifestation of LH is passive behaviour. LH alters incentive motivation, cognitive processes and emotions, leading to anxiety and depression (Maier and Seligman, 1967, 1976).

However, alleviation of the LH effect is possible and has been observed in rats and in dogs through demonstrating the behaviour which terminated shock (Seligman et al, 1968). The effects may also dissipate with time as has been observed in rats and dogs (Overmier and Seligman, 1967).

LH has been observed in humans, rats, mice, monkeys, cats (Maier and Seligman, 1976), gerbils (Brown and Dickson, 1983), chickens (Job, 1987), goldfish (Nash et al., 1983) and cockroaches (Brown et al., 1992). No studies are available regarding LH in parrots, although the term has been used in connection with the species (Friedman, 2002, Martin, 2002), neither are there investigations regarding recovery from LH.

In parrots, LH may be the result of inadequate or aversive housing conditions with lack of contingencies. LH may result from specific training, such as teaching or forcing birds to climb onto a stick and to stay (Fischer, 2001, 2002) or from restraining aggressive or fearful parrots by wrapping them in towels (Friedman, 2002). What may appear to be a “calm and passive” parrot, which tolerates handling and is even regarded as “tamed” may in fact be a parrot in a state of LH (Walsh et al., 2008a, 2008b).

The present case study is of a Jardine's parrot, Esmeralda, (Genus: *Poicephalus*; Species: *guglielmi*); size: 28cm; adult weight: 200–227g; wing 195–215 mm; distribution: Central and West Africa; usually found to fly swiftly in pairs or small groups (10) noisily above tree tops but large flocks do occur particularly to roost at night time. Jardines like to feed quietly in groups and are shy on approach (Forshaw, 2006).

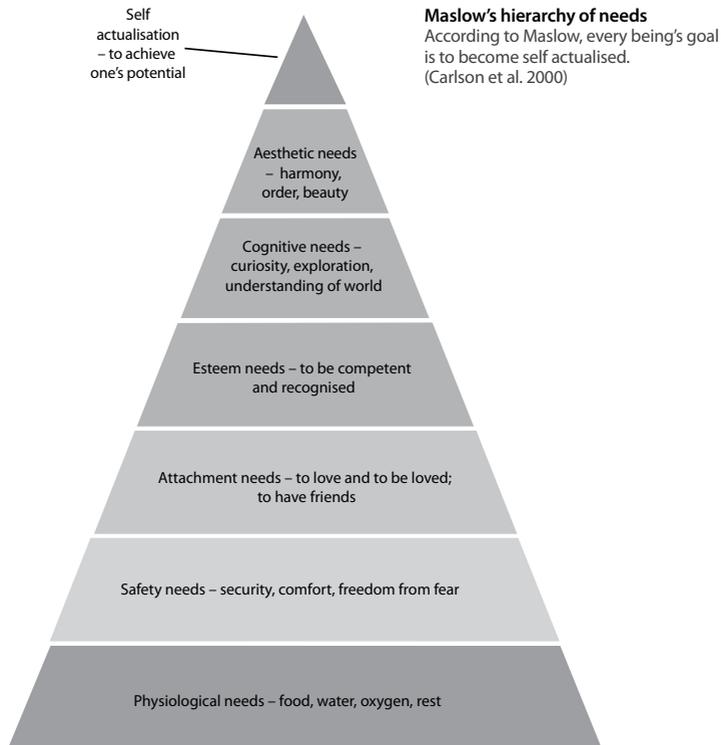
The parrot was about 3.5 years old and of unknown sex and origin. It was unclear whether it had been captive bred or wild caught. It was kept alone in a small dirty cage (44x44x66cm), on a low table in the middle of a dark room with a restricted diet of sunflower seed and apple. There was lack of opportunity to forage and to stand on a flat surface, as the cage furniture consisted of one dowel perch of an unsuitable circumference, and a metal chain. The parrot exhibited no behaviour other than those related to eating and drinking.

This parrot was re-homed and introduced appropriately into an enriched environment: the bird was first offered clean water and nutritious food, which was

introduced in a suitable and predictable manner. Toys and novel play objects followed secondary to food. A larger cage (80 x 60 x 136cm) with hiding places, was introduced slowly, when the bird chose to move into it itself. The parrot was given opportunity for flight or more correctly, to prepare to regain flight skills. Care was taken to ensure a predictive environment and contingent behaviour of the bird's carers.

The rehousing was completed in stages, the first being that the new cage was introduced at a distance and gradually brought closer; the parrot was also conditioned using a clicker. Additionally, the bird was positioned in such a way that it could choose when it decided to investigate the new premises. Therefore the changeover was at the bird's behest and not at its carers. The cage was furnished with differing types of perch (rope, wood, concrete) and toys; one third of the cage was covered to create a safe hide; the cage was sited in a "safe" place.

Retrospectively, the structure of the rehabilitation programme largely agrees with Maslow's hierarchy of needs. Fundamentally, the needs of the parrot may be considered similar to human needs and its high intellect may be an indication of the possibility to achieve self realisation. Certainly, cognitive function exists and perhaps arguably aesthetic appreciation (Beckoff, 2008).



Attempted interaction with other species was observed within one year. The interesting thing to note is that the initial interaction which evolved was unpredicted and evolved between the dogs living in the household and the bird. The relationships were not equal and did not mirror each other, which suggested the emergence of possible personality traits in the bird.

The bird's recovery is ongoing and new behaviour emerges continuously almost 7 years later.

Behaviour indicative of positive psychological state such as climbing, vocalisation, bathing, preening, object manipulation, acrobatic manoeuvre and flying, were observed to some degree within one year. However, consolidation of these behaviours occurred at differing rates both initially and in the ensuing years consistent with the model suggested by Maslow (Carlson et al, 2000).

Behaviour indicative of the parrot's ability to create and expect contingency occurred in year three (Maier and Seligman, 1976). This was when the parrot realised that it could summon her humans to provide her with a nut by ringing a bell. This may suggest that at this point the bird was beginning to function at a higher cognitive level, free from previous "learned helplessness".

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Risk factors for inappropriate urination and urine spraying in domestic cats

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Introduction

Urine spraying and inappropriate urination are common problems referred to veterinary behaviourists (Casey 2001; Heath 2009), but little epidemiological research has investigated factors which might influence their occurrence. Inappropriate toileting is reported to be the most common complaint for which owners seek professional advice (Olm and Houpt 1988; Heath 2009). A change in toileting location is suggested to reflect a loss of suitability of the original toileting site. There are multiple reasons why this may occur, broadly broken down into changes about the toileting site itself (substrate or location), and problems associated with accessing the toileting site, for example in multi-cat households.

In contrast, urine spraying is often associated with the types of situation that are likely to be anxiogenic for cats, such as agonistic encounters with other cats from outside or within the household or moving house (Pryor et al. 2001). The incidence of urine spraying has been reported as being higher in multi-cat households than single cat households (Pryor et al. 2001), and to increase in incidence with increasing numbers of cats in a multi-cat household (Beaver 2003). Furthermore, the location of spraying behaviour is significant. The most commonly sprayed items include furniture and walls or windows near to visual access outdoors (Pryor et al. 2001), which are areas where conflict with other cats is likely to occur, or other cats observed.

Materials and methods

In this study, cases and controls were recruited through veterinary practices and media, filtered by age and health inclusion criteria. Each cat and owner were visited in their own home and a detailed questionnaire completed, including, for example, information on family circumstances, other pets, cats' access outside and patterns of daily activity. 36 cats with inappropriate urination and 40 showing urine spraying were compared with a control population of 109 cats. Characteristics of cats, owners and environments were compared between affected cats and controls using logistic regression models. Initial screening of variables identified those significant at a level of $p < 0.2$ for inclusion in the multivariate model. Models were built using a backward stepwise approach.

Results

For inappropriate elimination, the model ($\chi^2 (13) = 76.371$, $p < 0.001$) explained between 41.6% (Cox and Snell R^2) and 61.4% (Nagelkerke R^2) of the variance, had a sensitivity of 72% and specificity of 93%. Remaining in the final model were: whether cats were allowed outside, how long cats chose to remain outside, the distribution of litter trays, frequency of avoiding familiar people and avoidance of other cats in the household. For urine spraying, the final model ($\chi^2 (13) = 96.547$, $p < 0.001$) explained between 49.3% (Cox and Snell R^2) and 70.9% (Nagelkerke R^2) of the variance, had a sensitivity of 75% and specificity of 92%. Remaining in this model were: age of cat, following owners, aggression to other cats in the household (frequency and type), owners telling cats off, and usual toileting site.

Conclusion

These data provide further evidence for environmental and situational factors associated with the occurrence of urine spraying and inappropriate urination in cats. Identification of risk factors helps inform education programmes to prevent the occurrence of behaviours likely to influence the cat-owner bond (Casey and Bradshaw 2010) and increase risk of relinquishment (Casey et al. 2009).

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Keywords: Cat behaviour; Toileting problems; Inappropriate urination; Urine spraying

The veterinary project: “He won’t bite! – How to avoid dangerous situations with dogs”

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Introduction

The aim of the project “He won’t bite! – How to avoid dangerous situations with dogs” is to convey knowledge about dog bite prevention to as large a population as possible. Dangers posed by dogs can be avoided through appropriate human behaviour and in this project veterinary surgeons in Germany teach dog owners about basic ethology, the right way to handle dogs, and about risk prevention.

Since most bite incidents with dogs occur at home in contact with the owner’s own dog or a well known animal (Kizer 1979; Podberscek and Blackshaw 1991; Avner and Baker 1991, Shewell and Nancarrow 1991; Brogan et al., 1995; Horisberger 2002), the emphasis in dog bite prevention projects should be the training of dog owners. Therefore, veterinary surgeons, specialised in ethology and behavioural therapy, developed this project together with the Bavarian Veterinary Board and the Chair of Animal Welfare, Ethology, Animal Hygiene and Husbandry of Munich Veterinary Faculty. In the 12-hour seminar specially trained veterinary surgeons teach dog owners how to avoid dangers in everyday situations. An important part of the process is to highlight potentially risky moments in everyday family life and explain how to deal with them, for example answering questions such as “how should I react when my dog growls at me while I am cleaning its paws?”

A book based on the seminar has been published (Jung et al., 2007). It covers the following areas:

- 1) Basic knowledge – the puppy and its development, understanding how each dog is different, explanation of the right playing, learning and training interactions, information about finding a good puppy playgroup, explanation of social hierarchy, dog and family interactions, dog and the public interactions and the importance of understanding communication
- 2) Danger avoidance – the aim is to teach owners the art of de-escalation and explain how to react properly in situations of conflict
- 3) Legal requirements.

In addition to the book a wide range of teaching material is offered to the veterinary surgeons. Through the use of around 180 overhead transparencies, videos, working papers, role plays and practical elements the seminar is a vivid experience for both the participants and those teaching and it aims to be very close to the practice situation. The veterinary surgeons organise their seminars themselves and about 10% hold the event together with a colleague. In Bavaria 37% of the seminars were organised by community colleges and 20% by dog schools (Geppert, 2007).

Materials and methods

In order to evaluate the benefits which participants gain from this 12-hour seminar a study was conducted (May, 2006) in which 11 seminars in Bavaria, with a total of 91 participants, were investigated. Using questionnaires, the seminar participants were asked about their behaviour in various everyday situations of danger avoidance and their knowledge of dogs before and immediately after the seminar, as well as three months later, was evaluated. The control group consisted of 100 dog owner clients of a veterinary practice who were also questioned about their danger avoiding behaviour. Statistical analysis was performed using SPSS. The knowledge questions before and after attending the seminar were compared using the paired t-test. In relation to the questions on danger avoidance, the answers of the participants before attending the seminar were compared with those of the control group by means of Pearson's chi-square test. A significance level of 5% has been used.

Results

79% of the seminar participants were female, 21% male. The majority of seminar participants were dog owners (87%), 12 people did not have a dog of their own.

For more than half of the dog owners (58%) it was their first dog. By contrast the percentage of first-time dog owners was only 39% in the control group.

The results indicated that the seminar resulted in a significantly enhanced level of knowledge ($p < 0.001$, $n = 11$ seminars). Before the seminar the average rating was 2.6, while after participation it was 1.2. In the follow-up survey three months later an average rating of 1.4 was achieved. Knowledge, therefore, improved from an average “satisfactory” level to a rating of “excellent”. In terms of danger avoidance behaviour the participants were usually doing significantly better than the dog owners in the control group even before the seminar. For instance, the participants’ behaviour at a road with a low level of traffic, was significantly different from that of the dog owners in the control group. While one third of the control group let their dog run freely in that situation, only 11% of the seminar participants did so. After attending the seminar, the majority of the dog owners put their dog on a lead in risky daily life situations such as meeting a cyclist or a child, walking along a street or near to a playground.

The participants themselves rated their knowledge gain through the seminar at a level of 1.5 (on a scale of 1 for excellence to 5 for poor), the benefit of the seminar at 1.4 and practical applicability of the contents at 1.3.

The danger avoidance behaviour of the participants improved considerably after the seminar, which was clear both from the questionnaires after the end of the seminar and from the follow-up survey three months later.

Conclusions

In the region of 410 seminars (in Germany and Luxembourg) with nearly 4300 participants have already been given. The book has also been published in Polish and the overhead transparencies are also available in French.

In Schleswig-Holstein and in Berlin where, according to the dangerous dog acts in these federal states dog owners of certain breeds are required by law to have a certain level of special knowledge, the completion of this seminar is acknowledged as a necessary component of the dog owner licence.

This presentation will aim to motivate more veterinary surgeons in other countries to start training dog owners in danger avoiding behaviour.

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The Blue Dog – challenges in marketing dog bite prevention

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Introduction

Dog bite injuries represent a serious health issue. A Belgian study indicated that every year 1% of the population suffers a dog bite requiring medical attention (Gisle, 2001). Children are twice as at risk as adults and severe injuries occur most frequently in young children, bitten in their own home and by a dog that is familiar to them (Kahn et al 2003, Kahn et al 2004). Following a substantial bite, 55% of children suffer from post-traumatic stress disorder (Peters et al., 2004). Despite these findings, most Bite Prevention programmes are aimed at the age group of 7 years and older and focus on public safety rules, such as how to behave when encountering an unfamiliar dog (Chapman et al., 2000). The Blue Dog programme was developed as a prevention tool for families with young children, thus targeting the apparent gap in dog bite prevention strategies relating to age group and context (De Keuster et al., 2006, Meints and De Keuster, 2009).

Since the launch in 2004, difficulties have been experienced in attempting to promote dog bite prevention messages, both to the end-user and potential sponsors. This was further highlighted in an independent marketing review, conducted by students of Ghent University (De Ruyter, 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 dog bite prevention. One interesting point that emerged was the problem of marketing a prevention programme using a fear message (e.g. every dog has the potential to bite).

Challenges in marketing a prevention message

According to communication sciences, an important pitfall exists, assuming that health prevention campaigns will necessarily induce a danger control process (and a change) (Witte K., 1992). Common examples are the well known drug-prevention persuasive messages designed to scare people by describing the terrible things that will happen to them if they do not do what the message recommends (fear appeal). For decades it had been assumed that such messages automatically lead the target towards a danger control process, wherein people cognitively deal with a given danger or threat by changing their attitudes, intentions or behaviours to prevent the threat from occurring (Witte K., 1992).

Recent research indicates a more complex theoretical approach, highlighting the importance of fear control strategies as a key factor in message rejection e.g. how people deal with their fear by denying or defensively avoiding the threat. In addition, the importance of “message receiver dependant variables” such as susceptibility, severity, response efficacy and self-efficacy has been shown in health campaigns (Cho et al., 2005)

Conclusion

In the last five decades, the field of dog bite prevention has evolved from ‘safety rules’ toward anticipatory guidance and creating awareness of potential risk situations (Love and Overall, 2001, Reisner and Shofer, 2007, Meints and De Keuster, 2009). According to research in communication sciences however, a prevention message such as “every dog has the potential to bite, and programme X will help you to live safely with your dog” runs the risk of inducing a fear control process and message rejection (Cho and Witte, 2005). In collaboration with professionals from the Flemish Institute for Health Promotion and Disease prevention, an extensive redevelopment of the Blue Dog website has been undertaken to minimise fear appeals and improve chances of message acceptance (Cho and Witte, 2005, Gore and Bracken, 2005). The design is intended to be attractive to parents and children. In addition, the website will provide information and downloadable resources for parents, children, health professionals and school teachers. The wide range of information to be included on the website will provide scope to offer partnerships to a large number of associated groups and hopefully expand the network of organisations associated with dog bite prevention.

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Keywords: dog bite, child, prevention, fear appeals

Studies on classifying abnormal-repetitive behaviours in dogs

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Introduction

Abnormal-repetitive behaviours (ARBs) are a subset of behaviours that are frequently repeated, invariant in motor output, and independent of environmental interaction or goal. Furthermore they are apparently functionless, maladaptive, self-injurious, additionally inappropriate or odd (Turner, 1997; Garner, 2006). They are common in dogs and can involve different behaviour patterns, such as licking leading to lick granulomas, tail chasing, light chasing and shadow staring. In human medical science ARBs are classified among others into stereotypic behaviours and compulsive disorders (CD) based on measurable characteristics (APA DSM-IV-TR, 2003; WHO ICD-10, 2000), while this has not been the case in clinical veterinary science so far. Thus, there is some confusion in the use of the terms “stereotypy” (Mason 1991) and “(obsessive) compulsive disorder” (Lüscher et al. 1991; Lüscher, 2002), as these terms are often used interchangeably. However, stereotypies and compulsive behaviours are likely caused by different factors, reflecting different disorders (Garner 1999). Stereotypy, for instance, comprises the abnormal repetition of a motor pattern whereas compulsive behaviour includes the abnormal repetition of a behavioural goal (ICD-10, 2000; APA DSM-IV-TR, 2003; Garner, 2006). Furthermore, stereotypies are characterised by invariance, being repetitive and serving seemingly no function (Holzapfel, 1938; Ödberg, 1978; Mason, 1991), while compulsive behaviours may be variable in form and have apparent goals and hence can differ also phenomenologically from stereotypies (Nicol, 1999; Garner, 2006). Moreover, there is good evidence that stereotypies reflect dysfunction of the basal ganglia (Martin 1991), whereas CD is associated

with dysfunction of the prefrontal cortex (Turner 1997). Studies in humans show that dysfunctions of these two different brain areas are associated with different impairments in executive processing resulting in different forms of perseveration (e. g. Owen et al. 1993). Perseveration is the inappropriate repetition of behaviour elicited in an experimental or diagnostic context, and different forms of perseveration are associated with stereotypies and CD, respectively (Turner 1997). While stereotypic behaviours are associated with recurrent perseveration – the inappropriate repetition of previous responses – which is mediated by the basal ganglia dysfunction, CDs are associated with stuck-in-set perseveration – the inappropriate repetition of goals – due to dysfunction of the prefrontal cortex. Recurrent perseveration can be assessed using a “two-choice gambling task” (Frith and Done 1983), whereas stuck-in-set perseveration can be assessed using an “intra-dimensional extra-dimensional (IDED) set shifting task” (Owen et al. 1991). Importantly, Turner (1997) showed that while recurrent perseveration correlates with stereotypy performance and stuck-in-set perseveration with compulsive behaviour, there was no correlation between stuck-in perseveration and stereotypy performance and no correlation between recurrent perseveration and compulsive behaviour. Based on these findings, we aimed to adapt both the gambling task and IDED task for use in dogs in view of classifying abnormal-repetitive behaviours into stereotypies and compulsive behaviours. The issue of classification and definition remains important, particularly in relation to the growing use of psychopharmacological treatments, which might be inappropriate if no definitive diagnosis can be made. Hence the aim of this study was to investigate the relation between scores in these two tests and performance of various ARBs in dogs to examine whether these tests provide a means to distinguish stereotypies from compulsive behaviours and thus improve the understanding and eventually the therapy of ARBs in dogs.

Materials and methods

Thirty-four pet dogs (*Canis familiaris*) of varying breeds, colours and ages were used for this study. Of the 34 dogs, 10 were in the healthy control group, 7 showed tail-chasing, 10 showed light chasing and shadow staring and 7 were suffering from lick granuloma. Each dog was tested on both tasks after some pre-training conducted by their owners.

The gambling-test consisted of 81 trials in which the dogs had to choose one of two food bowls placed at some distance from each other. On each trial, one bowl was baited with a food reward. Overall, the two bowls were baited pseudorandomly with equal probabilities, but probabilities were adjusted based on the last 20 trials so as to counteract side bias. Thus, there was no rule by which the dogs could learn to predict the baited bowl, and the only way to maximise food reward

was by visiting each side equally often. Recurrent perseveration was calculated using 3rd order Markov Chain Analysis to assess sequential independence across each successive tetragram of 4 choices, whereby recurrent perseveration is characterised by higher frequencies of repetitions (RRRLLLLRR) or alternations (RLRLRLRLRL) than predicted by chance.

In the IDED-test, the dogs were trained on a series of compound discriminations based on two different stimulus dimensions (shape and material of objects), including reversals and intra-dimensional shift to facilitate the formation of an attentional set (with respect to the relevant stimulus dimension), before they were tested on an extra-dimensional shift (EDS), where the previously relevant dimension became irrelevant and the previously irrelevant dimension was replaced by a now relevant new dimension (size of objects). Stuck-in-set perseveration is characterised by difficulties to shift attention from the previously relevant dimension to a new dimension and was measured in terms of the number of errors until reaching the learning criterion of 8 correct choices out of the last 10 choices.

Results

The gambling-test was finished successfully by 33 of the 34 dogs. Twenty-three of these dogs showed statistically significant perseveration. However, dogs of all four groups including healthy dogs from the control group were affected. Thus, there was no significant difference between the four groups (ANCOVA: $F_{3,25}=1,9792$; $p=0,143$) and contrary to previous studies on other species, we found no correlation between recurrent perseveration and performance of any of the three different ARBs (all $p > 0,05$).

Thirty-two of 34 dogs successfully passed the IDED-test. In none of the different discriminations was there a significant difference between the control group and the three groups of dogs with different ARBs (all $p > 0,05$). Importantly, there was no significant effect of group on the number of errors to reach criterion in the ED shift (ANOVA: $F_{3,22}=0,28$; $p=0,836$), and performance in the ED shift did not correlate with any expression of any of the three ARBs (all $p > 0,05$).

Discussion and conclusion

Contrary to findings in other species (z. B. Dias et al., 1996; Levy et al., 1997; Turner, 1997; Birrel und Brown, 2000; Garner, et al., 2003, 2006) we found no evidence for a relation between ARBs and generally perseverative behaviour in dogs. Two main reasons may account for these discrepant findings. First, throughout the population of dogs tested in this study, the expression of ARBs was rather mild, and underlying differences in perseveration may have been too subtle to be detected by the two tests. The small sample sizes may have further contributed to

this lack of sensitivity. Second, the tests may not have been accurately adapted for use in dogs. In particular, from the results of IDED task it appears that the dogs did not establish an attentional set which is a prerequisite for testing ED shift. Nevertheless, this study may provide a valuable approach for classifying ARBs into stereotypies and compulsive behaviours based on biomarkers of the underlying deficits. Furthermore, it may provide valuable guidance for further research in view of developing and validating adequate tests to assess such biomarkers.

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Keywords: Abnormal-repetitive behaviours, Obsessive compulsive disorders, stereotypies, dogs

A practitioner's perspective on continuing professional development in communication skills and personal competence

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Introduction

As veterinary behaviourists there is ample opportunity to increase our theoretical knowledge by participating in courses and conferences. It is more difficult with professional skills and personal competence. The aim of this study/review was to investigate client evaluation, video evaluation and reflection logs as tools for developing communication skills and personal competence.

Literature review

Competence has been defined as the triangle of theoretical knowledge, personal competence and the skills used in the profession (Skau, 2005).

As veterinary behaviourists we need theoretical knowledge in the following fields: veterinary medicine, ethics, communication, behaviour analysis, observation, ethology, animal welfare, psychopharmacology, learning theory, and diagnosis of behaviour problems.

The skills needed are, for instance, relationship building, listening and effective questioning, owner motivation, animal handling, animal training and instruction of owners as to how to train their animal.

Personal competence is a term used for the competence we develop as a social being, but there is no universally valid definition, and Skau (2005) lists 67 behaviours/characteristics that she includes in the term. From this list the following characteristics are emphasised in this study: sincere interest in other people,

capacity for empathy, belief in other people's capacity for change and development, coping with clients during the process of change, respect for and acceptance of differing qualities of clients.

Materials and methods

This presentation relates to a qualitative development project started in 2007, where the focus for analysis was the author's communication skills and personal competence.

The methods for developing personal competence were:

- 1) Self-awareness of the author's own behaviour during counselling sessions
- 2) Openness to feedback from others
- 3) Creativity and ability to try new strategies
- 4) Supervision from colleagues
- 5) Willingness to allow for trial and error learning

The primary source of data was the author, and observations and analyses were collated from her own experiences. Aids used in the process were:

- 1) videoing of counselling practices
- 2) reflection logs
- 3) supervision via counselling colleagues
- 4) Questionnaire to clients

The quality of counselling is rarely researched. It is a complex task since the effect of the counselling depends on the client and on the questions which are used in the process of evaluation. In this study the author gathered information from 40 clients (31 women, 9 men), with 25 dogs and 15 bitches, covering four topics: demographics, changes in the use of reward and punishment, motivation and success/failure. The focus for analysis was whether the author's change in practice influenced the owners' motivation and feeling of success.

Results

The author's change in counselling practice started in the autumn of 2007, coinciding with start of a University course in counselling and coaching (60 credits). The aim was to change from an advisory style of communication to a more coaching style, involving contribution to the owners' ownership of the advice and commitment to the work involved as well as the owner's responsibility of keeping focus. Specific goals were empowerment of the owners and acknowledgment of their status as experts in relation to their own pets.

