



RESEARCH

Is there a difference? Comparison of golden retrievers and dogs affected by breed-specific legislation regarding aggressive behavior

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Abstract Between 2000 and 2002, legislation in Lower Saxony insinuated a special dangerousness of certain dog breeds, and controls were imposed on them. Exemption was only possible if the dogs passed a standardized temperament test. In a previous study, test results of 415 dogs belonging to breeds affected by the legislation were analyzed. Ninety-five percent of the dogs showed no indication of disturbed aggressive communication or aggressive behavior in inappropriate situations. Because a control group was not available at that time, these results referred to a comparison between the affected breeds. In this study, golden retrievers were tested and used as control group. Seventy golden retrievers were tested in the temperament test. The order of testing was: veterinary examination, learning test, situations of dog-human-, dog-environment-, and dog-dog-contact, and obedience. Levels of escalation in aggressive behavior were scored using a scale of 1-7. A total of 58.57% of the dogs did not show aggressive behavior (Scale 1). Forty percent displayed aggressive behavior referring to Scale 2, and 1.43% showed aggressive behavior referring to Scale 5. A total of 98.57% of the dogs reacted appropriately, and 1.43% displayed aggressive behavior in inappropriate situations. In the previous study, 95% of the animals reacted appropriately, whereas 5% displayed excessive aggressive communication or aggressive behavior in inappropriate situations. Comparing the results of golden retrievers and breeds affected by the legislation, no significant difference was found. A scientific basis for breed specific lists does not exist. Therefore, legislation in Lower Saxony was changed, and breed lists were withdrawn. © 2008 Elsevier Inc. All rights reserved.

Introduction

Between July 2000 and July 2002, the Niedersaechsische Gefahrtierverordnung (GefTVO) was in force in Lower Saxony, Germany. At that time the authorities assumed that

certain breeds of dogs were especially dangerous without just cause. Therefore, controls regarding keeping and breeding were imposed on these breeds. An exemption from these restrictions was only possible if the dogs passed a standardized temperament test. This test had been developed to detect individuals displaying an indication of disturbed aggressive communication or aggressive behavior in inappropriate situations. It was based on a temperament test by Netto and Planta (1997).

In a previous study (Mittmann, 2002), the results of the temperament tests of 415 dogs belonging to six breeds

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affected by the legislation were analyzed for: (1) breed predisposition for disturbed aggressive communication or aggressive behavior in inappropriate situations, and (2) differences in behavior between the breeds. In 395 dogs (95.18%) no indication of disturbed aggressive communication or aggressive behavior in inappropriate situations could be found. Nineteen dogs showed aggressive behavior in inappropriate situations, and 1 dog reacted with disturbed aggressive communication (4.82%).

Because a control group was not available at that time, those results referred to a comparison between the six breeds affected by the legislation (American Staffordshire terrier, bullterrier, Doberman, rottweiler, Staffordshire Bullterrier, and dogs of the pit bull-type). However, whether the assumption of a special dangerousness of certain dog breeds is correct or not can only be proven with the use of a control group of dogs that do not belong to the breeds affected by the legislation.

For this reason, in a consecutive study 70 golden retrievers were tested and used as a control group. The results of this study were evaluated for:

- Breed disposition for disturbed aggressive communication or aggressive behavior in inappropriate situations in golden retrievers.
- Significant differences in the occurrence of aggressive behavior between the dogs affected by the legislation and golden retrievers.
- Clues for preferred strategies to solve conflict situations.

Materials and methods

Animals

For statistical reasons, all dogs of the control group had to belong to only 1 breed. The golden retriever was not affected by legislation in any German county. It is often regarded as a friendly and peaceable dog and widely represented in the German society. For these reasons, the golden retriever was chosen as breed to make up the control group. The owners attended the temperament test voluntarily.

According to the guidelines of the temperament test, the animals had to be at least 15 months old. A limiting age did not exist. All dogs were kept in private ownership and did not know the examiner conducting the temperament test, the test assistants or the location of the test.

Test area

The temperament tests were conducted at a special test area located on the premises of the University of Veterinary Medicine Hanover. The test site was approximately 1,300 square meters (38 m × 36 m). It was enclosed by metal fencing, which was 2 m high and on one side had a door that could be closed securely. The ground of the test site was made up of sand and gravel. Along one side was a 4 m wide asphalted

path. The whole area could be easily overlooked from every position within the test site. The general medical examination as well as learning and frustration test were carried out before the temperament test in a separate room of the university.

