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Research

Behavior of laboratory beagles: Assessment in a standardized behavior test using novel stimuli and situations

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ABSTRACT

Laboratory dogs should be sociable with humans and react in a relaxed way when confronted with new stimuli and situations. This is of particular advantage when dogs are used in animal experiments and for the handling of dogs and animal welfare, in general. We determined the reactions of laboratory dogs to different stimuli and manipulations and evaluated the dogs' behaviors to these in the context of housing condition, sex, age, and origin of the dogs. Ninety purpose bred, 1- to 10-year-old laboratory beagles of both sexes from 4 research facilities were subjected to: a new, standardized behavioral test including unfamiliar situations, varied and novel manipulations not routinely involved in physical examination as performed by an unfamiliar person, and novel optical and acoustic stimuli. An earlier article reported on these dogs' responses to approaches and physical examination by known and unknown people (Döring et al., 2014). Here, we concentrate on the effects of environmental stimuli and atypical manipulations. Videotape-based assessment and scoring of the dogs' behavior showed distinct patterns of reactions. Most dogs reacted with interest toward the unfamiliar test person and readily established contact. Many dogs reacted with uncertainty to the unfamiliar object and sound. Signals that may indicate conflict or distress (muzzle licking, paw lifting, and panting) were observed in some of the dogs in all facilities and in all parts of the test. Lowest body language scores indicated by anxious and/or "submissive" postures were observed when the dogs' muzzles were held shut or when the dogs were covered with a thin cloth.

Characteristic housing conditions of the different facilities significantly affected several endpoints. Male dogs were significantly less fearful than females in several parameters and older and facility-bred dogs were significantly less fearful. Housing conditions, sex, age, and origin of the dogs markedly affected their behavior.

Introduction

Laboratory dogs should be sociable with humans, relaxed and adaptive to new situations. They should be neither jumpy nor anxious. Moreover, reduction or absence of stress during laboratory procedures is highly desirable in view of animal welfare. Less stressed animals imply less stress for the care staff (Joint Working Group on Refinement, 2004). Furthermore, experimental data resulting from studies carried out on calm, well-adjusted animals are likely to be more consistent and meaningful, whereas distress can lead to physiological changes in the animal, to increased variability in experimental data and even invalid conclusions (Joint Working Group on Refinement, 2004). On the other hand, positive interactions between laboratory dogs and staff are considered to be of central importance (Loveridge, 1998; Hubrecht, 2002; Bayne, 2003; Joint Working Group on Refinement, 2004; Wells, 2004; Overall and Dyer, 2005), and thus, dogs should feel at ease when being approached and handled (Joint Working Group on Refinement, 2004).

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Helping the animals to become more adaptable is not only good practice but also helps prepare them for other roles, including rehoming into private hands after the experiments (LASA, 2004). Socialization, habituation, and training programs can lower stress levels in laboratory dogs when faced with novel situations in the laboratory and can make the animals more suitable for future rehoming (Joint Working Group on Refinement, 2004). Accordingly, LASA (2004) recommends that dogs are exposed to a variety of visual, tactile, and aural experiences and that they be permitted proper socialization with other dogs and people.

Compared to the complex environment of companion dogs, the usual housing conditions of laboratory dogs provided a narrow range and quality of environmental stimulation and exposure to new situations. Therefore, we investigated the reactions of laboratory dogs in different stimulatory and exposure situations which could affect their behavior.

The behavior of laboratory dogs housed in 4 different facilities was assessed applying a behavior test for laboratory dogs that focused on behavior toward humans, environmental stimuli, and unfamiliar situations (see Döring et al., 2014 for a review of the facilities). Our data show that in these dogs and facilities, sex, age, and origin markedly influenced the dogs' behavior.

Methods

Animals and husbandry

The study was performed on 90 purpose-bred laboratory beagles of both sexes, aged 1-10 years in 4 different experimental facilities, hereafter named A, B, C, D, which provided considerable differences in housing conditions as described in Döring et al. (2014) and summarized in Table 1. The study included 23 dogs each in facility A, B, and D and 21 in C. None of these dogs were used in concomitant experiments.

