



## A survey on the behavior of white and coloured Boxer dogs: are they different?



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### Introduction

In 1896, when the first Boxer Club was established, white Boxers were still very important for breeding; in the following years coats being white or with wide white markings were alternatively banned and readmitted (Bauer, 2001).

During the Second World War, Boxers were used as military dogs, but the white and black subjects could not be camouflaged; so in 1939 the breeding of Check Boxers (more than 1/3 white) was banned, and in 1941 it was expanded to black and white Boxers, meaning that unwanted colours had to be killed at birth (Stockmann, 1995).

In Germany, at the end of 1970s, a law for animal protection prohibited the killing of vertebrates without any reason other than animal welfare. The German Boxer Klub breeders tried to justify such a brutal practice by pleading assumed hereditary taints (Wegner, 1995). Since 1979 in Germany (2005 in Italy) all Boxers, regardless of the coat colour, are to have a pedigree, although white Boxers are “not for breeding” and they can not participate at shows.

However, many breeders keep believing that the white coat is associated with weakness, albinism and other conditions. Indeed, some breeders have tried to breed out the white colour of Boxers, but the dogs showed a substantial loss of vitality and lack of bone structure (Bosi, 1996), so the experiment was stopped. According to Bauer (2001), the number of registered white Boxers is increasing, but many white puppies are still illegally killed. Besides being a relevant welfare issue, not rearing white Boxers does not allow to scientifically test if the white coat is related to a higher risk of problems.

The aim of the current research was to assess whether white Boxers are different compared to Boxers of other colours (fawn and brindle).

### Subjects, materials and methods

The survey was carried out by using a questionnaire filled in by 223 Boxer owners recruited by personal contacts and through the Italian Boxer Club. Two groups were created: white Boxers (n=39) and coloured Boxers (n=184; only 11 had no white markings).

Forty-four multiple-choice items about dog behaviour and their frequency of display (often, sometimes or never; see table 1) and 3 items on fear (see fig. 1) were asked, plus 65 questions (see table 2) concerning dogs' physical diseases described as frequent in this breed (e.g. see Gough & Thomas 2004). Data obtained from the two groups was compared through logistic regression (p<0.05).

### Results

Results showed that white Boxers were very similar to coloured ones for the vast majority of surveyed behaviours (tab. 1 and fig. 1). White Boxers displayed the behaviour of “not obeying basic commands” (12.8% versus 5.4% often; 61.5% versus 50.5% sometimes; Wald=5.739; p=0.017), and “insistently licking the owner's mouth” (25.6% versus 12.5% often; 33.3% versus 23.4% sometimes; Wald=7.413; p=0.006) more than coloured ones. Moreover white dogs tended to “be aggressive when forced to do something” more than the other Boxers (0.0% versus 0.5% often; 15.4% versus 4.9% sometimes; Wald=3.247; p=0.072).

From a physical point of view, no difference was found between white and coloured Boxers. The only case of partial deafness was reported for a coloured dog.

### Discussion and conclusions

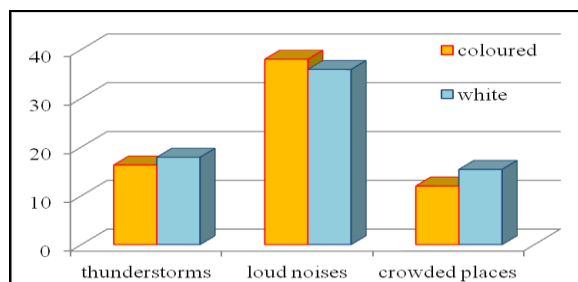
Results suggest that there is no considerable difference among Boxers with different coat colours, neither from a behavioural nor from a physical point of view. Behavioural differences may be more related to dog management rather than to genetics; it is possible that white Boxers, being regarded as dogs that need to be ‘rescued’, are adopted by people who tend to act differently from owners of coloured Boxers.

