

Firework fears and phobias in the domestic dog

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October 2005



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Summary

- ◆ Almost half of owners questioned (49%) reported that their dog was frightened of loud noises.
- ◆ 45% of owners reported that their dog showed fearful behaviour when it heard fireworks.
- ◆ Dogs born in Autumn and Winter were less likely to react fearfully to loud noises than those born in Spring or Summer.
- ◆ Older dogs were more likely to show fearful behaviour in response to loud noises than younger dogs.
- ◆ No particular breed type was significantly more likely to show fearful behaviour in response to loud noises, however cross-bred dogs were more likely to be fearful of loud noises than pure breed dogs.

Introduction

Clinical experience suggests that large numbers of dogs are presented to behaviour specialists for the treatment of excessive fear responses to sudden noises. Although this problem is widely recognised to be a common problem by behaviour specialists, vets and dog owners, there is no direct evidence as to how many dogs display excessive fear responses to noises. An accurate idea of the prevalence of firework related fears in dogs in the UK would be very beneficial in supporting arguments to further reduce the availability and decibel level of fireworks in the UK. It would also highlight the importance of preventative education of puppies, in terms of controlled exposure to potentially fearful stimuli during the early sensitive period for learning.

In normal circumstances, reacting to novel or loud noises is an adaptive response in dogs, as such noises could be indicative of something dangerous to them. The physiological changes that occur with the fear response enable the individual to be prepared for activity, and hence are potentially beneficial to that individual's survival. However, in some circumstances the emotional response can become extreme, and precipitated by even low levels of noise. This type of 'all or nothing' response is termed a 'phobia', and is maladaptive for the animal. Dogs may exhibit fears to a range of stimuli including loud noises (fireworks, gunfire and thunder), traffic, unfamiliar people or dogs and to other animals. If these fears are left to progress untreated then they will often develop into phobias, and will frequently also generalise to other similar stimuli.

The development of severe fears and phobias in dogs is thought to occur through a combination of genetic factors, early experiences, and exposure to fearful stimuli as

an adult. The genetic factors are related to both breed differences and underlying 'personality type' which influence how reactive an individual animal is likely to be to a novel stimulus. Early experiences are also important, as individuals are less likely to find stimuli aversive as an adult if they have previously habituated to them during the early sensitive period for learning in the first weeks of life (Appleby et al. 2002). On exposure to potentially fearful stimuli, the development of a fearful response is related to the degree of stress response associated with the stimulus – this is linked to the intensity and salience of the stimulus, as well as how predictable its occurrence is. Hence those stimuli that occur unpredictably, intermittently, and at a high intensity, such as fireworks, are more likely to induce a phobia, than those that occur at a lower intensity and/or more frequently and predictably.

The RSPCA has been at the forefront of a campaign to reduce the availability and noise level of fireworks. In a survey of vets in England and Wales conducted by the RSPCA in 2001, "4825 animals were treated for firework-related injuries and/or were prescribed sedatives because they were so frightened of the loud bangs and flashes". The prevalence of fear responses to fireworks is likely to be much greater than this, as owners are more likely to visit their vet for physical injuries than for psychological distress. In addition, ongoing signs of fear may be suppressed through the use of sedatives and tranquillizers that do not necessarily have any effect on the underlying emotional response experienced by the animal to the fireworks (Crowell-Davis et al. 2003).

To give us an idea as to the actual prevalence of noise phobias in the general dog population, we developed a questionnaire that was piloted at Crufts dog show in March 2005. A random sample of 34 people moving around the commercial exhibition were asked about the prevalence of noise phobias in their dogs: in this small study 53% of respondents had dogs that showed a fear response to noises, and, of these, 89% were fearful of fireworks. Similar methodologies have been used successfully in studies investigating the prevalence of behavioural disorders in dogs in the UK (Bradshaw et al. 2002a,b; Atkinson 2005). The aim of this study was to establish reliable information as to the prevalence of noise phobia, and, in particular, firework phobia, in the UK dog population. In addition we aimed to identify potential risk and protective factors related to the development of noise phobias in dogs.

Methods

The data was collected through a questionnaire survey of dog owners in different parts of the UK. Owners were asked to complete a standard questionnaire (See Appendix 1), designed to provide basic demographic data and more specific questions about the dog's behavioural history. The questionnaire contained questions about the specific reaction of dogs to a range of different, potentially fearful stimuli, through the presentation of a list of individually described fearful responses and behaviours. The questionnaire also included questions about the dogs' environment, environment during the early stages of life, and age at which the dog was obtained, in order to identify potential risk factors, or protective factors, for the development of general or specific phobias.

