IS THERE A CORRELATION BETWEEN PUPPY SOCIALIZATION CLASSES AND OWNER-PERCEIVED FREQUENCY OF BEHAVIOUR PROBLEMS IN DOGS?

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³ Susanne T. Martin. 2001



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ABSTRACT

IS THERE A CORRELATION BETWEEN PUPPY SOCIALIZATION CLASSES AND OWNER-PERCEIVED FREQUENCY OF BEHAVIOUR

PROBLEMS IN DOGS?

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University of Guelph, 2001

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A retrospective, matched cohort study was used to investigate the effectiveness of

puppy socialization classes as a method for decreasing the frequency of behaviour

problems in companion dogs. A total of 31 purebred dogs who attended puppy

socialization classes between January 1996 and January 1998 were matched to a

littermate that had not attended socialization classes as puppies. Owners were asked

through a mailed survey, to provide background information and rate their dogs in terms

of the frequency and severity of 198 descriptions of behaviours. Results indicated that

the two populations of dogs statistically differed in terms of their behaviour on 16 items.

It is therefore concluded that puppy class attendance is associated with a decrease in the

prevalence of certain problematic behaviours in adult dogs.

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CHAPTER I

INTRODUCTION AND LITERATURE REVIEW

Inadequate socialization is thought to be a contributing factor in the development of certain behaviour problems in dogs and, therefore, puppy socialization classes are frequently recommended by dog trainers, animal behaviourists and veterinarians. Although many studies have been conducted over the years researching the social development of dogs, few studies have actually investigated the effectiveness of structured puppy socialization classes. This chapter will review previous research focusing on the behavioural development of dogs and the influence of early environmental enrichment or restriction. Strengths and weaknesses of previous research on puppy socialization classes will be outlined. Last, the need for epidemiological information on puppy socialization classes as a method for preventing behaviour problems in companion dogs will be examined. The chapter will conclude with a statement of the objectives and hypotheses of this research study.

Behavioural Development of Dogs

Differences in behavioural patterns among dogs can be attributed to genetic factors, environmental influences, or both. In order to investigate the relationship between heredity and social behaviour in dogs, studies were initiated at Roscoe B. Jackson Memorial Laboratory in Bar Harbour, Maine in 1945 (Scott and Fuller, 1965). One of the most significant contributions which incurred during 30 years of research at this institute was the division of the early behavioural development of dogs (Figure 1) into four distinct categories (Scott and Fuller, 1965).

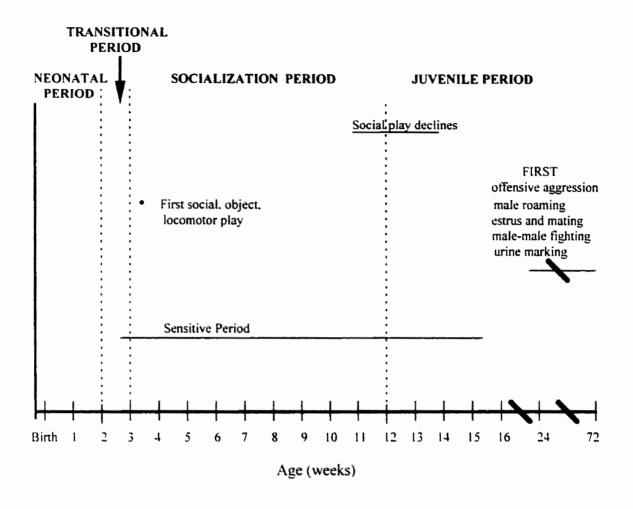


Figure 1 Early behavioural development of dogs (Adapted from Estep. 1996)

The first phase of development is called the neonatal period and occurs from the time the puppy is born until approximately 2 weeks of age. As a altricial species, dogs are born with underdeveloped brains, poor motor abilities and few sensory capacities (Scott, 1958). Although most behaviours are reflexive in nature during the neonatal stage (Bahrs, 1927; Scott and Fuller, 1965), studies have shown that dogs are capable of both appetitive and aversive conditioning (Stanley et al., 1963). However, due to limited sensory and behavioural abilities, the learning process of puppies during the neonatal stage is slower that that of older puppies (Cornwell and Fuller, 1960; Stanley, 1970, 1972). Studies that have investigated the effects of environmental enrichment and

restriction during this stage have concluded that both physical and mental development can be accelerated by daily handling (Fox and Stelzner, 1967). Fox (1978) reported that stress resistance, learning capacities and emotional stability can be improved through early handling by breeders, although such early experiences are not thought to influence later behaviour to any appreciable extent (Scott and Nagy, 1980).

The second stage, occurring between the age of 2 and 3 weeks, is termed the transitional period and consists mainly of the reorganization of existing behavioural capacities (Estep. 1996). Studies have shown that although adult learning rates are not achieved until 4 to 5 weeks of age (Fox. 1964; Scott and Fuller, 1965), there is a marked increase in the performance of both classical and operant conditioning tasks during the transition period (Scott and Fuller, 1965). It is during this stage that puppies begin to respond socially to other animals and humans (Scott and Fuller, 1965).

Following the transitional stage of development, dogs enter into the socialization period which begins at approximately 3 weeks and ends at 12 weeks of age. Although learning capacities continue to develop, they are limited by incompletely developed motor abilities (Freedman et al., 1958; Scott and Fuller, 1965). It is during this stage that puppies form interspecific and intraspecific social attachments (Scott, 1962; Scott et al., 1974). Unlike the neonatal and transitional periods, certain events during the socialization stage are known to have long-term effects on later behaviour (Clarke et al., 1951; Freedman et al., 1960; Fuller, 1964; Scott and Fuller, 1965) and as a result, this time period was termed the sensitive period for dogs (Bateson, 1979).

The final stage in the development of puppies is termed the juvenile period and occurs from the age of 12 weeks until sexual maturity. With learning abilities reaching adult levels, the focus of this period is refining existing capacities (Estep.1996) and the emergence of sexual behaviour (Scott and Fuller, 1965). As the sensitive period is thought to continue through the juvenile period, periodic social exposure during this

stage is required in order to prevent dogs from regressing through the loss of the sociability previously acquired (Pfaffenberger and Scott, 1959).

Influence of Experience on Behaviour Development

During the sensitive period certain events are likely to have the greatest influence and long-term effects on behaviour, and therefore, most research regarding the behavioural development of dogs has focused on the socialization and the juvenile periods (Bateson, 1979). The effects of restricting a puppy's environment and social experiences early in life was first investigated in the 1950's. In two separate studies. Scottish Terrier puppies were reared with varying degrees of isolation and restriction from 4 weeks until approximately 7 to 10 months of age (Clarke et al., 1951; Thompson and Melzack. 1956a). The findings from these studies led the researchers to conclude that puppies who were reared in restricted environments had inferior problem-solving abilities (Clarke et al., 1951; Thompson and Heron, 1954a). When these dogs were re-evaluated one year following the emergence from isolation results were similar to those found earlier. indicating that the deficiencies in problem solving abilities appeared to be fairly permanent (Thompson and Heron, 1954b). In addition to inferior problem solving abilities, restricted and isolated puppies were more active in novel situations (Thompson and Heron. 1954b), were deficient in their ability to avoid painful stimulation, and were more likely to show stereotypic behaviour (Thompson et al., 1956). Lastly, restricted puppies were incapable of competing with normally-reared puppies for food and bones during testing, and appeared to be more interested in the physical environment than in other animals (Thompson and Melzack, 1956b).

However, since only two puppies had been completely isolated during these experiments. Fisher (1955 cited in Scott, 1963) reproduced the experiments using an additional eight dogs who were completely isolated from the age of 3 weeks until 16

weeks, thereby encompassing the entire socialization period and extending into the juvenile period. This isolation procedure produced results similar to the earlier studies leading Fisher to conclude that isolated puppies were subordinate to normally-reared puppies during bone and food competitions, did not develop any fighting behaviour, and when placed with other puppies, continued to isolate themselves from other dogs.

One hypothesis generated by Fisher's conclusions was that companion dogs require exposure to conspecifics during the sensitive period to develop normal relationships with other members of their species. Subsequent research indicated that it is also during the socialization period that non-conspecific attachments for other animals and humans occurred (Cairns and Werboff, 1967; Fox, 1969). Fox (1969) cross-fostered Chihuahua puppies with a litter of kittens from 25 days until 16 weeks of age. Testing showed that cross-fostered puppies reserved all affiliative social behaviour for cats and kittens and avoided interacting with other dogs. However, following testing at 16 weeks of age, cross-fostered puppies were housed with other dogs and after 2 weeks of socialization with its own species they were re-evaluated. When puppies were exposed to their mirror image there was a marked increase in reactivity thereby indicating that puppies had developed species recognition and that "species specific behaviour patterns had not been severely affected by restricted early experiences" (Fox. 1969), thus disproving the hypothesis generated by Fisher's (1955 cited in Scott, 1963) conclusions. In a second study. Cairns and Werboff (1967) reared puppies with varying degrees of contact with rabbits. The first group of dogs (interaction) were singly housed in constant cohabitation with a rabbit, the second group of dogs (non-interaction) were individually housed with a rabbit, but divided by a wire fence, and the last group (isolation) of dogs were reared completely alone. The extent of a puppy's social attachment with the rabbit was measured by the level of distress during removal-replacement testing. Puppies in the interaction group whined and yelped at high rates when separated from the rabbit after the first day of cohabitation. Although puppies in the non-interaction group also

demonstrated significant distress responses, the degree of response only reached levels similar to the interaction group after one week of exposure. These findings lead the researchers to conclude that interspecific attachments at this age occur rapidly and that physical contact facilitates but is not necessary for socialization to occur (Cairns and Werboff, 1967).

Given that domestic dogs spend much of their lives in contact with humans, numerous studies have investigated the effects of isolation from humans. In a study conducted by Freedman et al. (1960), eight litters of cocker spaniels and beagles were reared with dam and littermates, but in isolation from humans from 2 weeks until 14 weeks of age. Puppies were divided into experimental groups which were removed from the litter and received one week of moderately intensive human handling and testing either at 2, 3, 5, 7 or 9 weeks of age, before being returned to the litter. The control group consisted of five puppies who remained in isolation without any human handling. At 14 weeks of age, all puppies were removed and tested. The experimental group of puppies who received the week of handling and testing at 5 weeks of age were significantly more attracted to the handler than those who were handled at 2, 3 and 9 weeks of age. It was thought that puppies at 2 and 3 weeks of age score less on the attraction tests due to their poor physical and motor abilities; however, the decrease in social attraction to the handler for the puppies at 9 weeks of age is attributed to the natural avoidance of the unfamiliar. Although puppies who had been tested and handled at 2, 3, and 9 weeks of age scored lower at the beginning of the final testing and handling week, all four groups of puppies were equal in terms of their social attraction by the end of the week of handling at 14 weeks of age (Freedman et al., 1960). However, puppies which were reared with minimal or no contact with humans until 14 weeks of age remained timid of strangers and fearful in novel environments even following several weeks of gentle handling and exposure to humans (Freedman et al., 1960; Pfaffenberger and Scott, 1959)

In summary, isolation studies show that puppies that are denied social contact and exposure to people may display fearful, aggressive and possibly compulsive behaviour in addition to suffering a deficit in cognitive abilities (Fox and Stelzner, 1965; Fox and Stelzner, 1966; Fuller, 1963; Fuller, 1967; Pfaffenberger and Scott, 1959)

Structure of Puppy Socialization Classes

Inadequate socialization appears to have a significant influence on the development of behaviour problems, and therefore, many veterinarians, dog trainers and animal behaviourists highly recommend puppy socialization classes.

Puppy socialization classes, which generally consist of six one-hour long weekly sessions, are designed for puppies between the ages of 12 and 20 weeks of age. Classes provide puppies with exposure to an unfamiliar place and with the opportunity to socialize with other dogs and people through off leash play sessions. In addition, puppies receive reward-based training, where the aim is to teach good manners rather than formal obedience. Lastly, puppy socialization classes educate owners in terms of normal behaviour, health and general care of dogs (Dunbar, 1987; Seskel, 1997).

Puppy Socialization Classes Study

Although there are numerous claims that substantial benefit can be obtained from puppy socialization classes, no validation of this statement exists. A study conducted in 1999 by Seskel et al. attempted to examine the short-term and long-term behavioural effects of attending structured puppy socialization classes. Fifty-eight purebred and mixed-breed dogs were randomly allocated to one of five treatment groups. The first experimental group consisted of puppies who attended puppy classes and included both obedience training and socialization sessions (S & T group). The second group consisted

of puppies who attended puppy classes which did not include obedience training (S group) and the third group consisted of puppies who attended obedience training sessions only (T group). The fourth group consisted of dogs who attended the training facilities and received the same amount of food rewards as those puppies in groups S, T and S & T but did not receive obedience training or socialization session (F group). Lastly, the control group of puppies lived with families but did not attend the training facility except for testing (C group).

Testing, which included rating puppies in terms of their response to obedience commands in addition to various handling, social and novel stimuli, occurred prior to the program commencing in order to obtain a baseline response level for each puppy. Identical testing occurred following the second and fourth week and finally four to six months after completion of the sessions. Puppies in the S & T and T groups were rated significantly higher than the other three groups in terms of their ability to obey commands when tested at two and four weeks following the beginning of the experiment. However, no significant differences were observed between any of the treatment groups in terms of their reaction to handling, novel, and social stimuli at any point.

Therefore, the results of this study indicated that puppy socialization classes may only be beneficial in terms of obedience training. However, whether obedience training in dogs decreases the occurrence of behaviour problems remains controversial in current literature. Some researchers have been unable to find a relationship between obedience training and behaviour problems (Line and Voith, 1986; Voith and Borchelt, 1982; Voith et al., 1992; Wright and Nesselrote, 1987), whereas others have found a significant association between obedience training and a lower occurrence of certain behaviour problems (Voith and Borchelt, 1982; Campbell, 1986; Jagoe and Serpell, 1996a; O'Farrell, 1997).

A weakness of the study conducted by Seskel et al (1999) is that the final testing of dogs occurred between the ages of 6 and 10 months of age. A study conducted by Voith

and Borchelt (1982) found that the onset of most behaviour problems occurs between the age of 1 and 3 years. Data collected from three behaviour referral clinics in the United States (Landsberg, 1991), indicated that 69% of all dogs presented at the behavioural clinics were under the age of 3 years with a mean of 2 years. When behaviour problems were analyzed individually, the mean age of the dogs brought in to behavioural centers was found to be 2 years for housesoiling, dominance aggression, intraspecies aggression and other general misbehaviours. For cases involving territorial aggression the mean age was 2.5, whereas the mean age for barking and fear aggression was three years, and the mean age for phobias was 5 years. Therefore, it is possible that Seskel et al. (1999) were unable to find an association between puppy socialization classes and a difference in responsiveness to specific stimuli simply due to the fact that the dogs in the study had not reached sexual and/or social maturity.

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The study conducted by Seskel et al. (1999) also examined the differences among seven breed categories by ignoring treatment groups; however, no analysis was performed on individual dog breeds. Although these categories include breeds of dogs that are similar in terms of original function, many behavioural differences can be found among breeds within a specific breed category. In the studies conducted by Scott and Fuller (1965) at the Roscoe B. Jackson Memorial Laboratory, breed differences were found for a number of behavioural tasks, including trainability, problem-solving ability and emotional reactivity, among the five breeds studied. In addition to behavioural differences existing between breeds, dogs within any particular breed may also differ. In a study conducted by Murphree et al. (1967) on the fearful behaviour of pointer dogs, a selective breeding program was successful within a few generations at producing two different strains of dogs, one with nervous or unstable behaviour and one with normal or stable behaviour. Genetics appears to play some role in the development of certain behaviour problems in dogs (Beaver, 1981; Thorne, 1944; Willis, 1989), and therefore the

occurrence of behaviour problems resulting from environmental factors should be examined between relatives in order to minimize genetic influences (Thorne, 1944).

Methodological Considerations

Many studies have examined the effects of socialization in laboratory dogs by measuring behaviours in controlled conditions using traditional psychological tests (Clarke et al., 1951; Fox and Stelzner, 1965; Fox and Stelzner, 1966; Freedman et al., 1960: Fuller, 1963: Fuller, 1967; Pfaffenberger and Scott, 1959; Scott and Fuller, 1965; Thompson and Melzack, 1956b). Although these studies provided valuable information. it is questionable whether results from such laboratory experiments can be extrapolated to the pet dog population. In order to evaluate the effectiveness of puppy socialization classes, Seskel et al. (1999) rated pet dogs' responses to 21 stimuli under controlled conditions. Studying dog behaviour in laboratory situations may, however, lead to inaccurate conclusions. First, only a limited number of behaviours can be studied under these structured situations. Second, measuring a dog's behaviour under controlled conditions is based entirely on the observers' ratings of the dog's behaviour during the test session - which may not be an accurate representation of the dog's behaviour at home due to the presence of competing responses or simply due to variability. This problem was demonstrated in a study conducted by Netto and Planta (1997), whereby test-retest reliability demonstrated a significant difference in the occurrence of aggressive responses displayed by some companion dogs under controlled testing conditions when measured on two separate occasions.

In order to alleviate problems inherent in measuring behaviour, surveys have trequently been utilized for behavioural assessments (Liebert and Liebert, 1995). In recent years, several owner-completed rating scales have been utilized to assess canine behaviour (Campbell, 1986; Goodloe and Borchelt, 1998; Jagoe and Serpell, 1996b;

Rapport et al., 1992; Voith et al. 1992); however, few of these surveys have been validated or assessed for reliability. Although the questions utilized to assess companion dog behaviour differ significantly from questions pertaining to child behaviour, a large number of parent completed rating scales, such as the Child Behavior Checklist and the Personality Inventory for Children, have been demonstrated to be both valid and reliable instruments for measuring behaviour (Hart and Lahey, 1999).

Validity is defined as a psychometric property which describes how well an instrument measures what it purports to measure (Norman and Streiner, 1998). A study conducted by Hewson et al. (1998) examined the construct validity of two rating scales: a 5-point Likert scale and a 10-point interval scale. The data suggested that both of these two owner-completed rating scales might be valid for measuring changes in the behavioural severity of canine compulsive disorders. Reliability, on the other hand, is defined as the degree to which a particular observation can yield a replicable score (Norman and Streiner, 1998). For surveys pertaining to dog behaviour, reliability is dependent on the owner's ability to accurately report on their dog's behaviour. In a study conducted by Goodloe and Borchelt (1998), inter-rater reliability was assessed by giving the same survey to two owners of a dog in 22 households. A correlation coefficient greater than 0.6 was found for 96% of the 126 survey items pertaining to their dog's behaviour indicating that the measurements obtained were reasonably independent of who completed the survey.

The Need for Companion Dog Behaviour Epidemiology

It is estimated that 50% of the 10 million households in Canada own one or more pets (Statistics Canada, 1992). Previous surveys conducted have demonstrated that 42-90 % of owners report that their dog displays one or more behaviour problems (Houpt, 1985; Vacalopoulos and Anderson, 1993). As a result, it is not surprising that approximately 3-

4% of all veterinary cases are related to behaviour and that almost 20% of front office time is devoted to behavioural advice (McKeown and Luescher, 1988). However, due to the lack of scientific information regarding preventative measures and treatment options, behaviour problems may remain unresolved and are therefore a major cause of abandonment, relinquishment to shelters, and euthanasia (Patronek et al., 1996). In the United States alone as many as 4-6 million dogs are relinquished to animal shelters every year (Beck and Katcher, 1996), of which an estimated 50 - 80% are believed to be relinquished because of undesirable behaviour (Burghardt, 1991; Sigler, 1991). As a result, behaviour problems are often considered to be the number one killer of dogs (Landsberg, 1991), especially in dogs under the age of one year (Heath, 1992). In addition, behaviour problems in domestic dogs have negative ramifications for the human population as it is estimated that over one million dog bites are reported yearly across Canada and account for approximately 1% of injuries reported in Canada annually (C.H.I.R.P.P., 1996).