All dogs were trained interalia for experimental manipulation. In facility A, all dogs were accustomed to walk on the leash. In facilities B and D, the caretakers regularly played with the dogs. The dogs in facilities A and B were brought daily to outdoor runs for several hours. Dogs in facilities C and D had permanent access to outdoor runs. In facilities A and C, the kennels were located in separate dog houses, whereas in facilities B and D the kennels were integrated in the facility building. In D, the kennels were in proximity to examination rooms and so forth. (See schematic in the Supplementary data).

The dogs were kept and the study was carried out at an ambient air temperature of 17.5°C-22.0°C in A, 21.5°C in B, 22.5°C in C, and 24.5°C in D.

Behavioral test

The dogs were subjected to a standardized behavioral test carried out by an unfamiliar female person in an unfamiliar room. It consisted of 10 different test parts (Table 2). The "luring" and "following" parts were based on Campbell's puppy behavior test (Campbell, 1985). Additional test parts included the dogs' behavior when alone in an unfamiliar room and their reaction to a new optical and acoustic stimulus and to new situations. An umbrella was chosen as foreign object as described (Goddard and Beilharz, 1984; King et al., 2003; Ley et al., 2007), however, in the present study the umbrella was opened slowly and then placed on the ground. The cloth tests were based on Coren's intelligence tests (Coren, 1997).

All behavioral tests were carried out between 8 and 12 AM. Full testing followed a short encounter test described in Döring et al. (2014) in the dogs' home kennels. The dogs from facility A were taken to the test room on a leash, the dogs from facilities B and D were carried in the experimenter's arms, and the dogs from facility C were taken in a cart to an unfamiliar test room by an unfamiliar female person (Dorothea Döring) who also performed the encounter test discussed in Döring et al. (2014). The tests discussed in this article were carried out by a different unfamiliar female person (Barbara E. Haberland), but the same person conducted the same parts of the tests across all facilities.

Because standardization is a minimum requirement for behavior tests (Taylor and Mills, 2006), we placed great emphasis on standardized test procedures. The movements and body postures of the test person and the conduct of the test parts had been trained and standardized by the test person on privately owned dogs before the start of the experiments. Throughout the tests, the dogs were not talked to. The entire test was videotaped by a second person standing quietly on a chair in a rear corner of the room.

The individual test parts were interrupted by 5-second breaks.

"Isolation": The dog was left alone in a closed and unfamiliar room for 30 seconds.

"Contact": The test person entered the room and stood motionless for 60 seconds.

"Luring": The test person squatted and clapped her hands lightly to lure the dog to her.

"Following": The test person walked past the dog and strode once around the room in a circle without looking at the dog.

"Playing": The test person offered the dog a rubber ball and rolled it slowly across the floor. If the dog did not notice and/or visibly react to the ball (e.g., sniffed the room or licked the test person), it was rolled a second time.

"Provocation": The test person gripped the dog's muzzle from above and held it shut with one hand for 10 seconds. During that time, the other hand rested on the dog's neck.

"Object": "Opening umbrella": The test person slowly opened an umbrella and placed it on the floor.

"Umbrella lying on the floor": The open umbrella was left on the floor for 15 seconds.

"Noise": The test person turned away from the dog and made a loud noise with a bicycle bell.

"First and second cloth test": A thin, approximately 1-m^2 large, nontranslucent blue cloth was spread over the dog. If the dog did not free itself, the cloth was removed after 25 seconds. The test was then repeated in the same manner.

"Offering food": The test person squatted in front of the dog and offered it food (from the facility) from the hand.

Table 1
Sex, age, and origin of the dogs in the 4 facilities A, B, C, and D

Facility	Sex		Age in years				Origin		
	Male	Female	Range (average)	<2	2-<5	≥5	Facility bred	Breeder	Other facility
A	1[a]	22[a]	1-10 (3.9)	2	15	6	15	6	2
B	13	10	1-5 (1.2)	22	—	1	23	—	—
C	6	15	3-6 (4.8)	—	5	16	—	21	—
D	11	12	1-6 (3.2)	4	15	4	19	—	4
Total	31	59		28	35	27	57	33	

[a] In A, the male dog and 2 of the females were neutered.