In order to ensure a representative sample, dog-owners were recruited from a variety of sources. Half (n=194) of the questionnaires were completed by people out walking their dogs, 35% were completed by dog owners attending dog shows or other dog-related events and 15% of the questionnaires were completed by people attending veterinary surgeries. Questionnaires were completed in various locations around the UK (Devon, Somerset, Wales, London, Dorset, West Midlands and Northumberland).

Results

I: Details of survey population

A total of 383 dog owners completed the questionnaire. 83 of the owners were male and 300 female.

The dogs ranged in age from 2 months to 18 years, with a median age of 3½ years (see Fig. 1).

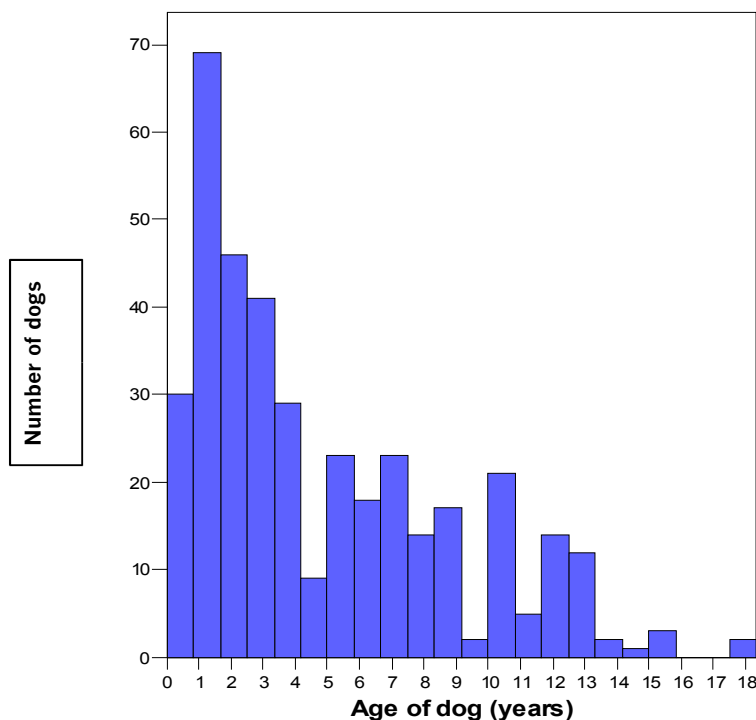


Figure 1: Ages of dogs included in the survey

46% of the dogs were male and 46% female. 53% of the dogs were neutered with the remaining 47% entire. Slightly, but not significantly ($\chi^2 = 2.6$; $df = 1$; $p = 0.107$), more of the female dogs were neutered than the males (see Fig. 2).

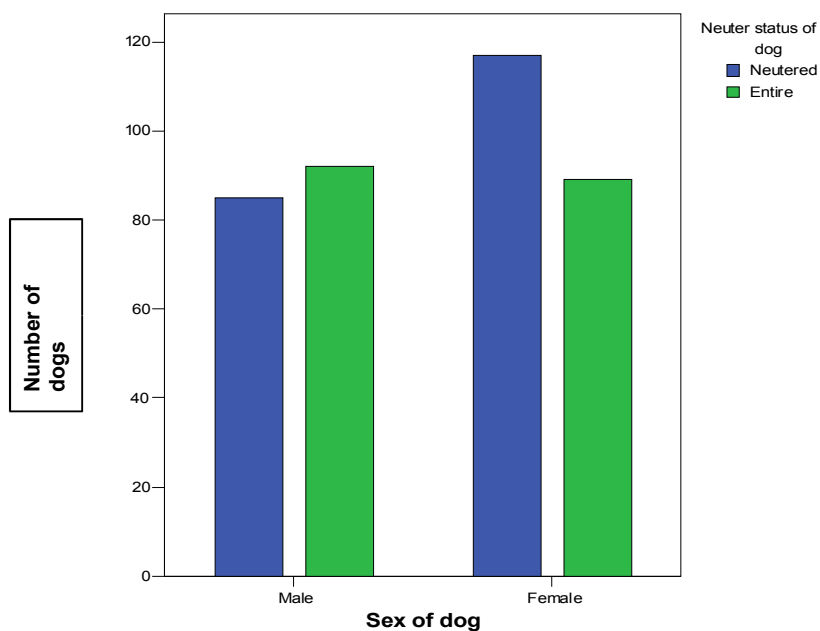


Figure 2: Sex and neuter status of the dogs included in the survey

15% of the dogs were crossbreeds and the remaining 85% of pure breed dogs represented all of the Kennel Club breed types (see Fig. 3).