One of the most common factors contributing to the development of certain behaviour problems is inadequate socialization to other dogs, people and places (Dunbar, 1987; Hetts and Estep, 1994; McCune et al., 1995). As a result, puppy socialization classes have been developed as a means to decrease the occurrence of behaviour problems in dogs (Dunbar 1987); however, no empirical validation of this exists.

Objectives

The primary goal of this research project was to investigate if there was a relationship between attendance in puppy socialization classes and behaviour problems in purebred adult dogs. It was hypothesized that dogs who completed a set of socialization classes as puppies between 12 and 20 weeks of age would have a lower frequency of certain behaviour problems than a group of matched littermates who had not attended any formal

puppy socialization classes. It was hypothesized that the occurrence of fear and/or aggression towards strangers, children, unfamiliar dogs and environments would be fewer in dogs who attended puppy socialization classes. By assuming that early socialization classes provide dogs with coping strategies for dealing with stressful events, it was hypothesized that puppies who attended puppy socialization classes would show fewer compulsive behaviours. However, behaviour problems that are not believed to be related to early socialization, such as possessive aggression, coprophagy, general misbehaviour such as begging and digging, and nuisance barking, were expected to be similar across both groups.

An important characteristic of this study was the attempt to measure behavioural differences in related adult dogs living with their human owners. This was accomplished by: 1) having owners indicate the frequency and severity of their dog's current reaction to the situations described in a survey; 2) comparing littermates sharing similar genetic makeup and a similar environment during the first 6 to 10 weeks of life; and 3) examining the behavioural differences for dogs between the ages of 3-5 years of age, that had thereby reached sexual and social maturity.

CHAPTER II

MATERIALS AND METHODS

Recruitment of Subjects

The design for the present study was a retrospective cohort study, with matched pairs of dogs that shared a similar genetic makeup and similar environment during approximately the first 6-10 weeks of life. The study was approved by the University of Guelph's Human Subjects Committee and the Animal Use Committee.

A convenience sample of three dog training schools that offered puppy socialization classes, following the format developed by veterinarian and behaviourist. Ian Dunbar (1987), were contacted by telephone and invited to participate in the study. Involvement included supplying the researcher with a list of all purebred puppies, including owner contact information, that had completed a puppy socialization program at their training schools between January 1996 and May 1998 (n=238).

Letters (Appendix 1) were mailed to 238 owners of puppy class graduates describing the study and the nature of their involvement should they agree to participate when contacted by telephone in approximately two weeks by the researcher. At the time of telephone contact (n = 151), the study was discussed in greater detail and those owners willing to participate (n = 95) provided the researcher with the breeder's name and telephone number.

The breeder of each puppy class graduate was then contacted by electronic mail or by telephone and asked to participate in the study. Participation included providing the researcher with the names and telephone numbers of owners of the littermates to the puppy class graduate (n=69).

Littermate owners were then contacted (n=69) by telephone to determine if they had attended puppy socialization classes. If they had not attended puppy socialization course, they were asked to participate in the study. For each puppy-class-graduate dog, one non-puppy-class littermate was required. Once a matched pair had been recruited, consent forms (Appendix 2) and surveys (Appendix 3) were mailed out to both owners (n=42).

Previous surveys studies have demonstrated that 42-90 % of owners report that their dog displays one or more behaviour problems (Houpt, 1985; Vacalopoulos and Anderson, 1993). Therefore, it was anticipated that as many as 60% of dogs not attending puppy socialization classes would display some type of behaviour problem and that completing puppy socialization classes would reduce this figure by 50% or more. Using a two-tailed significance level of 0.05 and a power of 0.80, the sample size for comparison of a dichotomous outcome was calculated to be 42 matched pairs. A total of 31 matched pairs completed the study.

Survey Design

A survey, designed to be completed by the dog's owner, focused on nine categories of behaviours including: sociability, housesoiling, vocalization, aggression towards humans, aggression towards dogs, fear, general misbehaviours, obedience and compulsive

behaviours. The survey was based on a questionnaire described in Goodloe and Borchelt (1998), which was utilized to identify clusters of behaviours to aid in describing companion dog temperament. In general, the questionnaire was modified to eliminate questions irrelevant to this study, such as attention-seeking. Additional questions pertaining to behaviour such as housesoiling were included. Questions used in this survey were selected based on the wide variability in behaviours that were expected to occur in the general dog population. Although the majority of the items focused on behaviours that were anticipated to be influenced by early socialization experiences, such as aggression, items pertaining to behaviours which were thought to occur equally in the two groups, such as excessive vocalization, were also included.

In addition to modifying some items from Goodloe and Borchelt's (1998) survey, alterations were made to the response scales to maintain consistency throughout the survey and to optimize the quality of the data obtained. The 5-point Likert scale was converted to a 11-point interval scale in order to minimize rating subjectivity, as previous research has demonstrated high variability in peoples' estimations of the probability associated with the adjectives used in Likert scales (Norman and Streiner, 1998). In addition to evaluating the frequency of aggressive and fearful behaviours, a 3-point scale was included in order to measure the magnitude of the reactions. Last, some questions were revised to increase readability and clarity. The survey utilized in this study was pretested by two animal behaviourists, two survey design specialists, six dog trainers, four dog breeders, ten veterinary clinic employees and 13 dog owners.

The final instrument (Appendix 3) was 28 pages in length and consisted of 198 descriptions of behaviours covering nine categories. Through the pre-test, it was

estimated that the final instrument would take approximately 25-45 minutes for participants to complete.

The first three pages of the survey contained categorical and open-ended questions in order to gather additional information regarding the dog, the household and the environment in which they live.

An 11-point interval scale was used by participants to rate their dog's behaviour out of ten occasions for questions pertaining to sociability, housesoiling, vocalization, obedience, compulsive disorders and general misbehaviours. "Not applicable" was an option for participants if 1) the dog was physically unable to perform due to age, illness, size or other factors. 2) the dog had never had the opportunity to perform the behaviour, or, 3) if the dog had been specifically trained to perform the behaviour.

Questions pertaining to aggression and fear consisted of two parts. First, participants rated the frequency of their dog's behaviour out of ten occasions on an interval scale, ranging from zero to ten with a "not applicable" option. The second part of the question was to be answered only if the owners had answered greater than zero, excluding "not applicable", on the first part of the question. The second part of the question was a three-point ordinal scale which provided the options of mild (1), moderate (2) and severe (3) in order to assess the degree of aggression or fear which occurred during the specified situation. A definition sheet (Appendix 4) was provided to describe the types of behaviours that would be included in each of these three categories.

Data Analysis

Data collected were entered into an Excel spreadsheet (MicroSoft Excel 97 SR-2, Microsoft Corporation, Redmond, WA.). Missing values (assigned a value of -8) and not applicable answers (assigned a value of -9) were treated as missing values in all analyses. Descriptive statistics (Appendix 5; Appendix 6) and data analyses were performed using a statistical analysis program (SPSS for Windows 10.0). Graphs were generated/created with a graphics package (MicroSoft Excel 97 SR-2).

Cut-points were used to convert the interval scale to a dichotomous outcome in order to determine the percentage of the entire population affected by the various behaviour problems. A cut-point of ≥ 8 was used to indicate the occurrence of desirable behaviours such as sociability towards people and dogs, and obedience, whereas, a cut-point of ≥ 2 was used to indicate the occurrence of undesirable behaviours such as aloofness towards people and dogs, and general misbehaviours. For questions pertaining to the occurrence of inappropriate elimination, aggression, fear, and compulsive behaviours, a cut-point of ≥ 0 was utilized. These cut-points were based solely on best-guess estimates, as no previous studies have investigated optimal cut-points to describe companion dog behaviours. Comparisons of the occurrence of behaviours between puppy class and non-puppy class dogs were performed using a McNemars test for two related samples and differences were considered statistically significant at $p \leq 0.05$.

In addition to determining whether puppy socialization classes are associated with a decrease in the occurrence of behaviour problems, comparisons between the non-transformed data for puppy class and non-puppy class dogs were performed using a Wilcoxon signed rank test for two related samples. Differences between the two groups were considered statistically significant at $p \le 0.05$. Data pertaining to the degree of either aggression or fear, which were obtained only from owners who answered greater

than zero on the linked frequency question, no longer reflected the matched-pair design. Therefore, the degree of aggression or fear was analyzed using a Mann-Whitney test, differences were considered statistically significant at $p \le 0.05$.

To determine if living with another dog produced similar socialization effects in terms of sociability towards other dogs, the score for the question pertaining to aloofness was treated individually whereas total scores were calculated for the three questions pertaining to sociability towards other dogs. Data were analyzed using a two-way analysis of variance and differences between dogs that were the only dog in the household and dogs that had lived with another dog were considered statistically significant at $p \le 0.05$.

Total scores for the questions found to be statistically significant by the Wilcoxon signed rank test were calculated for the 62 dogs. The mean total score and standard deviation for the significant questions were calculated to identify participating dogs that were in the top 10% of a standardized normal distribution. In addition, the differences in total scores for each matched pair were calculated and descriptive statistics were computed for the differences.

CHAPTER III

RESULTS

Participation Rate

A total of 238 owners of puppy class graduates were mailed letters informing them of the study. Following telephone contact, 95 owners (40%) verbally agreed to participate in the study should a match be made. Reasons for people not participating included inability to be contacted (87, 37%), refusal to participate (9, 4%), and ineligibility due to no longer owning the dog (9, 4%) or not knowing the breeder's information (38, 16%).

Of the 95 puppy class owners who agreed to participate, 42 (44%) were mailed a survey. Reasons for not being further included in the study included refusal to participate by the breeder (26, 27%), and inability to find a match because all littermates went to puppy socialization classes (21, 22%) or no littermate owners could be contacted (6, 6%).

A total of 31 matched pairs (74%) completed the study. Eleven matched pairs (26%) were not included in the data analysis because one of the two participants did not return the survey for various reasons, including being too busy (2, 5%), becoming ill or having a death in the family (3, 7%), moving (2, 5%), or failing to return the survey for unknown reasons despite repeated contact (4, 9%).

Data Quality

Initially, two of the surveys collected (3%) were considered to be incomplete as participants failed to indicate the degree (part b) of aggression or fear. When participants were notified of the missing information, the surveys were re-sent and completed responses were returned to the researcher.

Data obtained from the 62 completed surveys indicated that responses to most questions were not normally distributed and were frequently bimodal in distribution with the majority of responses falling at the lower end of the scale (Appendix 7). This result indicates that dogs frequently fall into one of two categories: dogs that rarely exhibit problematic behaviours or dogs that display behaviours problems the majority of the time.

Sample Population Characteristics

The median age for the 31 matched pairs was 45 months with a minimum of 28 months and a maximum of 48 months (25th percentile = 41 months; 75th percentile = 47 months).

Fifty-two percent of the study dogs were male. Significantly more females attended puppy socialization classes than did males (non-puppy class (non-pk) = 20 males, 11 females: puppy class (pk) = 12 males, 19 females). Eighty-five percent of all dogs participating in the study had been neutered or spayed, 84% of the males and 87% of the females respectively. There was no significant difference in the proportion of dogs neutered and spayed between puppy class attendees and non-puppy class attendees. The

median age for neutering males was 8 months (25th percentile = 6; 75th percentile = 9) and for spaying females was 6 months (25th percentile = 6; 75th percentile = 7.5). The age of spaying/neutering was not statistically significant between puppy class and non-puppy class dogs or between males and females.

Seven breed categories described by the Canadian Kennel Club (Dogs in Canada - Annual 1999), containing 19 different breeds (Table 3.1), were represented in the study with significantly more matched pairs belonging to the sporting dog group.

Fifty-six percent of all dogs attended beginner obedience classes. There were significantly more puppy class graduates who attended subsequent obedience classes than non-puppy class dogs (beginner: pk = 21, non-pk = 14; intermediate: pk = 12, non-pk = 4; advanced: pk = 3, non-pk = 0). Four dogs also completed agility and/or flyball classes; however, there was no significant difference between groups.

Sixty-six percent of all dogs were fed twice daily and there was no statistical significance in the frequency of daily feedings between puppy class and non-puppy class dogs.

Thirty-nine percent of dogs had been raised in households with children and 31% of dogs had been raised with teenagers; no statistical significance was found between non-puppy class and puppy class attendees. The median number of adults living in the household when the dogs were puppies was two and there were significantly more adults living in households with puppy class graduates than non-puppy class dogs.

Seventeen percent of dogs were raised with at least one other dog and 21% were raised in a household with at least one cat. Puppy class attendees were raised with

significantly fewer dogs and cats than non-puppy class dogs, but there was no statistical difference with regards to other types of animals in the household.

Ninety-five percent of all dogs lived in houses and there was no statistical difference between the type of dwelling (e.g. house) lived in by puppy class and non-puppy class dogs. However, there was a difference in terms of the type of neighbourhood. Sixty percent of all dogs lived in the suburbs and there were significantly more non-puppy class dogs who lived in rural and farming areas.

Seventy-six percent of all dogs had been crate trained with no statistically significant difference between groups. Nineteen percent of all puppies had suffered from medical problems (e.g. infection) during the first 6 months of life. The median duration of illness was 40 days and there was no statistically significant difference between groups in the likelihood of having an illness or the duration of the illness.

Sociability

The median rating for the number of times out of ten occasions that an owner's dog was sociable towards humans (A1-A6, A10-A11) ranged from 8 to 10 (25th percentile = 3-10; 75th percentile = 10). The median scores for sociability towards unfamiliar dogs (A8, A9, A12) ranged from 7.5 to 8 (25th percentile = 5; 75th percentile = 9-9.75). Dogs who attended puppy socialization classes approached unfamiliar dogs away from the home in a friendly manner significantly more frequently (Table 3.2) than dogs who had not attended puppy classes. However, no other significant differences in sociability

towards humans or towards unfamiliar dogs were found between puppy class and nonpuppy class dogs.

Comparison between dogs that had lived with other dogs and dogs that had not were compared using a two-way analysis of variance. For the three questions pertaining to sociability towards other dogs, dogs that had not lived with other dogs (pk = 21.2; non-pk = 16.1) had higher total score means than dogs that had lived with another dog (pk = 18.4; non-pk = 15.2), although the means were not significantly different. In addition, there was a tendency for dogs that had attended puppy socialization classes and had lived with another dog to be aloof to other dogs (mean = 1.7) less often than dogs who had not lived with other dogs (pk = 3.2; non-pk = 3.9) or than dogs that had lived with another but had not attended socialization classes (mean = 2.3). However, the means were not significantly different.

Using a cut-off point of ≥8 to indicate sociability, from 56-98 % of all dogs were found to be sociable towards humans, whereas only 50-62% of all dogs were sociable towards unfamiliar dogs. Analysis of the dichotomized data indicated that dogs that attended puppy socialization classes were more likely than non-puppy class dogs to be categorized as being sociable towards unfamiliar dogs away from home. However, no other significant differences in sociability were found between puppy class and non-puppy class dogs.

The median number of times that dogs were aloof to unfamiliar people (A13, A14) ranged from 1 to 2 (25^{th} percentile = 0; 75^{th} percentile = 6-7) and the median score for aloofness towards unfamiliar dogs (A15) was 2 (25^{th} percentile = 1; 75^{th} percentile = 5). Using a cut-off point of > 2 to indicate aloofness, from 56-67% of all dogs were found to

display aloofness when in the presence of people and/or unfamiliar dogs. There were no significant differences in the occurrence or the frequency of aloofness towards people and/or unfamiliar dogs between puppy class and non-puppy class dogs.

Inappropriate Elimination

The median rating for the number of times that an owner's dog eliminated inappropriately (B1-B10) was 0 on the 10 point scale (25th percentile = 0; 75th percentile = 0). Dogs who had not attended puppy socialization classes urinated in the home when the owner was not home significantly more frequently (Table 3.2) than puppy class graduates. There were no other significant differences in frequency between groups for the other 9 questions regarding inappropriate elimination.

From 0-23% of the dogs exhibited inappropriate elimination at least once out of every 10 occasions. Analysis of the dichotomized (0 vs. >0) data indicated that dogs that attended puppy socialization classes were significantly less likely than non-puppy class dogs to be categorized as exhibiting inappropriate elimination when the owner was not home. There were no other significant differences in the occurrence of inappropriate elimination between the two groups.

Vocalization

The median scores for dogs vocalizing at people (C1, C5, C8, C11, C14, C15, C17, C20, C22, C25, C27), either walking by or approaching, ranged from 0-2 (25th percentile

= 0: 75th percentile = 0-10) whereas the median score for dogs vocalizing at the sound of the doorbell (C2) was 9 (25th percentile = 0; 75th percentile = 10). The median rating for the number of times out of ten occasions that an owner's dog vocalized at moving vehicles (C3, C4, C9, C10, C16, C21, C26) ranged from 0-2 (25th percentile = 0; 75th percentile = 0-8). The median scores for vocalizations directed towards other dogs (C6, C12, C18, C23, C28) and other species (C7, C13, C19, C24, C29) ranged from 0 to 4 and 0 to 3 respectively (25th percentile = 0, 75th percentile = 4-9). In order to gain access to toys (C30), attention (C31) and food (C32), the median number of times that dogs vocalized was 0 (25th percentile = 0, 75th percentile 2-6). There were no statistical differences between puppy class and non-puppy class dogs for any of the 32 questions regarding vocalization.

Aggression Towards Humans

The median scores for possessive aggression with regards to food, toys and/or stolen objects (D3, D4, D5, D8, D26, D27, D28, D31, D48, D49, D50, D53) were 0 (25th percentile = 0, 75th percentile =0) on the 10 point scale. For those dogs that exhibited possessive aggression, 60-100% displayed mild aggression. There were no statistical differences in the frequency or severity of possessive aggression between puppy class and non-puppy class dogs. Using a cut-off point of >0 to indicate aggression, 2-20% of all dogs were found to display possessive aggression; there were no significant differences in the occurrence of possessive aggression between the two groups.

The median scores for aggression while being handled (D2, D10, D20, D25, D33. D43, D59) and bathed/groomed (D6, D7, D14, D29, D30, D37, D51, D52) were zero (25th percentile = 0, 75th percentile = 0). For those dogs who exhibited aggression, 60-100% were rated as displaying mild aggression while being handled, whereas 50-100% of the dogs exhibited mild aggression while being bathed/groomed. There were no significant differences in the frequency and severity between the two groups for the questions regarding being handled or being bathed and/or groomed. Using a cut-point of >0 to indicate aggression, between 9 and 18% of dogs were found to display aggression while being handled, whereas from 8 to 15% of dogs became aggressive while being bathed and/or groomed: there were no significant differences in the occurrence of aggression between the two groups.

The median scores for aggression displayed when disturbed while sleeping (questions D1. D24 .D47) and while playing (D9, D32, D54) were 0 (25th percentile = 0. 75th percentile = 0-1). For those dogs that displayed aggression when disturbed while sleeping, the degree was rated as mild for 50-83% of the dogs with no dogs showing severe aggression. However, 72-83% of the dogs that displayed aggression while playing were rated as exhibiting mild aggression, with only one dog displaying severe aggression. It was found that dogs that had not attended puppy socialization classes displayed aggression significantly more frequently (Table 3.2) while being played with by a familiar person or by an unfamiliar person; however the degree of aggression was not statistically significant. There were no other significant differences in frequency or severity between the two groups for the other questions pertaining to aggression when disturbed while sleeping and when playing. Using a cut-off point of >0 to indicate aggression. 7-14% of

all dogs were found to become aggressive when disturbed while sleeping and from 11-32% of all dogs became aggressive while playing. Analysis of the dichotomized data indicated that dogs that did not attend puppy socialization classes were more likely than puppy class dogs to be categorized as displaying aggression when being played with by a familiar person, but not when being played with by an unfamiliar person. No other statistically significant differences were found in the occurrence of aggression between puppy class and non-puppy class dogs when disturbed while sleeping or while playing.