Test assistants

Besides the examiner at least another 3 test assistants were needed to conduct a temperament test. All test assistants were students at the University of Veterinary Medicine Hanover. They were of varying age, sex, and body height. One of the test assistants had to operate the video camera. Before the temperament test, all test assistants were informed about safety regulations and professional discretion. The assessment of the golden retrievers was always carried out by the same observer. The dogs tested were not known to the examiner or test assistants.

Test devices

Depending on the test situation different items were needed. All items were property of the University of Veterinary Medicine Hanover. They had already been used by [Mittmann \(2002\)](#) for conducting the temperament test. The test devices are mentioned in the descriptions of the test situations ([Table 1](#)).

For safety reasons all dogs had to be lead on a 2 m long double-ended leash. With two golden retrievers a size 8 plastic muzzle (top length 8 cm, bottom length 13 cm, circumference 31 cm) was used.

The temperament tests, except for general medical examination and learning and frustration test, of all 70 golden retrievers were videotaped with the use of a Sony CCD-TR 950E video camera. The videotaping covered the whole situation, i.e., test assistant, owner of the dog, and display of the dog.

Test procedure

Per day, a maximum of 5 dog-owner-teams were tested. The order of dog-owner-teams was determined by chance. Before commencing with the tests, the owners were introduced to the test procedure, and questions were settled. After this, every dog had to undergo a general medical examination to detect or rule out any diseases that might influence the dog's behavior in the temperament test. After the general clinical examination, a learning and frustration test was carried out to be sure that the participants had not been given sedatives. The temperament test consisted of the following parts: 21 situations involving dog-human contact, 14 situations involving dog-environment contact, dog-dog contact, and obedience. For a single dog the test lasted about 60 minutes. The dog-dog-contact was tested after every dog had completed all other parts of the test. Following [Mittmann \(2002\)](#), the situations of the dog-dog-contact and the obedience part were not analyzed in this

Table 1 Dog behavioral test according to the law for keeping dogs in Niedersachsen (NMELF, 2000)

Situation	Grading (A)	Comments (description of communicative behavior)
1.		
2.		
3.		
4.		
5.		
6.		
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33.		
34.		
35.		
36.		
OBEDIENCE		
It must be obvious, that the owner is in control. The dog has to come back when recalled and stop any behavior when given a 'leave' command.		

Table 2 Assessment of dogs: grading system for reactions (NMELF, 2000)

1	No aggressive signals detected (e.g., dog shows avoidance behavior or fear)
2a	Acoustic signals (growling or barking, hissing, crying)
2b	Visual signals (showing teeth, lifting lip, staring/direct eye contact with or without growling or barking) while doing this, the dog is stationary or backs up
3	Snapping (bite movements at some distance) with/without growling or barking or showing of teeth, direct eye contact/staring; menace signals/aggressive facial expression or body language while being stationary or backing up
4	Like Number 3, but dog comes closer (but stops at some distance). It is important to observe if the dog stops on its own or if it gets stopped by the lead
5	Biting (attempt to bite) or attack (attempt to attack: coming closer at a fast pace and pushing) with growling or barking or showing teeth
6	Like Number 5, but without any acoustic or visual signs
7	Like Number 6 but animal needs over 10 min to calm down after escalation of behavior

study. A description of the situations of the dog behavioral test is given in Table 1.

Assessment of the dogs

The dog's behavior was observed for each situation separately. For every situation, the dog's behavior was assigned to a category of behavior called scale. The total number of scales was seven. Scale 1 summarized all non-aggressive behaviors, e.g., the dog stayed neutral, or showed social approach, avoidance behavior, play behavior, or flight. Scales 2–7 classified aggressive behavior into 6 steps of escalation. The description of the dogs' behavior and the scale it was assigned to is given in Table 2.

According to the GefTVO, the assessment of a dog regarding its dangerousness had to be based on the following observation whether a dog reacted appropriately in the test situations or not. A temperament test result was regarded as failure if the dog showed aggressive communication of Scale 5 in inappropriate situations, i.e., non-threatening situations in which the test assistant clearly communicated in a friendly way, or situations that often occur in everyday life. A dog was also considered to have failed the temperament test if, in any situation, it displayed aggressive behavior assigned to Scale 6 or 7. The assessment of a dog regarding its dangerousness was therefore dependent on its behavior in threatening and in non-threatening situations.