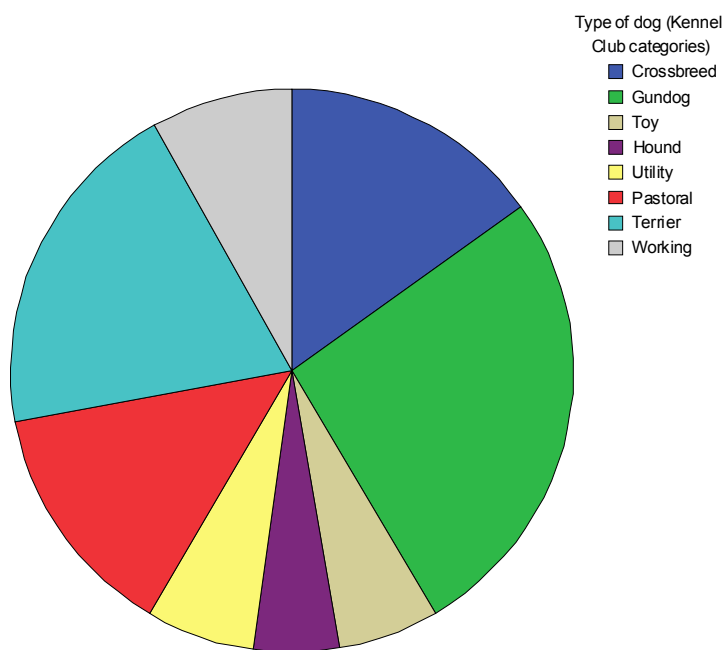


Figure 3: Breed type of dogs included in the survey

Dogs included in the survey were obtained from several sources. A large proportion were obtained as puppies, directly from the breeder of the dog (64%; n=243), with the

remainder being obtained from rescue organisations (17%; n=65), bred by the owner (9%; n=35), or obtained from other sources, such as pet shops, strays and private sales of adult dogs (10%; n=40) (Fig. 4).

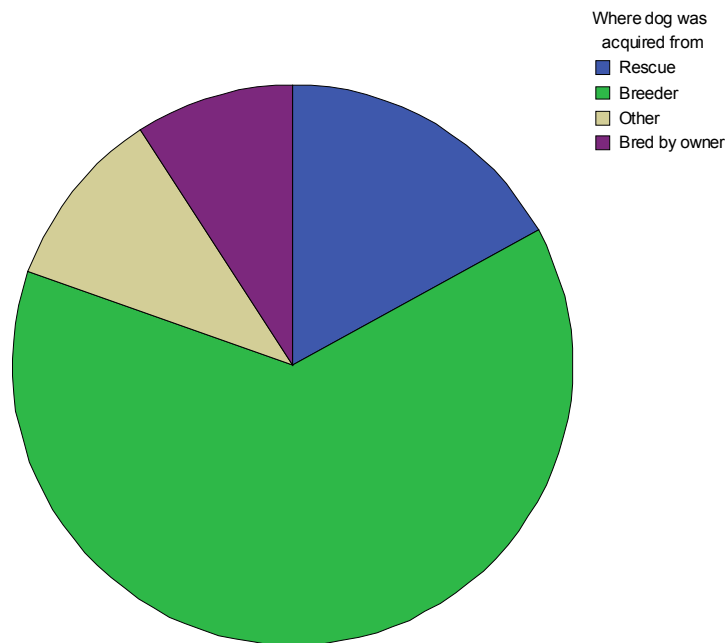


Figure 4: Origin of the dogs in the survey.

II: Prevalence of fear of loud noises;

Almost half of the owners questioned (49%; n=188) reported that their dog was frightened of loud noises, with 171 owners (45%) reporting that their dog showed fearful behaviour when it heard fireworks. More dogs were reported to show signs of a fear of fireworks than any other loud noise (See Table 1)

| Loud noise type | Proportion of dogs showing fearful response |
|--------------------------------|---|
| Fireworks | 83% |
| Thunderstorms | 65% |
| Gunshots | 30% |
| Cars backfiring | 28% |
| Other loud noises (eg. Hoover) | 18% |
| Loud noises on television | 12% |

Table 1: Types of loud noise that dogs were reported to show fearful reactions to.

Behavioural signs;

The most commonly reported behaviour shown by dogs that were fearful of loud noises was trembling/shaking, which was reported in 42% of the dogs (n=79). Barking was reported in 37% of the dogs (n=70) and this type of vocalisation was observed more frequently in fearful dogs than howling (n=5). A large proportion of dogs were also reported to attempt to hide (n=58), escape (n=32) and seek out people (n=64). Figure 5 shows the number of dogs reported to show each of the different behaviours. Other behaviours reported included whining, panting and running around.