Specific changes that were made included increasing the length of the introduction phase of the consultation, where the author would talk about the structure of the consultation, roles of the participants, and phases that a behaviour modification process includes. Emphasis was placed on communication skills such as listening, effective questioning and challenging. Sincere interest in other people and belief in their capacity for change and development were the two important challenges the author set for herself in terms of personal development. The use of video, reflection logs, and supervision by colleagues helped with this process. Obstacles for change were observed, and these included the ease of going back to old habits of a short introduction and the ease of going back to the use of an advisory role when the client came to the consultation with those expectations. A third hindrance was the challenge of clients with beginner/novice skills in the behaviour modification of dogs.

The preliminary results from the questionnaire indicate that the clients' motivation is higher with the changed communication style and that perception of success is more common. This is also supported by the increased number of revisits per client, and the increased frequency of visits.

Conclusion

This study cautiously suggests potential ways to develop one's skills and personal competence. It is a qualitative development project with pitfalls related to generalisation and validity and therefore the reason for increased motivation is only partially explained. The main aim of this study is to get the reader to reflect on their own skills and personal competence, and to spur some interest in supervision via counselling colleagues.

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Keywords: skills, personal competence, continuing professional development

Lack of activity hypothesised as the mean cause of behavioural problems in dogs and cats

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Introduction

Years of clinical observation has shown that the majority of behavioural cases presented to me in a referral behavioural practice are related to owner concern related to dogs and cats exhibiting excessive levels of unwanted behaviours (such as vocalising, destroying or being aggressive). The logical explanation is that pets are bored and try to adapt to boredom by producing behaviours shaped by their biology and the environmental possibilities.

Hypotheses

I hypothesise that the majority of urban pet animals lack activity, and that if the owners could supply them with enough activity to satiate their physiological and ethological needs, these problem behaviours will improve (Dehasse, 2009a).

My second hypothesis is that the general activity level of dogs and cats is intrinsic and biologically predetermined. The mean activity need is believed to be between 3 to 5 hours a day with extremes going as low as half an hour to as much as more than 15 hours; a record in my practice being 23 hours of diverse activities a day with only one hour of sleep (Dehasse, 2009a, 2009b).

The third hypothesis is that the general activity level is the sum of all forms of activities, such as hunting, searching for food, walking, vocalizing, chewing, playing, and so on. I put this idea in a subjective formula: $A_G = \text{SUM}(A_X)$, X being the different kinds of activities a dog or cat may produce (Dehasse, 2009a, 2009b).

$$A_{\text{General}} = A_{\text{Securization}} + A_{\text{Hunting}} + A_{\text{Feeding}} + A_{\text{Sexual}} + A_{\text{Motor}} + A_{\text{Vocal}} + A_{\text{Chewing}} + A_{\text{Social}} + A_{\text{Play}} + A_{\text{Aggression}} + A_{\text{Cognitive}} + \dots$$

Each category of activity should be weighed by a coefficient. For example I observe that motor activity (such as running and jumping) is less tiring than cognitive activity (such as object or symbol discrimination).

The fourth hypothesis is that each kind of activity is partially biologically predetermined. For example, the hunting behaviour can be divided in motor patterns such as observation, stalk, chase (pursuit), grab and kill-bite (Coppinger, 2002, Dehasse, 2009b). The repartition of each motor pattern can be described by a Gauss curve in the general population, each dog being at a specific place on the curve depending on its biology (genetics). For example, if a Border Collie needs to chase, he will. Whatever methods we use to try to stop this behaviour; it will be easier to redirect it than to stop it.

Methods and results

A review of 350 past cases showed that 295 (84,3%) dogs and/or cats (in my referral urban behavioural practice) suffer from lack of activity and produce problem activities such as vocalisation, chewing, excessive motor activity and aggression.

Using the activity formula hypothesis in clinical practice shows owners which kinds of activities they can give their pet. If my third hypothesis is correct, then to reduce one kind of problem activity, it is sufficient to increase another kind of accepted activity. For example, if a dog is vocalising too much, giving him more chewing activity might reduce the vocalisations. But my fourth hypothesis suggests that it will be impossible to eradicate a motor-pattern under its biological drive level (Dehasse 2009a, 2009b).

Most of the owners, who have limited time to provide their animals with various activities, choose activities that the animal can do by itself, such as chewing or searching for food. Alternatively they select activities that seem more tiring such as obedience and cognitive tricks.

Medication is the only way to reduce the general activity level artificially. Psychotropic drugs such as Fluvoxamine, Clomipramine and Fluoxetine reduce the general activity drive by 30 to 50%; other drugs such as Sertraline seem to have no effect on the general activity need. Often drugs will reduce the activity drive to an acceptable level for the owners, so that they are motivated to start the behavioural therapies and environment enrichment. Using this activity formula enables me to decrease the need for medication by 50%.

Combining this formula with a simplified version of Maslow Pyramid of needs (and motivations) (Maslow, 1943, 1954, Dehasse, 2009a, 2009b), I have also been able to alter compulsive disorders and other hyper disorders (such as hyperactivity) without medication, and redirect them into structured activities with high levels of owner satisfaction.

Discussion

The Activity Formula is a theoretical model; it is also clinically very effective. However, it is difficult to prove in clinical practice. It is possible to determine the movement level of dogs and cats using activity monitors, such as Actiwatch and Actical, but these will not give us information about the observation and cognitive activity times. Despite this, it would be a good starting point to measure the disparities between the general activity levels of different dogs and cats (individuals and breeds). This would also give the weighting coefficient for each kind of activity in the activity formula.

Being a clinician, I did not do this scientific analysis but I do have clinical knowledge of the efficacy of the activity formula. My intent is not to prove that the formula is true – it is a model and no model can be true – but that it is effective in practice (Dehasse 2009b).

Conclusion

The activities required by a companion animal can be modelled in a formula: the activity formula. Increasing and diversifying activities in city dwelling companion animals reduces many of the behavioural problems that these animals show because of boredom, especially those resulting from a lack of respect of their basic biological – genetically programmed – activity needs. The activity formula helps us and the owners to understand which kind of activities will assist the animal in satisfying its needs.

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Keywords: activity, hyperactivity, motivation

Does the response to, and recovery from, a threatening olfactory stimulus vary between cats of different coat colours?

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Introduction

Despite anecdotal report as to the relative influence of coat colour on styles of behaviour in the domestic cat, there has been little research on the association between colour and behavioural responses to stimuli. The aim of this study was to compare the response of cats of two different colour categories to a standard olfactory 'stressor' in a rescue shelter environment.

Materials and methods

The sample included all ginger, tortoiseshell and black and white (BandW) cats entering a large rescue shelter, which fulfilled inclusion criteria. The 41 cats were 9 ginger, 13 tortoiseshells, 10 BandW males and 9 BandW females. Ages ranged from 1–14 years and time in centre between 7 and 97 days. A modification of the McCune/Kessler and Turner cat-stress-score (CSS) (McCune 1992; Kessler and Turner 1997) previously validated in rescue shelter cats (Hawkins et al. 2006) was used. The score was recorded remotely to avoid observer effects (Hawkins et al. 2006). For baseline measures, the researcher approached the pen after a standard period of habituation to the camera, opened the door, closed it again, and left the pen area. CSS was taken from recordings at 20 seconds and 2 minutes after door

closure. The protocol was repeated, but a swab of mixed excretory urine from 4 male and 1 female cats was introduced when the door was opened.

Results

No differences in age or time in shelter were found between groups. Mixed between-within subjects ANOVA investigated the differences between colour with change in CSS between tests. No significant interactions enabled clear interpretation of between and within subject effects. CSS significantly varied over time from baseline (Wilks Lambda = 0.306, $F(2,44) = 49.865$, $p < 0.001$, partial eta squared = 0.694) and varied significantly between colours ($F(1,45) = 4.533$, $p < 0.05$, partial eta squared = 0.92). Post-hoc analyses revealed this difference to be greater at the final CSS measure (recovery) and in male cats.

Conclusion

The results of this study suggest a difference in the way that cats of different colours respond to, but particularly recover from, an olfactory stressor.

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Keywords: Cat behaviour styles; Coat colour; Olfactory stimulus; Cat stress score

First social isolation for puppies: evidence of significant stress from physiological and behavioural indicators

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Introduction

Social isolation is an inherently difficult state for dogs (Gazzano, et al., 2008). The sequence of events which involves firstly separation from the litter and then arrival in a human family can be a risk factor for adoption failures (Gaultier, et al., 2008). The aim of this study is to demonstrate the changes in physiological and behavioural parameters of stress that occur during puppies' first experience of social isolation.

Materials and methods

A range of parameters were evaluated for 30 puppies aged 7 to 8 weeks, during a standardised test: namely the first period of social isolation after separation from the litter. The group of puppies was standardised with reference to gender and degree of kinship. The following physiological parameters were considered: heart rate (HR) and plasma concentration of ACTH and Cortisol. Behavioural parameters analysed were the duration and frequency of puppy vocalisations during the test (Software Audacity®)

Data collection occurred at T₀: before the separation; T₁: after 15 minutes of separation and social isolation.

Results

We found significant differences between T₀ and T₁ for plasma concentration of Cortisol (ddl=29; F=-7.48; p=<0.0001; Student paired T Test) and ACTH (S=-188; p=<0.0001; Wilcoxon signed rank test); for the HR, a statistical trend was identified (S=-79; p=0.07; Wilcoxon signed rank test). Results of vocalisations were: duration (215.63 ± 186.4 sec) frequency (30, 13 ± 17,66).

Conclusions

This study offered a practical approach to the investigation of physiological and behavioural indicators of stress during the first period of separation from littermates, which is a significant stressful event even for puppies as young as 7 to 8 weeks old. The physiological results add interesting data for interpreting the effects of social isolation which is a crucial event in the development of the puppy, and for developing preventative intervention of veterinary behaviourists, in order to avoid future behavioural problems in dogs.

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Keywords: ACTH, cortisol, social isolation, puppies

Effect of early events on the response to stress in puppies

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Introduction

Individual differences in behaviour can be the result of the events occurring during early life. The purpose of this preliminary study was to evaluate the effect of the neonatal environment on the stress response in puppies.

Materials and methods

Twenty three puppies from three different litters (A, B and C) were assigned into three treatment groups. Group 1 (n=7) was handled for 5 minutes once a day, group 2 (n=7) was handled for five minutes three times a day and the control group (n=9) was left unhandled. Handling procedure was performed daily from the 3rd day of life until the 21st. In order to assess the emotional response to stress an Open Field Test (OFT) was performed at 40 days old.

Data were analysed using SAS 9.1. The differences between treatments and litters were analysed via parametric test (ANOVA). Values of $p < 0.05$ were regarded as significant.

Results

No differences were detected between treatments. However, a significant difference between litters was found. Puppies from litter B took more time to leave the first square ($p = 0.04$), did more escape attempts ($p = 0.0004$) and showed a tendency to cross more squares ($p = 0.06$). In order to determine the possible causes

of these variations between litters the behaviour of the mother was evaluated by means of an OFT. It was then observed that the mother of litter B was the one that performed more attempts to escape (93.3%) and that crossed more squares (54.0%).

Conclusions

This preliminary study suggests that there is an important influence of the behaviour of the mother on the individual differences in response to stress in puppies.

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Keywords: dog, handling, neonatal, mother

Harmonease[®] reduces noise induced fear and anxiety in a laboratory canine model of thunderstorm simulation; a blinded and placebo controlled study

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Introduction

Thunderstorm simulation in the laboratory setting induces fearful and anxious behaviour in Beagles, most notably manifested by increased inactivity (“freezing”), which, in a previous study, was ameliorated by the anxiolytic diazepam (Araujo, et al., 2009). Using this protocol, this study assessed the efficacy of Harmonease[®] (Veterinary Products Laboratory, Phoenix, AZ), a chewable oral anxiolytic botanical product containing a proprietary blend of extracts of *Magnolia officinalis* and *Phellodendron amurense* (Maruyama, et al., 2000)

Methodology

A balanced, placebo controlled, blinded single crossover design was used utilising 20 healthy adult Beagles. Following a baseline thunderstorm test, subjects

received *Harmonease*® chewable tablets or placebo treatment daily and were re-assessed on the 7th treatment day. Following a 7 day washout, the treatments were crossed over and an identical design as the first phase was employed. The thunderstorm test was performed in an open field arena and consisted of three 3 minute phases: an anticipatory phase in which no stimulus was provided; the thunderstorm phase in which a thunderstorm track was played over a loud speaker; and a recovery phase in which no stimulus was presented. Inactivity duration was considered the primary variable for assessing efficacy, was measured by a trained observer, and was defined as an animal sitting, lying down, or standing still, and not exhibiting any overt movement.

Results

Harmonease® significantly reduced inactivity duration during the thunderstorm phase. Specifically, 12/20 (60%) dogs improved from baseline under *Harmonease*® while only 5/20 (25%) improved on placebo. Furthermore, 9/20 (45%) placebo dogs showed increased inactivity duration (worsened), while only 4/20 (20%) treatment dogs worsened. Difference in number of dogs improved versus worsened by treatment group was significant at $p < 0.05$.

Conclusions

Harmonease® reduced fear-related freezing in dogs in this thunderstorm simulation model. This supports previous studies demonstrating that the combination of botanical extracts in *Harmonease*® is effective for the management of stress related behaviours (Maruyama, et al., 2000, Sufka, et al., 2001)

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Keywords: Fear, Thunderstorm, *Magnolia officinalis* and *Phellodendron amurense*

Behavioural patterns and welfare implications in Valdostana Brown (Castana Nera) calves

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Introduction

Valdostana Brown is an Italian local breed (Aosta Valley, North Italy). Selected primarily as milk producers (e.g. for Fontina cheese production), in the Alpine summer pasture system, they are dairy cows with secondary dual purpose (milk and beef). The alpine environment does not provide conditions ideal for outdoor rearing in all seasons, thus the calves require housing during their first months in order to protect the animals from adverse weather conditions. The aims of this study were to analyse the behavioural patterns of calves from 2 until 6 months old in experiment 1 and to compare two housing systems for 6 months calves, indoor pens (IP) versus outdoor pens (OP), in experiment 2.

Materials and methods

The study was carried out in a typical Aosta Valley farm over a period of 5 months (March–August 2008).

In experiment 1, after preliminary evaluation of the daily routine for Valdostana Brown calves, six female calves were followed from the age of two months up to 6 months of age. The animals were observed for 8 hours in 4 monthly sessions. They were managed in loose littered house pens (IP=Indoor Pen), which is the current system according to the law (91/629/EC revised by 2008/119/EC).

In experiment 2, two housing systems for calves were compared. The behaviour of the 6 calves previously managed in indoor pens was analysed in comparison to 6 calves of the same age managed in outdoor pens (OP = Outdoor pens).

Activities were recorded continuously. All behaviours were scored from videotape. Descriptive and statistical analysis SPSS 11.5 t-Test for Independent samples; $p < 0,05$ (experiment 2).

Ethological species-specific parameters were identified according to those found previously published (Hafez, 1969; Houpt, 2000; Mendl, 2001; Margerison et al., 2003; Van Reene, 2005; Færevik et al., 2008; De Paula et., 2008). A total of 34 events were video recorded, analysed and categorised according to previous published studies where they were classified as indicators of good or poor welfare: biorhythms (lying; total, on sternum and recumbent, food intake, rumination, sleeping, standing, vigilant resting, standing up, lying down, water intake, urination, defecation; playing behaviours (chasing, gambolling, kicking, bucking, head pushing, mounting, escape); socio-environmental interactions and stereotypes (scratching, grooming, chewing, licking, suckling, sniffing, tongue playing and rolling).

The time that the observers were present in the stables to video record the animals was selected taking into consideration the management requirements and biorhythms of the calves, the results of preliminary assessments, data collected by the farmers and their staff, and the analysis of data available in the literature (Veissier et al., 1989; Jensen et al., 1997; Houpt, 2000; Babu et al., 2004; Hepola et al., 2006; Lauber et al., 2006; Færevik et al., 2007).

The preliminary evaluation sessions served as a preparation for the subsequent experimental sessions; in particular, to allow the animals to become accustomed to the presence of the observers and the equipment used for video recording. Moreover, during each session, filming was preceded by the observers spending 30 minutes in the barn so that the animals habituated to the presence of the investigators.

Each session consisted of 8 hours of continuous observation in the cattle shed with the constant presence of two observers; actual filming lasted for a total of 4 hours per session. Two cameras were used (a Sony HC 30E and a Canon MV 550i). Films were then converted into a form suitable for viewing on computer screen and analysed in duplicate at real speed.

Behaviours were assessed for either the duration of time (T) that they were performed (to the nearest minute) or the frequency (N) at which the specific behaviour was performed. Data expressed as a length of time (T) are reported to the nearest minute, while behaviours analysed by frequency (N) were calculated considering the number of times the initial phase of a behaviour was performed, even when the behaviour was repeated with some modifications (Margerison, 2003).

Results

Experiment 1

Laying down seems to be the predominant position (mean = 35,19), on sternum (mean = 22,77) and recumbent (mean = 12,38) versus standing (mean = 24,81). They sleep (mean = 13,74) much more than they are vigilant (2,49). Rumination and food intake are important activities (mean = 14,83 and 12,34 respectively). Playing behaviour and socio-environment interactions are poorly represented. Stereotypes/displacement activities are performed: tongue playing (0,32) and tongue rolling (0,43) as well as tail (mean = 0,05), ear (mean = 0,28), teat (mean = 0,34) and muzzle (mean = 0,77) suckling. Allogrooming (mean = 0,46) and autogrooming (mean = 0,81) were present too.

Experiment 2

IP calves spend more time lying down than OP ($p = 0,10$). Food intake is significantly higher in OP ($p = 0,008$) while water intake and defecation are the opposite ($p = 0,049$). Self grooming ($p = 0,06$) is exhibited more in IP while allogrooming ($p = 0,049$) in OP. Tail, ear, muzzle and teat suckling ($p = 0,049$) are significantly higher in IP than OP. Gambolling ($p = 0,01$) head pushing ($p = 0,004$) and mounting ($p = 0,049$) differed significantly in the two groups, since the calves in pasture showed these behaviours more frequently than the others.

Discussion and conclusion

Currently in the field of applied ethology the correlations among behaviour, stress, welfare and livestock are of particular interest (Hasewaga et al., 1987; Krohn, 2001; Fregonese and Leaver, 2001; Juarez et al., 2003; Hill et al., 2009). Parameters used to evaluate welfare indicators and based directly on the response of the animal can be classified as zootechnical, physiological, pathological and ethological (Broom, 1986; Broom and Johnson, 1993; Cozzi et al., 2006). In the present study some ethological parameters were identified for the bovine species, considering the relative expression of welfare based on data published in literature (Broom, 1986; Veissier, 1998; Marques et al., 2005; Bouissou and Boissy, 2005).

The results of the present study confirmed that welfare assessment needs to take into account not only the housing and management practises but also the genetic variability of the animals and the effects of selection on their ability to cope with the environment. Even provision of sufficient space, proper facilities and social contact cannot provide totally natural conditions for livestock. This is the reason why it is crucial to assess behavioural patterns by carrying out observations and measurements in different breeds and geographical and socio-economical areas, according to the respective expectations in animal production and performance.

Further research in applied ethology in different breeds and contexts could provide further interesting and concrete information for improving the protection and welfare of animals kept for farming purposes.

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Keywords: Valdostana Brown, calves, behaviour, welfare

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Papers

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- 118** Pain-related aggression in dogs: 10 clinical cases
T. CAMPS
- 120** Separation anxiety in dogs: a case report
F. KUHNE
- 126** ‘Leo’ and ‘Knurz’ – a case report
H. BERNAUER-MÜNZ
- 129** The rabbit – behaviour, problems and behavioural therapy
A. McBRIDE
- 136** New German laws have changed the lives of dogs and their owners – but Germany is not any safer!
W.-D. SCHMIDT
- 140** Epilepsy – classification, treatment, and co-morbid behavioral problems
M. GERNERT
- 148** Pain and its morphological features – structural basics
H. GASSE

Pain-related aggression in dogs: 10 clinical cases

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The International Association for the Study of Pain (IASP) defines pain as an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage^{1,2}. It is widely accepted that pain can cause aggressive behaviour that is often described as a defensive reaction to avoid physical contact that may cause further injury^{3,4}. Pain also elicits a stress response that may reduce serotonin activity in the brain and this may in turn increase the dog's tendency to behave aggressively⁵. This second mechanism whereby pain causes aggression could result in a pattern of aggressive behaviour that is different from a defensive reaction. The aim of this study was to obtain preliminary information on the different patterns of aggressive behaviour induced by pain in dogs.

We present ten clinical cases of pain-related aggression in dogs. In six cases, the cause of pain was a hip orthopaedic disorder. The mean age of the dogs was 5.5 (range 1–13) years. Nine dogs were males and one was female. None of them were neutered. Four dogs showed a defensive body posture and facial expression, one dog showed ambivalent body language and in the remaining five cases the body language was not known.

Six dogs had not shown aggression before the onset of pain. Five of these animals showed impulsive aggression when somebody attempted to touch them (i.e. showed a lack or a reduction of warning signals before the attack). The remaining four dogs had shown competitive-related aggression before the onset of pain and all of them showed an increase in the intensity and/or frequency of aggression, but only one of them showed impulsive aggression. The statistical analysis shows that dogs which had not shown aggression before the onset of pain have a tendency to display impulsive aggression when in pain ($Df=1$; Chi-square=3.4; p -valor=0.0651).

It is therefore suggested that pain may cause two different patterns of aggressive behaviour. In dogs that have not shown aggressiveness before the onset of pain, pain is likely to cause impulsive aggression to avoid physical contact. In contrast, dogs that have behaved aggressively before the onset of pain tend to show an increase in the intensity or frequency of aggressive behaviour with a less pronounced risk of becoming impulsive.

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Keywords: Pain, aggression, dog, canine

Separation anxiety in dogs: a case report

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Introduction

The most important signs of separation anxiety in dogs, which might be shown during the time the dogs are left home alone or separated from their owner, are increased vocalisation, physical destruction of the environment, restlessness, vigilance or even self-mutilation. Even though some of these behaviours can be or become self-rewarding, they usually indicate a highly aroused emotional state. In some cases, outcomes of an activated autonomic system (like salivation, sweaty feet or elimination problems) can be seen. Often, owners have unintentionally reinforced the anxiety or distress during separation, e.g. by trying to stop vocalisation through reassurance behind the closed door or by giving the dog too much attention when leaving or coming back (Lund and Jorgensen, 1999; Overall, 1997).

Separation anxiety is often accompanied or caused by hyper-attachment, which can easily evolve when a dog was never separated from people after weaning, spent a long time in an animal shelter or had to change owners and households frequently. “Spoiling” by people, especially during or after a time of disease or serious injury (when a dog gets best care and extra attention) can also lead to a form of hyper-attachment, that may result in separation anxiety as soon as the owner or family continues the normal daily routine (Bradshaw et al., 2002).

An overrepresented piece of advice which clients often get is obtaining another dog. The second pet will usually not solve an underlying problem of focusing social attention on or forming a dependent relationship with a human or the whole family. Treating the separation anxiety with another dog may even worsen the dog’s condition through increasing the general anxiety caused by the abruptly changing social environment (Jago and Serpell, 1996; Schwartz, 2003).

Initial problem

Vocalisation and destruction of apartment in the absence of the owner

History

The dog, an 11-month-old castrated, 40 lb, male cross breed, was adopted at the age of 9 months from a shelter. Nothing was known about the first months of life or how many owners the dog previously had. The only information that could be given was that the dog vocalised a lot during his time at the shelter and had a food allergy resulting in itching skin. The owner, a single woman with inability to work, had no previous experience with pets. She tried to integrate the dog into her normal life. However, the woman did not try to find a daily routine with her dog that would have predicted her actions or activities, e.g. the dog could not rely on her being walked in the morning, so there were some elimination incidents in the early period after adoption.

After a short while, the dog started to follow the owner around the apartment and started to initiate interactions like petting or playing by nudging the owner's hands or bringing toys.

The owner did not establish an independent resting place for the dog such as a dog bed and the dog always stayed as close to the owner as possible during the whole day and night. Whenever the owner left home, she would come back to find the apartment destroyed. Neighbours reported excessive barking and whining as soon as the owner left the house and were annoyed by sounds of the dog pacing around the rooms for hours. While greeting the returning owner, the dog was extremely excited, trembling, panting and sometimes even started to chase its tail. The owner hereupon increased her interactions with her pet at home. She gave it even more attention and treats (which the dog never ate) when she left, but as soon as the dog got too excited and loud, she punished him.

The dog became increasingly agitated as the owner prepared to leave and the vocalisation and destruction got worse. On one occasion the dog was left alone for nearly 5 hours. During this time he damaged a whole carpet and almost thoroughly destroyed the door. After this incident the dog seemed to be even more anxious and excitable in general, so the owner decided to make an appointment at an animal behaviour clinic.

Consultation

During the first consultation two scenarios were tested: First, the owner was asked to leave the room for some minutes and second the owner was requested to ignore the dog after returning. The minute the owner left the consultation room

the dog became very nervous; he whined, yawned and walked around the room, until he heard sounds from outside of the door and lay down tensely in front of it. When the owner reappeared, the dog greeted her enthusiastically and, after being ignored, barked and started to chase its tail. After a few minutes the dog seemed to settle down slightly, lay down, but still remained agitated.

Physical examination

Several bald spots behind ears and on forelegs.