When placed in potentially threatening situations (D19, D21, D22, D42, D44, D45, D60, D61) the median scores were 0 on the 10 point scale (25th percentile = 0, 75th percentile = 0-3.25). Of those dogs who displayed aggression, the majority (62-88%) were rated as exhibiting mild aggression. When being disciplined (verbally and/or physically) by a member of the household, the frequency of aggression was significantly higher for dogs who had not attended puppy socialization classes (Table 3.2). There were no other significant differences found in the frequency or severity of aggression between puppy class and non-puppy class dogs. Using a cut-point of >0 to indicate aggression in potentially threatening situations. 11-46% of all dogs were found to display aggression: there were no significant differences in the occurrence of aggression between the two groups.

The median scores for aggressive displays when reached for (D13, D17, D36, D40, D56, D62, D63, D64, D65, D66, D67) and when loomed over or stared at (D11, D12, D34, D35, D55) were 0 (25th percentile = 0, 75th percentile = 0). Of those dogs that displayed aggression, 46-100% of the dogs showed mild aggression when reached for and mild aggression when loomed over or stared at was observed in 50 - 80% of the dogs. No

significant differences in frequency and severity were observed between puppy class and non-puppy class dogs. Using a cut-point of >0 to indicate aggression, 2-36% of all dogs were found to become aggressive when reached for and 6-16% of all dogs were found to be aggressive when loomed over or stared at; there were no significant differences in the occurrence of dominance aggression between the two groups.

The median scores for territorial aggression (D68, D69, D70) ranged from 0-1 on the 10 point scale (25th percentile = 0, 75th percentile = 4-7). Of those dogs that displayed aggression, 37-57% of the dogs were rated as exhibiting mild aggression, whereas 3-18% displayed severe aggression. No significant differences in frequency or severity of aggression were found between the two groups. Using a cut-point of >0 to indicate aggression. 36-52 % of the dogs were found to become territorially aggressive; there were no significant differences in the occurrence of territorial aggression between the two groups.

The median scores for becoming aggressive when injured (D15, D18, D38, D41, D42, D57) or for no apparent reason (D16, D39, D58) were 0 (25th percentile = 0, 75th percentile = 0 -1). Mild aggression when injured and for no apparent reason was displayed by 72 - 90% and 38-100% of the dogs, respectively. When accidentally injured by a member of the household, dogs who had not attended puppy socialization classes exhibited aggression more frequently than puppy class dogs (Table 3.2). There were no other significant differences between the two groups for the other seven questions pertaining to aggression when injured or the three questions pertaining to aggression for no apparent reason. Using a cut-point of >0 to indicate aggression. 9 -31% of all dogs were found to display aggression when injured, while only 2-13 % of dogs became

aggressive for no apparent. Analysis of the dichotomized data indicated that dogs that attended puppy socialization classes were equally likely to be categorized as being aggressive as non-puppy class dogs.

Aggression Towards Other Dogs

The median scores for possessive aggression towards other dogs (E2, E4, E11, E13, E22, E24) were 0 for all questions, except for when an unfamiliar dog attempts to take a toy, bone or other object away, where the median was 1 (25th percentile = 0, 75th percentile = 0, 4). Of those dogs that displayed possessive aggression towards other dogs, 0,73% of the dogs were rated as exhibiting mild aggression, whereas 5-25% displayed severe aggression. There were no significant differences in frequency or severity of aggression between the two groups. Using a cut-point of >0 to indicate aggression, 16-54% of all dogs were found to display possessive aggression towards other dogs; however, no significant differences were found between puppy class and non-puppy class dogs.

The median scores for territorial aggression towards other dogs (E19, E20, E30, E31) ranged from 0-1 (25th percentile = 0, 75th percentile = 0.75 - 5) on the 10 point scale. Of those dogs that displayed territorial aggression, between 53-85% of the dogs exhibited mild aggression, whereas from 0-11% were rated as displaying severe aggression. Dogs who did not attend puppy socialization classes displayed aggression when a familiar dog enters the owner's property (Table 3.2) significantly more frequently than puppy class dogs. There were no other significant differences in the frequency or severity between

puppy class and non-puppy class dogs. Using a cut-point of >0 to indicate aggression, from 15-68 % of all dogs were found to display territorial aggression; there were no significant differences in the occurrence of aggression between the two groups.

The median scores for aggressive displays towards another dog when a human was giving attention to the dog in question or when giving attention to another dog (E6, E7, E8, E9, E15, E16, E17, E18, E26, E27, E28, E29) were 0 (25th percentile = 0, 75th percentile =0-5). Of those dogs that displayed aggression, 80-100% were rated as exhibiting mild aggression. When a household member was giving attention to an unfamiliar dog, non-puppy class dogs exhibited aggression more frequently (Table 3.2) than puppy class dogs. There were no other significant differences between the two groups in terms of the frequency and severity of aggression. Using a cut-point >0 to indicate aggression, 4-42% of all dogs were found to exhibit aggression in these situations: there were no significant differences in the occurrence of aggression between the two groups.

The median response rates of dogs displaying aggression towards other dogs when disturbed while resting (E3, E12, E23) or for no apparent reason (E5, E14, E25) were 0 (25th percentile = 0-2, 75th percentile = 0-1). Of those dogs who displayed aggression for no apparent reason, 67-100% were rated as exhibiting mild aggression. Of those dogs who displayed aggression when disturbed while sleeping, 25-45% were rated as exhibiting mild aggression. There were no statistical differences in the frequency or severity of aggression between the two groups. Using a cut-point of >0 to indicate aggression, 0-23% of all dogs were found to become aggressive for no apparent reason.

whereas 16-31% of all dogs exhibited aggression when disturbed while resting: there were no significant differences in the occurrence of aggression between the two groups.

<u>Fear</u>

The median score for sensitivity to loud and sudden noises (F1) was 4 (25th percentile = 0, 75th percentile = 7) on the 10 point scale. Of those dogs who reacted fearfully to loud and sudden noises, 42% displayed mild fear whereas 5% were rated as exhibiting severe fear. The median scores for fear responses during thunderstorms (F2) and fireworks (F3) were 1 and 2.5 respectively (25th percentile = 0, 75th percentile = 6.25 and 8.25 respectively). For those dogs who displayed fearful reactions in response to thunderstorms and fireworks, 39-47% displayed mild fear responses while 16-22% exhibited extreme fear. Although dogs that attended puppy socialization classes reacted less frequently to loud and sudden noises than non-puppy class dogs (Table 3.2). no significant differences were found between the two groups in response to thunderstorms and fireworks. Using a cut-point of >0 to indicate fear, 72% of all dogs were found to have a sensitivity to loud and sudden noises, whereas 52% became fearful when exposed to thunderstorms and 64% exhibited fear responses to fireworks; there were no significant differences in the occurrence of fear between the two groups.

The median scores for fearful reactions to the noise of cars (F4) and to the sound of alarms (F5) were 0 (25th percentile = 0, 75th percentile = 2 and 1, respectively). Of those dogs who reacted fearfully, 58 % of dogs exhibited mild fear in response to the noise of cars, whereas 37 % reacted moderately. In response to alarms noises, 39 % of dogs

reacted mildly, whereas 43 % reacted moderately. There were no significant differences between puppy class and non-puppy class dogs in terms of the frequency and severity of fear responses to car or alarm noises. Using a cut-point of >0 to indicate fear, 39% of all the dogs reacted fearfully to the noise of cars while 49 % of all dogs reacted fearfully to the sound of alarms: there were no significant differences in the occurrence of aggression between the two groups.

When in the presence of another dog (F9, F10) or an unfamiliar person (F11-F16), the median scores for fearful reactions ranged from 0 to 1 (25th percentile = 0, 75th percentile = 1-3.75). For those dogs displaying fear, the degree of the response to other dogs or unfamiliar people was mild for 30-74% of the dogs and moderate for 12-60 % of the dogs. There were no significant differences in frequency or severity of responses between the two groups for the questions pertaining to fear of other dogs or fear of unfamiliar people. Using a cut-point of >0 to indicate fear, between 17-68 % of all dogs were found to display fearful reactions: there were no significant differences between puppy class and non-puppy class dogs.

The median score for the frequency of fearful reactions when examined and/or treated by a veterinarian (F16) was 2 on the 10 point scale (25th percentile = 0, 75th percentile = 8). Of those dogs that displayed fearful responses, 53% were classified as exhibiting mild fear, whereas 13% were extremely fearful. There was no significant difference in the frequency or severity of fearful reactions between puppy class and non-puppy class dogs when being examined and/or treated by a veterinarian. Using a cut-point of >0 to indicate fear, 68% of the dogs were found to be fearful; there were no significant differences between puppy class and non-puppy class dogs.

The median scores for fear responses when exposed to unfamiliar objects (F7) or sudden movements by familiar objects (F8), ranged from 0 to 1 (25th percentile = 0, 75th percentile = 0 and 3.2 respectively). Of those dogs who displayed fear responses, 66 % were rated as exhibiting mild fear when exposed to unfamiliar objects, whereas 62% displayed mild fear in response to sudden movements by familiar objects. There was no significant difference in the frequency or severity of fear reactions between the two groups. Using a cut-point of >0 to indicate fear, 43% of all dogs were found to respond fearfully when exposed to unfamiliar objects, whereas 53% of all dogs responded fearfully to sudden movements by familiar objects; there were no significant differences between puppy class and non-puppy class dogs.

The median score of fearful responses when first exposed to unfamiliar situations (F17), was 2 on the 10 point scale (25th percentile = 0, 75th percentile = 5). Of those dogs who reacted fearfully, 56% were rated as exhibiting mild responses. Dogs who attended puppy socialization classes responded fearfully to unfamiliar situations less frequently than dogs who had not attended puppy socialization classes (Table 3.2). However, there was no statistical difference in the degree of fear displayed by the two groups. Using a cut-point of >0 to indicate fear, 69% of all dogs were classified as being fearful when first exposed to unfamiliar situations; there were no significant differences between puppy class and non-puppy class dogs.

The median response rate of dogs displaying fear when reprimanded (F19) was 2 (25th percentile = 1, 75th percentile = 5) whereas when being groomed, the median score was 0 (25th percentile = 0, 75th percentile = 3.5). Of those dogs who responded fearfully, 62% were rated as displaying mild fear when reprimanded, whereas 39% exhibited mild fear

while being groomed/bathed. There were no significant differences between the two groups in terms of the frequency and severity of fear reactions to being reprimanded and/or being groomed. Using a cut-point of >0 to indicate fear, 76% of all dogs were found to respond fearfully when reprimanded, whereas 78% of all dogs became fearful while being groomed/bathed; there were no significant differences between puppy class and non-puppy class dogs.

General Misbehaviours

The median score for chasing animals was 8 (25th percentile = 5: 75th percentiles = 10). The median scores for escaping and roaming free (G2) and begging for food (G11) were 5 and 3.5, respectively (25th percentile = 0: 75th percentile = 9 and 7). The median scores for other general misbehaviours (G3-G10) were 0 (25th percentile = 0, 75th percentile = 0.75th percentile = 0.3). Dogs that had not attended puppy socialization begged when humans had food and escaped and roamed free significantly more frequently than puppy class dogs (Table 3.2). No other significant differences were observed between the two groups. Using a cut-point of > 2 to indicate misbehaviours, 81% of all dogs surveyed were found to chase other animals (G1). In addition, 56% of all dogs escaped and roamed free and 57 % begged for food. All other general misbehaviours occurred in 0-26% of all dogs. Analysis of the dichotomized data indicated that dogs that had attended puppy socialization classes were equally likely as non-puppy class dogs to display general misbehaviours.

Obedience

The median score for obeying obedience commands such as sit (H2), stay (H3) and come (H1) ranged from 8-9 on the 10-point scale (25th percentile = 5.75-8, 75th percentile = 9.5-10). The median score of dogs jumping on people (H4) was 3 (25th percentile = 0, 75th percentile = 8). Dogs that had attended puppy socialization classes retrieved thrown objects (H5) significantly more frequently than non-puppy class dogs. No other significant differences were observed in terms of the frequency of obedience between puppy class and non puppy class dogs. Using a cut-point ≥8 to indicate obedience, 55-87% of all dogs were found to obey obedience commands such as sit, down and stay, whereas 53% of all dogs jumped up on people. Analysis of the dichotomized data indicated that dogs that had attended puppy socialization classes were equally likely as non-puppy class dogs to be classified as obedient or likely to jump on people.

Compulsive Behaviours

For all questions pertaining to compulsive behaviours, the median percentage of daily time that dogs engaged in compulsive behaviours was 0 (25th percentile = 0, 75th percentile =0-10). Non-puppy class dogs displayed tail chasing (I3), excessive licking (I6) and pacing (I7) significantly more frequently than puppy class dogs. Using a cutpoint of >0 to indicate compulsive behaviours, 5-32% of all dogs were classified as exhibiting compulsive behaviours. Analysis of the dichotomized data indicated that dogs

that had attended puppy socialization classes were significantly less likely than nonpuppy class dogs to be categorized as displaying tail chasing, excessive licking and pacing behaviours.

Total Scores

The mean total score for the 16 questions which were statistically significant between puppy class and non-puppy class dogs was 31 (S.D. 16). The seven dogs with the highest total scores (mean + 1.3 SD) were all dogs that had not attended puppy socialization classes. Examination of the data revealed an interesting trend: these seven dogs tended to have by far the highest frequency scores for the significant questions pertaining to aggression (D18, D19, D32, D54, E20, E26), and hence appeared to account for the significant differences between puppy class and non-puppy class dogs. For all of the other significant questions, high scores on any individual question were scattered throughout all dogs, and not clearly related to the dogs with the highest total scores.

The difference in total scores for individual matched pairs indicated that the majority of dogs that had attended puppy socialization classes (77%) had lower total scores than their littermate that had not attended puppy socialization classes. The median difference for puppy class dogs that had lower total scores than their non-puppy class was 15.25 (minimum = 3.5; maximum = 49) whereas the median difference for puppy class dogs with higher total scores was 3 (minimum = 0.5; maximum = 14).

Table 3.1 Distribution of matched pairs among the eight breed classes as described by the Canadian Kennel Club (Dogs in Canada - Annual, 1999)

BREED CATEGORY	Number (%)	BREED	Number
Sporting Dogs	12 (39)	Retrievers (Golden)	6
		Retrievers (Labrador)	2
		Pointer (German Short-haired)	Ī
		Spaniel (American Cocker)	2
		Vizsla (Smooth)	1
Hounds	0 (0)		
Hounds	0 (0)		
Working Dogs	6 (19)	Alaskan Malamute	2
	,	Portuguese Water Dog	l
		Rottweiler	1
		Schnauzer (Giant)	1
		Siberian Husky	1
Terriers	4 (13)	Soft-coated Wheaten Terrier	4
Toys	1 (3)	Cavalier King Charles Spaniel	1
Non-Sporting	2 (6)	Poodle (Standard)	1
		Bichon Frise	1
Herding Dogs	5 (16)	German Shepherd Dog	ı
	\	Belgian Sheepdog	1
		Shetland Sheepdog	3
Miscellaneous	1 (3)	Border Collie	1

Table 3.2: Descriptive statistics for answers found to have significantly different medians (Wilcoxon sign rank test at p≤ 0.05) between puppy class graduates (PK) and non-puppy class dogs (NON)

Question ^a Median		25 th		75 th		Minimum		Maximum		
			percentile		percentile					
	PK	NON	PK	NON	PK	NON	PK	NON	PK	NON
A9	9	7	5	5	10	8	0	0	10	10
B3	0	0	0	0	0	1	0	0	0	7
D18A ^b	0	0	0	0	0	1	0	0	4	5
D19A	0	0	0	0	0	0	0	0	1	6
D32A	0	0	0	0	0	1	0	0	3	10
D54A	0	0	0	0	0	0	0	0	2	10
E20A	0	0	0	0	0	4	0	0	3	10
E26A	0	0	0	0	1	4	0	0	3	10
F1A	3	5	0	2	7	8.5	0	0	10	10
F17A	0	4	0	2	5	8	0	0	10	10
G2	2	7.5	0	2	7.5	10	0	0	10	10
GH	2	5	0	1.75	5	10	0	0	10	5
H5	8	7	6	5	10	10	0	0	10	10
13	0	0	0	0	0	5	0	0	10	20
16	0	0	0	0	0	10	0	0	10	90
17	0	0	0	0	0	10	0	0	40	50

⁴ A9 - Approach unfamiliar dogs away from your home in a friendly manner

B3 - Urinate in vour home when vou are not home

D18 - When accidentally injured by a member of the household

D19 - When being disciplined (verbally and/or physically by a member of the household

D32 - When played with by a familiar person

D54 - When played with by an unfamiliar person

E20 - When the familiar dog enters your property

E26 - When a household member is giving attention to an unfamiliar dog

F1 - Loud and sudden noises (for example, objects falling, gun shot, vacuum cleaner)

F17 - When first exposed to unfamiliar situations (for example, first time in an elevator)

G2 - Escape from the yard and roam free if given the opportunity (for example, not tied up or gate is left open)

G11 - Beg when humans have food

H5 - Retrieves objects such as balls and sticks when thrown for him/her

^{13 -} Chasing own tail/hind end (for example, spinning in circles)

I6 - Licking at other objects/people excessively

^{17 -} Pace

^b A indicates part A (frequency) and B indicates part B (severity) of the given question

CHAPTER IV

DISCUSSION

The focus of this research study was to identify differences in behaviours in two populations of related mature dogs under natural conditions. The first population consisted of dogs that had attended socialization classes as puppies and the second population consisted of littermates to the first population that had not attended socialization classes. This study supports the hypothesis that dogs that did not attend puppy socialization classes were more likely to display problematic behaviours in certain situations than their littermates that had attended socialization classes.

Importance of Results

Using a cut-off of ≥ 8 to indicate sociability, the majority of dogs were found to be sociable to humans and there were no statistically significant differences between puppy class and non-puppy class dogs. Because all dogs cohabitated with human, this finding may indicate that contact with owners within the home is sufficient to produce adequate social skills with humans.

Only about half of the dogs were found, however, to be sociable towards other dogs.

Dogs that had attended socialization classes were not only more likely to be categorized as sociable for approaching unfamiliar dogs away from the home in a friendly manner.

but the frequency of friendly approaches was significantly higher than for non-puppy

class dogs. These results support the hypothesis that dogs who attend socialization classes become more sociable with other dogs. Based on the assumption that living with humans appears to provide adequate socialization to humans, it was expected that those dogs participating in the study that had lived with other dogs would be significantly more sociable towards dogs than dogs that had not lived with another dog. However, the trends for the means of the total scores for the three questions pertaining to sociability towards other dogs indicate that the opposite may be true. Dogs that had not lived with other dogs had higher total score means than dogs that had lived with another dog, although the difference was not statistically significant. In addition, examination of the means for the question pertaining to aloofness towards other dogs demonstrated that dogs that had not lived with other dogs were more likely to be aloof to unfamiliar dogs, although the difference was not significant. It is important to note that low scores of sociability may represent three different types of behaviours: aggression and/or fear, or aloofness. On the other hand, a low score on aloofness may indicate a dog that approaches other dogs in a friendly manner, or reacts either aggressively or fearfully in the presence of unfamiliar dogs. Therefore, attending puppy socialization classes increases the frequency of friendly approaches to unfamiliar dogs; however, cohabitation with conspecifics does not appear to produce the same positive socialization effects.

