Development of a valid and reliable assessment to measure amicability in dogs

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Introduction

Dogs were originally bred by humans to undertake specific working roles such as guarding, hunting, herding and retrieving. As a result, a large number of dog breeds were developed, many representatives of which, still possess these particular working attributes. However, dogs in the present day rarely, if ever get to undertake the roles for which they were once bred. Yet approximately 40% of Australian households currently own a dog, with the dogs obtained mostly as human companions (Bennett et al., 2007). The companionship of dogs conveys many benefits on their owners. For example, dog owners are at lower risk of cardio vascular disease and depression, petting a dog lowers stress, and dogs facilitate social contact (Anderson et al., 1992; Patronek and Glickman, 1993).

Despite these benefits, dog ownership is not without its problems. Dogs and their owners face issues associated with increasing urban consolidation, busier lifestyles and government legislation which restrict pet ownership. Reduced access to off leash areas and tighter dog laws all can impact negatively on dog owners. Furthermore, dogs which were once bred to undertake a specific purpose are now expected to fulfill a different role, which may present particular adaptive challenges. For example, dogs specifically bred to herd livestock for hours per day and routinely bark to perform their role of sheepdog, are now expected to remain quiet, calm and well behaved all day, often in small apartments, while their owners are absent for extended periods of time. It is obvious that inappropriate dog-owner matching has the potential to cause problems.

When dogs exhibit behaviour that is unacceptable to their owners or the wider community, the relationship between dog and owner can break down (Serpell, 1996). This can cause significant distress to owners and result in dogs being surrendered to pounds or shelters, where their problematic behaviour often gets worse (Hewson et al., 2007) and where about 30% will be euthanased (Marston et al., 2004). Identifying dogs at risk of being relinquished or abandoned would support the introduction of strategies designed to reduce these statistics. In addition, the general community needs to be protected from dogs that cause disruption or injury to people and/or other animals. Suffering associated with dog-bite injuries is significant, with over 482 hospital admissions annually in Victoria alone (Cassell and Ashby, 2009). Factors such as these mean that Animal Management Officers and welfare shelters have historically been primarily interested in identifying dogs which are at risk of abandonment or which are dangerous to humans and/or other animals in the community. However, there are no reliable objective tests whereby individual dogs can be assessed to determine their level of dangerousness.

In addition, there are significant ethical constraints against provoking dogs to the extent required to ensure that they are safe in all situations, and incorrectly labeling certain dogs or certain dog breeds as more dangerous than others on the basis of invalid tests is both inappropriate and of limited value. It is not an accurate method for protecting members of our community, nor does it help promote a positive relationship between humans and dogs. It is critical that dogs and humans live together harmoniously. An alternative approach may therefore be to develop and utilise assessments which can accurately identify dogs which exhibit desirable behavioural traits. In conjunction with community education about dog behaviour, a scientifically designed canine behaviour assessment for desirable traits would be of great benefit. This paper will discuss the requirements to develop behaviour assessments correctly. The Monash Canine Amicability Assessment (MCAA) will be explained in detail and preliminary results will be presented. Lastly, the benefits of being able to accurately identify dogs who exhibit desirable behaviours will be discussed.

Which behaviours should be measured?

As previously stated, dogs are primarily kept as human companions. Hence, it is imperative that we identify which canine behaviours are important to ensure this role is a positive one. A recent survey was conducted in Australia to determine this. Data were collected from 877 participants (79.8% female) aged 18 to 82 years (mean = 34.3, SD = 14.5). The most important behavioural characteristics were; dogs being safe with children, fully housetrained, friendly and obedient. Participants also wanted their ideal dog to come when called, not to escape from their property, to enjoy being petted and to display affection to their owners (King et al., 2009).These behaviours comprise a canine personality trait identified as 'amicability' (Ley et al., 2009). The results indicated that overall, the majority of the Australian public prefer a dog which is amicable.