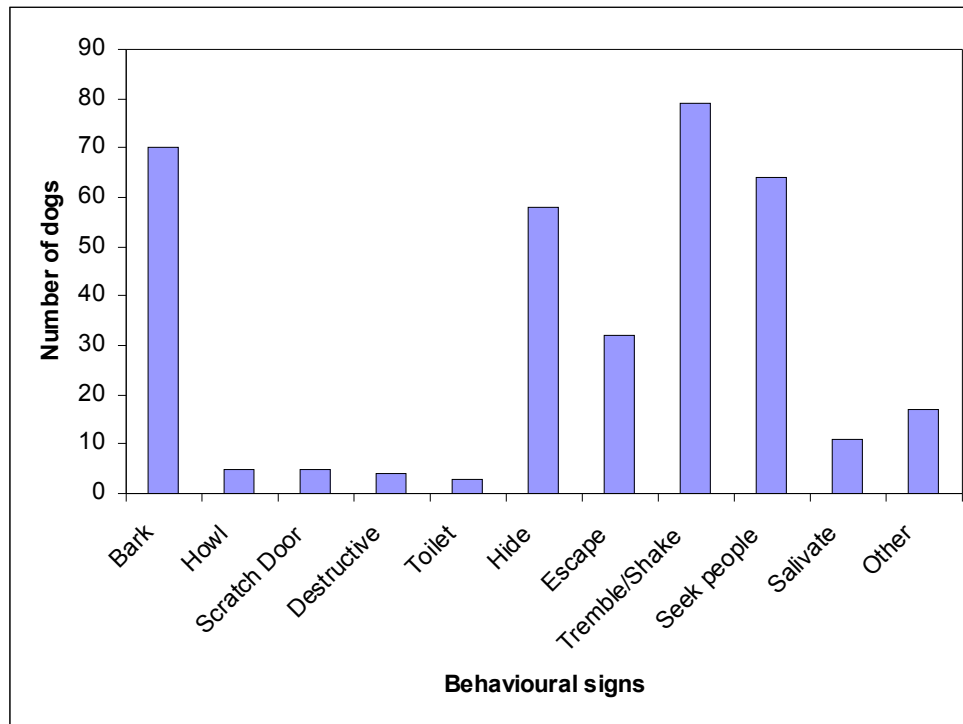


Fig 5: Behavioural signs shown by dogs that were fearful of loud noises

III: Factors related to the development of fear of loud noises;

There was no significant difference between male and female dogs in the prevalence of fears of loud noises ($\chi^2 = 0.55$; $df = 1$; $p = 0.458$).

Although fewer dogs in the working and gundog breed groups showed a fear of loud noises (see Fig. 6), difference between breed types was not quite significant ($\chi^2 = 12.47$; $df = 7$; $p = 0.086$), however, significantly more owners of crossbred dogs (66%) than pure breed dogs (46%) reported that their dog was frightened of loud noises ($\chi^2 = 6.63$; $df = 1$; $p = 0.01$). As the crossbreeds were older than the pure breed dogs, binary logistic regression was used to investigate this further. When age was taken into account, there was still significantly higher reporting of fearful behaviours in response to loud noises in the crossbred group (Wald = 4.129; $df = 1$; $p = 0.042$), when compared to pure breeds of dog.