Behavioural findings

- Vocalisation (whining, howling, barking) and physical destruction of the environment when left alone
- Constantly following owner around the apartment
- Agitation and nervousness when owner prepares to leave
- Agitation when owner returns
- Initiating interactions through nudging and presenting toys
- Attempting to stay as close to the owner as possible in all situations
- Loss of appetite when left alone
- Panting, whining, yawning, scratching in several situations
- Tail chasing when owner ignores dog or sometimes when owner comes home

Differential diagnoses

Following the owner around the apartment, barking in the owner's absence and severe attention-seeking behaviour can often be part of controlling behaviour in dogs. Since the dog also paced around, panted and showed a loss of appetite when left alone, there seems to be an element of fear involved. Vocalisation can also be a non specific outcome of a distress response, e.g. in reaction to arousing stimuli (bells, street sounds, people talking, etc.). Sometimes this reaction is only shown when left alone, due to the fact that the dog is either intimidated or more relaxed when in company of the owner. Since the vocalisation starts as the owner prepares to leave, the absence of the owner seems to be the trigger for the behaviour (McGrave, 1991). Destructive behaviour can also be a random sign of boredom, general stress, or inanimate play. Since it is only shown in absence of the owner and is mostly directed to doors, doorways and flooring, there seems to be a definite intended outcome from the behaviour such as escaping the apartment or finding the owner.

Diagnosis

Separation anxiety

Secondary diagnosis

- Attention-seeking behaviour
- Hyper-attachment
- General anxiety
- Tendency to fall into compulsive behaviour when stressed

Prognosis

Guarded – due to:

- The unknown upbringing and history of the dog
- The character of the dog (very reactive, vigilant, nervous)
- The severity of stress reactions
- The extreme hyper-attachment
- The inconsistent life schedule of the owner
- The inexperienced dog owner

Treatment

The client was encouraged not to leave the dog alone during the first training period. An individually adapted behaviour modification programme for the dog was designed and in parts demonstrated to the owner. The first step of the programme focused on establishing a verbal cue for relaxation. The cue was combined with a special blanket or crate that could eventually be moved to different rooms or apartments. In the next step, triggers, which would usually provoke excitation (toys moving, owner walking around the room, telephone ringing, etc.) were included in the training routine. When the dog was able to stay in a relaxed mood in most situations, some critical triggers, that often predicted the soon departure of the owner were added. These triggers were also desensitised and counter conditioned during daily life. Finally, the dog was left alone for gradually longer periods of time. The owner was advised not to take leave or greet the dog after returning. To take security measures and give the owner a feeling of safeness in situations when she had to leave the apartment, she was shown how to train her dog to wear a muzzle (Overall, 1997, Tuber et al., 1982).

The tasks of the programme were broken into short training sessions to avoid overtraining the owner and the dog. More important, the owner was made

aware of rather mild signs of distress in the dog, which she did not notice before. Furthermore, she was advised to only train on a level at which the dog was still comfortable. She was also told to abandon every kind of punishment for anxious behaviour.

Though changes in daily routine were introduced very carefully (because of the easily stressed nature of the dog) it was recommended to gradually ignore more and more of the attention-seeking behaviour and the owner was advised to start interactions herself. This meant that the owner was advised to change her attitude towards her own reactions to the attention-seeking behaviour, since she reported that she appreciated the dog following her around or nudging her hand and had to force herself to ignore that behaviour. The suggestion of closing a door sometimes between her and the dog was not acceptable for her. She also objected to the use of any psycho-active medication or food-supplement, but she was agreeable to the purchase of chewable items and food games, to occupy the dog during her absence.

Follow up

The owner worked up to five times daily on tasks of the behaviour modification programme. The dog wore the muzzle during the training sessions and sometimes between trainings sessions in the apartment or on the leash during a walk. To monitor the success of training, the dog's behaviour while left alone was frequently videotaped. The owner was able to slowly increase the time she left the dog in the apartment, but after a time limit of 15 minutes no further progress in the training programme could be made.

Since she was more aware of her dog's body language, she now perceived stress reactions to numerous stimuli inside and outside of the apartment and observed the dog scratching and licking his forelegs more after particularly stressful incidents. At this time she finally agreed to the use of medication. After a thorough veterinarian check-up and a blood check was completed, it was decided to use amitriptyline (25mg bid), because of its additional anti-histaminic quality.

Further response

About 1 year later, the client could leave the dog alone for 2–3 hours at a time. After eighteen months she had been able to decrease the dose of amitriptyline gradually and the dog is now withdrawn from all medication. The tail chasing was seldom shown in the first months of treatment and was never seen again after 2 years. The dog is now 8 years old and still needs to be managed through a clear set of rules, designed to provide a reliable and predictable structure in its life.

Conclusion

The consequences of separation anxiety on dogs and on the human-dog relationship should not be underestimated. Severe cases of separation anxiety demand extensive treatment particularly in terms of animal well-being. The treatment plan needs to include encouragement for the owners, who often have to deal with setbacks in training or huge restrictions in their life, while they are trying to manage the condition of their dog. The therapeutic outcome of a severe case is decisively based on the compliance and training skills of the owner, therefore the mentoring as well as the training programme need to be very individual. Furthermore, the treatment plan should take into account the character-traits of the dog, which frequently make variations of well-established training methods necessary.

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Keywords: dog, separation anxiety, distress

‘Leo’ and ‘Knurz’ – a case report

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History

Family S. adopted two male Bengal cats, both 16 weeks old. Both cats were neutered at 6 months of age. The kittens had been reared together but were not siblings. The family decided to take Bengals, because these cats are considered to form strong attachments to their owners, have a low aggression level and can withstand a lot of stress (this was the opinion of the owner). The boys in the family, who were 10 and 8 years old, had a lot of friends and the family liked to have a lot of guests. Two cats were chosen because the cats were to be kept indoors and would be alone for a number of hours during the week, due to the owners' work commitments.

The cats had free access to the kitchen, the dining room and the living room upstairs. The bedrooms of the parents and the boys were at the other end of the corridor and were separated with a door and there was no access for the cats. The cats were allowed to use the balcony near the kitchen. There was no cat flap, but the door was always open. The litter box was on the balcony and two or three food bowls stood next to it. A second balcony, accessible through the living room was only available when a family member was present. A long staircase went from the dining room up to the living room. A big wooden cat house stood above the last step.

For 4 years there were no problems. The cats lay together everywhere, liked to sit at the table with the family and even with guests. The cat house was used by both cats together at the same time. Leo and Knurz spent a lot of time in close contact and groomed each other.

Every summer the family went for a holiday for four weeks and the father of Mrs S. cared for the cats. In 2008 however, during the summer vacation, a painter worked for three weeks in the kitchen and dining room. When the family came back Leo and Knurz were distraught. They tried to avoid each other. It got better, but they never regained the previous close relationship. The owners asked their veterinary surgeon for help. Feliway was installed in January 2009 but no clear effect was observed.

In February 2009, the family went away again for 1 week and during this time the cushions of the couch in the living room were re-covered.

In April or May 2009 Mrs S. noticed some yellow marks and recognised them later as urine.

In July 2009 the family went on their usual summer holiday. In contrast to previous years a good friend of the family looked after the cats this time, rather than Mrs S's father. When the family came back, urine was found in a lot of places: the cushions of chairs in the dining room, the curtains in the dining room and even places in the kitchen and corridor. The cats tried to avoid each other and some fur was found. Nobody ever saw the cats urinating outside the litter box, but Mrs S. thought Leo was the one doing it. Leo growled and hissed sometimes when Knurz went by, but fighting never occurred while the owners were at home.

The owners asked their veterinary surgeon for help again and was given the advice to get a second litter box. They bought one immediately and put it on the balcony near the other one. Knurz used it at once but Leo was never seen in it.

The problem behaviour deteriorated from day to day.

Blood tests were carried out but nothing extraordinary was found. The veterinary surgeon advised referral to a behaviour therapist in August 2009.

Diagnosis

Urine marking caused by environmental stress

Intermale aggression (?)

Therapy

General information about stressful events for cats were given to the owner.

One litter box was put in the corner of the dining room and a new one upstairs in the living room. Food and water were put in different corners and as far away as possible from the litter box. It was advised that a new cat house should be bought or made. The cushions of the couch in the living room were covered with plastic when no one was there. Mrs S. was requested to write a diary to note the following events: date and place of urine marking, stressful events for the cats and behaviour of the cats.

Bach flower remedies were given to both cats.

For Leo: Gentian, Honeysuckle, Mimulus and Willow.

For Knurz: Beech and Holly

Other suggestions were made such as placing food bowls indoors and providing hiding places but these were not accepted by the owner.

Follow up

After one week the owner called. There had been no incidents of urine marking during the previous week. Knurz and Leo were friendly toward each other and happy. At the weekend guests came. The cats behaved as usual whilst the visitors were present but on Monday evening Mrs S. found some urine marks again. Mrs S. was very distraught and nearly wanted to give up at once. She decided to persist with the treatment approach but was already considering rehoming both of the cats.

Ten days later the owner called again. The cats had nearly two weeks with no problems at all. Overnight guests came at the following weekend and on Monday the urine marking behaviour was worse than before. The next day the cats were fine, lay together and groomed each other.

It was suggested to carry out blood tests again because thyroid function had not been checked the last time. Results of the blood tests were unremarkable.

During the next follow up phone call the owner reported an event that had occurred during the most recent summer holidays, six weeks ago. This event explained why the behaviour between the cats had deteriorated. The talk will consider this event and how it was a factor in the change in the relationship between the cats and subsequent urine marking problem.

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Keywords: cats, stress, urine marking, environment

The rabbit – behaviour, problems and behaviour therapy

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Rabbits, both in the wild and domestic form, have had a long association with man. Wild rabbits are a major agricultural pest as well as a source of sport and food, obtained using dogs and ferrets (Drakeford, 2002). Domestic rabbits have been bred and kept primarily as a food item contributing to the diet of both humans and their meat-eating pets; dogs, cats and ferrets. They also contribute to scientific advances in a range of disciplines as laboratory test animals. However, over the last century a small proportion of rabbits have been elevated to the status of pets, and in the last twenty years it has become increasingly common for them to be kept as indoor pets, sharing the home of their owners, and in the last few years they have become popular in Animal Facilitated Therapy programmes (McBride et al, 2006). It is estimated that there are over 1 million pet rabbits owned by 2.6% of UK households (PFMA, 2010).

Accompanying the rabbit's raised status to pet have been the positives of increased veterinary care and possibilities for health insurance and a range of negatives; not least being an increase in deformities relating to breed types, obesity and teeth problems, the latter due primarily to inappropriate diet and lack of exercise, both physical and mental. These issues in turn lead to behaviour problems which can result in rabbits being abandoned to exist, or more likely die, in the wild or be given to rescue societies. It is estimated that some 35,000 rabbits per annum are relinquished to rescue in the UK, the majority within 3 months of being acquired (Copping, 2009). Rabbits that are properly cared for can have a life expectancy of 5–10 years (depending on breed), and will cost some 3000 GBP to keep, yet it would appear that they are becoming the latest victim of a pet owning society that does not understand the welfare needs of their animals.

Under UK law (Animal Welfare Act, 2006) owners are responsible for the welfare of their animals, as based on the five freedoms. Namely to ensure that the rabbit is FREE FROM: hunger, thirst, discomfort, pain, injury, disease, fear

and distress and has the FREEDOM TO express normal behaviour. In order to fulfil these obligations and thus prevent physical and behaviour problems, owners and their advisors, veterinary surgeons and behaviour counsellors, must have an understanding of what a normal rabbit is and does.

A major reason for rabbits being abandoned or given up to rescue societies, or merely left to eke out their days in solitary confinement in their hutch is because of behaviour problems – in particular aggression towards owners. Many problem behaviours are the result of misunderstanding between rabbit and owner and thus can be prevented or resolved. Sadly it is still the case that the rabbit that has turned aggressive is more likely to be deemed to have gone ‘mad and bad’ than to be seen to be fearful or even sexually aroused (McBride, 2000)

All domesticated rabbits are derived from a single species, the European rabbit (*Oryctolagus cuniculus*), whose Latin name literally translates as ‘Hare like digger of underground passages.’ In spite of some 500 years of domestication, studies have shown that the behaviour repertoire of domestic rabbits and wild rabbits hardly differs (McBride, 2000). It is crepuscular, spending much of its time underground in the dark, emerging on the surface in the evening and returning below ground soon after daybreak. Rabbits dig and chew to make their underground burrows and eat, socialise, play, court and mate above ground. They live in hierarchical groups and are territorial. The wild European rabbit is a successful species with a wide distribution across the European continent, having adapted to habitats ranging from the lush pasturelands and trim golf courses of Southern England to the chilly, snowy regions of Northern Europe. Yet they originate from the dry landscape of the Iberian Peninsular, notably Southern Spain, an area of hot summers and little rainfall and thus poor quality herbage.

The rabbit’s specialised digestive system is designed to extract the maximum amount of goodness from this poor quality diet through the process of caecotrophy (refection). Bobbing its head between its back legs the rabbit catches soft moist pellets from its anus direct to the mouth, chews them and swallows them again. The hard pellets on the cage floor are made up from the remaining indigestible portion of the diet. Rabbits are hindgut fermenters, adapted to digest a high fibre diet consisting mainly of grass. The gastrointestinal tract makes up 10–20% of body weight, and food moves rapidly through the gut, in about 17 hours (Lowe 1998). This is evolutionary advantageous as it enables the rabbit’s body size and weight to stay small (Meredith, personal communication).

In the wild foraging takes place mainly from early evening to early morning and at night, and accounts for some 70% of the night’s activity (Myers and Poole, 1961), with refection occurring during the day below ground. Domestic rabbits spend approximately 5% of a 24 hour period foraging (1.2 hours) (McBride, 1986). If the wrong type of food is provided, this behavioural and physiological need to keep the gut moving can be a major contributor to obesity. Many problems seen in pet rabbits are directly or indirectly due to an inappropriate diet. The major

food source should be hay or grass and herbs. Rabbits require a high fibre diet, provided in long, thin grass-shaped form in order to wear the teeth properly and keep the gut moving. Mal-occluded teeth cause pain and associated behaviour problems and are a major reason for animals having to be euthanised. The PDSA (2010) surveyed 30,000 rabbits at their attending veterinary clinics and estimated that, in the last 5 years, there has been a fourfold increase in the number of dental procedures conducted and a 35% increase in rabbits referred for teeth problems. Rabbits require a diet that is 25% fibre and provision of a constantly available, *ad libitum* source of indigestible fibre, hay or grass, will ensure adequate fibre levels, assuming the rabbit eats it! (Harcourt Brown 2002). Such forage also enables the rabbit to be mentally occupied and has been shown to prevent stereotypic behaviours (Lidfors, 1997; Hansen and Berthelsen, 2000), pica, barbering and fur-chewing as well as other behaviour, such as aggression, related to frustration (boredom) (McBride et al, 2004). Yet, many owners are unaware of, or choose to ignore such advice. This may be for anthropomorphic reasons, as hay is not the most desirable looking food to human eyes. Schepers et al. (2009) found that up to 20% of owners surveyed fed their rabbits bread, treats high in sugar and human snacks and that 15% of participants did not provide hay.

Rabbits are a prey species. They are to put it bluntly, Mother Nature's version of McDonalds, providing the ideal take away dinner for a range of mammals, birds and snakes. In their native Spain they make up a fifth of the diets of more than 20 different species. This underlies all of rabbit behaviour. Whilst it is important to have enough to eat, food for rabbits is relatively easy to come by and does not require chasing and killing. What is more difficult is ensuring staying alive long enough to eat and reproduce. This is opposite to predators. Dogs and cats have more difficulty in getting food, finding, catching and killing it, but have fewer enemies to worry about. Being prey animals, rabbits have a major need for adequate space to run and to have constant access to places of safety, such as boxes and pipes. Dixon et al (2009) found rabbits to be less active and interactive with environmental enrichments when in small cages.

As prey, being able to detect predators and having good spatial awareness, knowing exactly where you are relative to places of safety, is essential to survival, as is the ability to not draw attention to oneself. Rabbits have acute senses of sight, smell and hearing. They are alert, reactive and extremely prone to making fearful associations. Rabbits react adversely to bright lights, sudden movement and to loud or sudden noise, both sonic and ultrasonic. However, they do not have flamboyant methods of communication, unlike dogs and cats. Rabbits do not indicate when they are scared or in pain by making loud noises or showing obvious overt body language, even when they may have a fractured back! To do so would indicate an easy target to a predator. Instead they appear as quiet, stoical creatures, seemingly placid and 'laid back', and this is a problem for those living with humans, as misunderstandings are rife. For example, it is a common mis-

perception that rabbits like to be picked up and cuddled. Actually, being lifted can be very frightening for animals, loss of support is a biologically pre-disposed fear (Seligman, 1971). Whilst rabbits may choose to sit next to their owners and be stroked, that is quite different from being lifted and held in a manner similar to that of the grip of a predator.

A worrying example of such errors is the belief that rabbits can be put into a relaxed "trance". It is suggested by some that this is an appropriate way of bonding with a rabbit and is a means of 'curing' behaviour problems (Telegraph, 2010). Laying a rabbit on its back and gently stroking its belly will cause it to go still and apparently relaxed. However, this is what happens when a predator holds down its prey and licks the fur, prior to tearing the flesh. "Trancing" occurs in amphibia, reptile, mammal and bird species. It is a transitory and reversible state of profound motor inhibition known as Tonic Immobility (TI) or the 'death feint' (Darwin, 1839). Research with ducks (Sargent and Eberhardt, 1975) and quail (Thompson et al., 1981) have shown that TI reduces the risk of a fatal attack by a predator, by removing movement, the salient attribute that increases the probability of predator attack. Fear both elicits and maintains TI. Saterlee (1993) selectively bred quail for the trait of fearfulness and found these birds were more susceptible to TI and remained in TI longer. Likewise, Carli (1979) found that rabbits with higher than norm baseline plasma corticosterone levels had increased susceptibility to and longer durations of TI. Day et al (2006) found that both physiological and behavioural indicators show that rabbits are highly stressed by this procedure and remain so for at least 15 minutes after they have recovered from the immobile state.

Rabbits are social creatures, living in stable groups of 2 to around 14 individuals. Lisiewicz et al (2009) found faecal corticosterone levels to be significantly higher in rabbits housed alone and concluded that being housed alone is a source of chronic stress for both males and females. Ideally rabbits should be kept in neutered male-female pairs. Housing two males together can cause issues as male rabbit society is hierarchical. Females tend to live in a state of mutual tolerance until their first breeding season when serious, and fatal, fighting can occur (McBride, 2000)

As stated earlier, rabbits communicate subtly. The most obvious signal of anxiety or fear is thumping of the hind legs on the ground. Rabbits make various sounds including grunts, growls, purrs and in extremis, scream. Different body and ear postures indicate rank, pleasure, pain or fear and behavioural intent. However, scent, as with cats, is perhaps the most highly developed of their communication channels.

Chin rubbing on objects, people and other animals denotes territory and identifies group members. While performed by both sexes, males tend to be rather more enthusiastic and can have quite damp and sticky chins caused by the secretions from the scent gland located there (McBride, 2000). The role of

scent is important to remember should the rabbits need to be separated for any reason such as a veterinary visit. Swapping the body scents of each by rubbing with cloths, and putting used bedding from each animal in the others cage prior to reintroducing them in a neutral space will help prevent rejection and fighting between animals that had previously lived together peaceably (McBride,2009).

Rabbits also deposit scent with their faeces and will use latrines as boundary markers. The latrines provide both an obvious visual and olfactory signal to other rabbits. To those outside the group they act as a warning that they are about to enter another's territory.

The third use of scent is through urine spraying and this can be a problem to owners. Unlike cats and dogs that tend to only spray objects in their environment, rabbits also spray each other, and not infrequently people! Predominately a male behaviour this is directed at subordinate males or intruders, and it is part of the courtship ritual. Some pet rabbits can learn to spray as an attention seeking behaviour (McBride, 2000)

This brief introduction to rabbits should indicate that rabbit behaviour problems have causes similar to those of other species; including lack of socialisation, fear provoking experiences, or the display of normal behaviour which is not understood by the owner or is directed at inappropriate objects. There are medical reasons which must be eliminated as the first part of any diagnosis. Rabbits have memory of place, events and of individuals (based on scent). They can learn both classically and operantly. Thus desensitisation and counter-conditioning can be used for fear based problems, and behaviours such as come, settle, leave, lead walking, as well as many others can be trained to cue, ideally in a hands off manner, such as clicker training (Orr and Lewin, 2006). These can be used in behaviour modification programmes, as well as simply providing mental stimulation and enhancing the relationship with the owner. In addition, there are some tools that can specifically help rabbits such as appropriate hay/grass based diet and rabbit appeasing pheromone (Bouvier and Jacquinet, 2008).

Diagnosis of any behaviour problem needs to identify the underlying emotion that caused the behaviour be that anxiety of a fear-provoking event or of a frustrating event; and the outcomes maintaining the behaviour, be that anticipation/acquisition of something pleasurable (positive reinforcement) or anticipation/acquisition of safety and relief (negative reinforcement). Ensuring the animal has an appropriate environment and management that provides for its physical and psychological needs is essential to any programme and not least for rabbits.

This paper serves only to introduce the basics of rabbit behaviour and how they view the world in which we ask them to live. As with all animals, they are a unique species and behaviourists should acquire substantial knowledge of their ethology, nutritional and environmental requirements, as well as an understanding of medical issues that may relate to problem behaviour.

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New German laws have changed the lives of dogs and their owners – but Germany is not any safer!

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Since the year 2001/2 more stringent laws have been introduced following several incidents involving dog-bites in Germany. This has not only happened in Germany but also all over Europe. The aim was to reduce the threat and the injuries caused by dog attacks on humans.

What would have happened if...

... no laws had been passed for “aggressive *canis lupus*”?

We suggest that nothing would have happened. Unlike in other countries, a German exaggeration took place and in nearly every federal state in Germany a new strict law was introduced. However, the incidence of dog-bites stayed at the same level, even after the new strict laws were introduced and implemented.

The new laws tried to guarantee more safety by stigmatising dogs by breed, body-weight (20 kg) or height at the withers (40 cm).

Every specialist knows that a dog-breed is based on phenotype but not on genotype. Moreover aggression and bite-incidences are based on individual actual life circumstances.

Dogs can be trained to be aggressive and therefore the humans seem to be the cause.

What would happen if...?

... for the well-being of the dogs and the society all current or future owners had to prove their competence in dog-handling in an obligatory test, rather like getting a driving licence?

In 1886 Karl Benz built the first motor-car “Velo-Model“ and a long history of car accidents began. The more motor-vehicles were bought, the more humans were injured or killed.

A voluntary driving-licence was introduced in 1890 in Switzerland and 1901 in Germany, but virtually nobody passed that voluntary examination and accidents increased as the number of cars continued to increase! It is not surprising that the voluntary scheme was unsuccessful since if you are going voluntarily for a licence to drive you admit that you perhaps are not a good driver.

In 1894 in Switzerland an obligatory driving-licence for the owners of motor-vehicles was introduced and the same happened in Austria in 1905 and in Germany in 1909. The number of cars increased quickly but from this point onwards the increase in car accidents and resulting injuries to people stopped and a number of years later it decreased despite the continuing rise in the number of cars.

Human beings can sustain severe injuries as a result of accidents with cars or dogs. In order to reduce the risk, people should be better informed both about new developments in traffic and about the life of dogs in urban surroundings. It is not only necessary to test the knowledge of up to date theory and information but also the practical ability of driving and recognising situations – the same applies for guiding a dog through our lives in industrial-surroundings.

Life has changed for humans and car and dog owners through the years ...

For 10,000 years or more *Canis lupus* has been sharing our world and its changing with us.

Humans have been responsible for the destruction of many species of plants and animals but they have also introduced good new systems for the benefit of the human race. The urbanisation of the world has been the biggest challenge for humans and dogs but there has been little consideration as to how dogs and other animals would perceive and adapt to these changes.

***Canis lupus* helps and helped us**

- to hunt more successfully
- to herd our cattle
- to watch our property
- to search and find lost people for us
- to search and spot explosives and drugs
- to spot human cancer and other diseases
- to get along with the human-loneliness in our modern, not always humane society.

How did we reward *Canis lupus*?

- we allowed him to live in kennels or cages
- we tethered him on a chain so he could watch and take care for our yards and houses
- we allowed him to live with us in little apartments on the seventh or eighteenth floor
- we put him on a lead for a ten minute walk two or three times a day through streets with more concrete than plants
- we allowed him to eat our garbage or tin-products
- we forced him to sniff exhaust fumes
- we treated him like humans, as he is “our best friend” – sometimes our only friend
- we would tether him to a lantern or at the roadside or bring him to an animal shelter when we wanted to get rid of him.

It took a long time for people to be convinced that it was necessary to introduce and implement animal welfare laws. Until the middle of the 20th century dogs had tasks and work to do and most of the dog-owners “cared” for their dogs out of self-interest as they needed these dogs to be healthy and efficient for the sake of their own livelihood. Now for many dogs their life is “a luxury life” without any specific task for the benefit of their owners. Most of modern dog-owners have little knowledge of dog-behaviour and there is a tendency to humanise their pets. Dogs are very different to humans and therefore dog-owners need exact theoretical and practical knowledge to care for their dogs in society.

What would happen if...?

... a compulsory dog-handling test was introduced?

We would anticipate that during the first month after introduction of such a test animal shelters would be asked to take in more dogs, but after that we anticipate that things would then normalise and everything would be the same as it was before in terms of the effect of pet ownership levels on veterinary surgeons, dog trainers and dog walkers, groomers and pet shops.

Only irresponsible dog owners would give their dogs away; the others, who care for their dogs, would take (and pass) the test. The irresponsible dog owners seldom visit veterinary surgeons and dog trainers etc.

This reflects the situation that occurred in Germany when the strict laws for some dog-breeds were introduced. In the first weeks animal-shelters were overwhelmed with relinquished dogs but now the number of dogs kept in pet homes has increased to the same levels as prior to introduction of the legislation. Even the restricted breeds are kept in the same numbers as before.

Why are our politicians so ignorant ...?

It is easier to draft bills and to punish people than to ask for knowledge and understanding and assist in its delivery to owners.