Not surprisingly, dogs which pose a danger or threat to the public are generally not considered desirable and animal management officers are routinely expected to identify, and deal with these animals. Often the decision to declare whether a dog is dangerous is based on what the dog has already done and also what it looks like. This method is problematic and poses a risk to animal management officers and the general public. Therefore, the purpose of this study was to develop a behaviour assessment, aimed at measuring the canine personality trait amicability, using a systematic scientific approach. Presumably, if it is possible to accurately identify amicable dogs then it could be possible to identify those which are dangerous and do not exhibit behavioural characteristics that the majority of the community consider desirable. To make sure the assessment is valid and reliable a number of important steps need to be undertaken.

Requirements to develop a valid and reliable canine behaviour assessment

Measuring any form of animal behaviour in a way that is scientifically valid involves adhering to specific guidelines. The way in which behaviour is quantified varies and can include measurements of latencies, frequencies, durations and intensities. Whichever approach is taken to measure behaviour, it is essential that collection of the information is conducted in an accurate and reliable manner (Martin and Bateson, 2007). Many researchers require measurements that can predict or determine how an individual will behave in the future. For example, working dog organisations need to determine which individuals will be best suited to particular specialised roles. Therefore, behavioural measures are taken which aim to measure a dog's aptitude at specific tasks (Wilsson and Sundgren, 1997). This is designed to predict a dog's future performance, so as to not waste time and money training inappropriate dogs.

To assess how well the chosen behaviours have been measured it is necessary to test for reliability and validity. Reliability refers to how repeatable and consistent the measure is while validity concerns the extent to which the measurement actually measures the desired behaviour in question and how well it can predict behaviour in the outside world (Martin and Bateson, 2007). The complexity of dog behaviour makes the development of accurate ways to measure behaviour difficult. Currently, a number of different approaches are employed to study canine behaviour. These include; owner-directed questionnaires, expert ratings of breeds, standardised assessments and observational studies (Spady and Ostrander, 2008). The most commonly used method to measure behaviour is the standardised assessment.

A standardised assessment attempts to identify dog temperament or personality traits, by using a series of subtests which measure a variety of behaviours. Unfortunately, many dog behaviour assessments have not been developed scientifically and it is therefore questionable whether they provide reliable and valid measures (Taylor and Mills, 2006). Many measure large numbers of behavioural variables, often relying on subjective assessments. By focusing on a single behavioural element and devising a quantitative assessment it will be possible to test for reliability and validity. By undertaking the correct approach when developing a behavioural assessment, it is expected that any problems encountered relating to the assessment's reliability, validity or feasibility can be resolved.

When developing an assessment, first it is necessary to define the concept that needs to be measured. In this case, the concept of amicability was identified by conducting a survey. Following this, appropriate ways to measure the desired behaviour can be devised. Testing conditions should be standardised as much as possible to ensure that the only variables that alter during the assessment of a dog's behaviour are related to the dog or owner. Factors such as equipment used, procedure, testers, participants, time of testing etc should remain the same throughout the assessment process. In the case of dog behaviour assessments, it is important to determine how an owner influences a dogs behaviour as they are with the dog in the general community most of the time and therefore a necessary part of the experimental procedure.

The development and evaluation of a dog behaviour assessment aimed at measuring the canine personality trait, amicability, will be discussed below.

Monash Canine Amicability Assessment (MCAA)

Based on the results described previously, which showed that, overall, Australians consider dogs which exhibit amicable behaviour to be ideal; the Monash Canine Amicability Assessment (MCAA) protocol was developed. The MCAA protocol was designed using an adaptation of Ainsworth's Strange Situation Test. It is a standardised protocol which measures a dog's behaviour in response to a choreographed sequence of events, involving meeting an unknown person and being separated from and then reunited with the owner. The assessment consists of sub-tests where the dog is both on and off lead in the presence, then absence of the owner. A person who is unknown to the dog is present throughout and attempts to interact with the dog during the assessment. The test duration is approximately 10 minutes. For the purpose of this study all assessments were held outdoors in a portable wooden-walled room measuring 6.0m (L) x 3.6m (W) x 2.4m (H). Two chairs were placed in the room for the dog owner and stranger. Gridlines were marked on the ground using chalk spray and four CCTV cameras were mounted on each wall to video record each dog's behaviour.