Fewer than one quarter of the dogs exhibited inappropriate elimination at least once out of every ten occasions, which is consistent with results of other studies that suggest that 17-24% of all dogs display housesoiling behaviours (Campbell, 1986; Landsberg, 1991). Dogs that did not attend puppy socialization classes were significantly more likely to urinate in the home when the owner was absent and the frequency of urination was also

significantly higher. Although this behaviour is often linked to separation anxiety (Voith and Borchelt, 1991; Overall, 1997), none of the other behaviours often associated with separation anxiety, such as destruction and vocalization when left alone, were found to be significantly different between the two populations.

Using a cut-off point of >0 to indicate aggression, fewer than one quarter of all dogs were found to be possessively aggressive towards humans whereas almost half were possessively aggressive towards other dogs. Of all of the dogs who displayed possessive aggression, the majority of dogs displayed mild aggression towards humans, whereas aggression directed towards other dogs was more severe. Although earlier studies measured possessive aggression during a bone competition test to assess dominance aggression among dogs (Clarke et al., 1951; Thompson and Melzack, 1956b), subsequent studies have concluded that there is a difference between competitive dominance^a and social dominance^b (Wright, 1980). Therefore, although the singular trait of competitive dominance should not be utilized as a method for measuring social dominance, dogs who display aggression when being handled, reached for, stared at, or loomed over may be classified as exhibiting social dominance aggression (Goodloe and Borchelt, 1998). The present study found that approximately one quarter of all dogs displayed aggression when being handled, reached for and loomed over or stared at: no significant differences were found between puppy class and non-puppy class dogs. Therefore, these results indicate

^a Competitive dominance is defined as assertive behaviour shown towards a person or dog in response to objects such as bones and food where the dog contests ownership of the object

b Social dominance is defined as assertive behaviour shown towards a person or dog, unrelated to inanimate

that puppy socialization classes do not affect the frequency or occurrence of either possessive or dominance aggression.

Using a cut-point of >0 to indicate aggression, 11-52% of all dogs exhibited territorial displays. The high prevalence of territorial aggression can potentially be attributed to owners believing that this type of aggression is acceptable, possibly even desirable. It is interesting to note that dogs were equally as likely to exhibit territorial aggression towards a human (36-52%) as towards other dogs (15-68%). Dogs that attended puppy socialization classes were equally as likely as non-puppy class dogs to be classified as displaying territorial aggression, which refutes the belief that dogs that attend puppy socialization classes are more likely to be confident and are therefore better guard dogs (Case, 1985). Interestingly, the frequency of aggression was significantly higher in dogs that had not attended puppy socialization classes which supports the view of some animal behaviourists that dogs that attend puppy socialization classes are less likely to become territorially aggressive (Jagoe and Serpell, 1996a).

Approximately one quarter of all dogs participating in the study exhibited aggression when accidentally injured by a human. Although there was no difference in the occurrence of aggression between the two groups, the frequency of aggressive acts when accidentally injured was significantly higher in dogs that had not attended socialization classes. During the course of socialization classes, owners are encouraged, through desensitization techniques, to teach their dogs to tolerate, and even enjoy, frightening, and possibly painful, handling (Dunbar, 1996). The results of this study suggest that at least in some dogs, this aspect of puppy class training may diminish their reaction to pain.

Approximately one quarter of all dogs participating in the study exhibited aggression while playing with humans. Dogs that had attended puppy socialization classes were equally as likely as non-puppy class dogs to be classified as being aggressive when being played with by an unfamiliar person; however, non-puppy class dogs were more likely to be classified as being aggressive when played with by a familiar person. In addition, dogs that did not attend puppy socialization classes displayed aggression significantly more frequently when played with by either a familiar or an unfamiliar person. This result suggests that dogs that attend puppy socialization classes have learned to control their play behaviours, through bite inhibition, with other puppies and their owners.

Dogs that had attended puppy socialization classes were equally as likely as nonpuppy class dogs to be classified as becoming aggressive when a household member gave
attention to an unfamiliar dog; however, the frequency of aggressive acts was
significantly higher for non-puppy class dogs. One possible explanation is that because
non-puppy class dogs had lived in households with more dogs, these dogs may have
learned to compete aggressively for attention, which then generalized to unfamiliar dogs.
However, when the data were examined more closely, equal proportions of dogs were
found to become aggressive whether they had lived with other dogs (29.4%) or had not
(28.4%). Therefore, these results suggest that although living with other dogs does not
directly affect the occurrence of aggression when a household member is giving attention
to an unfamiliar dogs, attending puppy socialization classes may allow puppies to
habituate to their owners paying attention to other puppies.

Approximately one third of all dogs in the study displayed fearful reactions when being bathed or groomed, whereas fewer than one quarter of all dogs became aggressive.

In addition, roughly three quarters of all dogs became fearful while being disciplined (physically and/or verbally), whereas just over half of all dogs became aggressive. These results indicate that in certain situations, dogs are more likely to behave fearfully than aggressively. Although aggression is reported to be a widespread problem in domestic dogs (Beaver, 1983; Borchelt, 1983; Jagoe and Serpell, 1996a; Line and Voith, 1986; Voith, 1981; Voith and Borchelt, 1982), and the most common cause for owners seeking professional advice at behaviour clinics (Landsberg, 1991), surprisingly few dogs in the present study were reported to display aggression. However, these results are consistent with those reported by Wells and Hepper (2000), who argue that, although aggression is a serious behaviour problem, it is not particularly common. On the other hand, owners may consider aggression to be socially unacceptable and therefore were reluctant to characterize their dogs as aggressive. This would have led to non-differential misclassification bias, which biases toward the null hypothesis (Martin et al., 1987), and may explain why more significant differences in aggression were not found between the two groups of dogs.

This study reveals that fearful reactions occur more frequently than aggression and that the degree of fear is much more severe than it is for aggression. Three quarters of all dogs reacted fearfully in response to loud and sudden noises (e.g. vacuum cleaner), although dogs that had attended puppy socialization classes were found to be significantly less likely to exhibit fear to these stimuli. This result may be attributed to the fact that dogs attending puppy socialization classes may be exposed and therefore habituated to more unfamiliar noises, making them less reactive. However, no significant differences were found for fearful reactions to other loud noises, such as fireworks, car noises and

alarm sounds, which may be attributed to the fact that these noises are so extreme that they are more likely to lead to a sensitization rather than habituation. The percentage of dogs displaying fearful reactions to noises in this study was significantly higher than that previously reported (Campbell, 1986). However, the results cannot be accurately compared as the types of noises were not specified in the Campbell (1986) study.

Dogs that had not attended puppy socialization classes were equally likely as puppy class dogs to be classified as displaying fearful reactions when exposed to unfamiliar situations. However, puppy class dogs displayed fear significantly less frequently than dogs that had not attended puppy classes, which is not surprising given that attendance at puppy socialization classes requires dogs to be exposed to an unfamiliar environment at the training facility. Therefore, dogs that attended puppy socialization classes may have benefited not only in terms of habituating to unfamiliar situations but also by experiencing pleasure in these sites. During the sensitive period, researchers have shown that puppies are capable of forming attachments to places, a process termed localization (Scott, 1958; Scott and Fuller, 1965). Although none of the dogs participating in this study attended socialization classes in a veterinary hospital, localization may be an important phenomenon for veterinary clinics to consider when holding puppy socialization classes. It is possible that dogs who complete early socialization classes in the veterinary environment may receive effective immunization against subsequently associating the clinic with negative experiences. Therefore, if dogs that had attended puppy socialization classes are less fearful during veterinary visits and are better behaved during physical examinations and medical procedures than dogs that did not attend classes at a clinic, it is likely that these dogs' owners will be more committed to their

veterinarians and will remain long-term clients. Furthermore, procedures conducted on well-behaved dogs are safer and require less time than procedures conducted on anxious or aggressive dogs (Dunbar, 1996).

Although it has been reported that between 2-3 % of cases presented at behavioural clinics are for compulsive behaviours (Landsberg, 1991), a much greater percentage of the dogs in the present study engaged in compulsive behaviours. Previous studies have concluded that severe social and environmental deprivation can lead to compulsive behaviours (Fox and Stelzner, 1965; Fuller, 1964). Although the non-puppy class dogs in this study were not considered to be socially isolated, this study indicated that dogs that did not attend puppy socialization classes were significantly more likely to tail chase, lick other objects or people, and pace. These results imply that dogs that attend puppy socialization classes may learn stress-coping mechanisms and so are less likely to display compulsive behaviours as adults (Fox and Stelzner, 1965). Questions pertaining to compulsive behaviours were most likely (38%) to identify significant differences between puppy class and non-puppy class dogs and accounted for 18% of the all questions which were statistically significant. It would seem that the effects of puppy socialization classes on decreasing the expression of compulsive behaviours ought to be investigated in greater depth.

Thus far, the results obtained were consistent with the hypothesis. However, significant differences were also found for certain behaviours that were not expected to be influenced by puppy socialization classes. Dogs that attended puppy socialization classes were significantly less likely to escape from the home or yard and roam free. In addition, dogs that attended puppy socialization classes begged for human food significantly less

frequently than dogs that had not attended classes. While these results are inconsistent with the hypothesis that these behaviours would be unrelated to socialization, it is possible that puppy socialization classes provide more owner education and thus, puppy class owners may gain more knowledge for dealing with such problems.

It is interesting to note that analysis of the interval data identified a greater number of statistically significant differences between puppy class and non-puppy class dogs than did analysis of the dichotomized data. This may suggest that in certain situations, puppy socialization class did not alter whether or not the behaviour was present, but did decrease the frequency of the behaviours. For example, there was no significant difference between puppy class and non-puppy class dogs in terms of the proportion of dogs that become aggressive when a household member gave attention to an unfamiliar dog, but of those dogs that did display aggression, the frequency was significantly lower in puppy class dogs. It is also important to consider that the difference between never (0) (or rarely, depending on the cut-point) and sometimes (1) exhibiting aggression is more important from a behavioural prospective than a difference between, for instance, exhibiting aggression 7 versus 8 times out of 10 occasions. Analyzing the data by two different methods allowed for the examination of the effects of puppy classes in terms of both the occurrence and frequency of behaviour problems.

Examination of the total scores for the 16 significant questions revealed that the dogs (n=7) with the highest total scores were all dogs that had not attended puppy socialization classes. Data trends indicated that these dogs with the highest total scores ("bad" dogs) were most likely to behave aggressively, but did not appear to differ from the other dogs in terms of other behaviours, such as fear. In addition, "bad" dogs that behaved

aggressively in one situation were also very likely to behave aggressively in the other "significant situations" pertaining to aggression, which indicates that aggression may more likely be a generalized phenomena for certain dogs. This finding is in contrast to the results from the principle component analysis conducted by Borchelt and Goodloe which identified four aggressive factors. In addition, the littermates to these "bad" dogs, that had attended puppy socialization classes, rarely exhibited aggression during these same situations. Therefore, at least with respect to its potential impact on aggression, puppy socialization classes may benefit some dogs more than others.

Study Parameters

A unique characteristic of this study was the attempt to measure behavioural differences in related adult dogs living with their human owners. This was accomplished by: 1) matching, i.e., comparing littermates sharing similar genetic makeup and a similar environment during the first 6 to 10 weeks of life; 2) using an appropriate age group, i.e., examining the behavioural differences for dogs between the ages of 3 to 5 years of age, which had thereby reached sexual and social maturity; and 3) surveying for information pertaining to the dogs' behaviour in the natural environment, i.e., asking owners to indicate the frequency and severity of their dog's current reaction to the situations described in a survey. Each of these issues is discussed in turn.

Littermates sharing similar genetic makeup and a similar early environment were compared in order to decrease variability in behaviours for reasons other than puppy socialization class attendance between the two cohorts of dogs. Previous studies have

identified breed differences on a number of behavioural tasks, including trainability, problem-solving abilities, emotional reactivity (Scott and Fuller, 1965) and in reaction to social stimuli (Seskel et al., 1999). In addition to behavioural differences existing between breeds, dogs within a particular breed have also been found to display differences in terms of fearful behaviour (Beaver, 1981; Murphree et al., 1967. Brown et al., 1978), compulsive behaviour, and aggressive behaviour (Beaver, 1981; Mugford, 1984; Thorne, 1944; Willis, 1989). Whereas genetic studies indicate the potential role of genetic inheritance in the development of certain behaviour problems, other studies have shown that early developmental experiences may also influence behaviour (Fox, 1978; Fox and Stelzner, 1965; Scott and Fuller, 1965; Stanley et al., 1963). In fact, when examining behavioural variance among littermates. Scott and Fuller (1965) assumed that the variance was due to environmental factors. Although ignoring genetic effects produced a measurement error, it would be too small to detect except in large scale studies (Scott and Fuller, 1965).

In addition to minimizing the potential influence of genetics and early environment, matching of littermates balanced the distribution of age. Age has been demonstrated to influence the expression of behaviour problems (Overall, 1997; Voith and Borchelt, 1982; Young, 1988), with the onset of problems being reported to occur between the age of 1 and 3 years (Voith and Borchelt, 1982). Landsberg (1991) found the mean age of dogs presented to behavioural centers to be 2 years for each of the following behaviours: destruction, housesoiling, dominance aggression, intraspecies aggression and unruliness. For cases involving territorial aggression the mean age was 2.5 years, whereas the mean age for barking and for fear aggression was 3 years. The prevalence of these behaviour

problems in the dogs participating in this study is likely to be representative, as the median age of the matched pairs was 3.75 years, thereby having reached sexual and social maturity (Young, 1988; Overall, 1997). However, fears and phobias often do not become a problem until approximately 5 years of age (Landsberg, 1991). Because participating dogs were less than 5 years of age, it is possible that the frequency and degree of fearful behaviours have been underestimated in the present study. However, a more probable explanation would be that fearful behaviours develop earlier but are not immediately viewed by the owners as being problematic and thus owners delay seeking professional help. This explanation supports the assertion that the proportion of dogs displaying fearful reactions in this study is representative of the population at large.

Matching of littermates ensured a similar distribution of many possible influences on behaviour problems (Martin et al., 1987); however, littermates were not matched by sex. Previous studies have demonstrated that certain behaviour problems, such as aggression and roaming, may be exhibited more frequently in males than in females (Beaver, 1983; Jagoe, 1994; Lund et al., 1996; Mugford, 1995; Wells and Hepper, 2000; Wright and Nesselrote, 1987). This project revealed that proportionally more females attend puppy socialization classes. Therefore, the higher prevalence of behaviour problems demonstrated by males in previous research (Beaver, 1983; Jagoe, 1994; Lund et al., 1996; Mugford, 1995; Wells and Hepper, 2000; Wright and Nesselrote, 1987) may be related to fewer males attending beneficial puppy socialization classes. As many of the behaviours which appear to be more common for males are believed to be under hormonal control, the influence of sex on the expression of certain behaviours in the present study should be mitigated because 84% of males had been neutered.

Although surveying owners regarding their dog's current behaviours eliminated the need for specially-trained observers to measure the responses of dogs to various stimuli, biases in responding may have occurred. Owners who completed the survey were from a convenience sample and not from a random sample and, so, those people who agreed to participate by completing a lengthy survey may have differed significantly from those people not wishing to participate. Therefore, volunteer bias (Martin et al., 1987) could be a potential reason why the frequency of behaviour problems reported to be displayed by the dogs participating in this study was much lower than in previous studies (Campbell. 1986: Landsberg, 1991). Another possibility is that breeders who were aware that their dogs exhibit behaviour problems did not wish to participate in the study for fear that their anonymity would not be respected and negatively affect their reputation. Alternatively, those breeders who wished to participate in the study may have had a greater understanding of the importance of early socialization. Therefore, these breeders may have socialized the puppies prior to being placed in their new homes and may also have encouraged the new owners to socialize their puppies. In fact, 30% of the puppy class graduates for which breeders provided the names of littermates were ineligible to continue in the study because all littermates had attended puppy socialization classes as required by the breeder. Many of the dog owners participating expressed enthusiasm about the study, returning the survey accompanied with a picture of their dog and additional descriptions of their dog's behaviours. Indeed, 92% of all participants requested feedback and results from the research project, so it is likely that those people completing the study had a greater interest in dog behaviour and may have been more knowledgeable about dog behaviour in general than those who declined to participate.

In addition, owners of puppy class dogs may differ in other important ways.

Participants were not randomly allocated to the two groups, and therefore, it is possible that owner characteristics may have been a confounding factor. For example, owners that do not bring their puppies to socialization classes may not believe in obedience training. Therefore, dogs that did not attend puppy socialization classes may have exhibited more behaviour problems due to lack of training and thus owner characteristics would have biased away from the null hypothesis. In addition, owner characteristics may also influence how they perceive their dog and their dog's behaviours. Therefore, owner characteristics may have been a confounding factor resulting in an inaccurate measurement of the dogs' behaviours.

In addition to the effects of volunteer bias, the lower frequency of behaviour problems in this study may be attributed to the sample not being representative of the true dog population. Dogs that had developed serious behaviour problems (pk n = 3; non-pk n = 4) were no longer with the original owners or had been euthanized and therefore were not included in the study. In addition, due to the anticipated difficulties in finding littermates for mixed-breed dogs, only purebred dogs were included in the study. With increasing knowledge of dog behaviour, breeders may be more likely to select for desirable behaviours in their breeding programs. Therefore, purebred puppies may be genetically less likely to display behaviour problems than mixed-breed dogs which are more likely to be a result of unplanned breedings. In addition, people who own purebred dogs may differ significantly from people who own mixed-breed dogs. People who are willing to spend several hundred to over one thousand dollars for a purebred dog may be more likely to invest in professional advice regarding behaviour problems. It is possible that

some dogs exhibited problematic behaviours, which decreased or were eliminated following professional help, and therefore these previous behaviour problems were not identified in this study, which examined dogs' current behaviours.

As a means of minimizing measurement errors due to rating subjectivity, owners were provided with a definition sheet that described the types of behaviours likely to be exhibited under varying degrees of fear and aggression. In addition, to ensure accuracy, surveys were completed by the dog's primary caretaker. However, measurement errors may still have occurred. Time and money constraints meant that inter-rater observations and test-retests were not collected to measure the reliability of the given responses. However, the survey utilized in this study was based on Goodloe and Borchelt's (1998), and they had assessed rater reliability by giving the same survey to two owners in 22 households. A correlation coefficient greater than 0.6 was found for 96% of the 126 survey items pertaining to their dog's behaviour. Therefore, although there may be a given level of error due to natural variation in behaviours displayed by a dog in the presence of different family members and variations in owner perception, this measurement error is likely to be minimal. However, further assessments of reliability and validity are required in order to standardize an instrument to measure behaviour in dogs.

Training schools were selected based on the researcher's knowledge of the puppy socialization program format, the size of the school, and the ability of the training schools to provided the required information. The three schools that participated in this study provided puppy socialization classes that followed the format designed by Dunbar (1987) and therefore, the effects of puppy socialization classes identified by this study may not

be applicable to puppy classes that do not follow this format. In addition, selection of the schools was based on convenience and all three training schools were based in Toronto or the surrounding areas, and therefore, results from this study may have been influenced by the region's breed distribution and gene pool. Furthermore, the majority of dogs were found to live in urban areas and may have been naturally exposed to more people and dogs than dogs living in more rural areas. Thus, it may not be accurate to extrapolate the results from this study to other geographical areas.

Although research in companion animal behaviour is on the rise, to date very few studies have been reported in the literature. One of the most significant limitations encountered in the interpretation of these results was the lack of recent and comparable literature. In order to eliminate the problem of extrapolating results to the target population, information was gathered on dogs living with their owners. As such, the results of this research project are not directly comparable to results obtained from socialization studies using laboratory dogs (Clarke et al., 1951; Seskel et al., 1999; Thompson and Heron, 1954a; Fuller, 1963; Fuller, 1964); however, the results are likely to be more indicative of the general population of dogs than the laboratory studies.