Keywords: breeds, stigmatise, bites, law

Epilepsy – Classification, treatment, and co-morbid behavioural problems

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Introduction

Epilepsies are the most common chronic neurological diseases in dogs as well as in humans. They are characterised by spontaneous (unprovoked) recurrent epileptic seizures with central origin. The prevalence of epilepsy in dogs has been estimated to be between 0.5 and 5.7%. Genetic predispositions are known for several dog breeds including for example Labrador Retrievers, Belgian Tervuerens, English Spinger Spaniels, Keeshonds, Beagles, Vizslas, Bernese Mountain dog, and Irish Wolfhounds. Prevalence in these breeds is higher and can reach up to 17% in Belgian Tervuerens (Oberhauer et al., 2010).

Epilepsies in dogs still relatively often lead to euthanasia or to premature death due to epilepsy-related risk factors (Berendt et al., 2007), emphasising the need for better understanding of pathomechanisms and improved therapeutic options in canine epilepsy.

Terminology and classification of epilepsies

Particular attention should be paid to the use of a consistent and consequent seizure terminology, as this is essential for appropriate therapeutic interventions. The term “epileptic seizure” is a phenomenological description and is the clinical manifestation of excessive hypersynchronous discharges of neurons as an unspecific reaction of the brain. Epileptic seizures are observed (1) as *spontaneous recurrent seizures* in the course of epilepsies, and occur chronically after a process called epileptogenesis that is induced by a variety of brain insults

and genetic mutations, and (2) as *acute symptomatic seizures* under circumstances not classified as epilepsies. Acute symptomatic seizures are typically transient and occur rather promptly as a result of an acute intracerebral cause (brain trauma, tumour, encephalitis, cerebral infarct) or as a result of an extracerebral cause (peripheral organ or metabolic disease; in veterinary medicine often termed as “reactive seizures”).

Depending on involved neuronal networks, different clinical manifestations of epileptic seizures occur, such as abnormal sensory perception, motor convulsions, autonomic alterations such as salivation, and impaired consciousness, the latter of which is defined as absence of responsiveness in humans. In dogs, impaired recognition of the owner or other signs of confusion may be interpreted as impaired consciousness. Veterinary clinicians rarely have the chance to witness the seizure itself. They rather must rely on the owner’s recollection of the event. Video recordings by the owner help to classify the seizure phenomenology.

In human neurology, epileptic seizures are classified according to the ILAE (International League Against Epilepsy) guidelines and depending on clinical and electrographic characteristics into *partial* versus *generalised* seizures. Generalised seizures (either convulsive or non-convulsive) are accompanied by electrographic seizure activity involving both brain hemispheres. Partial seizures are accompanied by electrographic seizure activity emanating from a circumscribed seizure focus in one hemisphere. The clinical signs reflect the function of the brain area generating the seizure.

Seizure classification defined for humans is increasingly adopted for dogs, where possible (Berendt and Gram, 1999; Berendt Et Al., 2004; Chandler, 2006; Licht et al., 2002; Podell, 2004). Electroencephalography is not routinely used in veterinary neurology. Generalised seizures in dogs typically comprise tonic, clonic, and tonic-clonic phases during which dogs usually become recumbent. Absence seizures may occur in dogs, but are difficult to detect. It was previously thought that partial seizures are rare in dogs (Jaggy and Bernardini, 1998; Schwartz-Porsche, 1994), likely because a partial seizure onset in dogs is typically of short duration and thus is often overlooked prior to the devastating secondary generalisation. However, in dogs as well as in humans, about two-thirds of epileptic seizures are partial seizures, most of them with secondary generalisation into generalised tonic-clonic seizures (for example Berendt and Gram, 1999; Licht et al., 2002). Partial seizures are classified as simple-partial (preserved consciousness) or complex-partial (impaired consciousness). While in humans most partial seizures are complex-partial, Berendt and Gram (1999) and Licht et al. (2002) presented conflicting data concerning preserved or impaired consciousness in canine partial seizures. This might in part be due to the difficulties to discriminate both types objectively in dogs. In dogs, partial seizures may contain for example signs of stereotyped contractions of a muscle or muscle group, head tremor, chewing movements, stereotyped paroxysmal behaviour such as “fly snapping”

(stereotyped behaviour as differential diagnosis), and autonomic signs. Behavioural signs are frequent and may be interpreted as anxiety or fear or express for example as seeking out the owner, restlessness, standing with blank stare or with an expression interpreted by the owner as concerned (Berendt et al., 2004). Combinations of several signs are common. Seizure duration is between several seconds and a few minutes.

A special form of seizures is the status epilepticus, which is characterised by prolonged (partial or generalised) seizure activity (seizure activity that lasts for more than 5 minutes, or two or more discrete seizures between which there is incomplete recovery of consciousness). A status epilepticus is a life-threatening condition that requires immediate treatment.

Classification of epilepsies includes criteria such as age of onset and underlying cause. Idiopathic epilepsies have a genetic or an unknown but presumed genetic cause and are usually characterised by an early age of onset of typically generalised seizures. Symptomatic epilepsies develop as a consequence of epileptogenesis induced by a known intracranial cause (e.g., head trauma, haemorrhage, neoplasms, cerebral infections). Symptomatic epilepsies often show a late onset of typically partial seizures. In cryptogenic epilepsies no cause is found, but a symptomatic cause is suspected because of typically partial onset of seizures. Indeed, in the majority of epileptic cases the cause remains unclear despite careful history taking, examination, and investigation. This is also true for canine epilepsy. Unfortunately, the terms used to classify canine epilepsies are not consistently used. Berendt and Gram (1999) rigidly applied the above described human classification of epilepsies to epileptic dogs and suggested adjustments of veterinary epilepsy terminology.

Treatment of epilepsies

Pharmacologic treatment of epilepsies using *antiepileptic drugs* (AEDs) is currently limited to symptomatic prevention or frequency reduction of epileptic seizures. Thus, the term AED is misleading because it implies that epilepsy can be cured. The term antiseizure (or anti-ictal) drug better describes the capability of current pharmacotherapies for epilepsies. Nevertheless, because AED is the established term, we will use it in what follows.

Different modes of action or combinations of them are known for currently available AEDs. Functional block of voltage-gated sodium channels, potentiation of GABAergic inhibition, inhibition of excitatory glutamatergic neurotransmission, inhibition of specific calcium channels, and some novel targets such as modulation of the synaptic vesicle protein SV2A are known to be involved in the action of AEDs (Rogawski and Löscher, 2004). Currently available AEDs are divided into first (introduced before 1970) and second generation AEDs (introduced after 1970).

An overview of pharmacological treatment of canine epilepsies is given for example by Dewey (2006) and by Podell (1998). The most commonly used AEDs in dogs are phenobarbitone and potassium bromide, both of which belong to the first generation AEDs.

Phenobarbitone is effective in 60–85% of epileptic dogs, i.e. seizure freedom or reduction of seizure frequency by at least 50% is observed. However, according to two large studies in epileptic dogs, only 20–40% of epileptic dogs become seizure-free (Schwartz-Porsche et al., 1985; Rieck et al., 2006). Phenobarbitone has several mechanisms of action including potentiation of GABAergic inhibition. Side effects of phenobarbitone include sedation (occasionally hyperexcitability), ataxia, polyphagia, polydipsia, and polyuria. These side effects are most pronounced in the first two weeks after initiation of treatment. Physical dependence occurs after chronic use and is the reason why phenobarbitone must not be withdrawn abruptly in order to avoid withdrawal seizures. Rarely, changes in blood count (neutropaenia, thrombocytopaenia), superficial necrolytic dermatitis or hepatotoxicity are observed. Phenobarbitone induces hepatic microsomal enzyme activity (p450 system), causing the serum level to drop down over the first few months of treatment. The AED primidone is metabolised to phenobarbitone. Although primidone is as effective as phenobarbitone, it shows more severe side effects and more pronounced hepatotoxicity than phenobarbitone (Schwartz-Porsche et al., 1985; Rieck et al., 2006), which has sharply reduced its use, particularly after phenobarbitone has been licensed for dogs with epilepsy.

Potassium bromide was the first AED to be used in humans in the 1850s and is thought to exert its effect by entry into neurons through chloride channels resulting in hyperpolarisation of the neurons. In humans, potassium bromide has been replaced by AEDs with less severe side effects. In dogs, it seems to be better tolerated. Nevertheless, side effects in dogs can be severe and include polyphagia, polydipsia, polyuria, sedation, ataxia, but also pancreatitis (especially when combined with phenobarbitone), and gastric irritation. Monotherapy with potassium bromide is not recommended because higher doses increase severity of side effects. Higher doses or overdoses and renal insufficiency increase the risk of bromism (Rossmel Jr and Inzana, 2009).

Due to the side effects associated with phenobarbitone and potassium bromide and because a relatively large number of epileptic dogs are refractory despite adequate plasma levels of phenobarbitone and potassium bromide, new treatment options were (and still are) required to treat epileptic dogs. Several new AEDs have been approved for use in humans during the last two decades. These are increasingly tested in terms of efficacy and tolerability in epileptic dogs. Unfortunately, only few AEDs are suitable for use in dogs, mainly because of more rapid elimination in dogs compared to humans (for example phenytoin, carbamazepine, valproate) or toxic side effects (for example vigabatrin). Felbamate (Ruehlmann et al., 2001), gabapentin (Govendir et al., 2005; Platt et al., 2006), levetiracetam

(Volk et al., 2008), zonisamide (Dewey et al., 2004; Von Klopmann et al., 2007), and pregabalin (Dewey et al., 2009), all of which belong to the second generation AEDs, have a sufficient half-life in dogs and have been demonstrated to be efficacious in canine epilepsy. However, levetiracetam and zonisamide may only show transient anticonvulsant effects due to development of tolerance at chronic use. Furthermore, the studies on efficacy of new AEDs so far have the pitfall that they were conducted as open-labelled and uncontrolled (non-placebo-controlled) studies. Muñana et al. (2010) conducted a meta-analysis of three prospective, placebo-controlled double-blinded canine epilepsy add-on trials and demonstrated a decreased seizure frequency in epileptic dogs in response to placebo administration. Vagus nerve stimulation as well as novel drug treatment significantly reduced seizure frequency when compared to baseline values, but this effect became insignificant when compared to placebo-induced seizure reduction (Muñana et al., 2010). This is of high importance when evaluating open label studies in dogs that aim to assess efficacy of AEDs, as the obtained results might be overstated. There is urgent need for placebo-controlled blinded long-term studies on efficacy of new AEDs in canine epilepsy.

Future steps to treat refractory epilepsy in dogs may include the development of retard preparations of for example phenytoin and the development of new AEDs with improved pharmacokinetic profiles for dogs. Experimental studies in dogs and a clinical pilot study using the partial benzodiazepine receptor agonist ELB 138 (imepition) demonstrated anticonvulsant effects and only few side effects such as transient polyphagia (Löscher et al., 2004; Rieck et al., 2006). This promising new drug, which has been specifically developed for canine epilepsy, will hopefully be licensed soon.

Finally, alternative treatment options such as ketogenic diet, focus resection, vagus nerve stimulation, therapeutic brain stimulation, focal application of AEDs, and neuronal transplantation are increasingly considered not only in humans but also in dogs as potential future options, but the placebo-controlled study of Muñana et al. (2010) casts doubt on the efficacy of at least some of these treatments in dogs.

Drugs of choice to interrupt status epilepticus are benzodiazepines (diazepam, midazolam, clonazepam). Side effects are sedation, polyphagia, and a risk of respiratory depression in response to intravenous injection. Benzodiazepines are not qualified for chronic use because of short elimination half-lives and strong induction of physical dependence and tolerance in dogs.

Co-morbid behavioural problems

Epileptogenesis and recurrent seizures may result in cognitive, psychiatric, and behavioural alterations. Psychiatric co-morbidities including anxiety disorders

and depression are frequent in human patients with epilepsy. Kanner et al. (2009) described a complex temporal bidirectional relationship between psychiatric diseases and epilepsies. Psychiatric disorders can follow the onset of epilepsy, but can also precede epilepsy and may act as a risk factor for the development of epilepsy. Co-morbid behavioural changes are likely due to morphological or functional changes in brain regions involved in behaviour such as limbic system structures (amygdala, hippocampus, etc.). It is likely that similar mechanisms apply to canine epilepsy, including behavioural alterations caused by epileptogenesis and recurrent seizures. However, co-morbid behavioural problems in epileptic dogs are as yet not well investigated.

Several behavioural changes related to treatment with AEDs ideally have to be thoroughly distinguished from co-morbid behavioural problems in epileptic dogs. In practical situations this is hampered by the fact that AEDs are given chronically and thus sometimes continuously might affect behaviour.

Co-morbid behavioural problems in a narrower sense should occur interictally and thus also have to be distinguished from behavioural abnormalities during preictal, ictal, and postictal states. Preictal behavioural changes (often termed as prodrome) may occur hours up to few days before onset of a seizure and may express as blank stare or stereotyped sniffing. An aura is sometimes misleadingly interpreted as preictal. However, it should correctly be seen as the onset of a partial seizure (which typically secondarily generalises in dogs). An aura is recognised by the owner as relatively specific to an individual epileptic dog. It lasts seconds to minutes and may express as restlessness, adherence to the owner, anxiety-related behaviour, confusion, inattention, blank stare or barking. Indeed, about 80% of dogs with partial onset of seizures show ictal behavioural changes as described before (“fly snapping”, anxiety-related behaviour, adherence to the owner, restlessness, blank stare; overview by Berendt et al., 2004). Postictal behavioural changes can occur and then last hours or days after the seizure. Increased aggressive behaviour, abnormal adherence to the owner, and disorientation are observed as postictal behavioural changes. Aggression in postictal states is occasionally pronounced and then may lead to euthanasia of the dog.

As mentioned before, interictal, i.e. co-morbid, behavioural changes are as yet not thoroughly investigated. Shihab et al. (2009, 2010) presented preliminary data on behavioural changes in dogs associated with the development of epilepsy. The studies were based on a behavioural questionnaire answered by owners of epileptic dogs. Drug-naïve dogs showed a significant increase in anxiety-related behaviour, aggression and abnormal perception with the onset of epilepsy. Dogs on medication with phenobarbitone/potassium bromide still showed anxiety-related behaviour and abnormal perception, but also abnormal reactivity, attachment disorder, demented, and apathic behaviour, the latter of which was suggested to reflect side effects of the medication (Shihab et al., 2009). Dogs with pharmacoresistant epilepsy seem to show even more severe co-morbid

behavioural changes (Shihab et al., 2010), which is in line with findings in human pharmaco-resistant epilepsy. However, the two preliminary studies by Shihab and colleagues did not clearly define how postictal and interictal changes in behaviour were distinguished from each other. Future studies hopefully will pay increased attention on co-morbid behavioural problems in the narrower sense in epileptic dogs.

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Pain and its morphological features – structural basics

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Introduction

Pain

- is a *subjective* experience^{1,12}
- is a matter of *individual consciousness/awareness*^{1,12}.

According to the International Association for the Study of Pain (IASP), *pain* is “... an unpleasant sensory and emotional experience with actual or potential tissue damage or described in terms of such damages”¹².

This definition puts the focus on the feature *tissue damage*. Consequently, the *noxious stimulus* and the process of *nociception* are key elements of pain, however, a clear *distinction* has to be made between pain and nociception: *Pain* is a *subjective* phenomenon, whereas *nociception* is the *object* of *sensory physiology*¹². Due to its objective character (in a neuro-physiological sense), *nociception* receives major attention in pain research.

Nociception

- is a *poly-neuronal* mechanism^{6, 7, 14, 15, 17, 18,}
- is *modulated* on *different neurological levels*^{7, 13, 15, 17}.

Again, the distinction between pain and nociception has to be kept in mind: “*Nociception* is at the *core* of many *painful states*, but pain may occur without (peripheral) nociception, and vice versa”¹². The description of the neuroanatomical background of nociception shall be the key issue of this article.

Mechanisms of nociception

Nociception comprises five neurological events^{15, 17}, i.e.

Transduction – Transmission – Modulation – Projection – Perception.

These events take place on different anatomical/structural levels, i.e.

Peripheral nerves – Spinal cord – Brain stem – Cerebral cortex.

Transduction

Nociception starts when neuronal *sensors* (sensory receptors) – called *nociceptors* – *transduce the noxious stimulus into a generator potential* (receptor potential; sensor potential) and then *encode it into trains of action potentials*¹². Such sensors have a very simple structure and – due to this – they are called free nerve endings.

Many nociceptors are polymodal, as they respond to multiple stimulus modalities, i.e. thermal, mechanical, chemical¹⁴.

Nociceptive neurons are characterised by a *high threshold*¹².

They do *not adapt*, which means that continued irritation does not lower their irritability.

As some types of tissue damage are not detected by any sensory receptors (and thus do not cause pain), the IASP recommends to distinguish noxious stimuli from nociceptive stimuli¹².

Tissue damage or inflammation causes a release of *algogenic mediators*¹⁴ into the extracellular matrix. This *sensitizing soup*¹⁷ irritates the nociceptors. The nociceptive neuron will then irritate other, i.e. sleeping sensors, and they will release nerve growth factor (NGF) to stimulate the outgrowth of new nociceptors. Both events will result in *enhanced pain*, i.e. *hyperalgesia*^{15, 17}.

When transduction has taken place, the action potential runs along the neuronal cell process in a direction towards the spinal cord; this event is called *trans-mission*^{15, 17}.

Transmission

Transmission, namely the conduction velocity, depends on the structural and physiological properties of the neuronal cell processes which are subclassified in different groups of so-called *pain fibres*. Some of them are thinly myelinated A δ fibres (fast conduction velocity; sharp/burning pain; major importance for spinal motor and vegetative reflexes), some others are unmyelinated C fibres (slow conduction velocity; aching/drilling pain). With respect to the above mentioned polymodal properties of the nociceptors, not all C fibres and A δ fibres are pure pain fibres^{12, 14, 15}.

Projection

The sensory peripheral neurons run towards the spinal cord and synapse on the *second* neurons of the nociceptive pathway. These are *Wide Range Neurons*, WRN, as each of them receives input from more than just one sensory neuron: there is convergence from several somatosensory neurons to a single WNR, and there is also convergence from viscerosensory neurons together with somatosensory input (this is the structural basis of the so-called *Referred pain*, *Dolor translatus*).

Projection via these WNR/projection neurons is performed only if they receive a certain quantity of input.

The projection neurons connect with different sites of the brain stem, e.g. with neurons of the *Periaqueductal Grey (PAG)*, *Formatio reticularis*, *Thalamus*.

Those projecting to the thalamus are predominantly located in the spinal grey matter's *Zona marginalis*, i.e. *Lamina I*⁶. Most of their axons cross to the *contralateral* side of the spinal cord and form the *Tractus spinothalamicus*.

The spinothalamic tract contains axons also from neurons of spinal cord Laminae IV–V, and VII–VIII⁶, however, these are not exclusively related to nociceptive pathways, but represent other sensory modalities (mechanical, thermal) as well.

The spinothalamic tract is much more diffuse in animals than in man, and many species differences exist in terms of *origin*, *fibre composition*, and *termination* of the spinothalamic tract^{1, 4, 5, 6, 16, 18}. For example, in animals it is multisynaptic with axons leaving the tract at various levels and synapsing on spinal neurons whose axons then re-enter the tract⁵. In humans, the spinothalamic tract is continuous⁵. Nevertheless, spinothalamic tract neurons shall be referred to as the *second* neurons of the nociceptive pathway in animals as in man.

The activity of spinothalamic tract cells is subject to various kinds of modulation performed by inhibiting (inter-)neurons. This shall be described later (see *Modulation*).

The spinothalamic fibres terminate at several separate nuclei within the *Thalamus*⁶, i.e. *Nuclei thalamici laterales*, *Nuclei thalamici mediales*, and – in between – *intralaminar nuclei*⁴. Some varieties of information exist in the literature as to the termination of the spinothalamic tract fibres, which may be due to the above mentioned species differences, or related to the applied method. The same is true for other spinal projections to the brain stem. For example, the hypothesised spinal input of Lamina I neurons to the *Formatio reticularis* has been denied⁶, however, the *Formatio reticularis* receives nociceptive input⁵ from spinal Laminae V and VII⁶. It remains controversial if these come from branches of the spinothalamic tract^{5, 10}, or if they represent separate fibres independent from the spinothalamic pathway¹⁸, or if this input is indirect rather than direct spinal input⁶. The heterogeneity of data seems somewhat confusing, especially when one compares species, however, such neurological data are essential to

understand the functional complexity of nociception, especially in terms of phylogenetic differences related to behavioural and evolutionary conditions⁶. A detailed reference of such data is far beyond the scope of this article. Instead, the common features of nociception shall be stressed here.

The cells of the *Periaqueductal Grey (PAG)* or *reticular nuclei* or *thalamic nuclei* represent the *third* neuron of the nociceptive pathway. Their axons connect to several cerebral locations for the *perception* of pain¹⁰.

Perception

The projections from the *Thalamus* can be described easily by making a structural and functional distinction between the so-called lateral and medial systems (13) that play different roles in pain *perception*.

Lateral system: *Fibrae thalamico-corticales*^{5, 16}, i.e. the axons of the *Nuclei thalamaci laterales*, project towards the parietal area of the neocortex to reach the *Primary Somatosensory Cortex*, which comprises the *fourth* neurons of the nociceptive pathway. Hence, the lateral system is primarily related to the *perception* of pain.

Medial system: The neurons of the *Nuclei thalamici mediales* and of the intralaminar nuclei synapse in various sites in the brain stem, i.e. on neurons of the

- *Formatio reticularis* which function as the Ascending Reticular Activation System (ARAS). ARAS diffusely activates the cerebral cortex for maintenance of the conscious awake state⁵;
- *Limbic cortex*, i.e. in particular *Gyrus cinguli*¹⁰, which causes complex cardiovascular, respiratory, pupillary autonomic responses and altered emotional expression when electrically stimulated in the monkey¹⁰.

A lot of research has been and still is performed to further elucidate the fibre connections towards and from the medial and intralaminar nuclei^{2, 3, 4, 6, 9}. This shall facilitate a better functional interpretation of what is called the *sensorical* and *emotional (affective) components* of pain, which have a special impact on animal (and human) *behaviour*. For instance, the medial system is involved in reflexes related to pain and flight, and in vocalisation.

Modulation

Inhibiting interneurons – located in the spinal grey matter's *Substantia gelatinosa (Lamina II)* – synapse on the wide range neurons of the spinothalamic tract in order to *inhibit projection* towards the brain. As such, they are the key partners in two *Pain Inhibiting Systems*, i.e. central-ascending, and central-descending,

according to the concept of Melzack and Wall's *Gate Control Theory*^{13, 15}.

Central-ascending system on the spinal segmental level: The concept is based on the different conduction velocities of slow, unmyelinated C fibres (pain fibres), and very fast A β fibres (from mechanoreceptors). Both of them synapse with the inhibiting interneurons, however, in a different way. C fibres have inhibiting synapses with the inhibiting interneurons. As a result, they keep open the gate for projection towards the brain. In contrast, the very fast A β fibres have excitatory synapses with the inhibiting interneurons; their activation – initiated for instance via mechanical stimulation (rubbing or squeezing) of the injured body region – will inhibit projection (gate closed) as long as the nociceptive stimulus does not go beyond a certain quantity.

Central-descending system: opioidergic fibres from PAG have excitory synapses to stimulate the spinal inhibiting neurons, while noradrenergic, and serotonergic fibres from Nuclei raphe (of *Formatio reticularis*) activate inhibiting synapses to the pain fibres.

Sensitisation

Pain threshold is “the minimal intensity of a stimulus that is perceived as painful”¹².

Pain tolerance level is “the maximum intensity of a stimulus that evokes pain and that a subject is willing to tolerate in a given situation”¹².

Sensitisation is “increased responsiveness of neurons to their normal input, or recruitment of a response to normally subthreshold inputs”¹². In other words, sensitisation includes, firstly, a drop in threshold, and, secondly, an increase in supra-threshold response¹². IASP¹² emphasises that this neurophysiological term can only be applied when both input and output of the neural system are known, e.g. by controlling the stimulus and measuring the neural event.

Clinically, sensitisation may only be inferred *indirectly* from phenomena such as *hyperalgesia* or *allodynia*¹².

Hyperalgesia – according to the current revised taxonomy¹² – is “increased pain sensitivity”; this term is proposed to be used as an *umbrella term*¹² for all types of increased pain sensitivity.

Allodynia is “pain in response to a non-nociceptive stimulus”. IASP recommends using this term only if it is known that the test stimulus is not capable of activating nociceptors¹².

As mentioned above, injury results in local release of chemicals that mediate or facilitate the inflammatory process¹⁴, e.g. bradykinin, leukotrienes, serotonin, histamine, substance P, thromboxanes, free radicals, cytokines, etc. (sensitizing soup¹⁷). Some of them can directly activate nociceptors, while others act indirectly by activating inflammatory cells, which release such algogenic substances.

Cytokines, for instance, increase production of nerve growth factor (NGF) which then stimulates mast cells to release histamine and serotonin; NGF also sensitizes nociceptors¹⁴. Additionally, there is outgrowth of new nociceptors¹⁷. All these mechanisms contribute to sensitization and hyperalgesia (enhanced pain)¹⁷ on a peripheral level (level of nociceptors) or central level, including increased responsiveness due to dys-function of endogenous pain control systems^{12, 17}.

Functional evaluation

Pain is commonly known to cause protective motor and vegetative reactions and may modify species specific behaviour, including social behaviour.

Acute pain (physiologic pain) is transient. It serves as an alert mechanism informing about damage; it helps to protect against the continuation of damage by means of nocifensive reflexes, immobilisation, or avoidance behaviour^{15, 17}.

