Journal of Animal and Veterinary Advances 8 (7): 1412-1418, 2009
ISSN: 1680-5593

Factors Linked to Territorial Aggression in Dogs

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Abstract: For many people a good guard dog is a dog that defends aggressively the property that is to say a dog with high levels of territorial aggression. Nevertheless, this advantage can turn into a problem when the dog attacks friends and family, or when the dog disturbs our neighbours with excessive barking at strangers. The study involved carrying out 711 surveys on dog owners. The survey analyses many factors that might be linked to territorial aggression. The results show that there are many factors that are connected to higher levels of territorial aggression and which depend on the owner: not punishing the dog when it does something bad; a high level of education (university studies) and if the animal is acquired as a guard dog. It also found dog-dependent factors associated with territorial aggression: sex (male); certain breeds; FCI groups 5 and 7 and aged between 3 and 7 years. Furthermore, we discovered certain dog behavioural factors that are associated with a higher level of territorial aggression, such as: having as favourite games tug-of-war or bring things, a long time spent eating; if the dog barks a lot; if it attacks strangers randomly; if it tends to bite upper limbs and how nervous the dog is.

Key words: Aggressive dog, behavioural problems, guard dog, protective aggression, punishment

INTRODUCTION

Territorial or protective aggression is a type of aggression aimed at strangers (people or animals) that invade or approach the family members or dog's territory (Landsberg *et al*., 1998; Pérez-Guisado and Muñoz-Serrano, 2008). This happens when the dog feels it is in a threatening situation (Wilsson and Sundgren, 1997; Pérez-Guisado and Muñoz-Serrano, 2008).

This form of aggression is highly prevalent, but owners do not usually consider it to be important and therefore, do not usually request professional help (Beaver, 1994; Pérez-Guisado *et al*., 2008a). This is because when the dog barks to protect the family members or property, the owner probably does not consider this to be a problem. The problem is when the dog attacks someone or the owner allows the dog to bark non-stop at passers-by or other animals and this annoys the neighbours. This form of aggression is natural in dogs. Many owners seek dogs for guarding and defending purposes and this is why they reinforce territorial aggression in their dogs (Pérez-Guisado *et al*., 2008a).

Although, a dog's territorial aggression can be reinforced or decreased by the owner, it is important to know that certain dogs will tend to be more territorial than others simply because of their genetic characteristics, since this is hereditary quality. For Wilsson and Sundgren (1997), the inheritability of territorial aggression is 0.22 in Labradors and 0.20 in German Shepherds. If territorial aggression is hereditary, then logically, certain breeds will be more territorial than others. In fact, the most territorial breeds are: for Takeuchi *et al*. (2001), the Labrador Retriever/German Shepherd and for Lund *et al*. (1996) the German Shepherd and the English Cocker Spaniel.

Neutering and spaying are not effective against territorial aggression (Hart and Eckstein, 1997; Pérez-Guisado and Muñoz-Serrano, 2008) and so should not be used as a remedy for dogs with territorial aggression problems; instead, behaviour therapy should be applied.

MATERIALS AND METHODS

Study sample: A total of 711 dogs (354 males and 357 females, 594 purebred and 117 mixed breeds) older than 12 months were assessed by an interview with their owners.

The study was carried out in 5 cities in Spain (Almeria, Cordoba, Granada, Jaen and Madrid) with a total population of about 5 million people. The interviewer was always the same person (male, veterinary, 28 years old) and the dogs lived with their owners. Interviews were carried out with dog owners who were taking their pets for

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a walk. Subjects were opportunistically selected (owners who were taking their dogs for a walk), 62% of the owners approached agreed to participate in the study. The interviewer was well trained to classify each dog through its morphological characteristics in each corresponding breed. So, the interviewer verified the owner's information about the breed of the dog.

Every breed studied had a minimum of 4 dogs. The 594 dogs that were assessed belonged to 47 pure breeds, grouped according to the World Canine Association (FCI = Federation Cynologique International) categories:

Group 1: Belgian Shepherd, German Shepherd and Rough Collie.