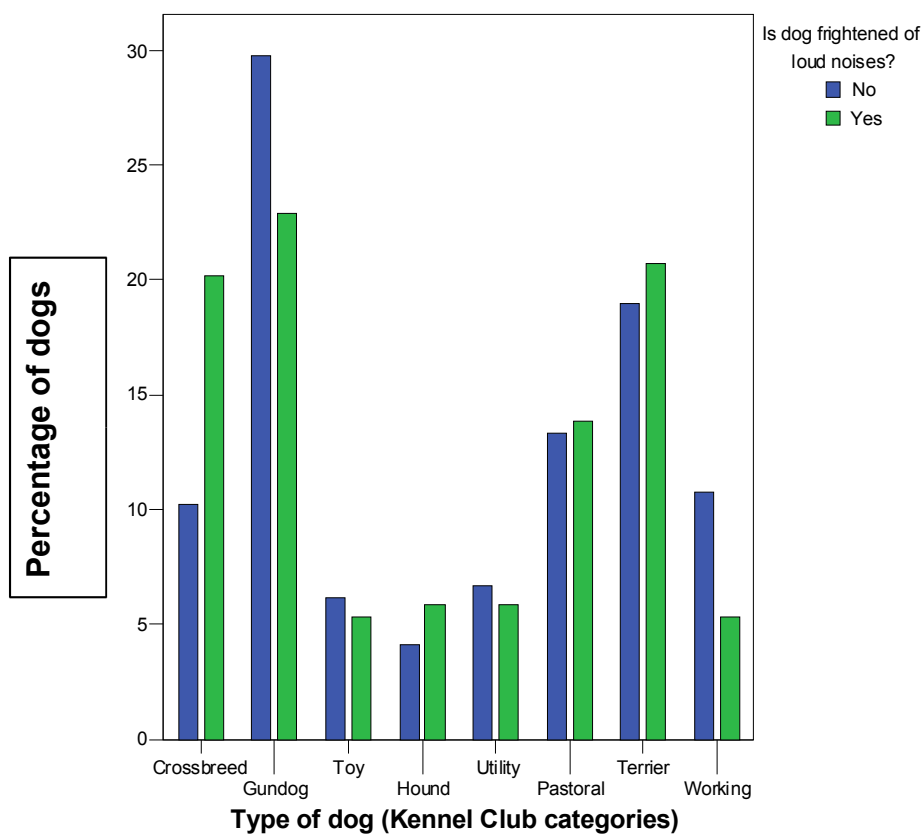


Figure 6: Prevalence of fear of loud noises in different breed groups.

Older dogs were found to be more likely to show a fearful response to loud noises ($Z = -4.79$; $p < 0.001$) (see Fig. 7).

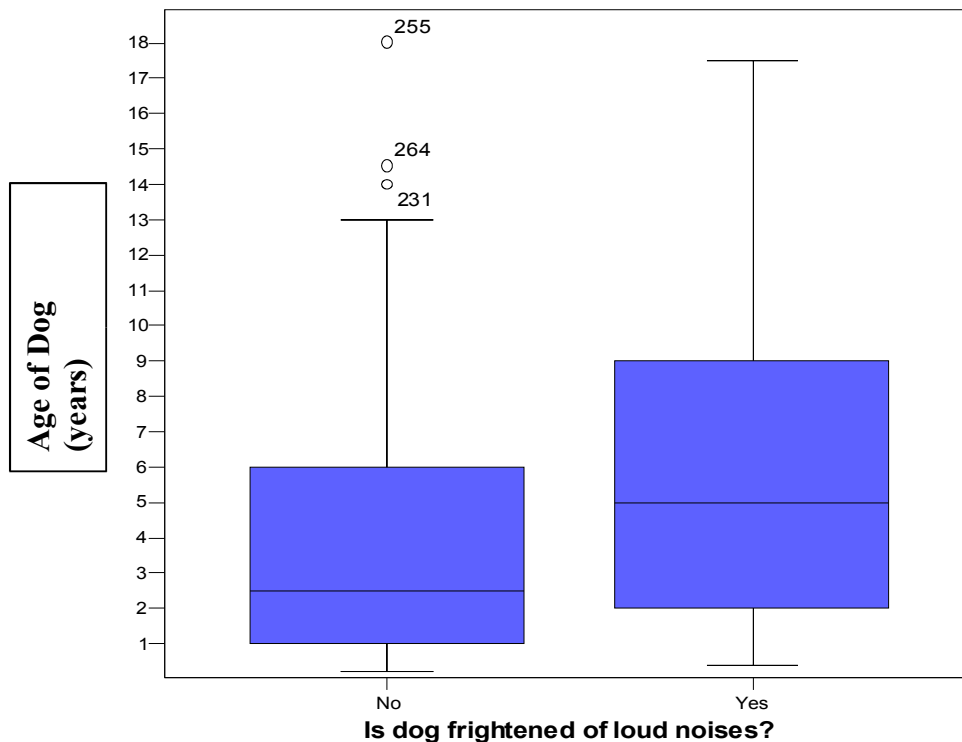


Figure 7: Ages of dog and fear of loud noises

(Solid horizontal line = median; Coloured box indicates 25th and 75th percentiles; Light horizontal lines = minimum and maximum; Individual points are those more than 1.5x interquartile range from median.)

The origin of the dog was not found to be significantly related to the dog's subsequent development of a fear of noises ($\chi^2 = 4.38$; $df = 3$; $p = 0.22$).

The development of fears of loud noises was not influenced by the age at which puppies were obtained from the breeder ($Z = -0.501$; $p = 0.62$), or whether the puppies were reared inside the breeders house ($\chi^2 = 0.81$; $df = 2$; $p = 0.67$), although the trend was towards puppies being less likely to develop a fear of noises if they were reared in the breeders house, rather than in another location.