Clinical pain (chronic pain, pathologic pain, idiopathic pain) has lost the alert function. It is experienced when the noxious/nociceptive stimuli which caused tissue damage were excessively intense or prolonged. Clinical pain is characterised by a low threshold to noxious/nociceptive stimuli or by an exaggerated response to such stimuli; it may be caused by inflammation associated with tissue damage (inflammatory pain) or by central or peripheral nerve injury (neuropathic pain) or may be induced by stimuli which under normal conditions are non-noxious/non-nociceptive (allodynia)^{12, 15}.

Domestic animals display a large variety of pain-related behaviour which appears to be very heterogeneous, and – in many cases – of opposite character, e.g. in terms of vocalisation, or motor activity. Attempts have been made to compile species-specific information^{8, 11}, however, the descriptions are somewhat vague, and even contradictory. In particular, data about laboratory animals seem to be lacking, or are rare.

Animal and human behaviour related to the individual's *response* to pain perception may be – in part – the result of *learning*, reflecting how much pain the individual is *willing* and *able to tolerate*. This may explain the very different ways of species' responses to pain, e.g. in terms of vocalisation. "Boys don't cry – no matter how much it really hurts"! Considering such learned behaviour, and having in mind the strategies applied to hide pain, helps to emphasise again that behavioural features are no true indicators of real pain, as long as they remain without relation to neurophysiological data.

Conclusion

Since pain is a *subjective* phenomenon in animals as in humans, the assessment of pain is limited due to limitations of communication. Consequently, there is a

strong need to focus on *nociception*, because nociceptive mechanisms are accessible by means of neurophysiological techniques. Considering this *condition sine qua non*, a strong emphasis is put on a taxonomy¹² that fits to describe appropriately the complexity of neurological processes, and helps to avoid subjective interpretations.

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Keywords: nociception, nociceptive pathways, modulation, sensitization

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Posters

- 159 Possible differences on dogs' and owners' behaviour related to the size of the animal
A. BASSI
- 161 Behaviour assessments of 108 dogs in Bavaria, Germany
U. FALBESANER
- 163 Heart rate responses to user and operator behaviours in therapeutic riding horses
M. FAZZONE
- 165 Clicking feral cats and getting them more sociable
S. FRAGOSO
- 169 Dog abandonment: an analysis of data for 1 year from 30 cities in the area of Barcelona
E. GARCÍA
- 172 The effects of the Italian law on potentially dangerous dogs: assessment in an urban environment
A. GAZZANO
- 176 The influence of the level of schooling on explorative and flight behaviour in sport horse stallions
K. GOSLAR
- 179 How do people train their dogs? A survey of training techniques used and training class attendance by dog owners
B. LOFTUS
- 182 Dogs' attachment to people: are search and rescue dogs different from pet dogs?
C. MARITI
- 186 Are puppies capable of learning through observational learning?
N. MAYORAL SÁNCHEZ
- 189 Survey of possible changes in undesirable behaviours after neutering in male dogs
M. MENGOLI
- 194 Some variables affecting owners' satisfaction with their dogs: a preliminary study
S. NORMANDO

- 196 Evaluation, management and welfare of aggressive sheltered dogs
M. C. OSELLA
- 198 Development of a standardised behaviour test to evaluate the influence of dog-owner relationship and dog-owner attachment on the behaviour of the dog – assessment of test-retest reliability
S. OTT
- 203 Is tail chasing a new, repetitive or compulsive disorder in Jack Russell Terriers as it is in other breeds?
M. A. PERRONIN
- 206 A survey of dogs' behaviour at the veterinary clinic
L. PIERANTONI
- 209 Opipramol – a very interesting antidepressant drug
P. PITURRU
- 211 Stress levels in dogs when being trained in a wild boar enclosure
E. SCHALKE
- 215 D.O.Q.-Test 2.0 – Dog Owners Qualification
W.-D. SCHMIDT
- 218 Differences in dogs' behavioural responses to standardised behavioural tests due to context
C. STEFANINI
- 220 Possible treatments with the new product Zylkene
K. THISSEN
- 224 Welfare of animals in travelling circuses in The Netherlands
M. VAN DIERENDONCK
- 225 A Cavalier King Charles Spaniel with shadow chasing: clinical recovery and normalisation of the DAT-binding after clomipramine treatment
S. VERMEIRE
- 228 Agreement between dog behaviour in a behaviour test and owner perception of dog everyday life behaviour
A. VON GAERTNER
- 232 Influence of different management and training factors in dogs on their behaviour in a standardised behaviour test
A. VON GAERTNER

Possible differences in dogs' and owners' behaviour related to the size of the animal

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Introduction

Nowadays dogs live closely with humans and are often regarded as a family member. According to literature small breeds tend to be more dependent on their owners and stay close to them (Kakinuma et al., 2008). This study aims to evaluate possible differences in dogs' and owners' behaviour related to the size of the animal.

Materials and methods

300 dogs, balanced for gender, ranging in ages from 1 to 17 years and of different breeds took part in this study. Dogs were assigned to one of three groups depending on the size: small (<10kg), medium (10–20kg) and large (>20kg). Owners were asked to complete a questionnaire on dog's signalment and history, on the physical and social environment and on the management regime for the dog inside and outside the home. Answers to the questionnaire were scored and absolute and relative frequencies were calculated and expressed as percentage. Chi-square test was used to identify differences in owners' and dogs' behaviour due to size.

Results

20.7% of dogs involved in the study were house soiling, of which 59.7% belonged to the small size group ($p < 0.05$). About a third of our sample showed aggressive behaviours towards people. The majority were small dogs and bites involved strangers (58.3%) ($p < 0.05$). About half of small dogs' owners avoided meeting big dogs as opposed to the owners of large dogs who approached other dogs easily ($p < 0.05$). 21% of the owners reported that interaction with other dogs was not necessary and about half of these owned small dogs ($p < 0.05$). Moreover 18.7% of dogs in this study were not allowed to run freely and about half of these belonged to small size group ($p < 0.05$).

Conclusions

Our results indicate that dogs' and owners' behaviour is influenced by the size of the animal. It would appear that small dog's owners are more protective towards their pet. The behaviour of the individual dogs is the consequence of interaction between their environment (physical and social) and their genotype (Shepherd, 2002) and therefore the owner-dog interactions can influence the dog's behaviour.

These results may be useful as a basis for further research in order to produce useful information for owners regarding appropriate communication with and management of their pets.

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Keywords: dog size, owners, relationship, behaviour

Behaviour assessments of 108 dogs in Bavaria, Germany

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Introduction

In accordance with the Dangerous Dogs Act in Bavaria of 1992, 108 dogs of different breeds were tested in the years 1999 to 2001.

Materials and methods

The majority of the dogs tested (40) belonged to the so-called category II dogs based on their breed type. The category was defined in 2001 as the following nine breeds and their mixes: Bullmastiff, Bullterrier, Dogo Argentino, Dogue de Bordeaux, Fila Brasileiro, Mastiff, Mastin Español, Mastino Napoletano, Rhodesian Ridgeback

Twenty dogs belonged to Category I, which includes five breeds (Pit Bull Terrier, American Staffordshire Terrier, Staffordshire Bullterrier, Bandog, Tosa Inu) and their mixes. These dogs are categorised as dangerous per se.

Twenty-two dogs were presented because of complaints regarding public safety (so-called category III dogs), e.g. having bitten a person or killed wildlife.

Eighteen dogs received a so-called short expert assessment due to their young age, whereupon they received preliminary certification from the authority.

The dogs were tested according to a questionnaire produced by the ministry.

Results

Aggressive behaviour towards people was more common in category III dogs, since these animals were presented for aggressive behaviour that represented a public health risk. Four of the category I dogs also showed increased aggression toward humans. In these cases the owner will not be able to obtain permission to keep the dog and therefore an expert assessment was not completed by writing

an expert statement.

The category I dogs and the category III dogs included a greater number of cases relating to aggression towards other dogs.

50% of the owners of dogs that caused a public security risk were keeping a second dog and 17% kept a third dog. Many dog owners were not aware that two dogs constitute a pack and that their reactivity (e.g. chasing wildlife, fighting) increases disproportionately. In most cases the attitude of the owner concerning public security was very poor and the obedience level of the dog was low.

Recommendations for 12.5% of the category II dogs and for 59% of the category III dogs included a requirement to have the animal on a lead in public. For 23% of the category III dogs there was also a requirement that the dog be muzzled in public. In addition, recommendations included the use of a commercially available head halter and attendance at obedience classes.

There were a few reported incidents, especially with category III dogs, which occurred after the authorities had imposed requirements on the owners. In some cases these incidents occurred because the owner did not comply with the requirements but in some cases they occurred due complex and unpredictable situations. For example, one dog jumped from a balcony on the third floor as another familiar dog was being walked downstairs by children. Another dog bit a skateboarder in front of its house despite being on a lead at the time.

Conclusion

The results support the intention of the Dangerous Dogs Act of Bavaria to reduce incidents with dogs. The results show that an increased level of aggression was found in category I and in category III dogs and that requirements imposed on the dog owners were necessary.

Further appropriate measures to reduce incidents with dogs might include:

- All dogs should be on a lead before leaving the house and on staircases
- All dogs should be on a lead in residential areas
- If one person walks two dogs or more, only one dog should run off lead and only if the dog has a high level of obedience
- A dog owner has to be specially qualified in order to walk more than one dog off lead
- Dogs should be on lead around children's playgrounds and when walking in crowds
- There should be obligatory reporting of bite incidents
- There should be identification marking for all dogs
- Training for dog owners (e.g. "dog owning license") should be obligatory

Keywords: Bavaria, behaviour assessment, dangerous dog act, dogs

Heart rate responses to user and operator behaviours in therapeutic riding horses

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Introduction

The potential benefits of therapeutic riding for people with disabilities are very well known. However, it is not clear how the horse-human relationship affects the horse in these situations. The aim of this study was to investigate how the horse's heart rate (hHR) changes in respect of some behaviours elicited in the dynamic of the relationship between horse, user and operator during therapeutic riding.

Materials and methods

During an observation period the behaviour of horses (4), operators (3) and users (32) were video-recorded and analysed by *scan sampling* and one *one-zero sampling* for predefined categories. The 32 users were divided in 4 groups: Autism (A), Motor Deficit (MD), Psychiatric Problems (PP), and Mental Retardation (MR). hHR was also recorded at 5 sec intervals (Polar S610[®]) during the same observation period. ANOVA and Tukey tests were used to statistically analyse the data (Minitab[®] 14).

Results

Higher mean hHR ($p < 0.000$) was recorded while users were yelling and moving, while it was significantly lower when users, independent of their group, showed stereotypes and aggression (51.83 bpm and 47.84 bpm respectively, $p < 0.010$),

looked for physical contact (53.09 bpm, $p < 0.000$) or gave commands (58.25 bpm, $p < 0.010$). Mean hHR was higher ($p < 0.010$) when working with PP (95.14 bpm) compared with when working with other users ($A = 55.53$ bpm, $RM = 53.69$ bpm, $DM = 49.28$ bpm). Mean hHR was clearly related to horse behaviour, it increased during nervousness (64.98 bpm, $p < 0.023$), submission (64.65 bpm, $p < 0.000$) and stereotypes (95.2 bpm, $p < 0.000$) and decreased during vigilance (56.83 bpm, $p < 0.033$). Mean hHR also varied in relation to different operators ($p < 0.000$), their position in the riding area (ranging from 53.39 bpm when in front of the animal to 81.14 bpm when inside the area; $p < 0.000$), means of control over the horse (by lead 66.08 bpm, by halter 54.35 bpm; $p < 0.000$) and operator behaviour ($p < 0.000$), increasing when the operator was talking to the animal (72.86 bpm) and decreasing with physical contact (51.54 bpm).

Conclusions

The results of this study confirm the importance of monitoring the emotional state of horses while working with disabled people, in order to improve human health benefits and safeguard animal welfare.

Acknowledgements: Authors are thankful to Dr Weber A. H., responsible of the therapeutic riding centre "Ippogrifo" for her precious collaboration.

Keywords: Therapeutic riding, horse welfare, heart rate, behaviour

Clicking feral cats and getting them more sociable

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A feral cat is one that has descended from domestic cats but has had little or no human contact and is usually unapproachable by people. Stray cats are those that once had owners and were abandoned or went missing. A feral cat was probably born that way. They are natural hunters and gain satisfaction from predatory behaviour. If these cats are brought into homes and kept inside all the time it is important to fulfil the predatory drive in order to keep them mentally well-balanced. Although these feral cats can make satisfactory pets once they have been tamed they are likely to continue to be extremely fearful of people they do not know. Trying to desensitise a feral cat, whether kitten or adult, can be a slow process. It will take a long time for them to reach the point of accepting humans and when they do they are unlikely to accept being picked up and held and may not tolerate being stroked. However the process of behavioural change can be accelerated significantly with the use of a clicker as a training tool.

In many countries, like Portugal, shelters are overcrowded with cats. Most of them are feral cats that need to be homed. Using a clicker based training process can increase the possibility of rehoming these cats successfully.

Training cats is usually done for one of four reasons:

1. to housetrain the cat
2. to tame a feral cat
3. to correct unwanted behaviour
4. to make the cat perform certain behaviours on cue (Marshall, 2008).

Each reason is valid in its context. A feral cat must be tamed before housetraining can occur. Taming a feral cat includes developing trust (Marshall, 2008). This is

not the easiest thing to do after a cat has been trapped, neutered, health checked and confined in a shelter. The animal is probably fearful. Patience is the key and the cat needs to feel that he is in control.

A primary positive reinforcer is something that has inherent positive qualities for the animal in the absence of learning. The positive association comes naturally, with no need for experience. Primary positive reinforcers usually include food or the chance to interact with others (for social animals which have been adequately socialised). A secondary positive reinforcer is something that the animal learns to appreciate as a positive signal. The learning can be accomplished through classical conditioning (Kirsch et al, 2004). This secondary reinforcer can also be called a bridge because it bridges the time between when the animal performs a desired behaviour and when it gets its reward. In other words, a bridge is a stimulus that has been associated with a primary reinforcer through classical conditioning. This process creates a conditioned positive reinforcer, often called a conditioned reinforcer. Animals that have learned to respond to a bridge react to it almost as they would to the reward that follows.

Classical conditioning is used for two purposes:

1. to condition (train) autonomic responses, such as the drooling, producing adrenaline, or reducing adrenaline (calming) without using the stimuli that would naturally create such a response
2. to create an association between a stimulus that normally would not have any effect on the animal and a stimulus that would (Pryor, 1984).

An animal can be classically conditioned to a clicker by clicking it and delivering some desirable treat, many times in a row (Peterson, 2000). Simply click the clicker, pause a moment, and give the cat (or other animal) the treat. After you've done this a few times, you may see the animal visibly respond, look towards the treat, or look to you. This indicates that it is starting to form the association of "click" and "treat". Some clicker trainers call this "charging up the clicker". It's also called "creating a conditioned reinforcer". The click sound becomes a signal for a forthcoming reinforcement (Pryor, 1984).

Cats easily condition to the clicker. Research in neurophysiology has identified a category of stimuli – bright lights, sudden sharp sounds – that reach the amygdala first, before reaching the cortex. The clicker produces a sound which falls into that category and is a conditioned 'joy' stimulus that is acquired and recognised through those same primitive pathways (Pryor, 2001). Another hypothesis concerning the extraordinary rapidity with which clicked behaviour can be acquired might be that the click is processed by the Central Nervous System much faster than any word can be. Even in the most highly-trained animal or verbal person, the word must be recognised, and interpreted, before it can 'work'; and the effect of the word may be confounded by accompanying emotional

signals, speaker identification clues, and other such built-in information (Pryor, 2001).

Any time an animal receives a treat, it causes activation of the parasympathetic nervous system. Anytime that a previously neutral stimulus, like a clicker, or a kind word, becomes paired with one of these parasympathetic reactions, through classical conditioning, the clicker acquires the ability to produce the same pleasant effects (Pryor, 2001). This is why treats (and soon the clicker) can be used to calm the animal, make it less fearful, and make the whole training process a positive experience. The click means one thing only: "You win!" The click is more than just a conditioned reinforcer. It marks or identifies precisely which behaviour is paying off and should be done again. That's why some trainers call it a marker (Pryor, 1984).

Remember that if the animal is responding with fear it is important to pay attention to what is being rewarded in order to avoid unintentional reward of the fear. The timing must be good and the reward needs to be sufficient to motivate a repetition (Pryor, 1984). Use a highly-preferred treat, such as canned tuna or any freeze-dried fish cat treat. Approach the cage, stand in a cat's safety distance and let the cat feel more relaxed (see the body language). When relaxed, put a pea-sized treat in the front of the cage, click, and instantly back away.

You are giving the cat two kinds of benefits:

- a) food comes
- b) scary person backs off.

Give the cat time to eat the treat. Even if the cat does not eat the treat, it will be learning that click means you're backing off: "*This scary person who is too near to me goes further away*". Leave the treats in the cage and come back later and try again. When you return not whether the cat ate the food while you were gone, which is a good sign, or left the food, in which case it is best to clean it up and try again another day.

As the cat begins accepting the food, click, approach, and put the food near the front of the cage; then retreat. Let the cat finish the food while you stand there. Now do not click; just stand still and watch for any voluntary movement toward the front of the cage. Click during that movement, give treat, and step back. Repeat. The cat becomes confident that it can make you click and treat by coming forward. It feels safe and in control of the situation, both the arrival of food and the departure of person, by coming forward. So, paradoxically, after a few more clicks and treats for the cat's forward movement you can stop stepping backwards (Pryor, 2003).

Clicker training is the easiest way to train your cat. However, not all cats respond positively to the clicker. The main obstacle to success with clicker training is the environment where the training is happening. The shelter environment is difficult for dogs and people, but it is especially stressful for cats. They are sub-

jected to a constant barrage of alarming stimuli, including noise, strange smells, intrusions from unknown humans, close confinement, and the often-frightening sight and smell of other unfamiliar cats, as well as loss of all familiar social contacts and all past comforts and enjoyments.

To conclude, clicker training is a quick way to build trust with a feral cat; it is much quicker than trying to calm it or reassure it with social attention, and much kinder than just leaving it alone in the hope that the fear will eventually disappear. As Karen Pryor (2002) says: “With cats we need not use the clicker to ‘train’ the cat in the traditional sense; we can use it to enrich the cat’s environment, to give it some control over its world, and if possible to widen its own perceptions of that world. We are communicating to the cat so the cat can learn healthy ways to communicate back”.

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Keywords: feral cats; clicker training; socialisation

Dog abandonment: an analysis of data for 1 year from 30 cities in the area of Barcelona

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Introduction

Dog abandonment is a major welfare concern (Haupt et al, 2007). It has been estimated that 115,879 dogs were abandoned in Spain in the year 2009, with 16,486 coming from the autonomous region of Catalonia. Extrapolating from these figures, the estimated annual incidence of abandonment in Catalonia is 2.24 dogs per 1000 inhabitants (Affinity Foundation, 2009).

In Catalonia, euthanasia is forbidden as a way to control the surplus of abandoned dogs and cats. Also, since 1999 it is mandatory in Catalonia to identify all companion animals.

To prevent overcrowding in the short term in shelters with a no-killing policy, it is necessary

- 1) to refine the process of returning stray dogs to their owners
- 2) to re-home the remaining population.

In order to do that, a good understanding of the overall numbers of animals admitted to shelters and the impact of identification on returning the animal to the family is needed.

To the authors' knowledge the only published studies done in Spain on dog abandonment are based on Internet and telephone surveys.

Aims of the study

To obtain data on dog abandonment from databases of public and private animal shelters with a no-kill policy in the area of Barcelona, with a special emphasis on the overall numbers of animals admitted to the shelters and the effect of the microchip in reclaiming success.

Materials and methods

Data were obtained from the database of an animal shelter charity providing full service to 18 cities and partial service to 12 cities in the province of Barcelona from January to December 2009. Information on human demographics was provided by each city local authority. The charity holds a no-killing policy where only animals suffering severe untreatable illness or overt aggression towards people are euthanised. A Chi-square test was used to analyse the effect of the microchip in reclaiming success.

Results

A total of 1467 admissions were recorded, from January 1st to December 31st 2009. 152 dogs (10.4%) were surrendered by their owners, 1308 (89.1%) were strays and 7 (0.5%) were legally held dogs. Only information from cities receiving full service was used for further analysis.

Complete records on sex, breed and age were available for 753 dogs. Adult dogs accounted for 620 (82.3%) admissions and 133 (17.7%) were puppies. Four hundred and fifty-nine dogs were males (61%) and 294 were females (39%). Regarding the size of adult dogs, 220 were large (35.4%), 208 were middle (33.5%) and 192 (30.9%) were small. According to the available information, 552 (73%) dogs were classified as crosses and 201 (27%) as purebred.

820 dogs from 18 cities were admitted, resulting in an annual incidence of admissions in the shelter of 2 dogs per 1000 habitants. 272 dogs (34%) were successfully returned to their owners. 544 adoptions were recorded during 2009. 259 dogs (47.6%) were adopted by people from the city the animal came from.

At the moment of admission, 197 (25%) stray dogs had a microchip and 595 (75%) were not identified by this method. The proportion of dogs successfully returned to the owner was significantly higher among individuals having the microchip (146 out of 197; 74%) than among those not identified (126 out of 595; 21%) (Chi-Square = 216,70, $df=1$, $p < 0,001$). The main reasons for the unsuccessful returning of dogs having the microchip include: inability to contact the owner ($n=23$; 45%), delays in incorporating files into the central database of identified dogs ($n=17$; 33%) and owners refusal to take care of the animal ($n=11$; 22%).

Discussion

The annual incidence of admissions to the shelter (2/1000 inhabitants) was comparable to data from the same period obtained through surveys of private and public shelters from the same autonomous region (2.23/1000 inhabitants) (Affinity Foundation, 2010). Nevertheless, if dogs successfully returned to the owner were removed from the calculation, the estimated incidence of abandonment was reduced to 1.34 dogs per 1000 inhabitants.

The proportion of dogs successfully returned to the owner was higher than the 16.8% reported by the aforementioned survey of animal shelters and lower than the 50% found in an analysis of the database of 3 Australian shelters (Marston et al, 2004; Affinity Foundation, 2010). These results may reflect cross-cultural particularities as well as differences in the management of each particular shelter.

Regarding the percentage of abandoned dogs identified by microchip, data from the present study is in agreement with a survey of animal shelters from the same geographic area (Affinity Foundation, 2010). Taken together, these results emphasise the need to carry out additional legal and educational measures to promote the identification of dogs.

The percentage of dogs successfully returned to the family was significantly higher among the group with a microchip. This result seems to confirm the value of identification as a tool to reduce admissions to animal shelters (Lord et al, 2007). However, it could also reflect that owners more willing to provide adequate care for their animals, including identification, are also less prone to abandon them.

One out of every four dogs with microchip admitted to the shelter was not successfully returned to the owner. One of the main reasons for that seemed to be the delay between the implantation of the microchip and the availability of the information in the central database. To the authors knowledge additional strategies are already being implemented to speed up this process in our autonomous region.

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Keywords: dog abandonment, dog welfare, identification.

The effects of the Italian law on potentially dangerous dogs: assessment in an urban environment

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Introduction

Canine aggression is a widely discussed topic, especially when people are injured as a result of the behaviour. In many countries laws have been enacted, attempting to reduce the problem of canine bites involving people. Most countries have breed specific legislation, with wide variation across countries. In Italy, the first legislative intervention was carried out on the 9th September 2003, through the Ordinance of the Minister of Health, Girolamo Sirchia, called “Protection of public safety against the risk of aggressions by potentially dangerous dogs”. In this law, all dogs belonging to the first and second group of the Fédération Cynologique Internationale, as well as Pit Bulls and their crosses, were subjected to a range of restrictions. The aim of the current research was to assess the effects of the Sirchia’s Ordinance 2003 on canine bites towards people in an urban environment.

Materials and methods

In total data from 556 cases of canine bites, which occurred in Florence (Italy) during three years, were gathered. Information was gathered from medical reports in different first aid stations and from reports for rabies prophylaxis; when

necessary, and when possible, they were supplemented with data from the dogs' registry office.

The analysed period was divided into three sections:

- 1st September 2002 – 31st August 2003, before the publication of the Ordinance. This acted as the control group.
- 1st September 2003 – 31st August 2004, the first year subsequent to the Ordinance. This was used to assess possible short term effects of the legislation.
- 1st September 2004 – 31st August 2005, the second year subsequent to the Ordinance. This group provided the opportunity to assess its long term effects.

The statistical analysis was carried out by using the χ^2 test ($p < 0.05$).

Results and discussion

Data regarding the kind of injuries incurred revealed that there was a significant reduction of less serious injuries (e.g. scratches, contusions and excoriations) in the first (51.9% *versus* 26.8%; $\chi^2 = 22.33$; $p = 0.000$) and second year post-Ordinance (37.8%; $\chi^2 = 9.51$; $p = 0.002$). This result may reflect the fact that many owners of aggressive dogs did not want to incur fines and encounter insurance problems and therefore they may have come to some agreement with the "victim" regarding the incident without involving a visit to a first aid station.

As for the characteristics of "victims", both before and after the introduction of the legislation men were more frequently bitten than women (58.8% *versus* 40.2%), and this is consistent with the finding of Wright (1985). One possible explanation is that men tend to approach and interact with dogs in a more threatening manner.

Personal particulars were not recorded for one third of dog owners' involved in the incidents. A reduction was observed when comparing the number of dog owners whose identity was known before and immediately after the law (72.9% *versus* 64.0%; $\chi^2 = 3.092$; $p = 0.079$), and in the second year after the Ordinance (63.2%; $\chi^2 = 3.662$; $p = 0.056$) but this reduction was not statistically significant. The decrease may be partially attributed to the reduced willingness of owners to give their personal particulars, in order to avoid the possibility of incurring fines and encountering other related problems.