Statistical analysis and preparation of graphics were carried out using GraphPad Prism 4 (GraphPad Software, Inc., La Jolla, CA). Concerning pair-wise comparisons, the significance between groups was tested with the χ^2 value. Values of $P < 0.05$ were considered as significant.

Results

Dogs

Of 70 golden retrievers tested in this research project, 22 were male (3 of them neutered), and 48 female (6 of them

spayed). The dogs were between 15 months and 10 years old with a mean age of 4.1 years.

Thirty-three golden retrievers had previously attended and passed a temperament test of their kennel club, 2 golden retrievers had attended it and failed. Thirty-five golden retrievers had not attended their kennel club's temperament test.

Highest scale reached

Of 70 golden retrievers tested, 41 dogs (58.6%) did not show aggressive behavior at all (scale 1). Mittmann (2002) had detected Scale 1 to be the highest scale reached in 33% of the American Staffordshire terriers, 63% of the bullterriers, 30% of the Dobermans, 36% of the rottweilers, 43% of the Staffordshire bullterriers, and 35% of the dogs of the pit bull-type (Table 3).

Another 28 golden retrievers (40%) displayed visual or acoustic menace signals while being stationary or backing away (Scale 2) at most. Mittmann (2002) had assigned Scale 2 as the highest scale reached to 49% of the American Staffordshire terriers, 32% of the bull terriers, 52% of the Dobermans, 54% of the rottweilers, 50% of the Staffordshire bull terriers, and 44% of the dogs of the pit bull-type (Table 4).

Table 3 Number and percentage of dogs per breed reaching Scale 1 as highest scale

Dog breed	Percentage of dogs
Golden retrievers	58.6
American Staffordshire terriers	33
Bull terriers	63
Dobermans	30
Rottweilers	36
Staffordshire bull terriers	43
Dogs of the pit bull type	35

Table 4 Number and percentage of dogs per breed reaching Scale 2 as highest scale

Dog breed	Percentage of dogs
Golden retrievers	40
American Staffordshire terriers	49
Bull terriers	32
Dobermans	52
Rottweilers	54
Staffordshire bullterriers	50
Dogs of the pit bull type	44

Biting or attacking with complete approach and earlier menace signals (Scale 5) was observed in 1 golden retriever (1.4%). Aggressive behavior of Scale 5 at most was shown by 13% of the American Staffordshire terriers, 3% of the bull terriers, 6% of the Dobermans, 4% of the Rottweilers, 12% of the Staffordshire bull terriers, and by 13% of the dogs of the pit bull-type.

Scale 3 (snapping intention while being stationary or backing up), Scale 4 (snapping intention while moving closer but stopping at some distance), Scale 6 (biting or attacking with complete approach but without earlier menace signals), and Scale 7 (like 6, but dogs needs more than 10 min to calm down) were not observed at all (Table 5).

Behavior of the dogs in individual situations

When examining the results it became apparent that the behavior of the golden retrievers depended on the behavior of the test assistants in the different situations. Aggressive behavior was most often observed in threatening situations: In situation "Person stares at dog" 12 dogs (17.1%) showed acoustic or visual menace signals (Scale 2). In situation "Person threatens dog with no aids" the behavior of 7 dogs (10.0%) was assigned to Scale 2.

In non-threatening situations, acoustic or visual menace signals (Scale 2) were shown in situations "Drunk Person" (7 dogs, 10%), "Clapping hands, screaming" (6 dogs, 8.6%), "Umbrella" (5 dogs, 7.1%), "Stumbling," "Bicycle" (3 dogs,

Table 5 Number and percentage of dogs per breed reaching Scale 5 as highest scale

Dog breed	Percentage of dogs
Golden retrievers	1.4
American Staffordshire terriers	13
Bull terriers	3
Dobermans	6
Rottweilers	4
Staffordshire bull Terriers	12
Dogs of the pit bull type	13

4.2% in each situation), "Long coat, hat," "Crying," "Person threatens dog with stick" (2 dogs, 2.8% in each situation), "Abrupt rise," "Person shouts at dog," and "Broom" (1 dog, 1.4% in each situation). In the situation "Drunk Person" 1 dog (1.4%) reacted with aggressive behavior assigned to Scale 5. This was the only situation in which a golden retriever reached a higher score than Scale 2.