Pilot study: Twelve adult dogs of various ages, sexes, breeds and temperaments, with their owners, were recruited to participate in a pilot study. Dog owners completed a number of validated questionnaires. These asked questions about their dog's behavioural characteristics and personality. Questionnaires also provided information about the relationship the owner has with his/her dog. Participants then accompanied their dog through the behaviour assessment. Participants and the confederate were instructed through the assessment protocol by means of pre-recorded voice prompts to minimise additional variables. Each assessment was video recorded and later viewed by a panel of experts who were familiar with dog behaviour. The panel consisted of dog breeders, veterinarians, animal management officers, dog trainers and behaviourists. The panel rated each dog on its level of amicability and each member was then asked to explain how they came to make that judgment based on how the dog behaved. A high level of agreement was found amongst the panel concerning amicability ratings of individual dogs (mean $r = 0.896$). Areas of the protocol requiring refinement were identified before large scale data collection commenced. For example, some sections of the protocol were lengthened and patting procedures conducted by the unfamiliar person were altered. In addition, a number of potential measures of amicability were identified. These included: dog orientation; dog location; activity; vocalisations; and body posture.

Main study: Two hundred dogs, aged at least 18 months of age, and their owners, who had owned their dog for at least 12 months, participated in the study. Participants were recruited via online forums, email, word of mouth, print media, radio and from distribution of fliers at a range of dog-related events. In addition, twenty puppies, aged between 6-8 months were recruited and tested. These puppies were tested again once they reached adulthood (18 months).

Prior to accompanying their dog through the behaviour assessment, owners completed four questionnaires. These asked questions about: the dog's behaviour, the dog's personality, the relationship between dog and owner as well as owner demographic questions. The validated questionnaires consisted of the Monash Canine Personality Questionnaire (MCPQ-R) (Ley et al., 2009), Monash Dog Owner Relationship Scale (MDORS) (Dwyer et al., 2006) and Canine Behaviour Assessment and Research Questionnaire (CBARQ) (Hsu and Serpell, 2003).

Testing conditions were standardised as much as possible. Each dog wore a flat collar and had the same lead attached. The testing procedure was instructed to participants by means of pre-recorded voice prompts. Each assessment was video recorded and behavioural data were collected by viewing footage at a later date. Location and orientation of the dog were measured, as were a range of behavioural variables.

Results

Amicability ratings from the Monash Canine Personality Questionnaire were computed. The mean amicability score was 82 out of a possible 100 rating. (n = 222, SD: 15.5) We are currently in the process of scoring video data to gather a range of behavioural variables from the 200 dogs tested. Preliminary results will be presented at the AIAM 2010 conference.

Evaluating the reliability and validity of the Monash Canine Amicability Assessment

Further analysis of the MCAA will help determine a number of factors relating to the assessment's reliability and validity.

To determine how **reliable** the assessment is, a number of steps will be undertaken.

- Intra-observer reliability will be evaluated by having the same person scoring the same 20 randomly selected dogs during the same assessment on two occasions, using the video recording of the session. The order of presentation will be randomised and four weeks will separate scoring sessions. Correlational analyses will compare the scores obtained from the two occasions.
- Inter-observer reliability will be evaluated by having two observers who possess a sound knowledge of dog behaviour score the behaviour of 20 randomly selected dogs using video recordings. Correlational analyses will examine the relationship between the scores obtained on the range of behavioural variables for each observer.
- Test-retest reliability involves a random sample of 20 dogs which have previously been assessed that are re-tested one month after initial testing. Correlational analyses will be conducted on both sets of behavioural variables measured.

To determine how **valid** the assessment is, we will conduct the following:

- Compare test and owner provided data (construct validity). Behavioural responses from the sample of 100 dogs will be compared to the owners' responses on the behavioural components of the completed questionnaires. The construct validity of the assessment would be supported by strong correlations with measures of amicability reported by the owner and weak correlations with unrelated traits such as hunting related behaviours.
- Compare test assessment with assessment by dog behaviour experts (criterion validity). Video recorded footage of a random sample of previously assessed dogs will be viewed by a number of dog behaviour experts. The experts will be asked to rate the amicability of each individual dog on a scale. Correlational analyses will be conducted to examine the relationship between the expert ratings and the behavioural variables obtained by the dog during the assessment. A valid measure of amicability would indicate that dogs who obtained high scores of amicability during the assessment would also be rated as highly amicable by a number of dog behaviour experts.
- The sample of 20 puppies (6-8 months old) will be evaluated using the assessment. The same individuals will be tested again at 18 months of age (predictive validity). Paired sample t-tests to compare results obtained at Test 1 and Test 2 will be used to determine if age affects test scores in a systematic way. Correlational analyses will be used to explore associations between Test 1 and Test 2, to establish which measures, if any, demonstrate predictive validity.
- To determine the best measures of amicability we will conduct a Principal Components Analysis (PCA) and multiple regression analysis. This will identify common groupings of variables and produce a number of components; these could be used to identify which variables are most likely measuring amicability. These measures would then be included in the final assessment protocol.

It is also important to take into account the feasibility of the assessment and keep in mind the broader applications of the protocol. It is necessary that the procedure is safe and easy to administer as well as being accurate.

Conclusions

Any form of assessment which aims to measure animal behaviour must be developed using a systematic and scientific approach to ensure that it is measuring the desired behaviour in a valid and reliable manner. Animal management officers are faced with the regular duty in determining whether or not a dog is dangerous and therefore whether it can exist safely in the general community. Rather than focusing on trying to only identify dangerous dogs, it may also be worthwhile to identify dogs which are amicable.

The ability to accurately assess amicability in dogs has many applications. As genes, in part, control behaviour, potential breeding dogs could be assessed on their level of amicability. Breeders who specifically aim to produce dogs which are primarily human companions and which exhibit friendly, relaxed, sociable behaviours, could be encouraged to select breeding stock which rate highly on their level of amicability. This could be conducted in addition to educating the general public about dog behaviour and training.

By producing dogs which are amicable it could be expected that fewer inherently dangerous dogs would be bred, which would then in turn reduce the number of dangerous dogs which exist in the community. Accurate information which can be obtained on an individual dog's behaviour would assist with better dog-owner matching. This would mean that people are better informed about the types of dog that would be suitable for them and their family's lifestyle. Rather that restricting breed or breed types, the focus would be on an individual's behaviour. In addition, an accurate assessment could provide more information about a dog's behaviour prior to rehoming from a welfare or rescue shelter. It could also help those in the dog training industry who need to measure a dog's behaviour prior to a training program and then at the conclusion of that program to determine its effectiveness.

These few examples highlight the benefits of being able to accurately measure amicable dog behaviour and therefore identify dogs which possess the attributes associated with trait. It is anticipated that the Monash Canine Amicability Assessment (MCAA) will provide the first scientifically validated test of canine amicability, which can then be used by trained assessors to evaluate dogs in a transparent and legally defensible manner.

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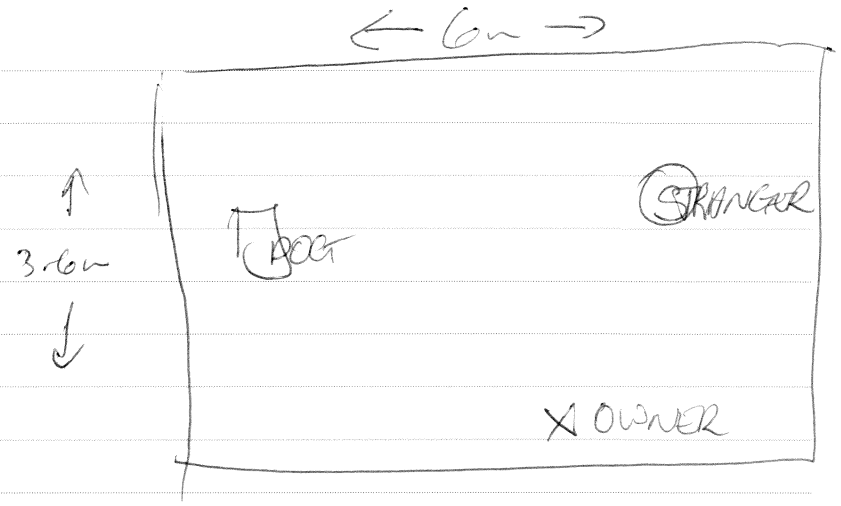
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