



## Canine Research

# Assessing stress in dogs during a visit to the veterinary clinic: Correlations between dog behavior in standardized tests and assessments by veterinary staff and owners



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## ABSTRACT

A visit to a veterinary clinic can be very stressful for the dog, and stress may interact with pain. The aim of this study was to observe the behavior of dogs in a veterinary clinic and to correlate it with subjective stress assessments by different persons. Systems have already been developed to assess pain in dogs. We tested the behavior of 105 dogs, sampled from 233 dog owners who completed our questionnaire and whose dogs were patients at the clinic. The dog owner, the test leader, the nurse, and the veterinarian were each asked to assess if the dog was experiencing pain or was stressed and to evaluate, overall, how the dog experienced the visit. Three behavior tests were also carried out to describe the dog's reaction in the veterinary clinic: a "social contact" test, a "play" test, and a "treat" test. The play and treat tests were carried out both inside and outside the veterinary clinic to see if the dogs reacted differently in the 2 situations. Agreement between observers was good to excellent but generally better when assessing pain than stress. Dogs rated as more stressed were significantly less likely to engage in social contact with an unfamiliar person ( $P < 0.0001$ ). They were significantly more willing to play and eat a treat outside the veterinary clinic compared to inside the clinic ( $P < 0.001$ ), implying that the dogs themselves experienced inside the clinic as being more negative. The results also indicated that the type of relationship the owner has with the dog may influence the dog's behavior during the clinical examination. The good agreements between the different measures in this study suggest that there is potential for a system to be developed to assess the extent to which the dog is stressed in the clinic.

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## Introduction

There have been several studies on the assessment of welfare of dogs in society, particularly in shelters (Hennessy et al., 2002; Sales et al., 1997; Weiss, 2002) but only a few studies on the assessment of the welfare of dogs in veterinary clinics (Mariti et al., 2015; Stanford, 1981; Väisänen et al., 2005). A visit to a clinic may be stressful for the patient for several reasons. The most obvious is because the dog is in pain associated with an injury or disease. Pain may be defined as an unpleasant sensory and emotional experience

associated with actual or potential tissue damage or described in terms of such damage (Merskey & Bogduk, 1994). In addition, most animal species both prey and predators commonly try to mask their pain as a protective mechanism, and it may be difficult to detect pain at a clinic (Quimby et al., 2011; Scotney, 2010; Sharkey, 2013). Although there are individual differences, pain and stress usually generate similar physiological responses (Hellyer et al., 2007) and are therefore difficult to separate. Visits to a veterinary clinic are also for routine checks, vaccination, or an operation such as castration, on an otherwise healthy dog. They can, however, still be stressful for the dog. Within the veterinary field, studies have shown that animals can respond to "the white coat effect" (Belew et al., 1999; Kallet et al., 1997; Quimby et al., 2011), and dogs may react based on earlier negative experiences in a clinic. Dogs may even react to other dogs and species in the waiting room (Rodan et al., 2011; Scotney, 2010; Siracusa et al., 2007) which may be

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stressful if the dog is scared of, aggressive toward, or curious about these other animal species. The dog–owner relationship may affect the dog's reactions during a visit to the veterinary clinic, especially if the owner is stressed because of their own previous experiences of veterinary clinics or anxious about what will happen to their dog in the current visit (Merola et al., 2012). Finally, isolation and separation from the owner may affect the dog negatively (Siracusa et al., 2008). Thus, there are many factors, past and present, that may be contributing to the overall experience of the dog during a particular visit to the veterinary clinic.

Stress in animals is sometimes defined as when an animal is suffering a threat to its homeostasis (Moberg, 2000), but with such a nonspecific response and variety of ways that an individual animal may try to cope (Koolhaas et al., 2011), it is not obvious how much agreement there should be between people when scoring stress. The advantage for an owner when assessing the level of stress in their dog is that they are very familiar with the dog's normal behavior and more likely to see deviations. A veterinarian on the other hand is trained to recognize symptoms of stress but probably only sees the dog for a limited period, most likely in the examination room. Thus, the question arises of who would be the best person to score the dog and whether any of these subjective scorings would correlate with the behavior of the dogs in standardized tests designed to assess its reactions under pressure.

Rating, as opposed to behavioral coding, is often thought to reflect more global states and so may be a fruitful way forward to validate tests in this context (van den Berg et al., 2006; Wilson & Sinn, 2012; for a longer discussion see Jones & Gosling, 2005; Meagher, 2009). More specifically, rating could help identify which of our noninvasive tests should be validated against accepted behavioral and/or physiological measures of stress in a future study.