The 5 situations of the test in which aggressive communication was observed most often were "Person stares at dog," "Person threatens dog with no aids," "Clapping hands, screaming," "Umbrella," and "Drunk person."

Comparison of threatening and non-threatening situations

The dog-human- and dog-environment-contact included four threatening situations. In 7.9% of the threatening situations aggressive communication of Scales 2-4 could be observed. In non-threatening situations aggressive behavior of Scales 2-4 was detected in 1.4% of the situations. Aggressive behavior of Scales 2-4 was therefore highly significant more often shown by the dogs in threatening situations than in non-threatening situations ($P < 0.0001$).

Disorders in aggressive behavior and aggressive behavior in inappropriate situations

A dog was categorized as showing aggressive behavior in inappropriate situations if it reacted with biting with complete approach in those situations in which the test assistant communicated clearly in a friendly way or in situations that often occur in everyday life. A dog was considered to show disturbed aggressive behavior if it showed biting without previous threatening behavior (Scale 6) or if it was not able to become calm within 10 min (Scale 7).

According to these criteria 69 golden retrievers (98.6%) reacted appropriately considering the situation. One animal showed biting with complete approach and earlier menace signals (Scale 5) in the situation in which a "Drunk person" staggers past the dog in 2 m distance. This situation is a non-threatening situation. Therefore the dog's reaction was considered as aggressive behavior in an inappropriate situation.

In the previous study by Mittmann (2002) had tested 415 dogs in the temperament test. In that study, 19 dogs had shown aggressive behavior in inappropriate situations. Concerning aggressive behavior in inappropriate situations, the pair-wise comparison between the dogs tested by Mittmann (2002) and the dogs of the control group resulted in a P value of 0.19 (χ^2 test). Therefore no significant difference between both groups of dogs with regard to aggressive behavior in inappropriate situations could be detected. The same results were found when comparing the golden retrievers with each single breed of dog tested by Mittmann (2002). The pair-wise comparison of bullterriers,

rottweilers, Staffordshire bull terriers, and dogs of the pit bull-type resulted in values of $0.26 < P < 1$ (χ^2 test). However, the pair-wise comparison of American Staffordshire terriers and Dobermans resulted in values of $P = 0.047$ and 0.049 respectively (χ^2 test), indicating that these breeds showed aggressive behavior in inappropriate situations slightly significantly more often than the golden retrievers.

For statistical reasons, i.e., too small numbers of dogs showing disturbed aggressive communication, a comparison between the breeds tested by Mittmann (2002) and the golden retrievers concerning disturbed aggressive communication could not be drawn.

Strategies to solve conflict situations

Every golden retriever underwent 34 test situations. As 70 dogs were tested, a total of 2,380 test situations were observed. In between 10 (29.4%) and 31 (91.2%) of the test situations signs of insecurity or stress signs such as panting, frequent urination, displacement behaviors such as shaking or yawning (Eisfeld, 1966; Lindsay, 2000; Rugaas, 2001; Schoening et al., 2004), and calming signals (Rugaas, 2001) could be observed in the display of the dogs. In a mean of 68.9% of the test situations the golden retrievers showed submissive behavior (e.g., averting gaze (Feddersen-Petersen and Ohl, 1995; Lindsay, 2000), squinting (Lindsay, 2000; Rugaas, 2001), submissive grin (Fox, 1971; Feddersen-Petersen and Ohl, 1995; Feddersen-Petersen, 2004), lip licking (Fox, 1971; Zimen, 1971; Feddersen-Petersen and Ohl, 1995; Lindsay, 2000; Feddersen-Petersen, 2004), paw raising (Schenkel, 1967; Fox, 1971; Althaus, 1982; Feddersen-Petersen, 2004), or drawn back ears, lips, and facial muscles (Schalke, 2004) as strategy for solving a conflict.

Discussion

The assessment of the behavior of dogs by observing them is always prone to the subjectivity of the observer. In 1 study, a significant difference between judgments made by experts in more than 50% of observed behaviors was found (Sundgren, 1993). The dogs tested by Mittmann (2002) were all observed by 2 experts. The golden retrievers were assessed by only 1 observer different from the experts in the previous study, and a second expert could always be consulted. However, to minimize the influence of errors caused by the observer's subjectivity, all temperament tests carried out at the Institute of Animal Welfare and Behavior (Pets, Laboratory Animals and Horses) of the University of Veterinary Medicine Hanover were videotaped. This made repeated observations of the dogs' behavior possible. By playing the tapes in slow motion or freezing images even slightest parts as well as fast changes of the dogs' displays could be detected.