Regarding the gender of the dogs, the number of males changed significantly from 70.0% during the control period to 85.0% one year after the law and then decreased to 78.9% in the second year. It is relevant that male dogs were highly represented in the sample of biting dogs (77.3% on average); which is in contrast to the equal distribution of sexes in the Florence canine population (51.5% males and

48.5% females, as recorded at the dogs' registry office). This gender difference has already been reported by other authors (Gershman et al., 1994; Mason, 1991).'

The biting dogs in this study belonged to 46 different breeds, the most commonly reported being: German Shepherd Dogs (56 cases out of 556, corresponding to 10.1%), Pit Bulls (4.5%), Doberman Pinschers (4.0%) and Maremma Sheepdogs (1.8%). Mixed-breeds were involved in 179 biting incidents. Previous literature has reported that bites are often inflicted by mixed-breeds, German Shepherd Dogs and Pit Bulls, as well as their crosses (Kizer and Town, 1979; Pinckney and Kennedy, 1982; Sacks et al., 1989; Wright, 1991). However the term Pit Bull may be used to identify dogs morphologically similar to Pit Bulls, independently from their genetics, especially when attacks by Pit Bulls have occurred and then been reported within the media (Overall, 2001). The same situation may be relevant for German Shepherd Dogs, a very common breed in Italy. Therefore the higher representation of some breeds may not be totally reliable. In addition it is important to remember that the number of biting dogs needs to be put in the context of the actual composition of the Florence canine population in order to accurately assess the proportion of biting dogs within a certain breed. For these reasons, although data seem to suggest that some breeds are predisposed to bite people, it is not possible to draw such conclusions without in depth analysis of the data within the relevant contexts.

Conclusion

As the composition of the "biting dogs' sample" has not significantly changed since the introduction of the Sirchia's Ordinance, it would appear that this law has been ineffective in reducing the level of aggressive incidents involving the breeds it considered as 'potentially dangerous' and aimed to target.

The most remarkable finding concerned the number of bites. A decrease was observed in the years following the Ordinance: 210 bites occurred in the year before the Ordinance, 172 in the first year and 174 in the second year after it. However the reduction was not statistically significant ($\chi^2=2.392$; $p=0.302$), and it reflected the trend which had already been in progress since 1986 (Ciceroni, 2004).

Data obtained suggests that the Sirchia's Ordinance has resulted in few significant changes in levels of canine aggression towards people in the studied sample, both in the short-term and in the long-term. Changes observed did not represent an improvement, as the number of bites was not significantly decreased, the severity of injuries was increased and the breeds involved in the incidents were not altered.

Results suggest that legislative intervention that aims to deal with and solve the problem of canine aggression toward people, which is undoubtedly a significant problem in society, cannot be limited to publishing restrictive laws.

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The influence of the level of schooling on explorative and flight behaviour in sport horse stallions

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Introduction

Exploratory and flight behaviour are part of a horse's normal behavioural repertoire, with a close coherency between them. Encountering startling situations and unknown objects are the most powerful stress-provoking situations riding horses may be confronted with. This study examined the influence of the level of schooling on the horses' reactions.

Materials and methods

The investigation was performed on seventy sport horse stallions, aged 3–20 years, which were housed in the national stallion depot Celle (Lower Saxony, Germany). They were divided into three groups according to age and level of schooling (LS).

Group 1 (Gr. 1) consisted of 35 stallions aged three years. The schooling of the horses to become a riding horse started four months ago. In comparison in Group 2 and Group 3 their LS is defined as low. Gr. 2 was composed of 18 stallions that were three years old. Their schooling started nine months ago, this means a medium LS compared with the horses of the other groups. Gr. 3 consisted of 17 stallions aged four to twenty years. Their schooling had also started at the age of three years. Therefore, in this group the level of schooling varied dependent on their age. In this study their LS is defined as high.

The tests were performed in an indoor riding school. A test arena (14.8 x 14.8 m) was separated by a fence. Each horse was investigated separately without visual or physical contact with other horses. The stallions were supposed to show

individual coping strategies without any influence of humans. This was accomplished by leaving them lead free in the test arena for the single test situations. To warm-up the horses before the test, each stallion was lunged for 30 minutes in a predetermined way. This was important to minimise potential injuries and to create comparable initial conditions.

The horses were confronted with three situations: In the Novel-Object-Test (NOT), a blow-up toy was placed in the middle of the arena. The time until the horse touched the object with its nose was measured. In the Startling-Test (ST), a flight reaction was provoked by pulling another blow-up toy with the speed of 3.65 m/s from the middle to the border of the test arena. The time from the flight reaction caused by the visual stimulus until the approach to and the striking of the object was measured. In the Human-Approach-Test (HAT), an unknown person was standing immobile in the middle of the test arena. The person did not gaze straight at the horse. The time until the horse touched the person with its nose was measured. Each test situation was ended if (a) the horse touched the object or human or (b) a maximum time of five minutes was reached. Trials were repeated after one week. The objects were changed in the second test phase to minimise a potential learning effect and to investigate the repeatability at any other time. The unknown person remained the same to ensure identical human behaviour. All test situations were filmed and approach time assessed afterwards.

Data were analysed using the statistical software SAS 9.1 (SAS Institute, Cary, NC, USA). For comparisons between the groups, two-way analysis of variance and post-hoc tukey-test were used. Values of $p < 0.05$, $p < 0.01$ and $p < 0.001$ were regarded as significant, highly significant and most highly significant, respectively.

Results

The results show an effect of time of testing on the horses' approach behaviour in all test situations: horses approached humans and objects faster in the second week.

In the Novel-Object-Test, comparison of the approach time shows no significant differences between the three groups of horses. In the Startling Test, horses with low LS (Gr. 1) and horses with medium LS (Gr. 2) approached the flight-eliciting object faster ($p < 0.001$ and $p < 0.05$, respectively) than horses with high LS (Gr. 3). In the Human-Approach-Test, horses of Gr. 2 approached the person faster than horses of Gr. 1 and Gr. 3 ($p < 0.05$ and $p < 0.01$, respectively).

Discussion

Learning experiences from testing in week 1 appeared to influence the horses' behaviour in week 2, independent of age and level of schooling. In the Novel-Object-Test there are no differences between the groups indicating that there is no influence of the age group and the level of schooling on the approach time in relation to the novel object. In this study horses with low and medium LS were younger than horses with high LS, which is common in sport horses. Curiosity and exploratory behaviour are more distinctive in foals and younger horses. In this age group the learning capacity is at its maximum (Zeitler-Feicht 2008). This might explain the results in the Startling Test. The behaviour of horses in the human-horse relationship is often based on a combination of the horses' temperament and previous experiences in interactions with humans (Visser 2008). In the Human Approach Test, recent experiences may lead to differences in approach time between groups. Horses with low LS (Gr. 1) had experienced substantial environmental changes four months before the start of training. Prior to being housed in loose-boxes in the national stallion depot Celle they had lived in a herd with conspecifics. It is possible that anxiety or insecurity are reasons for the fact that Gr. 1 horses did not come into contact with humans as fast as Gr. 2 horses, who were of the same age but had been ridden five months longer and thus were more accustomed to daily interactions. Horses with high LS (Gr. 3) may have learned to wait for signals from humans and therefore hesitated to act on their own.

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Keywords: horse, explorative behaviour, flight behaviour, level of schooling

How do people train their dogs? A survey of training techniques used and training class attendance by UK dog owners

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There is considerable discussion about the welfare, ethics, and efficacy of using different types of training techniques for the domestic dog, but little evidence as to the extent to which different approaches are used by owners. This study aims to evaluate the use of different training techniques used by dog owners in the UK so that this data can be used in further research into the impacts of training techniques on canine behaviour and welfare.

Behaviours that owners find problematic are widespread and can result in rehoming, euthanasia and dogs being abandoned. This causes concern for the welfare of dogs, and suggests the need to better understand how to prevent problematic behaviours from occurring. Investigating the relationship between methods and techniques used in training, and the occurrence of behaviour problems, facilitates the development of strategies to reduce the occurrence of behavioural problems.

Previous studies have found that some form of training with a pet dog is beneficial with regards to the dog owner relationship (Kobelt et al., 2003; Bennett and Rohlf, 2007). When specific training methods have been examined, however, an association was found between solely reward based training and fewer overall numbers of problematic behaviours when compared to dogs that had punishment based techniques used (Hiby, 2004). The potential negative effects on behaviour of using particular aversive training techniques have also been identified in other studies (Schilder et al., 2004). We therefore wanted to further investigate the relationship between attendance at training classes, types of training technique used,

and owner stated reasons for their use, in a population of UK dog owners.

In this study 16,484 questionnaires were widely distributed direct to dog owners; questionnaires were distributed in the following places: dog walkers in parks, in veterinary surgeries, agricultural/equine events, pet shops/dog related shops and at dog show/dog related events. A total of 3897 completed questionnaires were returned. 86% of respondents were female. The dogs were 48% males and 51% females, 51% neutered and 45% entire. According to UK Kennel Club categories 185 (5%) were toys, 438 (11%) terriers, 205 (5%) utility, 1176 (30%) gundogs, 253 (7%) working and 725 (19%) pastoral breeds. 679 (17%) were cross breeds. Ages ranged from 1-204 months (mean 48 months).

2747 (71%) of owners had attended some kind of training. 46% (1792) had attended puppy classes, 46% (1789) basic obedience, 20% (792) agility, 3% (110) flyball, 5% (189) gundog training, 17% (729) ringcraft and 9% (361) to other training. 3593 (92%) had used food rewards, 3611 (93%) stroking or patting, 1974 (51%) playing and 1146 (29%) clicker training to reward desired behaviours. 2295 (59%) had used verbal punishment, 1143 (29%) shut the dog away, 501 (13%) physical punishment, 659 (17%) withheld treats, 2442 (63%) ignored their dog when it misbehaved, and 737 (19%) used a non-verbal distraction techniques when their dog showed an undesired behaviour. 1890 (49%) physically manipulated their dog into a desired behaviour. The most commonly used devices were harness (32%), water pistol (20%), choke chain (18%), pet corrector spray (9%), bark-activated citronella collar (6%), remote citronella collar (4%) and remote electronic collar (3%).

When categories of training techniques were combined, owners reported that reward based techniques were 93%, punishment based techniques were 69%, and negative reinforcement techniques were 87%, successful at achieving a positive outcome for the particular training undertaken. Owners in this survey therefore perceived the use of reward based techniques to overall be more successful than other approaches.

Conclusions

This data gives important current baseline information on the current pattern of training techniques use in the UK. This can now be used to educate dog owners about the advantages and disadvantages of different approaches to training, and help to develop strategies to prevent the occurrence of behavioural problems developing or persisting. This in turn will have consequences on the welfare of pet dogs in the UK.

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Keywords: training techniques, punishment, reward

Dogs' attachment to people: are search and rescue dogs different from pet dogs?

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Introduction

The dog is a co-operative social species, engaging in many shared activities, such as playing and hunting, with both conspecifics and people. These activities are known to create a good relationship between dog and man, which is more affected by the quality rather than the amount of time spent together (Scott and Fuller 1965; Rooney and Bradshaw 2003). It can therefore be hypothesised that a working role would enhance the dogs' attachment to their handlers.

The aim of this research was to assess whether there are differences between pet and working dogs in the attachment to their owners/handlers.

Materials and methods

40 dogs were involved in the study. The composition of the pet dog group was 12 females (3 spayed) and 14 males (3 neutered), with a mean age of 38.5 ± 27.8 months; there were 7 Labrador Retrievers, 2 German Shepherds, 2 Border Collies, 1 Golden Retriever, 1 Flat Coated Retriever, 1 Belgian Shepherd Groenendael, 1 Beagle, 1 Dobermann, 1 English Springer Spaniel, 1 Irish Setter, 1 Jack Russell, 1 Pit Bull and 6 mixed-breeds. Each pet dog was tested with their owner.

Working dogs were all search and rescue dogs, cared for at home by handlers out

of working time. The group was composed of 5 females (2 spayed) and 9 males (all intact), with a mean age of 46.6 ± 27.1 months; there were 6 Labrador Retrievers, 3 German Shepherd, 1 Border Collie, 1 Belgian Shepherd Malinois, 1 Beagle and 2 mixed-breed. Each working dog was tested with their handler.

All dogs were at least 1 year old, they had been living with their owners/handlers for more than 6 months, they were used to being taken out, were accustomed to staying alone and they were well socialised to people. Before being tested, dogs underwent a behavioural consultation in order to exclude the presence of behavioural problems that may have affected results.

Dog attachment was measured through a modified version of the Ainsworth Strange Situation Test, as suggested by previous literature (Topál et al. 1998; Gácsi et al. 2001; Prato-Previde et al. 2003; Palestrini et al. 2005; Fallani et al. 2006; Palmer and Custance 2008). The stranger was played by a 23 year old woman, the same for all dogs. Sessions were videoed and observed by a continuous sampling, analysing the duration of 5 behavioural categories: exploration; individual play; whining; contact/proximity to people (comprising: attention seeking, physical contact with a person, following, approach, attention oriented to a person, proximity, social wagging); contact with/proximity to door/chair/shoe (comprising: standing by the door, behaviours oriented to the door, attention oriented to the door when the person was absent, behaviours oriented to the chair, behaviours oriented to the absent person's shoe). Social behaviours were analysed towards the owner/handler and the stranger; non social behaviours were analysed in presence of the owner/handler or stranger and in their absence.

In the first step of the statistical analysis, the whole sample (26 pet dogs plus 14 working dogs) was considered to make a comparison between the behaviours shown towards owners/handlers and towards the stranger in their presence/absence, using the Wilcoxon test ($p < 0.05$). In the second step, the analysis was made comparing pet dogs to working dogs, considering their behaviours towards owners and handlers, by using the Mann-Whitney test ($p < 0.05$).

Results

The first step of the statistical analysis revealed that dogs showed differences between the stranger and owner/handler conditions, suggesting that they were attached to the owner/handler. Contact with/proximity to door/chair/shoe was higher during the absence of owner/handler *versus* stranger: 143.0 *versus* 49.5, $z = 4.731$, $p = 0.000$; contact with/proximity to owner/handler was higher than to stranger: 127.0 *versus* 50.5, $z = 5.383$, $p = 0.000$; whining bouts were longer during the absence of owner/handler *versus* stranger: 0.5 vs 0.0, $z = 3.099$, $p = 0.002$; exploration was higher in the presence of the owner/handler *versus* stranger: 20.5 *versus* 6.0, $z = 2.293$, $p = 0.022$.

The second step of the statistical analysis revealed no statistical differences between the owner and handler conditions. For contact with/proximity to door/chair/shoe during the absence of owner and handler there was no statistical difference between pet and working dogs: 125.5 *versus* 167.5, $U = 132.000$, $p = 0.156$. Contact with/proximity to owners was comparable to that to handlers (102.0 *versus* 146.0, $U = 157.000$, $p = 0.478$), and also whining during owner and handler's absence lasted similarly (0.0 *versus* 3.0, $U = 147.000$, $p = 0.288$). No differences were found between pet and working dogs for exploration in presence of the owner and handler: 23.0 *versus* 10.5, $U = 138.500$, $p = 0.215$. Although no significant differences were found, search and rescue dogs showed a trend of higher attachment to their handler than pet dogs to their owner.

Conclusions

The lack of statistical differences may be explained by the similarity in the management of pet and working dogs participating at this study. In fact, the search and rescue dogs could be considered "working pet dogs," sharing activities both in and away from home, as they were cared for at home by their handlers when they were not working (this is because Lefebvre and colleagues in 2007 demonstrated that such a management system leads to a better relationship between handlers and dogs). On the other hand, owners stated that they regularly shared activities with their dogs (although not at a working level) and those activities were known to strengthen the dog-owner relationship, such as playing (Stafford 2006; Horváth et al. 2008) and walking (Podberscek and Serpell 1997; Lefebvre et al. 2007).

Results seem to suggest that the attachment pet dogs show towards their caring owners is similar to the attachment search and rescue dogs show towards their handlers, although being a "working pet dog" slightly increases the bond.

Further studies are needed to investigate the effects of different management styles and shared activities on dogs' level of attachment to people.

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Keywords: attachment, dog, pet, working

Are puppies capable of learning through observational learning?

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Introduction

Although observation of maternal behaviour may be one of the most important ways in which puppies learn, its influence has been evaluated in very few studies (Chesler, 1969; Slabbert, 1997). Slabbert's study is the only one known to the authors which evaluates the role of observation of the mother's behaviour in task learning in puppies.

Since dogs are social group living animals the authors consider it reasonable to suppose that they are predisposed to learn through observational learning from their parents and conspecifics. They therefore suggest that it is surprising how few studies analyse this basic skill in canine learning.

This paper aims to evaluate the mother's influence on her puppies' observational learning using the basic methods described by Slabbert (1997). Slabbert's study involved puppies of bitches working in search work for narcotics and the results showed that puppies which observed their mother "working" developed more abilities in searching for narcotics than those which remained in their kennels while their mother was "working". In this current study the objective was to evaluate observational learning using one simple task instead of the complex tasks involved in narcotic related search work.

Material and methods

65 puppies from 13 mothers of different breeds were enrolled on the study. Their ages ranged from 6 to 12 weeks and sex ratio was 12 males: 21 females in the control

group and 17:15 in the treatment group. There were two experimenters.

In the first part of the test each litter was divided into two groups. Half of the littermates (treatment group) were taken to a test area with their mother. The mother was given the cue to “sit” repeatedly until she had performed the behavioural response correctly eight times. The mother was given a food reward every time she performed the behaviour correctly. The other half of the littermates (control group) remain isolated from their mother while this training is taking place.

The second part of the test was carried out 24 hours later. All of the puppies were taken to the test area where they were given the cue to “sit” until they had performed the behavioural response correctly three times. Each accurate “sit” response was rewarded with food. The time taken for each puppy to perform the behaviour correctly three times was noted.

Results

Statistical analysis was carried out using S.A.S 9.1 program. The mean time to achieve the task was 158.15 seconds in the control group and 73.1 seconds in the treatment group. T-test was performed and results showed significant differences between these means ($p = 0.0009$).

ANOVA two way test was used to evaluate the potential influence of the puppy's sex and breed and the mother's knowledge of the “sit” cue prior to the test on the mean differences. Results showed that none of these variables had a significant influence.

Discussion and conclusion

In this study the demonstrator from the first part of the test was absent in the second part, which took place 24 hours after the first demonstration. This enables us to rule out other types of social learning like imitation, social facilitation (Zajonc, 1965) and contagious behavior (Whiten, 1992) since these types of learning require the presence of the demonstrator (Zentall and Levine, 1972) when the observer performs the evaluated task and have a transitional character (Klopfer, 1961).

Results are consistent with those obtained in previous studies evaluating observational learning in dogs (Slabbert, 1997) cats (Chesler 1969) and other species (Norton-Griffiths, 1965; Flandera, 1974).

The conclusion is that the differences are attributable to observational learning and since this is an innate social skill in dogs, it could be a useful tool for canine education and for social enrichment in environmental enrichment programmes.

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Keywords: observational learning, dog, puppies, imitation

Survey of possible changes in undesirable behaviours after neutering in male dogs

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Introduction

Orchiectomy of the male dog is one of the most frequently performed surgeries in veterinary practice (Maarschalkerweerd et al., 1997). Neutering is a common practice in pet dogs to reduce some undesirable behaviours, but its effectiveness is still controversial.

Undesirable sexual behaviour (hypersexuality) directed towards people, other dogs, and objects is the most common undesirable behavioural problem reported to the veterinary by owners asking for orchiectomy. Escaping/roaming behaviour and aggressiveness were also common reasons for it, and they occurred especially when females in the neighbourhood were in oestrus (Maarschalkerweerd et al., 1997). In addition neutering is practiced to suppress male sexual behaviour and breeding capacity in general (Goericke-Pesch et al., 2009). Other possible reasons for neutering male dogs include testosterone-dependent disease processes (e.g. balanoposthitis, prostatic hyperplasia, perianal glands and testicular tumours) (Maarschalkerweerd et al, 1997).

Pal et al (1998) investigated the influence of age and sex on intraspecific aggression in free-ranging dogs. They found that adults of both sexes were usually more aggressive than young animals. Regarding sex, it emerged that aggressive behaviour was correlated to different contexts: adult males showed aggressive responses all year round and exhibited inter-male aggression primarily when females were in oestrus, whilst the number of aggressive incidents in adult females dramatically increased when lactating (Pal et al., 1998).

In pet dogs inter-male aggression is considered the most common form of intrasexual aggression (Beaver, 2009).

The current research aimed to investigate whether neutering changes the display of undesirable behaviours in male dogs.

Materials and methods

An eight closed item questionnaire was filled in by 178 owners of neutered male dogs (6.2 ± 3.4 year old). Data were analysed by using Chi-square test ($p < 0.05$). A recent publication (Dodman et al., 2005) supports the efficacy of behavioural diagnosis using questionnaires, even when it is not possible to carry out a direct observation of the animals (Guy et al., 2001).

Results

The number of dogs showing aggressive behaviours toward male dogs was 45 (25.3%) before neutering and 61 (34.3%) after neutering. It was observed that the 15.8% began displaying inter-male aggressive behaviour after being neutered; moreover the number of dogs maintaining such behaviour after castration (88.9%) was statistically higher than the number of those who improved (11.1%; $\chi^2 = 76.550$; $p = 0.000$).

Seventeen dogs showed unexplainable escape behaviour prior to neutering. None of them stopped escaping from home after being neutered. Interestingly of the 66 who exhibited escape behaviour after neutering, 74.2% did not show this behaviour before. It emerged that the number of dogs who kept escaping was statistically higher compared to the dogs for whom the behaviour diminished ($\chi^2 = 28.983$; $p = 0.000$).

With regard to escape and roaming aimed to reach females in oestrus, none of the 9 dogs who displayed it before neutering stopped it after the surgical intervention, whilst among the 169 who showed escape behaviour after neutering, 42.0% did not show this behaviour before. The number of dogs improving was statistically lower than the number of dogs maintaining the behaviour after castration ($\chi^2 = 9.387$; $p = 0.002$). Identical results were found for mounting behaviour towards people.

Conclusions

These preliminary data suggest that neutering is not effective in reducing inter-male aggression, escaping/roaming or mounting behaviour towards people in male dogs, as already suggested in previous literature (van den Berg et al.,

2006; Bennet and Rohlf, 2007). Other authors found either lower aggression in neutered dogs (Borchelt 1983; Gershman et al, 1994; Messam et al., 2008) or an increase in the number of male dogs showing aggression (Podberscek and Serpell, 1997a, 1997b; Guy et al., 2001). Some studies showed that orchietomy reduced not only inter-male aggression, but also aggression directed toward female dogs and unfamiliar people (Maarschalkerweerd et al, 1997). Hsu and Sun (2010) showed that neutered/spayed dogs scored lower on owner-directed aggression, but there was no statistical significant difference scoring aggression towards male and female dogs. Heidenberger and Unsheim (1990) found an increase in aggressive behaviour in the 6% of dogs after orchietomy; a similar proportion (4%) to the animals showing an increase of this behaviour is also reported by Maarschalkerweerd and colleagues (1997). Maarschalkerweerd and collaborators (1997) also described the main behavioural response as the reduction from 60 to 90% of objectionable sexual behaviour, roaming, inter-male aggression and house-soiling, a result similar to that observed in previous studies (Hopkins et al., 1976; Fry, 1987; Heidenberger and Unsheim, 1990). Roaming behaviour decreased less after orchietomy than others undesirable behaviours (Hopkins et al., 1976; Fry, 1987; Heidenberger and Unsheim, 1990).

Previous studies have also suggested that the consumatory phase of normal sexual behaviour (Hart, 1974) could decrease significantly after orchietomy, but also that neutered male dogs never lose all interest in females in oestrus (Beach, 1970; Le Boeuf, 1970; Hart, 1974).

Research carried out on ferrets showed that chemical castration results in a decrease in the occurrence of aggressive behaviour among male animals both in the presence and absence of a receptive female or in oestrus. The same study (Vinke et al., 2008) showed that chemical neutering had more effect than surgical castration on reducing inter-male aggression, whilst a similar reduction was observed in chemically neutered and castrated animals regarding sexually motivated behavioural patterns.

Further data collection is needed to extend the study on this controversial topic and assess neutering effects depending on the age of castration. It may also be interesting to look at the effect of breed since Fox in 1972 suggested that Terriers would have a stronger tendency than most types of dogs to develop inter-male aggression. The time elapsed after neutering could also be studied since Hopkins and others in 1976 suggested a six-month period as the minimum to allow the development of behavioural changes. The possible association between neutering and behavioural therapy should also be investigated, considering the frequent use of chemical castration as support to therapy or as a temporary alternative approach to the problem.

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Keywords: behaviour, castration, male dog, neutering

Some variables affecting owners' satisfaction with their dogs: a preliminary study

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Introduction

There is significant scientific interest in methods to improve adoption of dogs from shelters (Luescher and Medlock, 2009). To this end owners' expectations and their satisfaction are important. The aim of this study was to investigate factors affecting owners' satisfaction with their dogs.

Materials and methods

Thirty owner-dog dyads (15 men, 15 women) participated in this study which included:

1. behavioural observation of the dogs while undergoing a set of standardised experimental procedures (approach and interaction by a stranger, a doll, a toy dog, playing, approach while eating) from which a level was attributed to the dog in relation to specific behavioural traits (activity level, sociability to stranger, children, dogs, fearfulness);
2. a questionnaire on the characteristics of the dog and the owner and details of management;

3. a questionnaire on owner's satisfaction with the dog (both general and on specific behavioural traits, including the abovementioned) and on the ideal dog for that owner (using the same specific behavioural traits).

Bootstrap mean estimate, bivariate and univariate local regression, linear model adaptation and random forests analyses were used.

Results

Levels of satisfaction with activity level, fearfulness and sociability to strangers, children and dogs corresponded more to the overall level of declared satisfaction in women than in men.

The difference between ideal and real level of courage and sociability to children were the most important factors inducing a decrease in overall satisfaction rating (Adjusted R-squared = 0.73).