As the number of breed-able Boxers passing the physical and behavioural selection is constantly decreasing, reintroducing the white Boxer for breeding may be a profit for the Boxers' gene pool (Bauer, 2001). However, the inheritance of the white colour is very complex in Boxers (see Bauer, 2001), so research focused on genetics would provide more reliable data on this very debated topic. Scientific guidance is also necessary in the experimental re-introduction of white Boxers for breeding proposed by the German Boxer Klub, where dogs undergo audiometric exams and long-term monitoring.

### References

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**Fig. 1:** percentages of coloured and white Boxers showing fear of thunderstorms, loud noises and crowded places.



**Tab. 1:** percentages of coloured and white Boxers showing the following undesirable behaviours (\* for  $p < 0.05$ ).

QUESTIONS	Coloured Boxers		White Boxers	
	Sometimes	Often	Sometimes	Often
1 Urinating in the house in big amount	17.4%	1.6%	5.4%	5.1%
2 Urinating in the house in small sprays	12.5%	1.2%	12.8%	0.0%
3 Defecating in the house	11.4%	1.1%	12.8%	5.1%
4 Jumping over owners when they come back home	27.2%	60.3%	33.3%	53.8%
5 Jumping over owners (not when just home)	52.2%	23.9%	66.7%	15.4%
6 Jumping over other people	48.4%	24.5%	61.5%	25.6%
7 Digging	35.9%	9.5%	38.5%	12.8%
8 Escaping from home	7.6%	2.2%	15.8%	0.0%
9 Not obeying basic commands (sit, down etc.)	50.5%	5.4%	61.5%	12.8% *
10 Not answering to the recall	50.0%	5.4%	61.5%	2.6%
11 Chewing objects	53.8%	24.5%	66.7%	17.9%
12 Chewing on owners' body parts	27.7%	7.6%	25.6%	10.3%
13 Insistently licking owner's mouth	23.4%	12.5%	33.3%	25.6% *
14 Insistently licking owner's other body parts	39.1%	13.6%	46.2%	23.1%
15 Chasing vehicles/bikes/people	19.6%	4.9%	12.8%	0.0%
16 Scavenging	25.0%	3.8%	28.2%	5.1%
17 Eating his/her own faeces	3.8%	0.5%	2.6%	0.0%
18 Eating faeces of other dogs	9.8%	0.0%	7.7%	0.0%
19 Barking when left alone	22.3%	4.9%	12.8%	2.6%
20 Destroying when left alone	41.3%	15.2%	53.8%	7.7%
21 Insistently barking (not when left alone)	31.0%	3.8%	25.6%	2.6%
22 Destroying (not when left alone)	27.7%	4.0%	23.1%	0.0%
23 Pulling on the leash	38.6%	45.7%	43.6%	43.6%
24 Insistently licking him/herself	31.0%	10.3%	33.3%	7.7%
25 Having a fixed idea on something	37.5%	7.6%	30.8%	2.6%
26 Shadow chasing	8.7%	1.6%	10.3%	2.6%
27 Circling	17.4%	2.2%	33.3%	0.0%
28 Chasing his/her tail	17.9%	1.1%	17.9%	5.1%
29 Insistently repeating an action	16.8%	1.1%	12.8%	0.0%
30 Mounting	28.3%	1.6%	35.9%	2.6%
31 Being very excitable and restless	50.0%	23.9%	41.0%	25.6%
32 Chasing cats	38.0%	34.8%	30.8%	35.9%
33 Barking at other dogs	42.4%	22.8%	51.3%	20.5%
34 Attempting to bite other dogs	28.3%	9.8%	30.8%	5.1%
35 Raising hair when meeting other dogs	50.0%	25.0%	53.8%	23.1%
36 Growling at other dogs	35.9%	13.6%	43.6%	10.3%
37 Reacting aggressively when touched on the head	2.2%	1.1%	5.1%	0.0%
38 Reacting aggressively when forced to do something he/she does not want	4.9%	0.5%	15.4%	0.0%
39 Reacting aggressively when scolded	2.7%	0.0%	7.7%	0.0%
40 Disliking to be stroked	9.2%	0.0%	5.1%	0.0%
41 Showing fear of veterinarian/clinic	29.9%	3.8%	17.9%	2.6%
42 Disliking people, especially strangers, entering his/her territory	20.1%	12.5%	10.3%	12.8%
43 Defending an object	23.9%	9.8%	25.6%	15.4%