The dogs participating in this study were classified on the basis of whether or not they had attended socialization classes as puppies; however, it was not possible to control for the amount of socialization puppies received outside of classes. People who do not bring their dogs to puppy classes may find alternative ways to socialize their puppy, such as visiting off-leash dog parks. Therefore, the results obtained from this study are specific to puppy socialization classes and should not be extrapolated to other methods of socialization.

Although controlled laboratory testing has been previously utilized to measure dog behaviour (Seskel et al., 1999), the results are dependent on the observers' evaluation of the dog's behaviours during a specific time period, which may not provide an accurate representation of daily behaviour. This study was an attempt to alleviate this problem. A thorough survey (198 items) allowed owners to rate the frequency and severity of their dog's behaviour for very specific situations, in order to produce a detailed picture of their dog's typical reactions. However, the lengthy nature of the survey may have adversely affected the response rate. It has been estimated that response rates decrease by 0.4 for every page beyond 10 pages in length (Norman and Streiner, 1998). This may have contributed to a lower, yet acceptable, response rate (74 % of those mailed) than was expected due to prior verbal consent to participate in the study. Therefore, the resultant decrease in sample size led to a decrease in power.

The original sample size (42 matched pairs) calculation was based on results from previous studies (Houpt, 1985; Anderson, 1991 as cited in Landsberg 1991), which indicated that approximately 60% of non-puppy class dogs displayed behaviour problems, and that attending puppy classes would decrease this percentage by more than 50%. However, the percentages of behaviour problems identified via the dichotomous data of this study were much lower than this estimate. For example, aggression when played with by an unfamiliar person (question D54A) was displayed by 17% of non-puppy class dogs and by 4% of puppy class attendees. Given these percentages and the sample size used (31 dogs per group), the power was calculated to be 0.38. In order to have maintained a power of 0.8, 86 matched pairs would have needed to be included in the study. Results from the question regarding aggression when familiar dog enters the

property (question E20A) indicated that 20% of puppy class dogs and 44% of non-puppy class dogs displayed aggression. Given these percentages and the sample size used, the power was calculated to be 0.53. In order to have maintained a power of 0.8, 58 matched pairs should have been included in the study. Therefore, the low power due to the difference in the proportion of dogs displaying behaviour problems resulted in a greater probability of declaring a difference to be statistically non-significant when a true difference exists in the population.

Due to the lack of information regarding the frequency of behaviours displayed by dogs, a sample size was not calculated prior to conducting the study for the interval scale. However, as an example, this study indicated that, out of 10 occasions, the mean frequency of aggression when played with by an unfamiliar person was 0.074 for puppy class dogs and was 1.3 for non-puppy class dogs with a common standard deviation of 2.24. Based on these results and the sample size used in this study (31 dogs per group), the power was calculated to be 0.58. In order to have maintained a power of 0.8. a sample size of 52 dogs per group should have been surveyed. For aggression displayed when a familiar dog enters the property, the mean frequency of aggression was 0.38 for puppy class dogs and was 2.33 for non-puppy class dogs, with a common standard deviation of 2.67. Given these results and the sample size of 31 dogs per group, the power was calculated to be 0.82. A power of 0.8 would have been obtained using a sample size of 29 dogs per group. If the results of these questions are representative of all items utilized, a larger number of matched pairs should have been included in this study in order to increase the probability of identifying the true differences that exist in the population as statistically significant. Therefore, the low number of significant

differences identified between puppy class and non-puppy class dogs may be attributed to the low power (Martin et al., 1987).

Statistical differences were observed in 16 out of the 198 survey question which is greater than would have been expected by chance alone, if there were no true differences (10 questions). Furthermore, the results that were not anticipated from the *a priori* hypotheses were likely not spuriously significant because all significant results supported the argument that dogs that attended puppy socialization classes exhibited fewer behaviour problems than those that did not.

CHAPTER V

RECOMMENDATIONS AND CONCLUSIONS

Future Studies

This study suggests that dogs that attend socialization classes as puppies may exhibit fewer behaviour problems than dog that do not attend such classes as puppies. In addition to preventing behaviour problems in some dogs, an important aspect of puppy socialization classes that requires further investigation is the effectiveness of puppy classes in eliminating or decreasing behaviour problems in puppies that already display problematic behaviours. In order to investigate this further, a study could be conducted whereby the puppy's reactions to specific stimuli are tested prior to beginning socialization classes. Dogs having similar initial reactions could then be randomly allocated to one of two treatment groups: attending puppy socialization classes or not attending classes. A survey similar to the one developed for this research project could then assess the dogs' adult behaviours.

In addition, a future study with a sample size of at least 100 dogs per group, is needed in order to investigate whether some dogs benefit from puppy socialization classes more than others, especially with respect to aggressive behaviours. If some matched pairs were found to have larger differences in total scores than others, the study could identify dog characteristics, such as breed, or other determinants, such as owner knowledge, which influence the effectiveness of puppy socialization classes.

Trainers, veterinarians and breeders emphasize the importance of preventing aggressive behaviours in dogs. However, this research project demonstrated that dogs are much more likely to display fear reactions than aggression. Therefore, if puppy socialization classes increase the focus of owners on the prevention of fears, such as gradually exposing the puppies to the sound of thunderstorms and other loud noises, the effectiveness of puppy socialization classes in decreasing the occurrence of behaviour problems could be greater than was identified in this study.

In addition to the socialization aspect, puppy classes may also benefit owner education in the areas of general health, behaviour and training. To evaluate this potential benefit, a study could be conducted in which owner knowledge in both puppy class and non-puppy class groups are assessed prior to participating in the study and after completion of the study. A subsequent survey could investigate correlations between owner knowledge and adult dog behaviour.

To eliminate the concerns regarding the basic aspects of reliability and validity, further research and psychometric analysis are needed in order to standardize this instrument to measure behaviour in dogs. To examine the reliability of the survey, the instrument should be completed by several people in the household in order to assess inter-rater reliability. In addition, participants could complete a second copy of the same survey one week following submission of the first copy to measure test-retest reliability. However, in addition to evaluating the instrument's reliability, studies should be conducted to assess the construct validity. One method for validating a test is by comparing responses given by owners on a questionnaire and the behaviours exhibited by dogs under controlled laboratory testing (Netto and Planta, 1997).

Conclusions

The major finding of this research project was that dogs that attended socialization classes as puppies differed from their littermates that had not attended classes in 16 of 198 behavioural parameters. Dogs that had not attended puppy socialization classes were more likely to display behaviour problems involving fear and/or aggression towards strangers, and unfamiliar dogs and fear of environments, all behaviours which are believed to be influenced by early socialization. Furthermore, dogs that attended socialization classes may have acquired coping strategies for dealing with stressful events, and thus were less likely than dogs that had not attended socialization classes to display compulsive behaviours. Certain behaviours, such as barking and possessive aggression, which were not believed to be influenced by early socialization occurred equally between both groups. However, other behaviours, not recognized as being related to socialization, such as begging, were found to occur less frequently in dogs that had attended socialization classes and, thus, puppy classes may have beneficial effects on dogs beyond the effects of socialization.

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APPENDIX 1: Initial Contact Letter requesting participation

UNIVERSITY OF GUELPH LETTERHEAD

September 15, 1999

Dear

My name is Susanne Martin. I am a graduate student at the Ontario Veterinary College working on a project on the effectiveness of puppy socialization classes. To date, the literature suggests that such a program is beneficial in decreasing the incidence of behavioural problems in adult dogs, although this has not yet been substantiated by any research.

I understand through my association with *Dealing with Dogs* that you and your dog participated in puppy socialization classes at some point during the period of January 1996 and May 1998. In order to complete my study. I would greatly appreciate your assistance. Participation will involve providing me with the name and telephone number of the breeder in addition to completing a mailed survey.

I will be contacting you by telephone in approximately one week so that we can discuss any questions that you might have.

Sincere Regards,

Susanne Martin
Department of Population Medicine
University of Guelph
Guelph, Ontario
N1G 2W1

UNIVERSITY OF GUELPH LETTERHEAD

CONSENT TO PARTICIPATE IN RESEARCH

I		y agree to participat	
study entitled Do early puppy social Details of the study have been of procedures which will be followed	explained to me to the e	extent that I fully un-	derstand the
comprehensive survey regarding m			
I understand that the material co anonymity will be protected unless			itial and my
I understand that the information	_		and may be
used in another research project in			
At the end of the study I am ent	• •	b	
I understand that I am capable of	of withdrawing from the	e study at any time s	should I
wish to do so. I understand that I am free to do	env any anguers to she	rific items or questic	one in the
survey.	iny any answers to spec	.me hems of question	Jus in the
If I have any further questions t	throughout the study I c	an contact the Proje	ct Director
Dr. Pamela Reid, at the University	of Guelph at 824-4120	ext.4065.	
Signature of Participant	Date		
			
Co-signature if participant is under 18 years old	Witness		
I would like a copy of the report u	pon its completion Y	ES NO	

*** PLEASE SIGN THIS CONSENT FORM AND RETURN IT WITH YOUR

COMPLETED SURVEY*****

APPENDIX 3: Socialization and Behavioural Survey

Socialization and Behavioural Survey

INSTRUCTIONS

Please read carefully:

Please complete the enclosed consent form and return it along with the completed survey.

In order to ensure proper understanding of terminology used throughout the survey, a definition sheet has been provided. Please keep this sheet readily accessible while you complete the survey for quick referral.

Although the survey appears long at first glance, it should only require approximately 30-45 minutes to complete. However, if at any time you begin to lose your concentration or get tired, please do not hesitate to take a break.

In order to simplify the survey, behaviours have been divided into several categories. Please read the individual instructions at the beginning of each section.

Please thoroughly complete the survey and consent form and return them in the enclosed. pre-addressed, pre-stamped envelop to:

Susanne Martin
Department of Population Medicine
University of Guelph
Guelph, Ontario Canada
N1G 2W1

If you encounter any problems or if any questions arise that need to be clarified, please contact Susanne Martin by telephone at (519) 822-9974 or by email at martins@uoguelph.ca

Socialization and Behavioural Survey

OWNER INFORMATION		
1. Name: (Last)		
2. Address: (Street)		(Apt #)
(City)	(Province/State)	(Postal/Zip Code)
3. Telephone: Home - ()		
4. Email address:	· · · · · · · · · · · · · · · · · · ·	
PET INFORMATION		
1. Dog's Name:		
2. Dog's Date of Birth: (month/ day/	year)	
3. Dog's Sex: Male Fema	ale	
4. Neutered/Spayed?: Yes	No	
If "ves", at what age was t	the surgery performed:	

5. Obedience	e Training: Please indicate which types of formal training your dog has received (you may check more than one category)
	Puppy Socialization (Kindergarten)
	Beginner Obedience
	Intermediate Obedience
	Advance Obedience
	Agility
	Flyball
	Other - please specify:
6. Daily Fee	eding Frequency: Once
	Twice
	Three times
	Free access (food down at all times)
	Other - please specify:
BACKGR	OUND INFORMATION
•	lete the following questions based on the time period ar dog turning 6 months old:
1. Number o	of people living in your household: children (under 13 years)
	teenagers (13-19 years)
	adults (over 19 years)
2. Number	of additional pets in your household: dogs
	cats
	other- please specify:

AF	APPENDIX 3 (continued): Socialization and Behavioural Survey			
3.	Type of home: House	:		
	Condo			
	Duplex	:		
	Apartm	nent		
	Other -	please specify:		
		preduce specify.		
4.	Neighbourhood type:	City-center		
		Suburbs		
		Rural		
		Farming/Ranching		
		Other - please specify:		
				
5.		wing chart according to the ave		
	spent doing the following	activities (PRIOR to the dog to	urning six months of age):	
Tv	pe of Activity	Average Hours per Day	Number of Days per Week	
	Walking/playing in			
1.	public areas			
1.	public areas Walking/playing in			
2.	public areas Walking/playing in secluded areas Playing in yard			
 2. 3. 	public areas Walking/playing in secluded areas Playing in yard - unsupervised			
 2. 3. 	public areas Walking/playing in secluded areas Playing in yard - unsupervised Playing in yard			
 2. 3. 4. 	public areas Walking/playing in secluded areas Playing in yard - unsupervised Playing in yard - supervised			
 2. 3. 4. 	public areas Walking/playing in secluded areas Playing in yard - unsupervised Playing in yard - supervised Playing with other dogs			
 2. 3. 4. 5. 	public areas Walking/playing in secluded areas Playing in yard - unsupervised Playing in yard - supervised Playing with other dogs			
 1. 2. 3. 4. 5. 6. 	public areas Walking/playing in secluded areas Playing in yard - unsupervised Playing in yard - supervised Playing with other dogs Exploring novel			
 1. 2. 3. 4. 5. 6. 7. 	public areas Walking/playing in secluded areas Playing in yard - unsupervised Playing in yard - supervised Playing with other dogs Exploring novel environments			
 1. 2. 3. 4. 5. 6. 7. 	public areas Walking/playing in secluded areas Playing in yard - unsupervised Playing in yard - supervised Playing with other dogs Exploring novel environments Other: please specify			
 2. 3. 5. 7. 8. 	public areas Walking/playing in secluded areas Playing in yard - unsupervised Playing in yard - supervised Playing with other dogs Exploring novel environments Other: please specify Other: please specify	d as a puppy?YesN	No	
 2. 3. 4. 6. 7. 8. 	Playing in yard - unsupervised Playing in yard - unsupervised Playing in yard - supervised Playing with other dogs Exploring novel environments Other: please specify Was your dog crate trained	d as a puppy?YesN any medical problems during the		
 2. 3. 4. 6. 7. 8. 	public areas Walking/playing in secluded areas Playing in yard - unsupervised Playing in yard - supervised Playing with other dogs Exploring novel environments Other: please specify Was your dog crate trained Did your dog suffer from			

The following 9 sections (A-I) of the questionnaire are designed to allow you to provide a detailed description of your dog's CURRENT behaviour, based on your experience of how he/she reacts and responds to a wide range of different events and situations.

For each question, please circle the most appropriate answer. Please keep in mind that you may circle any point along the continuum (for example, part way between 3 and 4)

A) SOCIABILITY	
Out of 10 occasions, how often does your dog:	
1) Love being the center of attention at social gatherings 012345678910	N/A
2) Approach unfamiliar adult men visiting your home in a friendly manner 012345678910	N/A
3) Approach unfamiliar adult women visiting your home in a friendly manner 012345678910	N/A
4) Approach unfamiliar children visiting your home in a friendly manner 012345678910	N/A
5) Approach unfamiliar adult men away from your home in a friendly manner 012345678910	N/A
6) Approach unfamiliar adult women away from your home in a friendly manner 012345678910	N/A
7) Approach unfamiliar children away from your home in a friendly manner 012345678910	N/A
8) Greet unfamiliar dogs visiting your home in a friendly manner 012345678910	N/A
9) Approach unfamiliar dogs away from your home in a friendly manner 012345678910	N/A
10) Enjoy being pet by family members 012345678910	N/A

11)	Enjoy being pet by unfamiliar people 012345678910	N/A
12)	Enjoy playing with unfamiliar dogs 012345678910	N/A
13)	Aloof with strangers entering your home 012345678910	N/A
14)	Aloof with strangers outside of your home 012345678910	N/A
15)	Aloof when meeting unfamiliar dogs 012345678910	N/A
<u>В</u>)	HOUSESOILING	
kno	the following questions, please exclude any instances where a medical condition own to be responsible for your dog's behaviour (for example, a urinary tract infect tof 10 occasions, how often does your dog:	
	Urinate in your home while you are in sight (excluding when greeting people, be pet or being reprimanded) 0	eing N/A
2)	Urinate in your home when you are at home but out of sight 012345678910	N/A
	Urinate in your home when you are not home 012345678910	N/A
4)	Urinate in the home upon greeting people 012345678910	N/A
5)	Urinate in the home while being pet 012345678910	N/A
6)	Urinate in the home while being reprimanded 012345678910	N/A

APPENDIX 3 (continued): Socialization and Behavioural Survey 7) Urinate inside unfamiliar buildings (for example, a friend's home) 0......1.....2.....3.....4.....5.....6.....7.....8.....9.....10 N/A 8) Defecate in the house while you are in sight 0......1.....2......3.....4.....5.....6.....7.....8.....9......10 N/A 9) Defecate in the house while your are at home but out of sight 0.....1....2....3....4....5....6....7....8....9....10 N/A 10) Defecate in the house when you are not home 0.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10 N/A C) EXCESSIVE VOCALIZATION Out of 10 occasion, how often does your dog vocalize (for example, bark and/or whine) excessively when your dog is: 1) In your house and people are walking by 0.....1.....2.....3.....4.....5.....6.....7.....8......9.....10 N/A 2) In your house and people ring the doorbell or knock on the door 0......1......2......3.....4.....5.....6.....7.....8.....9......10 N/A 3) In your house and a vehicle pulls into your driveway 0.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10 N/A 4) In your house and a vehicle drives by on the road 0.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10 N/A 5) In your house and a fast moving person (for example, a jogger or a bicyclist) goes by 0.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10 N/A 6) In your house and another dog walks by 0.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10 N/A

7) In your house and another animal (for example, a squirrel or a cat) is in sight outside 0.....1....2.....3.....4.....5.....6.....7.....8.....9.....10

0.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

8) In the yard and people are walking by your house

N/A

N/A

9) I	In the yard and a vehicle drives by on the road in front of your house 012345678910	N/A
10)	In the yard and a vehicle pulls into the driveway at your house 012	N/A
11)	In the yard and a fast moving person (for example, a jogger or a bicyclist) goes by 012345678910	y N/A
12)	In the yard and another dog walks by your house 012345678910	N/A
13)	In the yard and another animal (for example, a squirrel or a cat) is in sight 012345678910	N/A
14)	In the car and people are outside of your car 012345678910	N/A
15)	In the car and a person approaches your car 012345678910	N/A
16)	In the car and another vehicle drives by your car 012345678910	N/A
17)	In the car and a fast moving person (for example, a jogger or a bicyclist) goes by 012345678910	N/A
18)	In the car and you drive past another dog 012345678910	N/A
19)	In the car and another animal (for example, a squirrel or a cat) is in sight outside 012345678910	N/A
20)	On leash in public and an unfamiliar person approaches you and your dog 012345678910	N/A
21)	On leash in public and a vehicle drives by you and your dog 012345678910	N/A
22)	On leash in public and a fast moving person (for example, a jogger or bicyclist) g	
	0 1 2 3 4 5 6 7 8 9 10	IN/A

If you answer zero for part a), please skip part b) for that question and move to the next question.

If you answer any number greater than zero for part a), please complete part b) on the basis of the average degree of aggression that your dog displays in these instances.