Group 2: Boxer, Deutsche Dogge, Dobermann, Dogo argentino, English Bulldog, Giant Schnauzer, Miniature Schnauzer, Neapolitan Mastiff, Presa canario, Rottweiler, Sharpei, Spanish Mastiff and Standard Schnauzer.

Group 3: American Pitbullterrier Bullterrier, American Staffordshire Terrier, Foxterrier, Staffordshire terrier, West higland terrier and Yorkshire terrier.

Group 4: Miniature Teckel.

Group 5: Akita inu, Alaskan Malamute andalusian Hound, Husky Siberian, Chow-chow and Samoyed.

Group 6: Basset Hound and Dalmatian.

Group 7: Ireland Setter.

Group 8: English cocker spaniels, Golden Retriever, Labrador Retriever, Spanish water dog.

Group 9: Bichon frise, Chihuahua, French Bulldog, Lhasa Apso, Medium Poodle, Miniature Poodle, Pekingnese and Pug.

Group 10: Spanish Greyhound.

The mixed and pure breed dogs were classified into 3 categories: small (<10 kg), medium (10-20 kg) and large (>20 kg). Intact dogs constituted 92.54% of the pulation. The English Cocker Spaniels were subdivided into 3 different groups (blonde, black and particolour) since, several studies have observed a relationship between the colour of an English Cocker Spaniel's coat and its level of aggression.

This study was reviewed and approved by the Department of Veterinary Medicine and Surgery (University of Cordoba).

Description of the survey: The survey gathered information on 72 variables many of which were significantly linked to territorial aggression. However, this study will only discuss the most significant associations, certain variables that have been reported as significant by other researchers and those that were considered by this study to be of particular interest.

We assessed the dog's level of territorial-aggression through 3 situations. We consider a situation to be a positive instance of this behaviour when the dog is growling, snapping, biting or baring its teeth (the dog can have a score between 0-3 points).

These situations were:

- A stranger approaches its territory (the place where it sleeps, its kennel and so on)
- A stranger approaches a family member (for example when the family member is out walking the dog)
- A stranger approaches or tries to enter the owner's territory (front door, garden gate and so on)

We assessed the dog's tendency to bite during the previous situations (if the dog bit one point was awarded). Hence, the score for the dog's tendency to bite was rated between 0 and 3 points.

We also assessed how spoiled the dog was, based on 5 situations (giving it extra food from the family's meals when they were eating; allowing it to lie on the sofa/armchair/chair; allowing it to get on the bed; allowing it to sleep in the bedroom; allowing it to sleep on the bed with the owner). If the answer was affirmative, 1 point was awarded; hence, the score for spoiling ranged between 0 and 5 points.

We consider a dog to have received basic obedience training when the owner reported that it responded to at least 3 orders, such as: come, sit (lie) down, leave (an object it has in its mouth), stay, wait and so on.

We assessed how nervous the dog was asking the owner to award between 1 and 3 points the dog's level of nervous: 3 points for nervous dogs, 2 points for normal dogs and 1 point for calm dogs.

We determined whether, the dog was fearful by asking the owner if the dog in response to a stranger, startling noise or a new situation, usually displayed: the body postures described as fearful and illustrated in a photo showed to the owner (lowering its head, flattening its ears against its head, tucking its tail between its

legs and avoiding eye contact); tremble, pace, or try to escape; Submissive behaviours like avoiding eye contact, urinating submissively, or rolling over to expose its belly; Barking and/or growling at the object that was causing its fear. We considered that the dog was fearful dog when situation 1 and at least 2 of the 3 other situations were present.