There was a significant association between the time of year the puppy was obtained and whether it had a fear of loud noises. Puppies obtained from the breeder in Winter/Spring (born in Autumn/Winter and therefore more likely to have heard fireworks when young) were less likely to develop a fear of loud noises ($\chi^2 = 5.3$; $df = 1$; $p = 0.02$) (see Fig. 8).

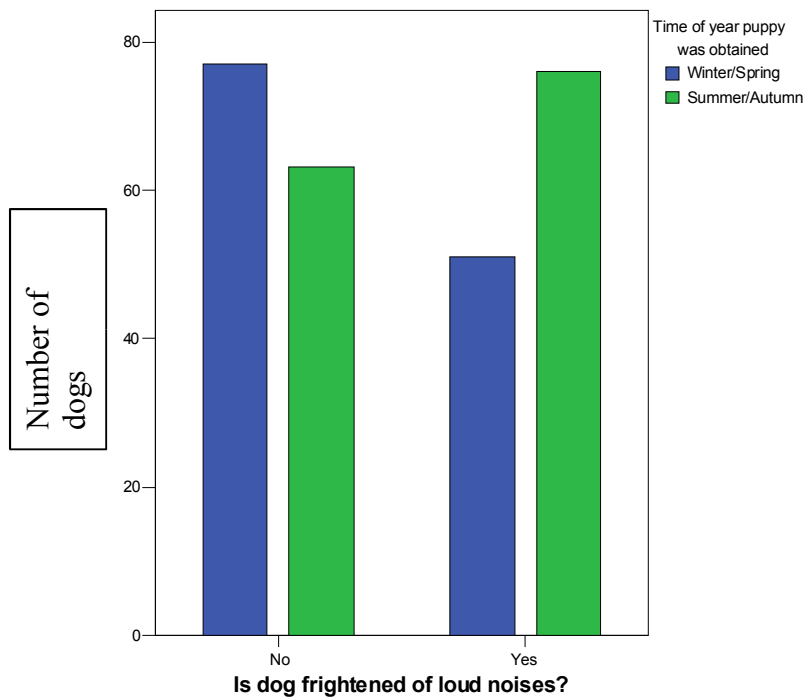


Figure 8: Time of year puppy obtained and fear of loud noises.

Half of all owners who had obtained their dogs as a puppy reported that they had been exposed to firework noises during the first few months that they owned them, however, this does not appear to have influenced the later development of fears of either loud noises ($\chi^2 = 2.75$; $df=2$; $p = 0.253$) or, more specifically, fireworks ($\chi^2 = 2.59$; $df=2$; $p = 0.274$).

Neither the type of location in which the breeder lived ($\chi^2 = 1.4$; $df=2$; $p = 0.496$), or the dog's current location ($\chi^2 = 2.44$; $df=3$; $p = 0.487$) was related to the prevalence of a fear of noises in later life.

Dogs that show fearful behaviour when they hear fireworks are also likely to show fearful behaviour when they hear thunder ($\chi^2 = 149.66$; $df=1$; $p < 0.001$), cars backfiring ($\chi^2 = 22.67$; $df=1$; $p < 0.001$) and gun shots ($\chi^2 = 64.67$; $df=1$; $p < 0.001$), but not "other" loud noises ($\chi^2 = 0.23$; $df=1$; $p = 0.63$).

Only 16 dogs were reported to have shown a fear of fireworks in the past, but not currently, suggesting that dogs that show a fearful reaction to loud noises do not spontaneously recover. Rather, owners of most of the dogs that no longer showed a fearful reaction to fireworks were reported to be deaf.

Owners who reported that they did not like loud noises themselves were slightly more likely to have a dog that showed a fear of noises, however this was not significant ($\chi^2 = 3.06$; $p = 0.08$; $df=1$).

Owners who reported that their dog showed a fearful reaction to loud noises were asked how they thought that their dog felt when it heard the noise. 145 owners (77%) reported that they believed that their dogs felt frightened, unsure or some other

negative emotion, however 14 owners (7%) failed to answer the question, or said that they did not know how their dog felt, and 29 (16%) attributed neutral or positive emotional states to their dog's behaviour.

The owners who reported that their dog was frightened by loud noises were also asked whether they had sought advice regarding this behaviour. Only 55 owners (29%) had asked for advice. 26 owners had asked their veterinary surgeon for advice, 10 had sought advice from a dog trainer, 7 had asked friends or neighbours for advice, 6 had sought advice from several sources, but only 3 owners had seen an animal behaviourist for advice.