I) HOUSEHOLD MEMBERS

- a) Out of 10 occasions, how often does your dog show aggression towards HOUSEHOLD MEMBERS (a person with whom your dog lives or has lived with for an extended period of time) in the following instances:
- b) The average degree of aggression that your dog displays under this circumstance is:

a) 01	N/A
2) When being hugged, pulled and /or restrained by a household member a) 0	N/A
3) When toys, bones or other objects (excluding food) belonging to the dog are tak away by a household member a) 01	
4) When the dog's food is taken away by a household member a) 012345678910 b) mild aggression moderate aggressionsevere aggression	N/A
5) When a household member retrieves a stolen object (for example, a dishtowel of piece of garbage) from the dog a) 01	
6) When being bathed by a household member a) 012345678910 b) mild aggression moderate aggressionsevere aggression	N/A

7) When being groomed by a household member a) 012345678910	N/A
b) mild aggression moderate aggressionsevere aggression	
8) When approached directly by a household member while your dog is eating a) 012345678910 b) mild aggression moderate aggressionsevere aggression	N/A
9) When played with by a member of the household a) 012345678910 b) mild aggressionmoderate aggressionsevere aggression	N/A
10) When being picked up, held and/or rolled over by a member of the household a) 012345678910 b) mild aggression moderate aggressionsevere aggression	N/A
11) When stared at directly by a member of the household a) 012	N/A
12) When being loomed over by a member of the household a) 0	N/A
13) When having his/her leash put on by a household member a) 012345678910 b) mild aggression moderate aggressionsevere aggression	N/A
14) When having his/her feet toweled by a member of the household a) 01234	N/A
15) When stepped on by a member of the household a) 012345678910 b) mild aggression moderate aggressionsevere aggression	N/A
16) Unpredictably towards a member of the household for no obvious or apparent re a) 0	ason N/A
17) When reached for by a member of the household a) 012345678910 b) mild aggression moderate aggressionsevere aggression	N/A

18) When accidentally injured by a member of the household a) 012345679	N/A
19) When being disciplined (verbally and/or physically) by a member of the househo a) 012345678910 b) mild aggression moderate aggressionsevere aggression	id N/A
20) When being pushed by a member of the household a) 012345678910 b) mild aggression moderate aggressionsevere aggression	N/A
21) When household members raise their voices (including in play) at each other a) 012345678910 b) mild aggressionmoderate aggressionsevere aggression	N/A
22) When household members physically threaten (including in play) each other a) 012345678910 b) mild aggressionmoderate aggressionsevere aggression	N/A
23) For any other reason not previously described - please specify: a) 012345678910 b) mild aggressionmoderate aggressionsevere aggression	N/A
II) FAMILIAR PEOPLE	
 a) Out of 10 occasions, how often does your dog show aggression towards a FAMILIAR PERSON (a person whom your dog has never lived with but whom he/she has encountered on numerous occasions) in the following instances: b) The average degree of aggression that your dog displays under this 	
circumstance is:	
24) When disturbed at, a favorite sleeping or resting place by a familiar person a) 012345678910 b) mild aggression moderate aggressionsevere aggression	N/A
25) When being hugged, pulled and /or restrained by a familiar person a) 01	N/A

26) When toys, bones or other objects (excluding food) belonging to the dog are take	en
away by a familiar person a) 012345678910 b) mild aggression moderate aggressionsevere aggression	N/A
27) When the dog's food is taken away by a familiar person a) 012345678910 b) mild aggressionmoderate aggressionsevere aggression	N/A
28) When a familiar person retrieves a stolen object (for example, a dishtowel or a p of garbage) from the dog a) 0	iece N/A
29) When being bathed by a familiar person a) 012345678910 b) mild aggressionmoderate aggressionsevere aggression	N/A
30) When being groomed by a familiar person a) 012345678910 b) mild aggressionmoderate aggressionsevere aggression	N/A
31) When approached directly by a familiar person while your dog is eating a) 012345678910 b) mild aggressionmoderate aggressionsevere aggression	N/A
32) When played with by a familiar person a) 012345678910 b) mild aggressionmoderate aggressionsevere aggression	N/A
33) When being picked up, held or rolled over by a familiar person a) 012345678910 b) mild aggression moderate aggressionsevere aggression	N/A
34) When stared at directly by a familiar person a) 012345678910 b) mild aggression moderate aggressionsevere aggression	N/A
35) When being loomed over by a familiar a) 012345678910 b) mild aggression moderate aggressionsevere aggression	N/A

36) When having his/her leash put on by a familiar person a) 01	N/A
37) When having his/her feet toweled by a familiar person a) 012345678910 b) mild aggressionmoderate aggressionsevere aggression	N/A
38) When your dog is stepped on by a familiar person a) 012345678910 b) mild aggressionmoderate aggressionsevere aggression	N/A
39) Unpredictably towards a familiar person for no obvious or apparent reason a) 012345678910 b) mild aggressionmoderate aggressionsevere aggression	N/A
40) When reached for by a familiar person a) 012345678910 b) mild aggressionmoderate aggressionsevere aggression	N/A
41) When accidentally injured by a familiar person a) 0	N/A
42) When being disciplined (verbally and/or physically) by a familiar person a) 012345678910 b) mild aggressionmoderate aggressionsevere aggression	N/A
43) When being pushed by a familiar person a) 01	N/A
44) When familiar people raise their voices (including in play) at each other a) 012345678910 b) mild aggressionmoderate aggressionsevere aggression	N/A
45) When familiar people physically threaten (including in play) each other a) 012345678910 b) mild aggressionmoderate aggressionsevere aggression	N/A
46) For any other reason not previously described - please specify: a) 01	N/A

III) UNFAMILIAR PEOPLE

- a) Out of 10 occasions, how often does your dog show aggression towards an UNFAMILIAR PERSON (a person whom your dog has only encountered on a few occasion or whom your dog has never encountered before) given the following instances:
- b) The average degree of aggression that your dog displays under this circumstance is:

47) When disturbed at, a favorite sleeping or resting place by a unfamiliar person a) 012345678910 b) mild aggression moderate aggressionsevere aggression	N/A
48) When toys, bones or other objects (excluding food) belonging to the dog are take away by an unfamiliar person a) 012345678910 b) mild aggressionmoderate aggressionsevere aggression	en N/A
49) When the dog's food is taken away by an unfamiliar person a) 012345678910 b) mild aggression moderate aggressionsevere aggression	N/A
50) When an unfamiliar person retrieves a stolen object (for example, a dishtowel or piece of garbage) from the dog a) 0	· a N/A
51) When being bathed by an unfamiliar person a) 01	N/A
52) When being groomed by an unfamiliar person a) 01	N/A
53) When approached directly by an unfamiliar person while your dog is eating a) 012345678910 b) mild aggressionmoderate aggressionsevere aggression	N/A
54) When played with by an unfamiliar person a) 01	N/A

55) When stared at directly by an unfamiliar person a) 0) N/A
56) When having his/her leash put on by an unfamiliar person a) 012345) N/A
57) When stepped on by an unfamiliar person a) 01) N/A
58) Unpredictably towards an unfamiliar person for no obvious or apparent reason a) 0	
59) When pushed by an unfamiliar person a) 012	0 N/A
60) When unfamiliar people raise their voices (including in play) at each other a) 012345678910 b) mild aggression moderate aggressionsevere aggression	0 N/A
61) When unfamiliar people physically threaten (including in play) each other a) 012345678910 b) mild aggression moderate aggressionsevere aggression	0 N/A
62) When reached for by an unfamiliar man while being walked/exercised on a le a) 012345678910 b) mild aggression moderate aggressionsevere aggression	
63) When reached for by an unfamiliar man in the dog's home a) 012345678910 b) mild aggression moderate aggressionsevere aggression	0 N/A
64) When reached for by an unfamiliar woman while being walked/exercised on a 0	
65) When reached for by an unfamiliar woman in the dog's home a) 012	0 N/A

66) When reached for by an unfamiliar child while being walked/exercised on a leash	
a) 012345678910 b) mild aggressionmoderate aggressionsevere aggression	N/A
67) When reached for by an unfamiliar child in the dog's home a) 012345678910 b) mild aggression moderate aggressionsevere aggression	N/A
68) When an unfamiliar person approached your dog while he/she is in the car a) 0	N/A
69) When an unfamiliar person enters onto your property a) 01	N/A
70) When an unfamiliar person enters into the home a) 0	N/A
71) For any other reason not previously described - please specify: a) 0	N/A
E) AGGRESSION TOWARDS OTHER DOGS	

Please refer to the definition sheet to gain an understanding of the types of behaviour which are to be classified as mild, moderate and severe aggression

For questions in section E (#2 - #32) please answer part a) on the basis of how many times out of 10 occasions your dog would display the behaviour

If you answer zero for part a), please skip part b) for that question and move to the next question.

If you answer any number greater than zero for part a), please complete part b) on the basis of the average degree of aggression that your dog displays in these instances

1) Do you have more than one dog in the household: Y N If you answered no - please skip questions 2 - 9 and go directly to question 10 If you answered ves - please answer the following questions (2 - 9) 1) HOUSEHOLD DOG(s) a) Out of 10 occasions, how often does your dog show aggression towards ANOTHER HOUSEHOLD DOG (a dog with whom your dog lives or has lived with for an extended period of time) in the following instances: b) The average degree of aggression that your dog displays under this circumstance is 2) When approached by another household dog while your dog is eating N/A b) mild aggression...... moderate aggressionsevere aggression 3) When disturbed by another household dog while your dog is resting/sleeping a) 0......1.....2......3.....4.....5.....6......7.....8......9......10 N/A b) mild aggression...... moderate aggressionsevere aggression 4) When another household dog attempts to take a toy, bone or other object away N/A a) 0......1.....2.....3.....4.....5.....6......7.....8......9......10 b) mild aggression...... moderate aggressionsevere aggression 5) Unpredictably towards another household dog for no obvious or apparent reason a) 0.....1....2....3....4....5.....6.....7....8.....9.....10 N/A b) mild aggression...... moderate aggressionsevere aggression 6) When a household member is giving attention (for example, being pet) to another household dog a) 0......1.....2.....3.....4.....5.....6......7.....8.....9......10 N/A b) mild aggression...... moderate aggressionsevere aggression 7) When approached by another household dog while receiving attention (for example. being pet) from a household member a) 0......1.....2.....3.....4.....5.....6......7.....8.....9......10 b) mild aggression...... moderate aggressionsevere aggression

a) 0......1.....2.....3.....4.....5.....6.....7.....8.....9......10

b) mild aggression...... moderate aggressionsevere aggression

N/A

8) When an unfamiliar person is giving attention to another household dog

9) When approached by another dog while receiving attention (for example, being person an unfamiliar person	æt)
a) 012345678910 b) mild aggressionmoderate aggressionsevere aggression	N/A
10) For any other reason not previously described - please specify: a) 0123456	N/A
II) FAMILIAR DOG(s)	
 a) Out of 10 occasions, how often does your dog show aggression towards a FAMILIAR DOG (a dog whom your dog has never lived with but whom he/she has encountered on numerous occasions) in the following instance b) The average degree of aggression that your dog displays under this circumstance is: 	ļ
11) When approached by the familiar dog while your dog is eating a) 012345678910 b) mild aggression moderate aggressionsevere aggression	N/A
12) When disturbed by the familiar dog while your dog is resting/sleeping a) 012345678910 b) mild aggression moderate aggressionsevere aggression	N/A
13) When the familiar dog attempts to take a toy, bone or other object away a) 012345678910 b) mild aggression moderate aggressionsevere aggression	N/A
14) Unpredictably towards the familiar dog for no obvious or apparent reason a) 012345678910 b) mild aggressionmoderate aggressionsevere aggression	N/A
15) When a household member is giving attention (for example, being pet) to the familiar dog a) 012	N/A

16) When approached by the familiar dog while receiving attention (for example, being pet) from a household member	<u>,</u>
a) 012345678910 N b) mild aggression moderate aggressionsevere aggression	i/A
17) When an unfamiliar person is giving attention (for example, being pet) to the famil dog	iar
a) 012345678910 N b) mild aggressionmoderate aggressionsevere aggression	I/A
18) When approached by the familiar dog while receiving attention (for example, being pet) from an unfamiliar person	<u>,</u>
a) 012345678910 N b) mild aggressionmoderate aggressionsevere aggression	I/A
19) When the familiar dog enters your home a) 012345678910 b) mild aggressionmoderate aggressionsevere aggression	I/A
20) When the familiar dog enters your property a) 01	√A
21) For any other reason not previously described - please specify: a) 012345678910 N b) mild aggressionmoderate aggressionsevere aggression	 √A
III) UNFAMILIAR DOG(s)	
a) Out of 10 occasions, how often does your dog show aggression towards UNFAMILIAR DOG (a dog whom your dog has only encountered on a fe occasion or whom your dog has never before encountered) in the following instances:	
b) The average degree of aggression that your dog displays under this circumstance is:	
22) When approached by an unfamiliar dog while your dog is eating a) 012345678910 b) mild aggressionmoderate aggressionsevere aggression	N/A

23) When disturbed by an unfamiliar dog while your dog is resting/sleeping a) 012345678910 b) mild aggression moderate aggressionsevere aggression	N/A
24) When an unfamiliar dog attempts to take a toy, bone or other object away a) 012345678910 b) mild aggression moderate aggressionsevere aggression	N/A
25) Unpredictably towards an unfamiliar dog for no obvious or apparent reason a) 012345678910 b) mild aggression moderate aggressionsevere aggression	N/A
26) When a household member is giving attention (for example, being pet) to an unfamiliar dog a) 012	N/A
27) When approached by an unfamiliar dog while receiving attention (for example, be pet) from a household member a) 012345678910 b) mild aggression	oeing N/A
28) When an unfamiliar person is giving attention (for example, being pet)to an unfamiliar dog a) 01	N/A
29) When approached by an unfamiliar dog while receiving attention (for example, bet) from an unfamiliar person a) 0	oeing N/A
30) When an unfamiliar dog enters your home a) 01	N/A
31) When an unfamiliar dog enters your property a) 012345678910 b) mild aggressionmoderate aggressionsevere aggression	N/A
32) For any other reason not previously described - please specify: a) 01	N/A

F) FEARFUL REACTIONS
Please refer to the definition sheet to gain an understanding of the types of behaviour which are to be classified as mild, moderate and extreme fear.
Out of 10 occasions, how often does your dog display a fearful reaction in the following instances:
1) Loud and sudden noises (for example, objects falling, gun shot, vacuum cleaner) excluding thunderstorms, fireworks and car noises a) 012
2) Thunderstorms a) 012345678910 N/A b) mild fearmoderate fearextreme fear
3) Fireworks a) 012345678910 N/A b) mild fear moderate fearextreme fear
4) Car noises (for example, honking horns, loud cars, heavy traffic and/or car backfiring) a) 012
5) The sound of alarms (for example, smoke detector battery running low and/or fire/security alarm set off) a) 012345678910 N/A b) mild fear
6) The sight of baby gates a) 012345678910 N/A b) mild fear
7) The sight of strange or unfamiliar objects on or in familiar areas (for example, garbage cans, litter, and/or flags flapping)

b) mild fear..... moderate fearextreme fear

Sudden movements by inanimate objects (for example, a door opening, a car	moving.
and/or an object falling) a) 01234567891 b) mild fear moderate fearextreme fear	0 N/A
) When approached by a familiar dog a) 01234567891 b) mild fearmoderate fearextreme fear	0 N/A
0) When approached by an unfamiliar dog a) 01234	10 N/A
1) When approached directly by an unfamiliar adult man a) 0123456789 b) mild fear	10 N/A
2) When approached directly by an unfamiliar adult woman a) 0123456789 b) mild fear	10 N/A
3) When approached directly by an unfamiliar child a) 0123456789 b) mild fear moderate fearextreme fear	10 N/A
4) When stared at directly by an unfamiliar person a) 0123456789 b) mild fear moderate fearextreme fear	10 N/A
(5) When an unfamiliar person approaches when your dog is in your car a) 01234567899	10 N/A
16) When examined/treated by a veterinarian a) 012	.10 N/A
17) When first exposed to unfamiliar situations (for example, the first time in ar and/or the first visit to a veterinarian)	ı elevator
a) 01	.10 N/A

18) When approached by any member of the household a) 012345678910 b) mild fear	N/A
19) When reprimanded a) 012345678910 b) mild fear	N/A
20) When groomed and/or bathed a) 012345678910 b) mild fear	N/A
21) Any other reason not previously described - please specify: a) 0	N/A
G) MISCELLANEAOUS	
Out of 10 occasions, how often will your dog:	
1) Chase other animals, such as birds, mice and squirrels ()12345678910	N/A
2) Escape from the yard and roam free if given the opportunity (for example, not tie or gate is left open) 012345678910	
3) Ingest his/her own or other dogs' feces 012345678910	N/A
4) Destroy household objects by chewing, digging and/or scratching when no one is home 012345678910	s N/A
5) Destroy household objects by chewing, digging and/or scratching when someone home 012345678910	
6) Attempt to dig out of area when confined 012345678910	N/A

7) Raid garbage cans 012	3	4	5	6	7	8	9	10	N/A
8) Dig holes in the yard 012	3	4	5	6	7	8	9	10	N/A
9) Dig at points of exit in 012									
10) Dig at points of exit i	n the h	ome suc	ch as do	ors and	l windo	ws whe	n someo	one is a	i .
012	3	4	5	6	7	8	9	10	N/A
11) Beg when humans had 012	ave foo	od 4	5	6	7	8	9	10	N/A
H) TRAINING AN	D OB	EDIE	NCE						
Out of 10 occasions, how	often	does yo	ur dog:						
1) Come to you when ca 012	lled 3	4	5	6	7	8	9	10	N/A
2) Sit on command 012	3	4	5	6	7	8	9	10	N/A
3) Stay on command 012	3	4	5	6	7	8	9	10	N/A
4) Jump up on people 012			z.	6	7	o	0	10	NI/A
								10	IN/A
5) Retrieve objects such	as ball	s and st	icks wh	en thro	wn for	him/her			

I) COMPULSIVE BEHAVIOURS

For the following questions in section I (#1 - #8) please answer based on what percentage of the day your dog spend doing the following behaviours:

- 1) Staring intently at nothing visible 0...10...20...30...40...50...60...70...80...90...100 N/A
- 2) Snapping at invisible flies
 0...10...20...30...40...50...60...70...80...90...100 N/A
- 3) Chasing own tail/hind end (for example, spinning in circles)
 0...10...20...30...40...50...60...70...80...90...100 N/A
- 4) Chasing/following shadows 0...10...20...30...40...50...60...70...80...90...100 N/A
- 5) Licking at himself/herself excessively (for no know medical condition) 0...10...20...30...40...50...60...70...80...90...100 N/A
- 6) Licking at other objects/people excessively 0...10...20...30...40...50...60...70...80...90...100 N/A
- 7) Pacing 0...10...20...30...40...50...60...70...80...90...100 N/A
- 8) Other bizarre, strange and repetitive behaviour please specify 0...10...20...30...40...50...60...70...80...90...100 N/A

APPENDIX 3 (continued): Socialization and Behavioural Survey ADDITIONAL COMMENTS Please include any additional comments that may help us further our understanding of your dog's current behaviour:

Thank you for your participation

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N1G 2W1

DEFINITIONS

PLEASE KEEP THIS SHEET ON HAND AT ALL TIMES THROUGHOUT THE SURVEY

NOT APPLICABLE (N/A)

- not applicable is the appropriate response when you don't know the answer or when the dog is unable to perform the behaviour. Possible reasons for this include:
 - •The dog is physically unable to perform the behaviour due to age, illness, size or other factors
 - The dog never has the opportunity to perform the behaviour
 - •The dog has been trained to perform the behaviour

AGGRESSION

Mild aggression: Body tense and erect, tail held up, looking at being in question

Moderate aggression: Characteristics of mild aggression with the addition of

growling and/or raising of the lip

Severe aggression: Moderate aggression with the addition of lunging, snapping

and/or biting

FEAR

Mild fear: Freeze and/or avoid object/being in question

Moderate fear: Mild fear in addition to lowered head, flattened ears back against the

head, tail tucked between legs and may try to leave area

Extreme fear: Shiver, tremble, salivate and/or pant

APPENDIX 5: Summary of descriptive statistics of whole population

Question	Median	25 th percentile	75 th percentile	Minimum	Maximum
Al	8	5	10	1	10
A2	9	5	10	0	10
A3	9	8	10	0	10
A4	10	8	10	0	10
A5	8	<u>3</u> 5	10	0	10
A6	9	5	10	0	10
A7	9	6.25	10	0	10
A8	8	5	9.75	0	10
A9	8	5	9	0	10
A10	10	10	10	5	10
A11	9	7.75	10	0	10
A12	7.5	5	9	0	10
A13	1	0	6	0	10
A14	2	0	7	0	10
A15	2	1	5	0	10
Bl	0	0	0	0	0
B2	0	0	0	0	7
B3	0	0	0	0	7
B4	0	0	0	0	5
B5	0	0	0	0	2 4
B6	0	0	0	0	4
B7	0	0	0	0	9
B8	0	0	0	0	0
B9	0	0	0	0	4
B10	0	0	0	0	8
C1	1	0	7	0	10
C2	9	0	10	0	10
C3	2	0	8	0	10
C4	0	0	0	0	8
C5	0	0	3	0	10
C6	1	0	8	0	10
C7	3	0	8.25	0	10
C8	2	0	5	0	10
C9	0	0	0	0	10
C10	1	0	8	0	10
C11	0.5	0	5.25	0	10
C12	4	0	9	0	10
C13	3	0	9	0	10
C14	0	0	3.5	0	10