Statistical study: The dogs obtained a score of between 0 and 3 points for territorial aggression. In order to study discontinuous variables, 3 groups of territorial aggression were created: low (0-1 points), medium (2 points) and high (3 points). Variables were analyzed independently, nevertheless four variables (dog sex, dog age, dog breed and the purpose for which the dog was acquired) were locked during model building due to their potential to act as confounders because they are highly significant variables and other variables studied may depend on them. SAS (2000) was applied in order to carry out the following statistical analyses:

- Continuous Variables (CV) were analysed using Analysis of variance in order to determine if there were any significant differences. If significant differences were observed, Duncan's test was used to determine the number of statistically significantly groups
- Discontinuous Variables (DV) were analysed using Chi-square (χ^2) contingency table analysis. The percentage of dogs of each group of territorial aggression were analysed within each discontinuous variable class. The DV results are summarized for the high level of territorial aggression group (3 points)

RESULTS

Interview completion: The average time taken to complete an interview was 28 min.

Factors analysed

Significant factors ($p<0.05$): Significant factors and its components with higher levels of territorial aggression are shown in Table 1. The highly significant factors ($p<0.001$) were: dog's sex, FCI groups, breeds, dog's age, type of punishment used with the dog, owner's level of education, the purpose for which, the dog was acquired, which body parts are most frequently attacked and if the dog barks a lot. The significant factors ($0.001 \leq p<0.05$) were: dog's favourite games, the time the dog spends eating, dog's biting preferences, which extrange person the dog prefers to bite and how nervous the dog is.

Insignificant factors ($p>0.05$): Factors that were not significant were: dog's size, owner's sex, owner's age, children in the family, number of family members, having more animals in the family, first time dog ownership, the main person that feeds-walks or plays with the dog, playing competitive games with the dog, how spoiled the dog is, the type of punishment used with the dog, owner's level of education, the age of the dog when it was adopted by the owner, the place from which it was acquired, whether the dog had passed from one owner to another, castrated status, whether it had suffered an illness during the first 16 weeks of life, type of food, how often de dog is fed, the time the owner spends walking the dog, the total time the owner spends with the dog, if the dog is currently suffering from an illness, if the owner described the dog as stubborn or a frightened dog, destructive behaviour, inadequate elimination and frequent vocalization.

Table 1: Highly significant factors ($p<0.001$)

Factors	Higher levels of territorial aggression
Dog's sex$_{(CV)}$	Males
FCI groups$_{(CV)}$	1,2
Breeds[1]$_{(CV)}$	Presa canario, Neapolitan Mastiff, Rottweiler, Dobermann, Spanish Mastiff, German Shepherd
Dog's age$_{(CV)}$	3-7 years
Dog's favourite games	Tug-of-war and bring things
Type of punishment used with the dog$_{(CV)}$	No punishment
The purpose for which the dog was acquired$_{(CV)}$	Guarding
The time the dog spends eating$_{(CV)}$	Dogs spend more time eating
The time the owner spends walking the dog$_{(CV)}$	Little time
Dog's biting preferences $_{(DV)}$	Extrangers
Which extrange person the dog prefers to bite$_{(DV)}$	Indiscriminated (anybody)
Which body parts are most frequently attacked $_{(DV)}$	Upper limbs
To be a barking dog$_{(CV)}$	Yes
How nervous the dog is$_{(CV)}$	Normal

CV: Continues Variable; DV: Discontinues Variable

DISCUSSION

The general consensus is that aggression is a male characteristic (Cameron, 1997; Landsberg *et al*., 1998; Guy *et al*., 2001a). Takeuchi *et al*. (2001) show that male dogs are more likely to attack owners and strangers. The results confirm that levels of territorial-aggression are higher in males than in females. This is very probably due to the effect of androgenic hormones that favour territorial behaviour in males (Pérez-Guisado and Muñoz-Serrano, 2008).

In relation to breed, most experts believe that aggression problems are more prevalent in pure breeds than in mixed dogs (Line and Voith, 1986; Guy *et al*., 2001a, b; Takeuchi *et al*., 2001). The results show that there are no significant differences between pure and mixed breeds with regard to territorial-aggression. In a large sample of mixed-breed dogs containing a wide range of different sizes and crossbreeds, the logical outcome would be that the territorial-aggression average would be statistically equal to the average in pure breeds and this is borne out by our results.