Discussion

This study has revealed a surprisingly high prevalence of noise fears/phobias in the pet dog population in the UK. The proportion of dogs showing a fear response to noises in this study is significantly higher than that reported in clinical prevalence data, such as that published by the Association of Pet behaviour Counsellors (APBC) annually (<5% of caseload).

Although fear of other noises was reported by owners, the commonest sound causing a fear response in dogs was fireworks. Dogs that showed a fear of fireworks also showed a fear of gunfire, cars backfiring and thunder. This supports the hypothesis that dogs that show a fearful reaction to a specific loud banging noise, may generalise this fear to other similar types of sounds.

The most commonly reported behavioural sign was trembling/ shaking. This finding is consistent with that of Beerda et al. It is possible however, that trembling and shaking are more often reported by owners than other behaviours because they are easily analogous to fearful behaviours in humans. Other behavioural signs, such as decreased activity or hiding may not be as easily recognised by owners as signs of a fear response, and hence may be under-reported in this study. However, the frequency with which affected dogs show obvious shaking and trembling in response to noises found in this study, should make it easy for owners to recognise noise-related fear responses in their dogs, in response to education campaigns to highlight the importance of this problem.

In this study it was found that fewer crossbreeds were reported to show signs of fear in response to noises than pure-bred dogs. This finding was confounded by the fact that the pure-bred dogs in the study were found to be significantly younger than the crossbreeds. However, even when this age effect is removed using linear regression, there is still a slight, but significant, increase in prevalence in cross breed dogs. A similar higher level of occurrence has been found in a previous study on prevalence of separation-related behaviours in pet dogs in the UK. It is unclear for either behavioural disorder whether this effect is related to the dogs themselves, or whether it is a consequence of different owner reporting styles between the groups. However, it seems likely that the reporting of behaviour problems could be lower in breeders of pure-bred dogs, due to commercial interests, and this effect may be responsible for the apparent difference in prevalence between pure and cross bred dogs, particularly in this study where some of the owners were recruited at dog shows.

Interestingly, this study found no relationship between the prevalence of noise phobias in dogs, and their owner's own reported response to fireworks. In clinical cases, it appears that the response of owners to their dog's fear is important in the reinforcement of this response. The lack of significant relationship between owner and dog fears in this study may suggest that this reinforcement occurs more because the owner wishes to reassure their pet, rather than because they are worried themselves. However, pet owner interactions are often complex and this area requires further observational studies to examine how owner responses might influence the fearful reaction of individual dogs.

Although it has been suggested that rearing puppies in a non-domestic environment pre-disposes them to a number of fear-based behavioural disorders, this study found no relationship between the puppies rearing environment and the subsequent development of fears of loud noises. However, there was a non-significant trend in the data suggesting some protective effect of being reared in the breeder's house. As with any retrospective study, this result should be viewed with some caution, as it relies on owner's recollections, sometimes over a number of years, and also any assumptions they might have been made about the environment (for example where puppies are viewed inside a breeder's house but had been reared in an outside kennel).

Fascinatingly, there was a lower prevalence of noise fears and phobias in dogs that were acquired by their owners in Winter or Spring, than in Summer or Autumn. Those acquired in Winter and Spring would have been born in Autumn and Winter, when they would be more likely to experience firework noises during their early life. This finding supports the suggestion that exposure to noises during the important early 'socialisation period' of puppies has a protective effect on the development of fears later in life. However, more detail on the level and timing of exposure to noises was impossible to determine in this study, due to inaccuracies of owner recollections. This important developmental information about fears of noises requires further investigation with prospective studies.

The higher prevalence of fears of loud noises in older dogs can possibly be accounted for by the natural development of fearful behaviour over time, through the processes of sensitisation and generalisation. Younger dogs, in the initial stages of development of fears may not display a fearful reaction that is obvious to the owner, however over time, as the fear generalises or becomes more extreme (sensitisation), the dogs behavioural response becomes more "visible" and therefore more likely to be reported by its owner. Alternatively it may be the case that older dogs have had more opportunities to become fearful of noises following exposure to fireworks etc. Some of the increased prevalence in older dogs might also be attributable to age-related behaviour changes (e.g. cognitive dysfunction).

As has been found in studies of other 'behaviour problems' in domestic dogs (e.g. Blackwell et al.), this study found that a very low proportion of owners who reported a noise fear / phobia in their pet sought any help for the problem. An even smaller proportion sought any help from a qualified professional. From our discussions with owners when carrying out the survey, it became apparent that many owners were unaware that treatment was available for these behaviours. There is therefore a need for welfare organisations such as RSPCA to increase awareness in the general dog

owning public that treatment is both available and effective in dealing with fears/phobias of loud noises, and to direct them towards appropriate sources of help.