APPENDIX 5 (Continued): Summary of descriptive statistics of whole population

Question	Median	25 th percentile	75 th percentile	Minimum	Maximum
C15	1	0	6.5	0	10
C16	0	0	0	0	9
C17	0	0	1.25	0	10
C18	0	0	5.75	0	10
C19	0	0	5	0	10
C20	0	0	1	0	10
C21	0	0	0	0	7
C22	0	0	0.5	0	10
C23	0.50	0	5	0	10
C24	0	0	4.5	0	10
C25	0	0	0	0	10
C26	0	0	0	0	10
C27	0	0	0	0	10
C28	0	0	4	0	10
C29	0	0	4.25	0	10
C30	0	0	4.25	0	10
C31	0	0	6	0	10
C32	0	0	2	0	10
C33	0	0	4	0	19
DIA	0	0	0	0	10
DIB	i	1	1.25	1	2
D2A	0	0	0	0	6
D2B	1	ı	1	1	2
D3A	0	0	0	0	9
D3B	1	1	1.625	1	2
D4A	0	0	0	0	10
D4B	1	1	1.75	1	2
D5A	0	0	0	0	10
D5B	1	1	1	1	2
D6A	0	0	0	0	3
D6B	1	1	1	1	1
D7A	0	0	0	0	9
D7B	1	1	1	1	2
D8A	0	0	0	0	10
D8B	2	2	2	1	2
D9A	0	0	1	0	9
D9B	1	1	1	ī	2
D10A	0	0	0	0	5
D10B	1	1	1.75	1	2

APPENDIX 5 (Continued): Summary of descriptive statistics of whole population

Question	Median	25 th percentile	75 th percentile	Minimum	Maximum
DIIA	0	0	0	0	5
DIIB	1.5	1	2	l	2
D12A	0	0	0	0	7
D12B	1	1	1.5	1	2
D13A	0	0	0	0	10
D13B	1	1	1.75	I	2
D14A	0	0	0	0	10
D14B	1	1	1	1	1
D15A	0	0	0	0	4
D15B	1	1	2	0	2
D16A	0	0	0	0	1
D16B	n/a	n/a	n/a	n/a	n/a
D17A	0	0	0	0	1
D17B	I	1	1	1	I
D18A	0	0	0	0	5
D18B	l	11	1	i	2
D19A	0	0	0	0	6
D19B	1	11	2	1	2
D20A	0	0	0	0	6
D20B	i	1	1	l l	1
D21A	0	0	1	0	7
D21B	1	1	1	l	2
D22A	0	0_	3	0	10
D22B	l	!	2	l	3
D23A	0	0	0	0	5
D23B	2	1.25	2.75	i	3
D24A	0	0	_ 0	0	5
D24B	1.5	I	2	1	2
D25A	0	0	0	0	9
D25B	1	11	1	I	1.5
D26A	0	0	0	0	10
D26B	1	1	l	1	2
D27A	0	0	0	0	2
D27B	1	1	1	11	1
D28A	0	0	0	0	10
D28B	i	1	l	1	2
D29A	0	0	0	0	3
D29B	1	i	1	l	1
D30A	0	0	0	0	3
D30B	1	1	1	1	1.5

APPENDIX 5 (Continued): Summary of descriptive statistics of whole population

Question	Median	25 th percentile	75 th percentile	Minimum	Maximum
D31A	0	0	0	0	10
D31B	1	1	2	1	2
D32A	0	0	0	0	10
D32B	1	I	1.5	1	2
D33A	0	0	0	0	7
D33B	1	1	2	1	2
D34A	0	0	0	0	6
D34B	1	1	1.5	1	2
D35A	0	0	0	0	5
D35B	1	0.5	1.5	0.5	2
D36A	0	0	0	0	2 3
D36B	1	1	1	l	1
D37A	0	0	0	0	4
D37B	1	1	2	I	2
D38A	0	0	0	0	10
D38B	1	l	1.1	ī	2
D39A	0	0	0	0	10
D39B	2	1	2	1	2
D40A	0	0	0	0	6
D40B	1	Ī	1.75	I	2
D41A	0	0	I	0	10
D41B	l	l	1.25	1	2
D42A	0	0	0	0	8
D42B	1	1	1.5	1	2
D43A	0	0	0	0	8
D43B	1	1	1	1	1
D44A	0	0	1	0	10
D44B	1	1	2	Ī	2
D45A	0	0	3.25	0	10
D45B	1	1	2	1	3
D46A	0	0	0	0	8
D46B	i	1	1	1	1
D47A	0	0	0	0	10
D47B	1.5	1	2	I	2
D48A	0	0	0	0	10
D48B	1	1	2	1	2
D49A	0	0	0	0	10
D49B	1	1	2	l	2
D50A	0	0	0	0	10
D50B	l	1	2.25	1	3

APPENDIX 5 (Continued): Summary of descriptive statistics of whole population

Question	Median	25 th percentile	75 th percentile	Minimum	Maximum
D51A	0	0	0	0	10
D51B	1	1	2	1	2
D52A	0	0	0	0	10
D52B	1.5	1	2.25	l	3
D53A	0	0	0	0	10
D53B	1.5	l	2	i	2.5
D54A	0	0	0	0	10
D54B	1	1	1.5	1	3
D55A	0	0	0	0	10
D55B	Ī	ı	2.5	1	3
D56A	0	0	0	0	10
D56B	1	l	1	1	I
D57A	0	0	0	0	10
D57B	1	1	1	1	3
D58A	0	0	0	0	10
D58B	1	1	2	1	2
D59A	0	0	0	0	10
D59B	1	1	2	1	3
D60A	0	0	1	0	10
D60B	1	1	2	1	2
D61A	0	0	1	0	10
D61B	1	1	2	1	3
D62A	0	0	1	0	10
D62B	1	1	2	ī	3
D63A	0	0	0.375	0	10
D63B	1.5	i	2	i	3
D64A	0	0	0	0	10
D64B	2	1	2	1	3
D65A	0	0	0	0	10_
D65B	1	1	2.25	i	3
D66A	0	0	0	0	10
D66B	l	1	2	1	3
D67A	0	0_	0	0	10
D67B	I	1	2	l	3
D68A	0	0	4	0	10
D68B	1.5	1	2	1	3
D69A	1	0	7	0	10
D69B	2	1	2	1	3
D70A	0	0	5	0	10

APPENDIX 5 (Continued): Summary of descriptive statistics of whole population

Question	Median	25 th percentile	75 th percentile	Minimum	Maximum
D70B	1	1	2	1	3
D71A	0	0	0	0	4
D71B	2	2	2	2	2
El	2	1	2	1	2
E2A	0	0	0	0	5 3
E2B	2	2	2.75	l	3
E3A	0	0	0	0	3
E3B	2	1.25	2	1	2
E4A	0	0	1.25	0	7
E4B	2	1.5	2	1	3
E5A	0	0	0	0	0
E5B	n/a	n/a	n/a	n/a	n/a
E6A	0	0	0	0	3
E6B	1	1	1	1	l
E7A	0	0	0	0	2
E7B	1	1	1	l	1
E8A	0	0	0	0	3
E8B	1	1	1	1	l
E9A	0	0	0	0	4
E9B	1	1	1	1	1
E10A	0	0	0	0	3
E10B	1	1	I	ī	i
EHA	0	0	1	0	10
EIIB	1	1	2	1	3
E12A	0	0	0	0	8
E12B	1	1	2	1	2
E13A	0	0	2	0	10
E13B	1	1	2	1	3
E14A	0	0	0	0	3
E14B	1	1	I	1	2
E15A	0	0	1.75	0	10
E15B	1	1	1	1	2
E16A	0	0	1	0	9
E16B	1	1	1	1	3
E17A	0	0	0	0	9
E17B	1	1	1.25	i	2
E18A	0	0	0	0	9
E18B	1	11	1	1	2
E19A	0	0	0.75	0	10

APPENDIX 5 (Continued): Summary of descriptive statistics of whole population

Question	Median	25 th percentile	75 th percentile	Minimum	Maximum
E19B	1	1	1	1	2
E20A	0	0	1	0	10
E20B	l	1	1.25	1	2
E21A	0	0	0	0	10
E21B	2	2	2	2	2
E22A	0	0	1	0	10
E22B	2	1	2	1	3
E23A	0	0	1	0	10
E23B	2	1	2.75	ı	3
E24A	1	0	4	0	10
E24B	1	l	2	1	3
E25A	0	0	2 2	0	10
E25B	1	1	2	1	3
E26A	0	0	l	0	10
E26B	1	1	1	1	2
E27A	()	0	1	0	10
E27B	1	I	I	1	3
E28A	0	0	0	0	5
E28B	1	1	1	1	1
E29A	0	0	1	0	10
E29B	1	1	1	1	3
E30A	0	0	2.5	0	10
E30B	1	1	2	1	3
E31.A	1	0	5	0	10
E31B	1	1	2	1	3
E32A	0	0	0	0	10
E32B	1.75	1.125	2.75	1	3
F1A	4	0	7	0	10
F1B	2	1	2	1	3
F2A	1	0	6.25	0	10
F2B	2	I	2	1	3
F3A	2.5	0	8.25	0	10
F3B	2	1	2.375	1	3
F4A	0	0	2	0	10
F4B	1	1	2	1	3
F5A	0	0	7	0	10
F5B	2	1	2	1	3
F6A	0	0	0	0	10
F6B	1.75	l	2	1	2

APPENDIX 5 (Continued): Summary of descriptive statistics of whole population

Question	Median	25 th percentile	75 th percentile	Minimum	Maximum
F7A	0	0	3.25	0	10
F7B	l	1	2	1	3
F8A	1	0	3.25	0	10
F8B	1	1	2	l	3
F9A	0	0	0	0	10
F9B	2	1	2	1	3
F10A	ı	0	3.75	0	10
F10B	1.75	1	2	ī	3
F11A	0	0	2.75	0	10
FIIB	1	1	2	l	3
F12A	0	0	2	0	10
F12B	1	1	1.5	1	3
F13A	0	0	I	0	10
F13B	1	1	2	l	3
F14A	0	0	0	0	10
F14B	1	1	2	1	2
F15A	0	0	0	0	10
F15B	1	ı	2	1	3
F16A	2	0	8	0	10
F16B	1	1	2	Ī	3
F17A	2	0	5.5	0	10
F17B	l	1	2	Ī	3
F18A	0	0	0	0	6
F18B	1	ı	2.5	1	3
F19A	2	1	5	0	10
F19B	1	1	2	l	3
F20A	0	0	3.5	0	10
F20B	1	I	1	[3
F21.A	0	0	0	0	10
F21B	1	2	1	2	10
Gl	8	5	10	0	10
G2	5	0	9	0	10
G3	0	0	0	0	10
G4	0	0	0	0	5
G5	0	0	0	0	0.5
G6	0	0	0	0	10
G7	0	0	3	0	10
G8	0	0	1.25	0	10
G9	0	0	0	0	1

APPENDIX 5 (Continued): Summary of descriptive statistics of whole population

Question	Median	25 th percentile	75 th percentile	Minimum	Maximum
G10	0	0	0	0	0
G11	3.5	0	7	0	10
HI	8	7	9.5	1	10
H2	9	8	10	4	10
Н3	8	5.75	9.7	0	10
H4	3	0	8	0	10
H5	8	5	10	0	10
I 1	0	0	7.5	0	50
12	0	0	0	0	50
13	0	0	0	0	20
14	0	0	0	0	90
15	0	0	10	0	70
16	0	0	10	0	90
17	0	0	0	0	50
18	0	0	0	0	90

APPENDIX 6 Summary of descriptive statistics comparing puppy class graduates (PK) and non-puppy class dogs (NON)

Question	Med		25 th	<u> </u>	75 th		, 	mum	Maxi	umum
			perc	eutile	perce	ntile				
	PK	NON	PK	NON	PK	NON	PK	NON	PK	NON
Al	7.5	8	3.8	5	9	10	1	1	10	10
A2	9	9	5	5	10	10	0	1	10	10
A3	9	9	8	7	10	10	0	1	10	10
A4	10	10	8	8	10	10	0	2	10	10
A5	8	8	3	3	10	10	0	0	10	10
A6	9.5	8.5	4.5	5.75	10	10	1	0	10	10
A7	9.5	9	7	5	10	10	0	0	10	10
A8	9	8	5.5	5	10	8	0	0	10	10
A9 *	9	7	5	5	10	8	0	0	10	10
A10	10	10	10	10	10	10	5	8	10	10
All	9	8	8	7	10	10	0	0	10	10
A12	8	7	5	4	10	8	0	0	10	10
A13	1	1	0	0	4.5	7	0	0	10	10
A14	1.5	2	0	0	7	7	0	0	10	10
A15	2	2.25	0	i	5	5	0	0	10	10
B1	0	0	0	0	0	0	0	0	0	0
B2	0	0	0	0	0	0	0	0	7	0
B3 *	0	0	0	0	0	1	0	0	0	7
B4	0	0	0	0	0	0	0	0	4	5
B5	0	0	0	0	0	0	0	0	1	2
B6	0	0	0	0	0	0	0	0	3	4
B7	0	0	0	0	0	0.4	0	0	9	3
B8	0	0	0	0	0	0	0	0	0	0
B9	0	0	0	0	0	0	0	0	4	1
B10	0	0	0	0	0	0.25	0	0	4	8
Cl	0	2	0	0	5	8	0	0	10	10
C2	4	9	0	1.5	10	10	0	0	10	10
C3	2	3	0	0	8	7	0	0	10	10
C4	0_	0	0	0	0	0	0	0	8	8
C5	0	0	0	0	3	3	0	0	9	10
C6	0.8	2	0	0	5.75	9	0	0	10	10
C7	3	3	0	0	8	9	0	0	10	10
C8	0	2	0	0.5	4	6	0	0	9	10
C9	0	0	0	0	0	0	0	0	9	10
C10	1	1	0	0	8	7.25	0	0	10	10
C11	0	1	0	0	5	6	0	0	9	10

APPENDIX 6 (continued) :Summary of descriptive statistics comparing puppy class graduates (PK) and non-puppy class dogs (NON)

Question	Med		25 th		75 th	,		mum	Maxi	umum
			ı	entile	perce	ntile				
	PK	NON	PK	NON	PK	NON	PK	NON	PK	NON
C12	1	5	0	1	7	10	0	0	10	10
C13	2	3	0	0	9	9	0	0	10	10
C14	0	0	0	0	3	4.25	0	0	10	10
C15	1	2	0	0	7.25	6	0	0	10	10
C16	0	0	0	0	0	0	0	0	9	5
C17	0	0	0	0	1.75	1.25	0	0	10	10
C18	0	1	0	0	6.5	4	0	0	10	10
C19	0	0.5	0	0	5.5	5.25	0	0	10	10
C20	0	0	0	0	i	1.5	0	0	10	10
C21	0	0	0	0	0	0	0	0	6	7
C22	0	0	0	0	0.25	1	0	0	10	10
C23	0	1	0	0	5	5	0	0	10	10
C24	1	0	0	0	7	3.25	0	0	10	10
C25	0	0	0	0	0	1	0	0	4	10
C26	0	0	0	0	0	0	0	0	2	10
C27	0	0	0	0	0	2	0	0	4	10
C28	0	0	0	0	4	4	0	0	9	10
C29	1	0	0	0	7	2	0	0	9	10
C30	1.5	0	0	0	5	2	0	0	10	10
C31	3	1	0	0	6	5	0	0	10	10
C32	0	0	0	0	3	1	0	0	10	10
C33	0	0	0	0	5	1	0	0	9	10
DIA	0	0	0	0	0	0	0	0	10	1
DIB	1	1	1	1	1.75	1	1	1	2	1
D2A	0	0	0	0	0	1	0	0	2	6
D2B	1	1	1	1	1.5	1	1	1	1.5	2
D3A	0	0	0	0	0	0	0	0	4	9
D3B	i	1	1	1	1.75	1.5	1	i	2	2
D4A	0	0	0	0	0	0	0	0	2	10
D4B	1	2	1	2	1	2	1	2	1	2
D5A	0	0	0	0	0	0	0	0	8	10
D5B	1	1	1	1	1	1.5	1	1	1	2
D6A	0	0	0	0	0	0	1	0	ī	0
D6B	li	1	† <u>i</u>	1	1	1	1	1	ī	1
D7A	0	0	0	0	0	0	0	0	4	9
D7B	11	1	1	1	1	1.25	1	1	1	2

APPENDIX 6 (continued) :Summary of descriptive statistics comparing puppy class graduates (PK) and non-puppy class dogs (NON)

Question	Med		25 th	`	75 th			mum	Maxi	umum
			perc	entile	perce	ntile				
	PK	NON	PK	NON	PK	NON	PK	NON	PK	NON
D8A	0	0	0	0	0	0	0	0	0	10
D8B	n/a	2	n/a	2	n/a	2	n/a	2	n/a	2
D9A	0	0	0	0	1	1	0	0	9	8
D9B	1	1	1	1	1.25	1.25	1	ı	2	2
D10A	0	0	0	0	0	0	0	0	5	2
D10B	1	1	1	1	1.75	1.75	1	1	2	2
D11A	0	0	0	0	0	0	0	0	5	5
DIIB	2	1	2	1	2	1	2	1	2	1
D12A	0	0	0	0	0	0	0	0	5	7
D12B	1.5	1	1	1	2	1	1	1	2	1
D13A	0	0	0	0	0	0	0	0	1	10
D13B	l	1	1	I	1	1	1	1	2	1
D14A	0	0	0	0	0	0	0	0	1	10
D14B	1	1	1	1	1	1	1	1	I	1
D15A	0	0	0	0	0	0	0	0	4	3
D15B	1	1.5	1	1	1	2	0	1	2	2
D16A	0	0	0	0	0	0	0	0	0	1
D16B	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
D17A	0	0	0	0	0	0	0	0	0	1
D17B	n/a	1	n/a	1	n/a	1	n/a	1	n/a	1
D18A *	0	0	0	0	0	1	0	0	4	5
D18B	1	1	1	1	1	1	1	l	1	2
D19A *	0	0	0	0	0	0	0	0	1	6
D19B	1	1	1	1	1	2	1	1	1	2
D20A	0	0	0	0	0	0	0	0	2	6
D20B	1	1	1	1	1	1	1	1	1	1
D21A	0	0	0_	0	0.25	1	0	0	5	7
D21B	1	1	1	1	1	1	1	1	2	2
D22A	0	0	0	0	2.5	4.5	0	0	10	10
D22B	1	1	1	1	2	2	1	1	2.5	3
D23A	0	0	0	0	0	0	0	0	5	5
D23B	l	2	1	2	1	3	1	2	l	3
D24A	0	0	0	0	0	0	0	0	5	5
D24B	2	1	2	1	2	1	2	1	2	1
D25A	0	0	0	0	0	0	0	0	3	9
D25B	1	1	1	1	1.38	1	1	1	1	1

APPENDIX 6 (continued) :Summary of descriptive statistics comparing puppy class graduates (PK) and non-puppy class dogs (NON)