Territorial-aggression characteristically develops with extrangers (Landsberg *et al*., 1998; Pérez-Guisado and Muñoz-Serrano, 2008). We agree with this statement, since they are extrangers who are most frequently bitten by dogs with this problem.

There are many opinions about the most territorially aggressive breeds: Labrador Retriever/German Shepherd (Takeuchi *et al*., 2001), English Cocker Spaniel and German Shepherd (Lund *et al*., 1996), mixed breeds/English Cocker Spaniel/English Springer Spaniel (Overall and Love, 2001). Our results show that the most territorially aggressive breeds we have studied are: Presa Canario, Neapolitan Mastiff, Rottweiler, Dobermann, Spanish Mastiff and German Shepherd. And the most territorially aggressive ICF groups are: 1 and 2.

English Cocker Spaniels with a single colour coat are more dominantly aggressive than particolour dogs (Podberscek and Serpell, 1997a, b; Pérez-Guisado *et al*., 2006a) and more aggressive behaviour is displayed, in decreasing order, by blonde, black and finally particolour coated dogs (Podberscek and Serpell, 1996; Pérez-Guisado *et al*., 2006a, b; 2008b; Pérez-Guisado and Muñoz-Serrano, 2009). Results confirm that as well as for dominant aggression, for territorial-aggression the decreasing order in English Cocker Spaniel is also golden, black and finally particolour (the scores were 1.97, 1.36 and 1.14, respectively) (Table 2).

There are some studies that found an association between: a low aggressive behaviour and owners over the age of 65/owners that spend more time with their dog/owners that spend more time walking their dog (Podberscek and Serpell, 1997a) number of people in the

Table 2: Territorial aggression's mean scores

Factors	Mean scores	Duncan's group
FCI groups		
1	2.24	A
2	2.00	A
10	1.60	B
9	1.59	B
Pure	1.54	B
Mixed	1.53	B
8	1.48	B
6	1.36	C
3	1.25	C
4	1.00	C
7	0.89	D
5	0.60	D
Breeds		
Presa Canario	2.83	A
Neapolitan Mastiff	2.80	A
Rottweiler	2.68	A
Dobermann	2.64	A
Spanish Mastiff	2.50	A
German Shepherd	2.43	A
Dog's sex		
Male	2.04	A
Female	1.04	B
Dog's age		
3-7 years	1.90	A
≤2 years	1.13	B
8-10 years	1.03	B
>10 years	0.63	C
Dog's favourite game		
Tug-of-war	1.65	A
Bring things	1.60	A
None	0.51	B
Type of punishment used		
No punishment	1.80	A
Only verbal	1.64	B
Physical	1.50	B
Owner's level of education		
University	1.66	A
High school	1.49	B
School	1.48	B
Nothing	1.47	B
The time the owner spends walking the dog		
Nothing	2.98	A
0-30 min	2.25	B
30-60 min	1.29	C
60-120 min	1.09	C
>120 min	0.22	D
The purpose for which the dog was acquired		
Guarding	2.68	A
Defending	1.81	B
Hunting	1.80	B
Present	1.59	B
Company	1.46	C
Pet	1.40	C
Dog exhibition	1.31	C
Whim	1.11	D
Breeding	1.00	D
Draught animal	0.78	E
If the dogs bark a lot		
Yes	1.76	A
No	1.30	B
How nervous the dog is		
Normal	1.88	A
Nervous	1.48	B
Calm	1.31	C

family and dog aggression (Guy *et al*., 2001b) higher aggression levels and dogs that suffered an illness during the first 16 weeks of their life (Podberscek and Serpell, 1997a). Results affirm that all the above-mentioned factors are not linked to territorial aggression.

Voith *et al*. (1992) found a positive correlation between the time the dog spends eating and higher levels of territorial aggression. The results, confirm that there is a positive relationship with the time the dog spends eating, since territorially aggressive dogs spend more time eating.