The rating in satisfaction with sociability to children, with intelligence and with level of affection shown had more effect on the overall satisfaction in women than in men, while satisfaction with fearfulness was more important for men.

Conclusions

This study contributes to the understanding of which behavioural characteristics, among those which can be assessed in a shelter, could be important in determining owners' satisfaction with their dog, with the long term aim of improving adoption rates in shelter dogs.

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Keywords: dog, behavioural characteristics, owner's satisfaction

Evaluation, management and welfare of aggressive sheltered dogs

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Introduction

Animal-to-human aggression is a significant problem in the management of dogs in Italian shelters.

In the most severe cases, after appropriate evaluation, one potential outcome might be euthanasia. This is legally permitted in Italy for cases in which dangerousness in stray dogs has been proven, but rescue associations remain strongly opposed to this approach.

Concerns have been raised over the welfare of dogs which are housed long term in shelters since these animals can experience conditions which risk severe deprivation and threaten to result in very poor quality of life.

If dogs are aggressive to humans the problem is further compounded by the need to carry out relevant risk assessment.

The aims of this study were

- 1) to analyse the behavioural patterns of highly aggressive long-term sheltered dogs
- 2) to assess the risk for workers in the shelter
- 3) to house and handle the dogs appropriately according to the animal welfare criteria and human safety
- 4) to analyse further adoption options.

Materials and methods

In the population of a Municipal Shelter in North Italy 20 highly aggressive long-term sheltered dogs were selected: 18 males and 2 females. Their previous history was unknown.

The dogs were evaluated by a veterinary behaviourist and a professional trainer. The evaluation included multiple phases of observation and physical approach.

A list of behaviours (reactivity, predation, space and resource control) was analysed in different contexts (familiar and strange people, outside and inside the kennel): social approach behaviours (40 items), agonistic behaviours (55 items), stress related behaviours (22 items). Activities were recorded and all behaviours were scored from videotape.

For each dog: an ethogram and profile personality was filled out, a list of suggestions was proposed and applied in handling and management.

Conclusion

Results of this study highlight the following points:

- 1) there is no statistical approach which is suitable for standard evaluation and intervention and monitoring of behavioural changes is necessary
- 2) there is a need for accurate evaluation of management/housing conditions for aggressive sheltered dogs in order to improve their welfare and the safety of humans
- 3) rehabilitation can be long and expensive
- 4) sometimes adoption is impossible

Keywords: dog, shelter, aggression, risk assessment, evaluation

Development of a standardised behaviour test to evaluate the influence of dog-owner relationship and dog-owner attachment on the behaviour of the dog – assessment of test-retest reliability

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Introduction

As part of a larger project on the influence of the dog-owner relationship on the behaviour of the dog, a standardised behaviour test was developed. Behaviour tests need to meet certain requirements, so-called “criteria of good quality” (objectivity, reliability, validity), to a particular degree (Atkinson et al. 2001; Lienert 1961; Rost 2004). Previous reviews concerning behavioural testing in dogs found a lack of standardisation and emphasised the need to fulfil these test quality requirements (Jones and Gosling 2005; Diederich and Giffroy 2006; Taylor and Mills 2006). Thus, the study presented here aimed at evaluating the behaviour test regarding its test-retest reliability.

Materials and methods

Sixty-two dog-owner teams participated in the study. All dogs were privately owned, pure-bred German Shepherds, male and female, aged 1 to 8 years. The behaviour test consisted of 25 situations in which the dogs were confronted with different animate and inanimate stimuli; it comprised situations adapted from already published behaviour tests (Goddard and Beilharz 1984, 1986; Nmeff 2000; Svartberg 2002, 2005, 2006; Svartberg and Forkman 2002; Svartberg Et Al. 2005).

In each situation, the dog's behaviour was classified into one of 11 behavioural categories based on the work of Zimen (1971), Feddersen-Petersen and Ohl (1995), and Feddersen-Petersen (2004, 2009). All observations were carried out by the same observer. Twenty-five of the participating dogs were tested twice after an interval of approximately one hour.

Data were analysed using SPSS 15.0. Reliability was assessed by calculating percentage of agreement and kappa coefficient between first test and second test.

Results

Between the first and second test, the percentage of agreement ranged from 36.0% to 84.0% ($\bar{x} = 60.48\% \pm 2.90\%$ SD). For Cohen's κ , values ranging from -0.087 to 0.733 ($\bar{x} = 0.339 \pm 0.044$ SD) were found. The following levels of agreement were calculated:

- **poor:** "friendly contact" (72.0%/ -0.087), "toy car" (36.0%/ -0.008);
- **slight:** "person with long coat and hat" (36.0%/ 0.080), "toy horse" (60.0%/ 0.097), "stranger strokes dog" (36.0%/ 0.145), "plastic bag" (64.0%/ 0.022), "drunk person" (36.0%/ 0.156);
- **fair:** "social contact" (60.0%/ 0.307), "metallic noise 1" (44.0%/ 0.224), "metallic noise 2" (64.0%/ 0.353), "person in wheelchair" (56.0%/ 0.272), "staring at dog" (64.0%/ 0.375), "owner plays with dog" (72.0%/ 0.319), "shouting at dog" (56.0%/ 0.344), "sudden appearance" (52.0%/ 0.394);
- **moderate:** "play 1b" (76.0%/ 0.599), "ghosts" (52.0%/ 0.416), "chase" (64.0%/ 0.426), "stumbling" (68.0%/ 0.526), "distance play 1" (56.0%/ 0.422), "clapping hands / screaming" (72.0%/ 0.524), "abrupt rise" (76.0%/ 0.571), "play 2" (76.0%/ 0.586);
- **substantial:** "play 1a" (84.0%/ 0.733), "distance play 2" (80.0%/ 0.668).

Discussion and conclusion

The varying levels of agreement found here may result from the stimuli themselves. Stimuli eliciting approach behaviour during the first trial might evoke neutral behaviour during the second trial, if the dog recognises them as being previously experienced. Due to unintentional differences in presenting the stimuli, dogs might feel a conflict during one trial and no conflict during the other, thereby resulting in neutral or attentive behaviour on one occasion and in conflict-related behaviour such as aggressive, submissive, or flight behaviour on the other, again leading to less agreement. The extent to which changes in response are a result of learning or due to possible differences in the presentation of the stimuli is difficult to estimate. In addition, the classification of the dogs' behaviour by the observer needs to be considered as cause for disagreement between the trials.

Scott and Charles (1954) calculated the test-retest reliability but it is not clear which observations these authors used in their comparison. Goddard and Beilharz (1984) in their work on fearfulness in dogs found correlations between 0.01 and 0.50 for different situations tested at an age of six and twelve months. They also reported correlations between 0.16 and 0.70 for "fear on walks" – scores taken from three, four, six, and twelve months old dogs. In a later investigation, Goddard and Beilharz (1986) report low and non-significant correlations for "approach" – scores, low and positive correlations for "avoid" – scores, and correlations between 21 and 64 with one non-significant and nine significant ones between several behaviour tests conducted with four, five, six, seven, and nine week old dogs. For the agreement of the overall estimation of "social tendencies", measured at 7 and 16 weeks of age, Beaudet et al. (1994) found a correlation of $R = 0.29$.

Netto And Planta (1997) assessed 37 dogs twice after six months. For the behaviour test in total, the agreement was 0.52, 0.65, and 0.77 (rs) for "total attack behaviour", "snapping", and "biting/attacking" respectively. When comparing each situation, they found kappa coefficients ranging from -0.05 to 0.79. King et al. (2003) found moderate and high correlations between 38 variables obtained from four situations of a behaviour test when applying two trials with an inter-trial time of six to eleven weeks (rs: range 0.6 to 0.8)

More research is needed, particularly on the influence of the duration of the inter-trial period on test-retest reliability as well as on the factors that induce behavioural stability or instability in dogs if they are confronted with identical situations.

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Keywords: dog, behaviour test, test-retest reliability

Is tail chasing a new, repetitive or compulsive disorder in Jack Russell Terriers as it is in other breeds?

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Introduction

Compulsive behaviour describes repetitive actions such as tail chasing, performed without any obvious purpose and to the extent that it interferes with the animal's normal activities. These behaviours include stereotypic licking or overgrooming sometimes leading to self-injury, flank sucking, spinning or tail chasing, pacing, jumping, air biting or fly snapping, staring at shadows, walls (or some toys) and pica. Repetitive or compulsive behaviour, such as tail chasing or spinning, is well recognised in some breeds such as the Staffordshire Bull Terrier or German Shepherd Dog. These behaviours, usually exhibited outside a normal function or context, seem to be developed, in Bull Terriers, by individuals with a genetic predisposition. This study aims at evaluating the possible emergence of tail chasing and spinning as a frequent, compulsive behaviour in Jack Russell Terriers.

Material and methods

In this study we focused on tail chasing, self injury and spinning in Jack Russell Terriers.

In 2009, we evaluated 6 cases of tail chasing and spinning among 19 Jack Russell Terriers arriving for consultation in our clinics. There were 14 males and 5 females,

ages ranging from six months to nine years. For each dog, a medical and behavioural history was obtained from the owners and a neurological examination was performed. Underlying medical problems that could affect the dog's behaviour and cause compulsive responses were investigated, such as epilepsy, head injuries, bacterial or viral infections and sensory disorders including cognitive dysfunction. The owners' management routines for the dogs were recorded.

Results

The dogs which exhibited tail chasing and spinning behaviour were 3 males and 3 females, ages ranging from six months to nine years. In the six cases, the diagnostic process identified tail chasing, spinning or self-injuries interfering with normal behaviour. The compulsive behaviours occurred out of context and were not purely conditioned behaviours. In none of the six cases was this problem related to a known medical cause such as a physical lesion or a pathological process. Our cases showed that dogs' tail chasing, self-injuries or spinning was mostly expressed as a result of living conditions leading to conflict behaviours. One case showed no relation to any kind of stressful situation or action from the owner but we could not find any medical cause either. The expression of this repetitive behaviour seemed to be influenced by the age of the animal. The high frequency and duration of the tail chasing as well as self-trauma seemed to be related to a young age. With the one year old dogs the expression of the tail spinning was mostly triggered by the behaviour of the owner. Compliance of the owner seemed to contribute to the improvement of the disorder. In five cases, the tail spinning behaviour disappeared. One dog was euthanised: this dog was unable to do anything other than tail chasing, eating or sleeping and the impact on his well being was very severe.

Conclusion

The number of cases enrolled in this study is too small to be able to draw any statistically significant findings. However, the study is continuing and further cases are being enrolled and with larger numbers it will be interesting to assess, as it is about to be done for the Staffordshire Bull Terriers, if Jack Russell Terriers are more likely to develop tail chasing or spinning than other breeds. This information can then be used to help owners and breeders to avoid and/or manage this disorder.

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Keywords: Jack Russell Terrier, tail chasing, spinning, compulsive behaviour

A survey of dogs' behaviour at the veterinary clinic

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Introduction

Veterinary visits are known to be stressful events for dogs. The veterinary clinic frequently represents a novel environment or may have been associated with previous aversive experiences linked to the process of restraint, the inability to escape or the experience of painful interactions (Archer, 1976).

Previous studies (Stanford, 1981) found that many dogs show signs of fear and anxiety while at the veterinary clinic, and discussed the need to evaluate the implications of the treatments in terms of animal welfare (Christiansen and Forkman, 2007).

The aim of this study was to evaluate the behaviour of dogs at veterinary clinics.

Materials and methods

Five hundreds owners of dogs of various breeds and ages were asked to anonymously fill in a 47 item questionnaire. As a preliminary study 17 closed questions were analysed.

The analysed questions were strictly related to the behaviours exhibited by the dogs while at the clinic, their reactions to the veterinary surgeon and the approach modalities of the veterinary surgeon.

Results

It emerged that the vast majority of dogs (79.7%) exhibit signs of anticipation that they are going to the veterinary clinic, usually when they get there (52.9%), but

sometimes earlier in the car (39.7%) or even when the dog is still at home (7.4%). For the majority of dogs (91.4%) the first visit to the clinic occurs during puppyhood.

At the veterinary clinic only 36.4% of dogs appear calm in the waiting room, whilst others show signs of fear (24.4%), excitement (37.6%) and/or aggressiveness (3.4%). Entering the consulting room seems to be unpleasant for 52.2% of dogs, who need to be encouraged (27.4%) or picked up (17.4%) by owners. On the examination table 73.2% of animals appear nervous, displaying behaviours such as attempting to jump off the table (31.8%), trembling (16.8%), holding the tail between their legs (18%), and attempting to be held in their owners' arms (21.0%).

Before starting the examination, veterinary surgeons usually either talk to the dogs (54.2%), or call them by their name (39.2%), or pet them (48.6). Only 6.2% of veterinary surgeons examine their patients immediately. If dogs get nervous during the visit, veterinary surgeons usually ask the owner (54.8%) or an assistant (18.8%) to hold them, try to calm the dogs down by petting them (41%), apply a muzzle (10.6%) or scold the dogs (2.4%). When food is offered, 34.6% of dogs refuse it. When approached by veterinary surgeons, the majority (65.0%) of dogs are tense but not aggressive, 8.6% growl, 3.2% attempt to bite, and only 26.4% wag their tail. According to the owners, dogs do not usually show preferences for veterinary surgeons' gender (77.4%), but women are favoured (14.7% versus 7.9%; $X^2 = 4.534$; $p = 0.033$) by those who do express a preference.

It is relevant that about one owner out of three (34.2%) decide to switch to another veterinary surgeon during their dog's life, mostly because they do not like the way the animal is treated (26.9%) or because they do not consider the veterinary surgeon to be competent enough (26.3%).

One third of dogs (36.8%) seem to tolerate all kinds of clinical handling well; the most disliked treatments are temperature measurement (22.4%), blood sampling (18.2%), injection (17.4%) and ear examination (15.2%). Undergoing painful treatment leads to an increase in fearful and/or aggressive behaviour in almost half of the patients (44.5%). 4.9% of owners are bitten by their dogs during the visit.

Conclusions

The results of this study suggest that the veterinary clinic is perceived by dogs as a very unpleasant place and as a result many of them start to become tense as soon as they realise they are going to be examined.

While dogs are in the clinic, they display fear and anxiety, as demonstrated by their behaviours in the waiting room, on the table and when approached or handled by the veterinary surgeon.

Moreover, data suggest that although veterinary surgeons try to handle animals carefully, their friendly approach does not seem to be enough to reduce the dogs'

tension, especially if the patient had previously experienced unpleasant or painful treatments. It is particularly important to note this, as fear, anxiety and frustration can lower aggression thresholds (Panksepp, 1998) resulting in some dogs being really difficult and dangerous to handle (Moffat, 2008).

It can be concluded that veterinary surgeons should take into account the dogs' psychological welfare and should try to prevent stress related behaviours in their patients. They should minimise as much as possible stimuli and situations that lead to fear and understand basic animal behaviour. If veterinary surgeons recognise signs of anxiety and fear, it is important that they ensure a calm environment, and gently and humanely handle their patient.

In this paper, the presented results correspond to the answers to 17 closed questions relating to the behaviours displayed by dogs in the veterinary clinic. It would be beneficial to carry out further analysis in order to correlate such data with that arising from the owners' answers to other items of the questionnaire related to their owner-dog relationship, personal data of the family and dogs' habits.

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Keywords: anxiety, clinics, dog, Veterinarian

Opipramol – a very interesting antidepressant drug

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Medication plays an important role in veterinary behavioural medicine. For example the treatment of certain behavioural disorders includes the use of tricyclic antidepressants (TCAs). A potential new treatment option for behaviour problems is a TCA named Opipramol. Opipramol belongs to the class of the dibenzazepine and is commonly used in human medicine. It shows substantial similarity to the anticonvulsant Carbamazepine, but has no anticonvulsive effects itself. It is not clear why substances with such similar structures have such a variance in their effects. In common with many psychopharmacological medications it has not been scientifically proven in companion animals and unfortunately there is little information available about the effects of Opipramol in dogs and cats.

In the past Opipramol has been used because of its antidepressant and tranquilising characteristics. It is effective in calming and mood elevation, as well as resolving excitement and acting as an anxiolytic. At the beginning of treatment a rapid calming effect is seen and after only 1–2 weeks this effect supplemented with a mood elevation effect.

Opipramol is known to lack addictive potency but in common with other psychotropic agents it is advised to discontinue medication slowly and in a controlled manner because its calming effect has the potential to have a paradoxical effect and therefore potentially unmask existing complications.

In contrary to other TCAs Opipramol has no debilitating effect on the reuptake of biogenic amines. The following impact mechanisms have been proven: at first Opipramol acts as a ligand for sigma-receptors which is a largely unique feature amongst the different anxiolytics. It is assumed among other things that this is the reason for causing the clinical anxiolytic effect. Later on it blocks, with low affinity, the serotonin-receptors 5-HT_{2A}, which are associated with anxiety, nervousness and compulsiveness. Acting as an analogue to some neuroleptics it also blocks, with low affinity, the dopamine-receptors D₂ which are implicated in

some psychoses e.g. anxiety, paranoid symptoms and behaviour which does not appear to serve any obvious function. The blockage of the histamine-H₁-receptors, also with low affinity, causes the slightly sedative effect. Both the anxiolytical effects as well as the possible side effects can be traced attributed to the combination of biochemical effects listed above.

Recognised potential side effects include gastrointestinal dysfunctions, nausea, dry mouth and fatigue. If they do occur they are usually limited to the first few days of medication with Opipramol. In the author's personal experience some cases in which Opipramol has been administered for several weeks have been associated with pronounced hair loss. In case of overdosing extra pyramidal dysfunctions which are typically associated with neuroleptics may be shown. Due to the lack of statistics for an established risk assessment in human medicine Opipramol should only be administered during pregnancy in strictly controlled conditions. Furthermore it passes, in low quantity, into the dam's milk and should not be taken during lactation.

The author has experience of using Opipramol for 68 dogs which were suffering from nervousness and insecurity. The dose rate for dogs was 0.25–2mg/kg twice daily. With the use of Opipramol it was possible to work with the dogs quite normally and to treat them with additional behavioural therapy. All of the dogs appeared to be more relaxed. Any mild side effects, such as those listed above, were nearly always reversed by adjusting the individual dose. In the cases of just three dogs the author had to cease medication with Opipramol because of the absence of compliance by the owners in adjusting the individual dose for their pet.

This experience suggests that further research is needed to investigate the efficacy of Opipramol in companion animals but it may be effective as a well-tolerated treatment and provide a new pharmacological option within behavioural therapies.

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Stress levels in dogs when being trained in a wild boar enclosure

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Introduction

In Germany, wild boar enclosures have a long tradition. They have traditionally been used to avoid taking untrained dogs into a full wild boar hunting context (Woermann 2003). In recent years, however, they have become a matter of considerable controversy. Supporters claim that training hunting dogs in these facilities increases experience and thus safety of the dogs when they eventually go hunting. The argument is that the dogs can learn to correctly assess the wild boars' aggressive responses, to find the boars, and to set them in motion towards the huntsman without being harmed themselves. Furthermore, the wild boars' safety is increased as unusable dogs, i.e. individuals working too aggressively when in contact with wild boars, can be removed from the hunting dog stock at this training stage (Wunderlich 2007). Opponents, however, criticise this training method for hunting dogs and claim that dogs as well as wild boars experience excessive levels of stress during the dogs' training, thus violating the German Welfare Act.

The study presented here aimed to evaluate the stress levels of dogs during training in wild boar enclosures, particularly in comparison to working in familiar hunting grounds, and to evaluate this training method in terms of its animal welfare relevance.

Materials and methods

Wild boar enclosures, approved by the hunting association of Brandenburg, Germany, were visited on 8 different days. Thirty dogs of varying breeds between 1 and 10 years old, male and female, neutered and intact, participated in this study.

All dogs were trained and used as hunting dogs by their owners.

Saliva samples were taken after resting at home (BC), after work in enclosures (EC), and after hunting in familiar hunting grounds (FC). For BC, two salivary samples with an interim time of one hour were taken per dog. For EC/FC, 4 saliva samples were taken from 5 minutes after work and then every 5 minutes. All samples were obtained using Salivetten® with citric acid (Firma Sarstedt) and analysed at the laboratories of the Department of Pharmacology, Toxicology, and Pharmacy, University of Veterinary Medicine Hannover, by a Cortisol Saliva ELISA (Firma IBL Hamburg).

To analyse the hunting dogs' behaviour while working in the enclosures, the dogs were videotaped and their behaviour between taking off the lead and the first recall by the owner observed. The dogs' behaviour was classified as submissive behaviour, defensive/offensive aggression, flight behaviour, avoidance behaviour, chase behaviour, or urination/defecation. The behavioural category displayed most often was determined for each dog. In case of equity between two behavioural categories, both were counted.

Data were analysed using SPSS 16.0. For comparisons between BC, EC, and FC, a variance analysis for repeated measurements was used. For the analysis of influence of dog gender and boar population density in the enclosure on EC, a univariate analysis of variance was conducted. The influence of a dog's number of training sessions on EC was tested using bivariate correlation analysis.

Results

For BC, a mean \pm SD of 9.26 ± 5.2 ng/ml was found, for EC this was 15.93 ± 6.84 ng/ml, and for FC it was 14.11 ± 4.37 ng/ml. When comparing BC–EC, a significant difference was found ($p = 0.029$). In six dogs (19.4%) BC was higher than EC, and in 25 dogs (80.6%) BC was lower than EC. When comparing BC–FC, a significant difference ($p = 0.028$) was calculated. In 6 dogs (19.4%), BC was higher than FC, and in 25 dogs (80.6%) BC was lower than FC. The difference EC–FC was not significant ($p = 0.402$). Here, 18 dogs (58.1%) had higher values for EC, and 13 dogs (41.9%) had higher values for FC.

No significant differences were found for influence of dog gender ($p = 0.830$), number of training sessions ($r = 0.15$; $p = 0.437$), or boar population density ($p = 0.305$) on EC.

Chase behaviour was observed in 42.9% of the dogs, followed by defensive aggression (27.1%), flight behaviour (14.3%), avoidance behaviour (8.6%), urination/defecation (4.3%), and submissive behaviour (2.9%). No dog showed offensive aggression.

Discussion and conclusion

For BC, EC, and FC, higher cortisol concentration were found than in Vincent and Michell (1992) and Beerda (1997), whereas Wust (2006) obtained similar results. The Elisa used in the present study is a new, more sensitive method to measure salivary cortisol concentrations and this may explain these findings. However, as relative changes in cortisol concentrations (and not absolute values) were taken into account, a reliable statement on the dogs' stress levels can be made (Köhler 2004).

Higher salivary cortisol concentrations during both EC and FC as compared to BC were presumably due to chasing being an enjoyable, self-rewarding behaviour with high levels of activity (Schalke 2008). Physical activity on its own increases plasma cortisol levels and therefore also cortisol levels in the saliva (Stichnoth 2002). The non-significant difference between EC and FC demonstrates that working in wild boar enclosures is not more stressful than working in familiar hunting grounds.

Chasing is a self-rewarding behaviour, i.e. it is most unlikely that the dogs suffered from stress levels relevant which could be considered significant in terms of animal welfare. The other behaviours observed may in part be signs of increased stress levels, e.g. urination/defecation, defensive aggression, avoidance behaviour, or flight behaviour. However, urination/defecation may have been caused by the highly frequented enclosures and the numerous urine marks from other dogs as well as by the inability to urinate/defecate before working in the enclosures. Defensive aggression, avoidance behaviour, or flight behaviour as parts of agonistic behaviour are in fact shown towards stressors in order to increase the distance towards them. It has been shown, however, that animals which are able to escape from stressful situations experience less stress than animals which cannot control the situation (Stichnoth 2002), and withdrawing from the situation was possible at all times. Submissive behaviour is negligible here, as it was shown during interactions with the owners but not toward the wild boars.

In conclusion, continuing to train hunting dogs in wild boar enclosures is in accordance with the German Animal Welfare Law from a canine perspective. The degree to which the boars suffer from stress is currently being investigated in a parallel study.

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Keywords: stress, dog training, wild boar enclosure

D.O.Q.-Test 2.0 – Dog Owners Qualification

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There are a number of voluntary tests for dog-owners in existence around the world. Some of these only involve proof of theoretical knowledge, while others have a theoretical and a practical part. The questions are published and appear to be the same in every test so it appears that there is a risk that owners may learn them by heart and not really understand their meaning.

D.O.Q-Test dates from April 2006 and stands for a voluntary test which is administered and evaluated via the internet. It is offered to dog owners by an association of veterinary surgeons called the Verein Tierärztliche Arbeitsgemeinschaft Hundehaltung e.V. (TAG-H (group of veterinary surgeons specialised in behaviour) which is an affiliated group of the Bundestierärzte-kammer (BTK (organisation of all German veterinary surgeon). Later the association Verein Tierärztliche Arbeitsgemeinschaft took a patent on this **D.O.Q-Test** and protected it by law.

The acronym D.O.Q-Test 2.0

D stands for:

- a) doc – as veterinary surgeons established and subsequently carry out the test and it represents veterinary innovation and knowledge
- b) dogs

O stands for:

- a) the owner of the dog

Q stands for:

- a) qualification of the dog owner
- b) quality of the test ie quality as a standard for testing in the context of standardised examinations about dogs and their owners. This quality has a central meaning for high quality examinations for differing target groups.

D.O.Q.-Test 2.0 is an ongoing development of the Verein TAG-H. The technology is based on that of Data-Parc Ltd and on the TOEFLE-Test Thomson Prometric,

(about 1 million of tests per year.).

This test assesses theoretical knowledge and practical skills of dog owners. The theoretical side of the **D.O.Q.-Test** takes place online in a veterinary-clinic on a secure website. For those who do not have access to a personal computer there is a paper and pen alternative version. Both are multiple choice tests. The multiple choice questions are of the same standard throughout the country.