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Appendix 1



Ref: VP DS DW



At University of Bristol we are carrying out research into fears and phobias in pet dogs for RSPCA. We would therefore be extremely grateful if you could spare a few minutes of your time to tell us about your dog. When you have finished, please place the questionnaire in the envelope provided and return it to us at the freepost address (no stamp required).

Thank you!

IF YOU HAVE MORE THAN ONE DOG, PLEASE COMPLETE THIS QUESTIONNAIRE FOR THE YOUNGEST DOG THAT YOU OWN

About you:

Are you : Male Female

About your dog:

1. How old is your dog? (please estimate if not sure) _____
2. What breed is he/she? _____
3. Is your dog Male Female
4. Has your dog been neutered (castrated or spayed)? Yes
No

5. How old was your dog when you first got him/her? _____

6. Where did your dog come from ?

Rescue organisation

Person who bred him/her

Other (Please say where) _____

7. If you got your dog directly from the person who bred him/her please answer questions a) – c) below, if not, please go to question 8.

a) Where were the mother and puppies kept?

Out of the house in a Kennel/ shed or other outbuilding

Inside the breeders House

Other

Don't Know

b) What type of location did the breeder live in?

Urban

Suburban

Rural

c) Was the breeders household busy, with lots of people coming and going?

Yes

No

Don't Know

8. What type of location do you currently live in?

Urban

Suburban

Rural

IF YOU HAVE OWNED YOUR DOG SINCE IT WAS A PUPPY (LESS THAN 14 WEEKS OLD) PLEASE ANSWER THE FOLLOWING 2 QUESTIONS – if not please turn to the next page

9. If your dog was a less than 14 weeks old when you first acquired him/her, did he/she have any of the following experiences in the first few months you owned him/her?

| | | | |
|-------------------------|-----|----|------------|
| a. Traffic | Yes | No | Don't Know |
| b. Town | Yes | No | Don't Know |
| c. Countryside | Yes | No | Don't Know |
| d. Puppy/Training Class | Yes | No | Don't Know |
| e. Thunderstorm | Yes | No | Don't Know |
| f. Fireworks | Yes | No | Don't Know |
| g. Gunshots | Yes | No | Don't Know |

10. What time of the year did you first get your puppy? (please circle)

Spring Summer Autumn Winter

11. On **average**, how long does your dog get exercised **each day**?

On lead

Never
Less than 15 minutes
15-30 minutes
30 minutes to one hour
1-3 hours
3-5 hours
More than 5 hours

Off lead

Never
Less than 15 minutes
15-30 minutes
30 minutes to one hour
1-3 hours
3-5 hours
More than 5 hours

12. On an **average** day, how long is your dog left alone without human company?

Less than 1 hour
1-2 hours
2-4 hours
4-6 hours
6-8 hours
More than 8 hours

13. Does your dog show any of the following behaviours **only when he/she is left alone?** (tick all that apply)

Bark
Howl
Scratch at doors
Destroy objects (furniture, walls, etc)
Urinate/defecate indoors
Other (specify) _____
None

14. When you are at home does your dog try to get your attention, e.g. by barking, whining, jumping up, pawing or bringing you toys when ignored?

Yes, often

Yes, sometimes

No, never

15. Is your dog frightened/nervous of any of these things? (Please **tick all that apply**)

Loud noises/bangs (e.g. fireworks)

Traffic noise

Other dogs

People he/she knows

People he/she doesn't know

Nothing

Other (please specify) _____

16. Does your dog do any of the following **in response to loud noises** when you are present? (**tick all that apply**)

Bark

Howl

Scratch at doors

Destroy objects (furniture, walls, etc)

Urinate/defecate indoors

Hide

Try and escape

Tremble/shake

Seek out people

Salivate

Other (specify) _____

17. Which loud noises does your dog respond to?

Currently

Used to but not any more

Fireworks

Thunder

Wind

Rain

Loud noises on TV

Gun shots

Cars backfiring

Other (specify)

18. When does this behaviour begin?

When he/she hears the noise
Before a storm
When it gets dark
When he/she goes outside
Other (specify)
Don't know?

19. If your dog is frightened of gunshots, fireworks or thunder, does he/she react badly every time he/she hears them?

Yes, always

No, only sometimes

20. Have you had any advice about this behaviour from any of the following?
(please tick all that apply)

Veterinary surgeon
Animal behaviourist
Dog trainer
Friend/neighbour
Other (specify)

21. How do you think your dog feels in response to loud noises? (**in your own words**)

22. How do you feel/react to loud noises?

END OF QUESTIONNAIRE – THANK YOU FOR YOUR HELP