By using a standardized testing procedure and scaling system a validated assessment of a dog's behavior was possible.

Results

A significant difference in the occurrence of aggressive behavior in inappropriate situations between the golden retrievers tested in this study and dogs belonging to 6 different breeds affected by the legislation and tested in a previous research project (Mittmann, 2002) could not be detected. For the following reason, this is a striking result. The owners of the golden retrievers participated in this study on a voluntary basis. The results of their dogs' tests did not have to be passed on to the authorities.

The dogs tested by Mittmann (2002) fell into 2 categories according to the legislation. Dogs belonging to Category 1 (American Staffordshire terriers, bullterriers, and dogs of the pit bull type) had to undergo a temperament test to not be euthanized. Dogs assigned to Category 2 (Dobermans, rottweilers, Staffordshire bull terriers, and 9 other dog breeds) had to attend a temperament test in case the owner wanted to get an exemption from having his dog muzzled and on a leash for the rest of its life. Concerning dogs belonging to either Category 1 or 2, the results of the temperament test had an influence on the dog's further life. The owners of these dogs therefore had a much higher psychologic pressure resting on them. The higher the psychologic and physiologic pressure resting on the owner, the more stress will the dog experience in a certain situation, leading to the dog showing aggressive behavior earlier and more intensively (Schoening, 2000). This applies to the dogs tested by Mittmann (2002) and explains the slightly more frequent occurrence of aggressive behavior in dogs tested in the previous study. However, no significant difference between the 415 dogs tested by Mittmann (2002) and the 70 golden retrievers of this study was found. Furthermore, no significant difference in the pair-wise comparison of golden retrievers with rottweilers, bullterriers, Staffordshire bullterriers, and dogs of the pit bull type was detected. The result that American Staffordshire terriers and Dobermans had a tendency to show aggressive behavior in inappropriate situations more often than golden retrievers might be explained by the far bigger psychological pressure put on these dogs' owners—the passing of the test being the single criterion deciding over a dog's euthanasia or its life-long being kept leashed and muzzled.

As the results show, aggressive behavior was most often shown in situations that were threatening for the dog, or in situations that were characterized by fast, abrupt, or strange movements of the test assistants. The reason for showing aggressive behavior was most often found to be anxiety. The same results were found by Mittmann (2002). This accordance shows that dogs, regardless of their breed, display

aggressive behavior toward the same triggers. Regardless of their breed dogs are threatened by similar human attitudes and situations.

Aggressive behavior most often shown in situations that dogs are not familiar with, and in situations that do not often occur in daily life. The human behavior that triggers aggressive behavior in dogs is often different from what dogs know as being "normal." This indicates how important the first weeks in a dog's life, i.e. the socialization period is in which a dog learns what it should regard as "normal" in its later life. To minimize the chance that a dog will show aggressive behavior in its later life due to anxiety or fear, breeders as well as future owners need to present many stimuli connected with positive experiences to a dog regardless of the dog's breed. Still the following has to be considered: however good the experiences with humans and the environment of a dog in its life has been during the socialization period, strange situations can occur in a dog's life. A dog cannot be prepared for every single situation it will encounter in its later life. To prepare a dog for its later life it should be trained an alternative behavior as early in its life as possible, thus teaching the dog a way to solve conflicts by showing this alternative behavior instead of feeling anxious and reacting aggressively.

Conclusion

In this research project, no significant differences in the occurrence of aggressive behavior in inappropriate situations were found when comparing golden retrievers and 6 dog breeds affected by legislation. Therefore, assuming that certain dog breeds are especially dangerous and imposing controls on them cannot be ethologically justified. Consequently, legislation in Lower Saxony was changed, and breed lists were withdrawn.

It is striking that the golden retrievers and the dogs tested previously reacted mainly in situations involving unusual movements. In both groups, fear was found to be the main cause of the behavior. This underlines that the emphasis for preventing biting accidents should be consideration of the emotions in the dog and the effect of eliciting stimuli rather than affiliation with particular breeds. It

furthermore shows that more emphasis has to be put on educating breeders and owner as well as on preventing than on solving behavior problems.

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