Nowadays, most veterinary clinics aim to make the experience of the visit as positive for the dogs as possible, for example, by offering carefully prepared waiting and examination rooms, not mixing different species in the waiting rooms, and offering the patients different types of rewards (Rodan et al., 2011; Siracusa et al., 2008; Väisänen et al., 2005).

Pain recognition in animals has advanced considerably in the past decade (Mathews et al., 2014; Viñuela-Fernández et al., 2007; Viñuela-Fernández et al., 2011). For the assessment of pain, scoring systems have been developed for use in the veterinary clinic (Merola and Mills, 2015; Reid et al., 2007; Sharkey, 2013; van Loon et al., 2010). When measuring stress, it is usually suggested that a combination of behavioral and physiological measures is the most reliable approach (e.g. Beerda et al., 1999; Rooney et al., 2007). However, taking the physiological measures may in turn influence the dog's experience of the clinic, and there is a delay before the results of the analysis are available. There is a clear need for more research in this area to evaluate the potential of developing a feasible, reliable scoring system for assessing stress in veterinary clinics.

There are already several tests available to test the reactions of dogs in different situations. For example, the "Swedish Working Dog Association" uses the behavior of dogs in standardized tests as an indicator of whether they have an appropriate personality to work in different services, such as rescue, guide dogs, and so forth. The test is nowadays called the "Dog Mentality Assessment" and consists of 10 separate subtests, which are performed outdoors in a specific order (Svartberg and Forkman, 2002). Over the years, the different subtests have been evaluated and are now considered sufficiently validated that they are often used by researchers in other situations (Strandberg et al., 2005; Svartberg, 2002; Svartberg et al., 2005). Other studies directed specifically at dogs in a clinic have shown that dogs in pain are less willing to eat (Downing, 2011). One might expect the same also in dogs that are stressed.

It is known that the support of the owner can affect the behavior of the dog, especially in a stressful situation (Rehn et al., 2014). The relationship can be assessed by Monash Dog–Owner Relationship Scale (MDORS; Dwyer et al., 2006).

This study investigates how dogs experience a visit to the veterinary clinic using a series of standardized tests and assessments by a veterinarian, a veterinary nurse, a test leader, and the owner. The study also addresses whether the type of relationship the owner has with the dog influences how the dog experiences the visit. The aim is to evaluate the interobserver reliability and see how well these are correlated with standardized behavior tests. This is done with the intention of developing a simple stress assessment protocol in the future, similar to that developed for pain. The future protocol should be applicable for all different breeds and ages and as much as possible should work for both healthy and sick dogs. The selected behavioral tests have to be easy to do and robust enough to yield valid results under a number of different circumstances. The benefit of such a stress assessment protocol, once developed and validated, would be to help veterinary clinics better adapt the way they receive the dog, thus contributing to dog welfare and handler safety.

## Material and methods

### *Data collection and study population*

The target population was privately owned dog patients at the Animal Hospital at the Swedish University of Agricultural Sciences. At the time of the study, the clinic had on average 700–900 dog patients entering the clinic per month. Questionnaires were placed at the front desk of the clinic so dog owners could choose themselves whether to participate in the study. Information about the study was given on posters in the waiting room. The data were collected in the period from February 2005 to the end of July 2005. Before filling in the questionnaire or testing the dog, the owner was asked to read a brief paragraph describing both the background and the purpose of the study as well as what would happen to the dog and then to sign an owner approval form.

A total of 233 owners completed the questionnaire. The questionnaire was always available, but the behavior tests were carried out on certain days, and the 105 dogs that took part in the behavior tests were randomly selected. In addition to performing the behaviour tests, the test leader also made pain and stress assessments on these 105 dogs. The veterinarian completed a total of 89 questionnaires, of which 84 were of dogs that had taken part in the behavior tests, and the veterinary nurse completed a total of 117, of which 68 dogs had been tested. The Swedish Board of Agriculture approved the use of nondestination bred dogs, and the Animal Ethics Committee in Uppsala, Sweden, approved the experimental procedure.

### *Questionnaire design*

To access information on how the dogs experienced the visit to the veterinary clinic, 4 different questionnaires were developed, and for the evaluation questions, a Likert scale from 1 (not at all) to 10 (very much) was used. The first questionnaire was given to the owner and addressed general information about the dog (such as sex, age, and breed), other questions about the dog (such as whether the dog had any behavior problems), and the reason for visiting the veterinary clinic. The owner was also asked to scale how the dog was experiencing the visit. The second questionnaire was filled in by the person receiving the dog, usually a veterinary nurse (although this could sometimes be a veterinary student). The third questionnaire was filled in by the veterinarian, who was also asked

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