We agree with Hart and Eckstein (1997) that castration doesn't affect to territorial-aggression. For that reason, castration is a useless measure for dogs with territorial-aggression problems.

Opinion is divided in relation to dogs' biting preferences: many authors say that dogs prefer to bite adults (Lund *et al*., 1996; Guy *et al*., 2001b); the average age of people attacked by dogs is 32.5 (Freud *et al*., 1997); 60-75% attacks are on people under the age of 20, of which the most affected group is 5-9 years olds (Overall and Love, 2001). The April 2, 2009 average age of people who have been attacked by a dog is 15 years old and the highest incidence occurs in children between 5 and 9 years old, representing in this case 3.6% of all medical emergencies in 5-9 years olds (Weiss *et al*., 1998). In relation to the gender of the person attacked, men are most often attacked (Wright, 1985, 1991; Bandow, 1996; Freud *et al*., 1997; Overall and Love, 2001) although, Matter and Arbeitsgemeinschaft (1998) state that women are attacked more often than men. The results reveal that territorial-aggression is characteristically directed against strangers and is not discriminative, since these dogs are capable of biting any stranger, regardless of sex and age. The problem with previous studies is that they are compiled from databases in which dog aggression has been reported and we know that people usually report the most dangerous forms of dog aggression. This might be because men are likely to be less wary than women and women are usually more prudent than men. For that reason, men would take more risks with dogs than women in dangerous situations and therefore, it is normal that dogs would display more aggression than with women, but this does not mean that dogs prefer to attack men over women.

Most studies agree that in adults, the body part that is most frequently attacked is the limbs and specifically the upper limbs, hands and arms (Guy *et al*., 2001b; Overall and Love, 2001; Bandow, 1996; Freud *et al*., 1997). The only exception is Wright (1985), who observes a higher frequency for the lower limbs (42.8%) rather than the upper limbs. The explanation for this is that the upper limbs are displayed more to the dog (Bandow, 1996). However, for children, the body part that is most frequently attacked is the head/face/neck (Wright, 1991; Bandow, 1996; Matter and Arbeitsgemeinschaft, 1998; Weiss *et al*., 1998; Overall and Love, 2001). The explanation for this is that the head/face/neck is at the same level as the dog's mouth and children are less capable than older people of protecting themselves with their extremities (Wright, 1991). In this study, dogs with higher levels of territorial-aggression prefer to attack the upper limbs.

When a person chooses a dog, the purpose is important. For example, highly aggressive dogs are more likely to have been chosen just as a pet (Podberscek and Serpell, 1997b). We agree with this statement, although, we must point out that the purpose associated with highest level of territorial-aggression is for guarding. This might be because owners encourage territorial aggressive behaviour in these dogs that could favour territorial-aggression.

Other data we must consider are:

- Lower levels of territorial-aggression are found in dogs that do not have a favourite game. This is very probably due to the fact that these dogs are typically older than 7 and belong to FCI group 5. Dogs in both these groups characteristically have low levels of territorial aggression
- Higher levels of territorial-aggression in dogs that bark. This is very probably due to the fact that when dogs want to defend their territory they bark as a dissuasive measure
- The positive correlation between territorial-aggression and a dog's tendency to bite. This is logical, since territorial-aggression is a form of aggression and more aggressive dogs tend to bite more often
- The association between people with university studies and dogs with higher levels of territorial-aggression. This link might be due to the fact that owners with university studies could be subconsciously reinforcing this behaviour
- Not punishing the dog when it deserves it. Perhaps, if the owner does not punish the dog, it feels stronger and might develop a higher level of territorial-aggression

CONCLUSION

Territorial aggression depends on modifiable factors connected to the owner (environmental factors) and non-modifiable factors connected to the dog.

ACKNOWLEDGEMENT

This research was supported by research grant from the Ministry of Education and Science of Spain. We are grateful to all the owners dog who responded to the survey unselfishly.

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