**Tab. 2:** percentages of coloured and white Boxers showing the following physical conditions (\* for  $p < 0.05$ ).

Physical conditions	Coloured B	White B
1 Monolateral deafness	0.0%	0.0%
2 Bilateral deafness	0.0%	0.0%
3 Partial deafness	0.5%	0.0%
4 Total deafness	0.0%	0.0%
5 Aortic stenosis	3.8%	0.0%
6 Aortic-pulmonary stenosis	4.3%	0.0%
7 Cardiomyopathy	0.5%	0.0%
8 Other cardiac conditions	6.6%	0.0%
9 Dermatitis	18.5%	30.8%
10 Hypersensitivity	9.1%	12.8%
11 Cysts	9.5%	7.7%
12 Skin tumours	6.5%	7.7%
13 Other dermatological conditions	9.4%	15.4%
14 Drug reactions	6.7%	2.6%
15 Hypothyroidism	1.1%	0.0%
16 Other endocrine conditions	2.3%	2.6%
17 Pyloric stenosis	0.6%	0.0%
18 Colitis	4.9%	0.0%
19 Intestinal obstruction	0.6%	0.0%
20 Bloat	1.7%	0.0%
21 Frequent diarrhea	7.0%	5.1%
22 Other gastro-intestinal conditions	12.2%	17.9%
23 Temporomandibular dysplasia/luxation	1.7%	0.0%
24 Arthritis	3.2%	5.1%
25 Spondylosis	6.5%	5.1%
26 Elbow dysplasia	0.6%	0.0%
27 Hip dysplasia	4.3%	0.0%
28 Knee dysplasia	2.1%	0.0%
29 Cleft lip and palate	0.0%	0.0%
30 Frequent fractures	0.0%	0.0%
31 Elbow luxation	0.0%	0.0%
32 Other musculo-skeletal conditions	10.5%	7.7%
33 Mast cell tumour	7.0%	5.1%
34 Melanoma	0.6%	0.0%
35 Cutaneous haemangioma	0.6%	2.6%
36 Histiocytoma	1.0%	5.1%
37 Fibroma	1.7%	0.0%
38 Gingival and oropharyngeal neoplasia	1.2%	2.6%
39 Osteosarcoma	1.2%	0.0%
40 Primary brain tumour	1.5%	0.0%
41 Thyroid tumour	0.6%	0.0%
42 Testicular/udder/uterus/ovary neoplasia	10.8%	0.0%
43 Other tumours	3.4%	10.3%
44 Neuropathy	1.5%	0.0%
45 Epilepsy	1.6%	5.1%
46 Meningitis	0.0%	0.0%
47 Other neurological conditions	2.6%	0%
48 Entropion	1.0%	2.6%
49 Ectropion	0.5%	2.6%
50 Prolapse of the nictitating membrane's gland	2.1%	0.0%
51 Blindness	0.6%	0.0%
52 Corneal ulceration	1.1%	0.0%
53 Conjunctivitis	5.3%	12.8%
54 Other ocular conditions	6.5%	10.3%
55 Kidney conditions	6.8%	0.0%
56 Urinary conditions	6.0%	5.1%
57 Nostril stenosis	0.5%	0.0%
58 Lung tumour	1.0%	0.0%
59 Other respiratory conditions	2.1%	2.6%
60 Otitis	15.1%	2.6%
61 Vaginal hyperplasia	0.6%	0.0%
62 Cryptorchidism	5.5%	0.0%
63 Monorchidism	3.3%	2.6%
64 Reproductive tumours	3.0%	2.6%
65 Other reproductive conditions	6.0%	5.6%