The questions are not published and therefore the dog owners have to prove their own knowledge.

A book – Hunde und Menschen – immer gern gesehen? (Dogs and humans – always welcome?) written by Dr.U.D.Feddersen-Petersen, Dr.P.Piturru and Dr.W.-D.Schmidt and published by the Verein TAG-H provides background reading and covers all of the areas that the questions will cover.

All of these theoretical **D.O.Q.-Tests** fulfil three important quality requirements:

- **Objectivity** due to the independence of the individual tester.
- **Validity** because each question is related to required knowledge.
- **Reliability** due to a consistent and equal standard of questions and their diagnostic evaluation. A high comprehension, practicability and understanding is uppermost aim.

Every dog owner can take part in this qualification and some German states have embraced the **D.O.Q.-Test 2.0** and recommend it.

D.O.Q.-Test 2.0 consists of two parts:

1. 35 multiple choice questions from a questionnaire of over 400 questions. 70% have to be answered correctly. This theoretical examination can be taken in any veterinary practice and can also be administered by **D.O.Q.-Test PRO** (professional) qualified dog trainers.
2. A practical examination where owners handle their own dog in normal situations. This practical part can be assessed by veterinary behaviourists, by veterinary surgeons with a qualification for testing **D.O.Q.-Test 2.0** or by **D.O.Q.-Test PRO** qualified dog trainers.

Each candidate (dog owner) has to pass the theoretical part of the test just once but the practical part has to be passed separately with every dog that the person owns. If a family dog is handled by more than one person, every person of the family has to pass the **D.O.Q.-Test 2.0** theory (once) and practical (with each dog individually).

In the future it is anticipated that multi medial fade in, with pictures and videos, will help to improve the questions. The mouse-click does not only replace the physical marking of the examination paper (in place of ticking a box with a pen) but also allows the organisers of the test to collect data which can be used for

further development and improvement of the questions.

In the practical part the owner has to control their dog for over 60 minutes in open and fenced areas without causing any negative situations or encounters with members of the public.

The owner fails the practical part if:

- the dog attacks the examiner, the owner or another person
- the dog is not controllable in certain situations over several minutes
- the dog threatens or attacks other dogs
- if the owner is too rough with his dog or behaves inappropriately toward other people or screams at or kicks his dog
- if the owner cannot control his dog

The owner has the choice to take the practical test with his dog on or off lead.

In addition to providing a way in which dog owners can prove their knowledge the Verein Tierärztliche Arbeitsgemeinschaft Hundehaltung e.V. feels that it is beneficial if dog trainers, dog handlers and dog walkers also prove their knowledge. Therefore **D.O.Q.-Test PRO** was established.

For **D.O.Q.-Test PRO** dog trainers, dog handlers and dog walkers also have to pass a computer based multiple choice questionnaire on dog behaviour, behaviour problems and laws. An interview on ethological subjects, behaviour problems and their solutions follows. When the theoretical part has been passed they have to demonstrate how they teach dog owners and solve problems with them and their dogs. These **D.O.Q.-Test PRO** qualified dog trainers can then test dog owners using the **D.O.Q.-Test 2.o** theory and practical examinations.

Keywords: online, dog, knowledge, test

Differences in dogs' behavioural responses to standardised behavioural tests due to context

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Introduction

Recent scientific and public interest in dog aggression has led several governments to take action in an attempt to prevent such events, including through the use of behavioural tests, despite limited generalisation between contexts (Cristensen et al., 2007). Little research has been done to investigate the effects of the context on dogs' behavioural response during these test procedures.

This study assessed differences in dogs' responses to a standardised set of challenges common to most screening tests in veterinary versus domestic contexts. The challenges tested in this study were: approach by a stranger, handling and leading by a stranger, interactions with an unfamiliar (stuffed) dog, approach by a doll, attempting an impossible task, non-predatory and predatory playing, and being disturbed while eating.

Materials and methods

Twenty dogs (12 male, 8 female) aged 1 to 10 years were randomly divided into two groups of 10 dogs each. The first group was observed first at their homes and then at a single veterinary clinic; the contexts were reversed for the second group. The same researcher conducted all tests according to a highly standardised procedure to control for handler effects. The behaviour of the dogs was videotaped and scored by a focal-animal, all-occurrence technique. The ratio of behavioural occurrences of a particular event to total behavioural occurrences was analysed with Wilcoxon signed-rank tests.

Results

In the “approach by a stranger” challenge, dogs in both groups showed more putative stress-related behaviours ($Z=2.61$; $p<0.01$) and ignored the stimulus more often ($Z=3.58$; $p<0.001$) when the tests were conducted in the veterinary clinic than at their home. Dogs were more excited ($Z=1.99$; $p<0.05$) at home than in the veterinary clinic during “interactions with an unfamiliar dog”. All other differences were not significant.

Conclusions

Given that dogs’ performances during even highly-structured testing conditions vary for some challenges depending on the context, we recommend that the testing context be selected depending on the variables being studied.

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Keywords: behaviour, dog, experimental setting

Possible treatments with the new product Zylkene

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Introduction

The neutraceutical product Zylkene has been available in Germany since October 2009 to assist in the management of anxiety disorders in dogs and cats. Zylkene's active ingredient is alpha-casozepine, a decapeptide obtained from a-S1 casein by tryptic hydrolysis. Alpha-casozepine is similar in spatial structure to gamma amino butyric acid (GABA) and it has an affinity for benzodiazepine receptors. Alpha-casozepine is reported to have an anxiety-reducing effect similar to diazepam, but without the potential reported side effects of diazepam use.

Case-studies (short form) demonstrating the administration of alpha-casozepine (Zylkene) to cats

CASE ONE: Aggression between two 12-year-old male neutered Abyssinians, who have lived together since they were weaned

The Abyssinians, Enzo and Kasimir (both 12-year-old neutered males), lived together with an older cat, Paul, for 10 years without any problems. After Paul's death, the two cats began to exhibit aggressive behaviour toward each other while lying with the owner. At first the cats fixated on one another for several minutes, then Kasimir bit Enzo on the neck, whereupon Enzo chased Kasimir around the room. Both cats were hissing and growling at one another throughout the interaction. Intermittently they would lock onto each other biting. The owner would regularly stop these fights by pulling the door to the room wide open, and closing it as soon as one of the cats had run through it. As the months went by, these aggressive interactions became more frequent, until they were occurring almost every day. To start with it was possible to open the door and reintroduce the cats after about half an hour but as the problem progressed it became necessary to keep the

barrier between the cat have to remain for 2 or 3 hours. If the door was opened too early, the locked out cat would run back into the room, and the threatening-fixation, chasing, and fighting cycle would start again.

In January 2010, both cats commenced treatment with one 75 milligrams capsule of Zylkene daily. After one to two weeks of administration the owner noticed a drastic reduction in the aggressive interactions. The frequency decreased to less than once a week. When fights did break out, it was sufficient to separate the cats for 30 minutes and the fights no longer resumed after the door was opened.

CASE TWO: Inappropriate urination and defecation of a house cat, first observed after the owners had a baby

The house-cat Charlie (male, neutered, 12 years old) had lived for twelve years with his owners in a large house and was kept indoors. Charlie was very sociable and his owners took him with them when they went on holiday. Four months ago, his owners had their first baby and they were afraid that Charlie (weighing 8 kg) might lie down with the baby and suffocate it. For this reason Charlie was no longer allowed to sleep with his owners, and was always kept out of the baby's room during the day. The nursery was also the same room where the owners spent most of their time. A few weeks ago, the owners noticed that Charlie began occasionally urinating outside the litter tray. Twice he defecated outside the litter tray.

The use of a pheromone spray resulting in no change in behaviour. Charlie was given 150 mg Zylkene daily in his food. Additionally, the owners made two additional litter trays available. The owners were advised to schedule time into their routine when they could spend time with Charlie on a daily basis. Charlie stopped depositing urine or faeces outside of the litter tray as quickly as a couple of days after starting the alpha-casozepine, and remained reliably housetrained 3 months after beginning the treatment.

CASE THREE: Preventative management of an anxious house cat, prior to moving to a new home

The house-cat, Lucy (female, spayed, 5 years old,) is going to have to cope with an imminent house move. Lucy was a barn cat, when the owner adopted her at 12 weeks of age. Since then, Lucy has always been kept indoors. She does not exhibit any problematic behaviour, but is easily frightened by changes in her surroundings. Even the purchase of new appliances (for example a washing machine), which are brought and installed by strangers, leads to Lucy hiding away for many days, only coming out of her hiding place at night to eat. She stays out of the room where the new appliance is for several weeks, or at least enters it very cautiously. Lucy shows similar behaviour after going to the vet, with the accompanying ride in the car. The treatment with a pheromone spray has not shown any noticeable positive effect.

Lucy was given 75 milligrams of Zylkene daily, beginning 4 weeks before the move. At the same time, she was given treats for getting into her cat carrier, to help her get accustomed to it. The owners did all the packing and unpacking for the move themselves, without hiring outside help. On the day of the move, Lucy was brought into the new home before the movers arrived. She was kept in the guest bathroom, so that she would not be confronted with strangers.

During the day of the move, especially in the new home, Lucy was noticeably stressed. None the less, at night when the door to her room was opened again, Lucy sought out contact with her owner and slept that night in her bed. Two weeks later, Lucy was exploring the entire new home slowly and carefully. After four weeks, Lucy was moving about the house and acted in a completely “normal” manner. The owner was advised to continue the treatment with Zylkene for a year, and after that to slowly taper off the product.

Conclusion

Veterinary surgeons often report, that the prescription of medication can increase the success rate of a therapy, and thereby also improve the willingness of the owner to engage in behavioural therapy over the long term. The nutraceutical Zylkene is not classified as medication, but in some cases it has been found to be a very effective new tool for veterinary surgeons practicing behavioural therapy. Owners do not object to their pets taking Zylkene, since it is not a medication, in their understanding, and is classified as a natural product with no reported side effects. The ability to give this product to cats with their food, makes the treatment easy to administer for many cat owners.

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Keywords: cat, alpha-casozepine, case-studies

Welfare of animals in travelling circuses in The Netherlands

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In 2007, the Minister of Agriculture asked for an investigation of the welfare of (non-domesticated) animals in circuses in the Netherlands. We made an assessment of the living and working conditions of important non-domesticated animals present in 2008 – elephants, lions, tigers and camels – as well as all horses that lived and worked in six travelling circuses in the Netherlands. Also their health and behaviour was investigated. We visited the circus sites during the tours, winter residences and during transportation.

Caretakers responsible for these animals were interviewed with standardised questionnaires. In total circuses have been visited 82 times (53 surprise visits). During these visits, the behaviour of 40 non-domesticated individual animals and 62 horses was observed over a total of 1170 effective hours (divided over 6 x 24 hour scan sampling (control-, travel- and performance days) and 2 x 5 times 1 observation hour of 1/0 sampling (5 periods including a control period) per circus). The health of the animals was inspected by two independent veterinary surgeons. Due to the nature of a circus and the limited amount of animals per species, only descriptive statistics could be performed.

In five of six circuses, the state of health and feeding was for most animals generally satisfactory. One circus scored (very) negatively on almost all parameters.

Although horses have not been seen in an outdoor enclosure often, they displayed only very little stereotypic behaviour. In both lions and tigers stereotypic pacing was mostly recorded in anticipation of feeding, compared to other periods. The elephants appeared to suffer the most as a result of a poor quality and poor quantity of stimulation, sometimes inadequate feed and a lack of freedom of movement and (possible) companionship. They showed very frequent stereotypic behaviour, mostly weaving and trunk swinging, as a result of boredom and frustration.

A Cavalier King Charles Spaniel with shadow chasing: clinical recovery and normalisation of the DAT-binding after clomipramine treatment

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Introduction

This report describes a 30-month old Cavalier King Charles Spaniel. Abnormal behaviour started at 18 months of age with the dog fixating on and chasing shadows. Arousal and agitation, accompanied by barking, excessive salivation and licking followed over time. Frequency increased as well as the level of arousal. The behaviour also occurred in the absence of the owner. No abnormalities were noticed on clinical, dermatological or neurological examination, or on blood test results.

The expression of excessive, uncontrolled and repetitive motor behaviour is a sign common to stereotypic behaviour in animals and obsessive compulsive disorder (OCD) in humans. OCD involves a disturbance in dopamine and serotonin neurotransmission (Westenberg et al., 2007; Luescher, 2003).

Materials and methods

A dopamine transporter (DAT) scan was performed using Single Photon Emission Computed Tomography (SPECT) to evaluate the dopaminergic system. Acquisition was started 3.5h after the intravenous (iv) injection of the highly selective dopamine transporter tracer ^{123}I -FP-CIT (dose: 116 MBq), using a triple-head gamma-camera (Triad, Trionix, OH, USA) equipped with low-energy ultra-high resolution parallel hole collimators. General anaesthesia was necessary to immobilise the dog during the scan. In short, sedation was obtained with an iv injection of medetomidine hydrochloride (Domitor; Pfizer; 1000 $\mu\text{g}/\text{m}^2$ body surface area) 30 min. before the scan. General anaesthesia was induced intravenously with propofol (Propovet; Abbott) and maintained with isoflurane (Isoba; Schering-Plough).

After acquisition, images were reconstructed with filtered back projection and application of a Butterworth filter (cut-off 1.6 cycles/cm, order 10). Finally, a striatal-to-brain ratio was calculated and compared to the previously calculated normal canine values based on the resolution-independent method of Dobbeleir et al. (Dobbeleir et al., 2005; Vermeire et al., 2010).

Treatment was started with the tricyclic antidepressant clomipramine (2.5mg/kg BID) (Hewson et al., 1998; Seksel and Lindeman, 2001).

Results

Increased DAT ratios were noticed in left (25.98; normal value: 15.39 ± 2.38 SD) and right (26.14; normal value: 15.23 ± 2.23 SD) striatum.

Clinical improvement was noticed after 7 days of treatment with the clomipramine. Shadow chasing almost disappeared. Gluttony was noticed after 6 weeks of treatment as single side effect. Two months after the start of medication, the post-therapy DAT scan revealed ratios of 10.82 (left) and 12.49 (right striatum).

Conclusions

This is the first report demonstrating increased in vivo DAT binding in canine compulsive behaviour. Clinical improvement and normalisation of the DAT level were achieved after treatment with clomipramine. This provides evidence for an (in)direct influence of the serotonergic drug clomipramine on the dopaminergic system.

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Keywords: shadow chasing, SPECT, dopamine transporter, clomipramine

Agreement between dog behaviour in a behaviour test and owner perception of their dog's behaviour in everyday life

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Introduction

The accurate assessment of dog behaviour is important in many respects, e.g. for selecting breeding stock, matching dogs and owners during adoption from shelters, diagnosing behavioural problems, or selecting dogs for particular tasks. Research on canine temperament has so far made use of batteries of tests, observational tests, ratings of individual dogs, and expert ratings of breed prototypes (Jones and Gosling 2005). A standard method, however, does not exist. Comparison of data simultaneously collected by means of two or more of these methods are rare.

The aim of this study was to investigate the degree of concordance between dog behaviour in a behaviour test and owners' perceptions of their dogs' behaviour in everyday life with specific reference to play behaviour in dogs.

Materials and methods

Sixty-two owners participated in this study. The dogs were privately owned, pure-bred German Shepherds, male and female, aged 1 year to 8 years. The owners

first filled in the questionnaire by Serpell (1996), rating their dogs' behaviour on 12 semantic differential-type rating scales, one of which was concerned with the dogs' playfulness. Afterwards, the dog-owner teams underwent a behaviour test with 25 situations confronting the dogs with different animate (humans) and inanimate (objects and noises) stimuli. With the exception of one situation ("person in wheelchair"), the behaviour test comprised situations adapted from already published behaviour tests (Goddard and Beilharz 1984, 1986; Nmelf 2000; Svartberg 2002, 2005, 2006; Svartberg and Forkman 2002; Svartberg et al. 2005). In six situations, the dogs were invited to play with owner or test-person. For all dogs, behavioural testing was conducted in the same place, a wooded area (200m x 200m) which was fenced and therefore inaccessible to the public, and under similar conditions

For each situation, the dogs' behaviour was classified into one of 11 behavioural categories based on the work of Zimen (1971), Feddersen-Petersen and Ohl (1995), and Feddersen-Petersen (2004, 2009). The dogs' behaviour was assessed and noted using a standardised recording sheet directly after each situation. All observations were carried out by the same observer.

Data were analysed using SPSS 15.0. For the statistical analyses, the dogs' behaviour was coded as "play behaviour" (one category) or "no play behaviour" (all other categories). The owners' ratings were transformed from 5-point Likert scales into dichotomous categories ("playful", "not playful"). For comparisons between owner ratings and behavioural observations, Cohen's κ was calculated.

Results

When assessing their dogs' playfulness, 50 owners rated their dogs as playful, and 12 owners rated their dogs as not playful.

In the six test situations, the following behaviours were observed (percentage of dogs is given in brackets; $n = 62$):

- **"play 1a"**: play behaviour (48.4%), chase behaviour (41.9%), aggressive behaviour (9.7%)
- **"play 1b"**: play behaviour (53.2%), chase behaviour (38.7%), aggressive behaviour (6.5%), neutral behaviour (1.6%)
- **"distance play 2"**: play behaviour (54.8%), chase behaviour (37.1%), aggressive behaviour (4.8%), submissive behaviour or non-focused state of arousal (1.6%)
- **"distance play 1"**: attentive behaviour (32.3%), play behaviour (30.6%), chase behaviour (12.9%), aggressive behaviour (9.7%), non-focused state of arousal (6.5%), submissive behaviour (4.8%), neutral behaviour (3.2%)
- **"owner plays with dog"**: play behaviour (80.6%), non-focused state of arousal

(8.1%), submissive behaviour (6.5%), aggressive behaviour, flight behaviour, chase behaviour (1.6%)

- **“play 2”**: play behaviour (50.0%), chase behaviour (41.9%), aggressive behaviour (4.8%), neutral behaviour (3.2%)

Poor agreement between owner ratings and behavioural observations was found in four situations (“play 1a”: $\kappa = -0.265$, “play 2b”: $\kappa = -0.243$, “play 2”: $\kappa = -0.194$; “distance play 2”: $\kappa = -0.166$), and slight agreement in two situations (“distance play 1”: $\kappa = 0.035$; “owner plays with dog”: $\kappa = 0.070$).

Discussion

In situations in which the dogs were invited to play, they often recognised the human play signals and reacted by playing with the test-person or owner. Very often the dogs interacted with the test-person, but displayed behaviour with high levels of arousal and a lack of play characteristics. This behaviour was classified according as chase behaviour and not as play behaviour. Aggressive behaviour, submissive behaviour, and flight behaviour was also observed. These behaviours all aim at increasing the distance towards a stressor, which implies that the behaviour of the human was perceived as threat by some dogs.

When comparing the results from questionnaire and behavioural observations, marked differences were found between the dogs’ behaviour in the play situations of the behaviour test and the owners’ ratings of their dogs’ everyday behaviour as regards playfulness. This might be due to the fact that the questionnaire asked the owners to rate their dogs’ playfulness in a very general way whereas the six situations of the behaviour test were very specific as regards the human who invited the dog to play (test-person (unfamiliar) versus owner (familiar)) and the type of play (with toy versus without toy). On the other hand, the majority of the dogs did actually interact with the human. This behaviour, however, could not be classified as play behaviour in its ethological meaning due to a lack of play characteristics in the dogs’ display. Instead it was classified as chase behaviour, which has a different underlying motivation.

Conclusion

This study indicates that more research into owners’ perceptions of their own dogs’ behaviour as well as dog behaviour in general is urgently needed. Future investigations should not only concentrate on play behaviour but also include other behavioural categories such as submissive behaviour or aggressive behaviour. Furthermore, this study indicates a need to interpret owners’ perceptions of dog behaviour with great care, especially when they have been collected by means of a

questionnaire, since owners and researchers might be using very different terminology and have widely differing interpretations, at least when play behaviour is concerned. Finally, the discussion also shows that a standardised scoring system for behavioural testing in dogs, and possibly other species, is needed. Such a system could be helpful in allowing more useful comparisons to be made between research projects as well as enabling more accurate communication with colleagues and dog owners. This is particularly important as political factors increasing place the task of assessing dog behaviour in the hands of the veterinary profession.

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Keywords: dog, play behaviour, behaviour test, owner perception

Influence of different management and training factors in dogs on their behaviour in a standardised behaviour test

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Introduction

Dogs belong to one of the earliest domesticated species; since prehistoric times, they have lived in close relationship with humans (Zeuner 1963). Nowadays, dogs are an integral part of many human societies. The impact which dogs may have on humans has been demonstrated in several studies (see Friedmann and Thomas 1985; Garrity and Stallones 1998 for reviews). However, humans may also have influence over a dog's behaviour, as well as the dog's breed, age and gender, socialisation and habituation experiences, and the current context it is in. (Scott and Fuller 1965; Jagoe 1994; Appleby et al. 2002; Sterry et al. 2005).

The study presented here aimed at assessing the influence of different management and training factors on a dog's behaviour towards various animate and inanimate stimuli presented in a standardised behaviour test.

Materials and methods

Sixty-two dog-owner teams participated in the study. In order to be eligible for inclusion in the study dogs had to be privately owned, healthy, pure-bred German

Shepherds. Males and females, either intact or neutered, were included and ages ranged from one to eight years. The owners completed a questionnaire covering different aspects of their dog's management and training, e.g. age of the dog at time of purchase and at time of the study, origin of the dog, intended main use of the dog, number of persons and of other dogs in household, level of training of the dog, type of housing and duration of daily interaction with the dog.

The dog-owner teams then underwent a behaviour test consisting of 25 situations of dog-human- and dog-environment interactions. With the exception of one situation ("person in wheelchair"), the behaviour test comprised situations adapted from already published behaviour tests (Goddard and Beilharz 1984, 1986; Nmelf 2000; Svartberg 2002, 2005, 2006; Svartberg and Forkman 2002; Svartberg et al. 2005). For all dogs, behavioural testing was conducted in the same place, a wooded area (200m x 200m) which was fenced and therefore inaccessible to the public, and under similar conditions (e.g., the order of situations, kind of stimuli, distance between dogs and stimuli).

The dogs' behaviour was classified into one of 11 behavioural categories (social approach behaviour (towards a test person), approach behaviour (towards a test object), aggressive behaviour, flight behaviour, submissive behaviour (passive submission), play behaviour, chase behaviour, imposing behaviour, attentive behaviour, neutral behaviour, or non-focused state of arousal) and noted by means of an evaluation sheet directly after each situation

Data were analysed using JMP IN 5.1.2. For pairwise comparisons between management/training factors and the dogs' behaviour, Chi-Square tests were used.

Results

A multitude of statistically significant results were found when comparing the owners' answers to the questionnaire and the dogs' behaviour in the behaviour test:

- **Sex of owner:** "toy horse" ($p=0.0098$), "distance play 1" ($p=0.0060$), "dummy" ($p=0.0183$).
- **Sex of dog:** "play 1a" ($p=0.0122$), "play 1b" ($p=0.0175$), "chase" ($p=0.0219$), "distance play" ($p=0.0175$), "play 2" ($p=0.0158$)
- **Age of dog at testing:** "ghosts" ($p=0.0293$)
- **Age of dog at acquisition:** "friendly contact" ($p=0.0185$), "dummy" ($p=0.0420$)
- **Origin of the dog (breeder/private/shelter):** "dummy" ($p=0.0188$), "play 2" ($p=0.0277$)
- **Number of dogs in the household:** "social contact" ($p=0.0603$)
- **Number of humans in the household:** "plastic bag" ($p=0.0373$)

- **Main use of dog (companion dog/sports/police dog):** “play 1a” (p=0.0009), “play 1b” (p=0.0050), “staring at dog” (p=0.0318) “play 2” (p=0.0164)
- **Attendance at puppy classes:** “play 1a” (p=0.0012), “play 1b” (p=0.0092), “distance play 2” (p=0.0429), “play 2” (p=0.0041)
- **Attendance at young dogs’ classes:** “play 1a” (p=0.0011), “play 1b” (p=0.0175), “stumbling” (p=0.0316), “distance play 2” (p=0.0421), “play 2” (p=0.0056)
- **Training as companion dog:** “friendly contact” (p=0.0073)
- **Training for Schutzhund sports:** “play 1a” (p=0.0195), “play 1b” (p=0.0167), “play 2” (p=0.0183)
- **Training as search and rescue dog:** “toy car” (p=0.0137), “stranger strokes dog” (p=0.0254), “plastic bag” (p=0.0171)
- **Training for dog sports:** “stumbling” (p=0.0158), “drunk person” (p=0.0328).
- **Type of housing (indoors outdoors i.e. kennel/both):** “play 1a” (p=0.0135), “play 1b” (p=0.0013)
- **Duration of daily interaction with the dog:** “chase” (p=0.0368) “stumbling” (p=0.0069)

Discussion and conclusion

The results show that a dog’s management and training can have an influence on its behaviour. Correlations between management and training factors and the dogs’ behaviour were particularly evident in situations in which the dog was invited to play with a test-person or owner, as well as in one situation in which the dog was threatened by the test-person. Interesting differences were identified between intact and neutered/spayed dogs, between dogs with different intended main uses and between those dogs that visited a puppy class or young dogs’ class and those that did not. These results are partially in agreement with other studies but some aspects are not in accordance with previous research.

In this study, many of the factors included in the questionnaire were related to each other. Therefore, it is difficult to determine the degree to which each single aspect is significant. This study highlights the need to further investigate how far different ways of managing and training dogs are related to each other. For example, it would be interesting to investigate the extent to which the particular tasks which people obtain a dog for (sports dog, hunting dog, search and rescue dog, companion dog, service dog, etc.) are connected to their subsequent views on management and training, and how this may, in turn, might influence the dogs’ behaviour.

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Keywords: managing, training, dog behaviour, behaviour test