Question	Medi		25 th		75 th			mum	Maxi	umum
			perc	entile	perce	ntile				
	PK	NON	PK	NON	PK	NON	PK	NON	PK	NON
D26A	0	0	0	0	0	0	0	0	2	10
D26B	1	1	l	1	1	1.75	1	1	1	2
D27A	0	0	0	0	0	0	0	0	2	0
D27B	1	n/a	l	n/a	1	n/a	1	n/a	1	n/a
D28A	0	0	0	0	0	0	0	0	3	10
D28B	1	1	1	1	1	1.5	1	1	1	2
D29A	0	0	0	0	0	0	0	0	2	3
D29B	1	1	1	1	1	1	1	1	1	1
D30A	0	0	0	0	0	0	0	0	2	3
D30B	1	1	1	1	1.5	1	1	1	1.5	1
D31A	0	0	0	0	0	0	0	0	2	10
D31B	1.5	i	i	1	2	2	1	I	2	2
D32A *	0	0	0	0	0	1	0	0	3	10
D32B	1.3	1	i	1	1.5	1.5	1	1	1.5	2
D33A	0	0	0	0	0	0	0	0	2	7
D33B	1.5	1	1	1	2	2	ī	ı	2	2
D34A	0	0	0	0	0	0	0	0	5	6
D34B	2	1	2	1	2	l	2	1	2	1
D35A	0	0	0	0	0	0	0	0	5	1
D35B	1	1	0	1	2	1	0	1	2	1
D36A	0	0	0	0	0	0	0	0	2	3
D36B	1	1	l	1	1	1	1	1	1	1
D37A	0	0	0	0	0	0	0	0	2	4
D37B	1	2	1	1	1	2	Ī	1	l	2
D38A	0	0	0	0	0	1	0	0_	5	10
D38B	1	1	1	1	1.15	1.5	1	1	1.2	2
D39A	0	0	0	0	0	0	0	0	5	10
D39B	2	2	1	1	2	2	1	1	2	2
D40A	0	0	0	0	0	0	0	0	5	6
D40B	1	1	1	1	2	1	l	1	2	1
D41A	0	0	0	0	0_	1	0	0	5	10
D41B	1	1	1	1	1	2	1	1	1	2
D42A	0	0	0	0	0	0	0	0	1	8
D42B	1	1	ı	1	1	1.75	1	1	1	2
D43A	0	0	0	0	0	0	0	0	2	8
D43B	1	1	1	1	1	1	1	1	1	1

APPENDIX 6 (continued) :Summary of descriptive statistics comparing puppy class graduates (PK) and non-puppy class dogs (NON)

Question	Medi	ian	25 th		75 th		Mini	mum	Maxiumum	
				entile	perce	ntile			1	
	PK	NON	PK	NON	PK	NON	PK	NON	PK	NON
D44A	0	0	0	0	0	1	0	0	5	10
D44B	I	1	1	1	2	2	1	l	2	2
D45A	0	0	0	0	0.75	4.25	0	0	6	10
D45B	1.5	1	1	1	2	2	1	1	2	3
D46A	0	0	0	0	0	0	0	0	8	0
D46B	1	n/a	1	n/a	1	n/a	1	n/a	1	n/a
D47A	0	0	0	0	0	0	0	0	5	10
D47B	2	1	1	1	2	2	l	1	2	2
D48A	0	0	0	0	0	0	0	0	5	10
D48B	1	1.5	1	1	1.75	2	1	1	2	2
D49A	0	0	0	0	0	0	0	0	1	10
D49B	1	2	1	2	1	2	1	2	1	2
D50A	0	0	0	0	0	0	0	0	4	10
D50B	1.5	ì	1	l	2	2.5	l	1	2	3
D51A	0	0	0	0	0	0	0	0	6	10
D51B	ı	1	ı	1	2	2	1	1	2	2
D52A	0	0	0	0	0	0	0	0	7	10
D52B	2	1	1	1	3	2	1	1	3	2
D53A	0	0	0	0	0	0.25	0	0	5	10
D53B	2	1	1.3	1	2.38	2	1	1	2.5	2
D54A *	0	0	0	0	0	0	0	0	2	10
D54B	1	ì	1	1	1	2	1	1	1	3
D55A	0	0	0	0	0	0	0	0	7	10
D55B	1.5	1	1	1	2.75	2.5	1	I	3	3
D56A	0_	0	0	0	0	0	0	0	3	10
D56B	l	1	1	1	1	1	1	1	1	1
D57A	0	0	0	0	1	1	0	0	3	10
D57B	ì	1	1	1	1	1.75	1	1	1	3
D58A	0	0	0	0	0	0	0	0	7	10
D58B	1.5	1	1	1	2	1.75	1	1	2	2
D59A	0	0	0	0	0	0	0	0	4	10
D59B	1	ī	1	1	2	2.25	1	1	2	3
D60A	0	0	0	0	0	2	0	0	7	10
D60B	1.5	1	1	I	2	2	1	1	2	2
D61A	0	0	0	0	0	3	0	0	5	10
D61B	1	1	1	1	2	2	1	1	2	3

APPENDIX 6 (continued) :Summary of descriptive statistics comparing puppy class graduates (PK) and non-puppy class dogs (NON)

Question	Medi		25 th	(, , , , , ,	75 th			mum	Maxiumum	
			l	entile	perce	ntile				
	PK	NON	PK	NON	PK	NON	PK	NON	PK	NON
D62A	0	0	0	0	5	4.25	0	0	10	10
D62B	1.5	1	1	1	2.25	2	ı	1	3	3
D63A	0	0	0	0	0.5	0.5	0	0	7	10
D63B	1.5	1.5	1	1	2.25	2	1	1	3	3
D64A	0	0	0	0	0	1	0	0	10	10
D64B	1	2	1	l	2.5	2	1	1	3	3
D65A	0	0	0	0	0	0	0	0	7	10
D65B	i	l	1	1	2.5	2	1	1	3	3
D66A	0	0	0	0	0	1	0	0	10	10
D66B	1	1	1	l	2.5	1.75	1	1	3	2_
D67A	0	0	0	0	0	0	0	0	7	10
D67B	1.5	1	1	1	2.63	2	1	1	3	2
D68A	0	0	0	0	3	4	0	0	10	10
D68B	1.5	1.5	l	1	2.75	2	1	1	3	3
D69A	1	1	0	0	9	5	0	0	10	10
D69B	2	2	1	1	2	2	1	i	3	3
D70A	0	0	0	0	5	5	0	0	10	10
D70B	1.5	1	1	1	2	2	1	1	2.5	3
D71A	0	0	0	0	0	0	0	0	4	0_
D71B	2	n/a	2	n/a	2	n/a	2	n/a	2	n/a
E1	2	2	1	1	2	2	1	0	2	2
E2A	0	0	0	0	0	0.5	0	0	3	5
E2B	2	2	2	2	2	3	2	2	2	3
E3A	0	0	0	0	0.75	0	0	0	3	2
E3B	2	2	1	2	2	2	2	2	2	2
E4A	0	0	0	0	1.75	2	0	0	6	7
E4B	1.5	2	1	2	2	2.5	1.5	2	2	3
E5A	0	0	0	0	0	0	0	0	0	0
E5B	n/a	n/a	n/a	n/a	n/a	n/a_	n/a	n/a	n/a	n/a
E6A	0	0	0	0	1.5	0	0	0	0	0
E6B	1	n/a	1	n/a	1	n/a	1	n/a	1	n/a
E7A	0	0	0	0	0	0	0	0	2	0
E7B	1	n/a	1	n/a	i	n/a	1	n/a	1	n/a
E8A	0	0	0	0	0	0	0	0	2	3
E8B	1	1	1	1	1	1	1	1	1	1
E9A	0	0	0	0	0	0	0	0	1	4

APPENDIX 6 (continued) :Summary of descriptive statistics comparing puppy class graduates (PK) and non-puppy class dogs (NON)

Question	Med	ian	25 th		75 th		Mini	Minimum		Maxiumum	
			perc	entile	perce	ntile					
	PK	NON	PK	NON	PK	NON	PK	NON	PK	NON	
E9B	I	1	1	1	1	1	1	1	1	1	
E10A	0	0	0	0	0	0	0	0	1	3	
E10B	l	1	1	1	1	1	1	1	1	1	
EllA	0	0	0	0	0.88	1.25	0	0	2	10	
EIIB	I	1.5	l	1	1.25	2.25	1	l	2	3	
E12A	0	0	0	0	0	0.75	0	0	4	8	
E12B	1	1.5	l	1	2	2	1	1	2	2	
E13A	0	0	0	0	2	2	0	0	5	10	
E13B	I	ı	ì	1	1	2	1	1	2	3	
E14A	0	0	0	0	0	0	0	0	2	3	
E14B	1	1	1	1	1	1.5	1	I	1	2	
E15A	0	0	0	0	I	2.75	0	0	7	10	
E15B	1	i	l	1	1	1	1	1	2	2	
E16A	0	0	0	0	1	1	0	0	3	9	
E16B	I	ı	1	1	1	1	i	1	1	3	
E17A	0	0	0	0	0	0	0	0	3	9	
E17B	1	1	1	1	1	2	1	1	1	2	
E18A	0	0	0	0	0	1	0	0	3	9	
E18B	ī	1	1	1	1	1	1	1	1	2	
E19A	0	0	0	0	0	1	0	0	2	10	
E19B	1	1	1	1	1	1.75	1	1	1	2	
E20A *	0	0	0	0	0	4	0	0	3	10	
E20B	1	1	l	1	1.25	1.75	1	1	2	2	
E21A	0	0	0	0	0	0	0	0	1	10	
E21B	2	2	2	2	2	2	2	2	2	2	
E22A	0	0	0	0	1	1.5	0	0	6	10	
E22B	2	1.5	1.3	1	2.75	2	1_	1	3	2	
E23A	0	0	0	0] 1	1.75	0	0	3	10	
E23B	2	1.5	1.3	1	2.75	2.75	1	1	3	3	
E24A	1	0.75	0	0	3.5	5.75	0	0	8	10	
E24B	1	2	1	1	2	2	I	1	2	3	
E25A	0	0	0	0	0.5	2.5	0	0	10	9	
E25B	1	1	1	1	2.25	2	1	1	3	3	
E26A *	0	0	0	0	1	4	0	0	3	10	
E26B	1	1	1	1	1.5	I	0	1	2	2	
E27A	0	0	0	0	3	2	0	0	10	10	

APPENDIX 6 (continued) :Summary of descriptive statistics comparing puppy class graduates (PK) and non-puppy class dogs (NON)

* Signification	Medi		25 th	<u> </u>	75 th	șii idilie c		mum	Maxiumum	
Q 4 4 5 4 1 5 1 1	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			entile	perce	ntile	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		WILLAN	ишиш
	PK	NON	PK	NON	PK	NON	PK	NON	PK	NON
E27B	1	1	1	1	1	2	1	1	3	2
E28A	0	0	0	0	0	0	0	0	2	5
E28B	1	1	1	1	1	1	1	1	Ti T	1
E29A	0	0	0	0	1	ī	0	0	10	7
E29B	I	1	1	i	1	1	1	1	3	1
E30A	0	0.5	1	0	2	4	0	0	10	10
E30B	1	1.5	0	1	1	2	1	1	2	3
E31A	1	i	1	0	4	9	0	0	10	10
E31B	1	2	1	1	2	2.25	1	ī	3	3
E32A	0	0	0	0	0	0	0	0	0	10
E32B	n/a	1.75	n/a	1.125	n/a	2.75	n/a	1	n/a	3
FIA*	3	5	0	2	7	8.5	0	0	10	10
FIB	1.9	2	1	1	2	2	1	1	3	3
F2A	0	2	0	0	6.25	6.5	0	0	10	10
F2B	2	2	1	1	2.5	2	I	1	3	3
F3A	3	2	0	0	8	9	0	0	10	10
F3B	1.5	2	1	1	3	2	1	1	3	3
F4A	0	0	0	0	3.25	2	0	0	10	10
F4B	i	1	1	1	2	2	1	1	2	3
F5A	1	0	0	0	6.25	7.5	0	0	10	10
F5B	1.5	2	1	1	2	2	1	1	3	3
F6A	0	0	0	0	2.5	0	0	0	10	10
F6B	1.3	2	1	2	2	2	1	2	2	2
F7A	0	0	0	0	5	3	0	0	10	10
F7B	1	1	1	1	2	2	1	1	3	3
F8A	0	1	0	0	4	3	0	0	10	10
F8B	1	1	1	1	2	2	1	0	3	3
F9A	0	0	0	0	0	0	0	0	10	10
F9B	2	2	1	1	2.5	2	1	0	3	0
F10A	1	0	0	0	3.5	4	0	0	10	10
F10B	1.8	1.5	1	1	2	2	1	1	3	3
FIIA	0	0.5	0	0	2	5.5	0	0	10	10
FIIB	1	1.5	1	1	2	2	1	1	3	3
F12A	0	0	0	0	2	2	0	0	10	10
F12B	1	1	1	1	1	2	1	1	3	3
F13A	0	0	0	0	1	1.25	0	0	10	10

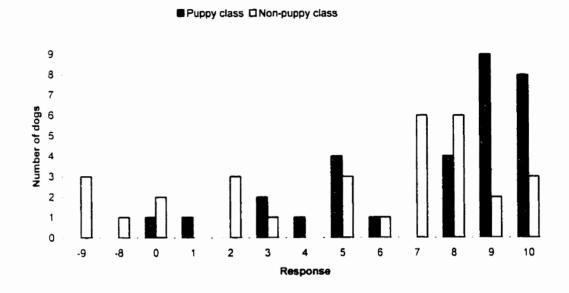
APPENDIX 6 (continued) :Summary of descriptive statistics comparing puppy class graduates (PK) and non-puppy class dogs (NON)

Question	Median		25 th		75 th		Minimum		Maxiumum	
Question	Wittuan		percentile		percentile		William		Wiaxiumum	
	PK	NON	PK	NON	PK	NON	PK	NON	PK	NON
F13B	1	1	1	1	2	2	1	1	3	3
F14A	0	0	0	0	3.25	0	0	0	10	10
F14B	1	1.5	1	1	2	2	1	ī	3	2
F15A	1	0	0	0	6.25	0	0	0	10	10
F15B	1.5	1	1	1	2	2	1	1	3	2
F16A	0	3	0	0	2.5	9	0	0	10	10
F16B	1.3	2	1	1	2	2	1	1	3	3
F17A *	0	4	0	2	5	8	0	0	10	10
F17B	1	1.5	1	1	2	2	ı	1	3	3
F18A	0	0	0	0	4	0	0	0	10	6
F18B	1.5	l	1	1	2	3	1	1	2	3
F19A	2	2	0.5	0.75	5	7	0	0	10	10
F19B	1	1	1	1	2	2	1	i	2	3
F20A	0	0	0	0	2	4.25	0	0	10	10
F20B	1	1	1	1	1	1.75	l	1	3	3
F21A	0	0	0	0	0	0	0	0	10	10
F21B	2	2_	2	2	10	3	2	2	10	3
Gl	8	9	5	4	10	10	0	0	10	10
G2 *	2	7.5	0	2	7.5	10	0	0	10	10
G3	0	0	0	0	0	0	0	0	10	5
G4	0	0	0	0	0	1	0	0	4	5
G5	0	0	0	0	0	0	0	0	0	0.5
G6	0	0	0	0	0	0	0	0	10	10
G7	0	0	0	0	1.5	4	0	0	10	10
G8	0	0	0	0	3	1	0	0	5	10
G9	0	0	0	0	0	0	0	0	0	1
G10	0	0	0	0	0	0	0	0	0	0
G11 *	2	5	0	1.75	5	10	0	0	10	5
HI	8	8	7	7.5	9	10	1	3	10	10
H2	9	9	8	8	10	10	7	4	10	10
H3	9	7	6	5	9	10	2	0	10	10
H4	3	3	0	0	9	8	0	0	10	10
H5 *	8	7	6	5	10	10	0	0	10	10
[]	0	0	0	0	10	6.25	0	0	40	50
12] 0	0	0	0	0	0	0	0	10	50

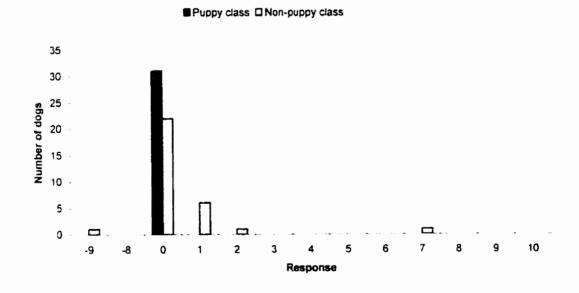
APPENDIX 6 (continued) :Summary of descriptive statistics comparing puppy class graduates (PK) and non-puppy class dogs (NON)

Question	Median		25 th percentile		75 th percentile		Minimum		Maxiumum	
	PK	NON	PK	NON	PK	NON	PK	NON	PK	NON
I3 *	0	0	0	0	0	5	0	0	10	20
[4	0	0	0	0	0	0	0	0	90	10
15	0	0	0	0	10	10	0	0	20	70
[6 *	0	0	0	0	0	10	0	0	10	90
17 *	0	0	0	0	0	10	0	0	40	50
18	0	0	0	0	0	0	0	0	90	10

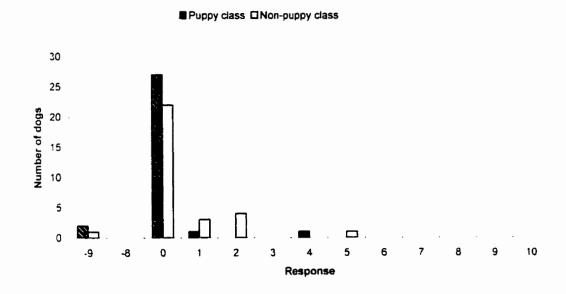
Question A9: Frequency of approaches to unfamiliar dogs away from the home in a friendly manner



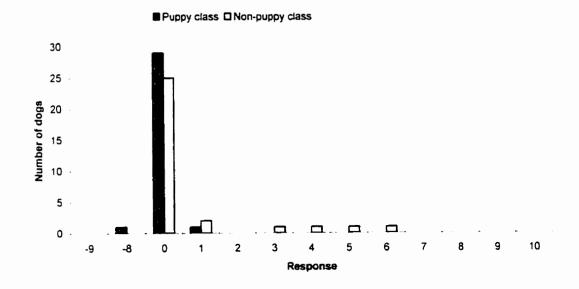
Question B3: Frequency of urination in the home when owners are not home



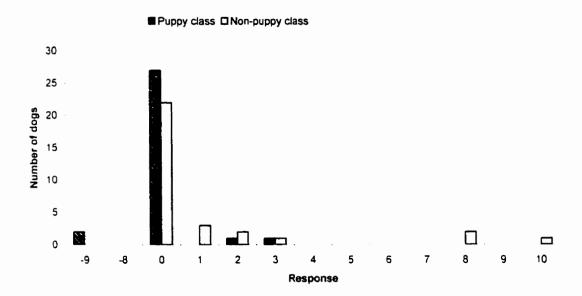
Question D18A: Frequency of aggression when accidentally injured by a member of the household



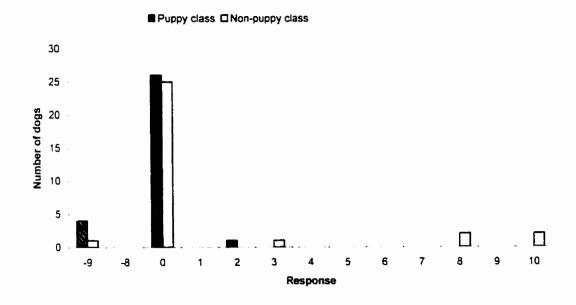
Question D19A: Frequency of aggression when being disciplined (verbally and/or physically) by a member of the household



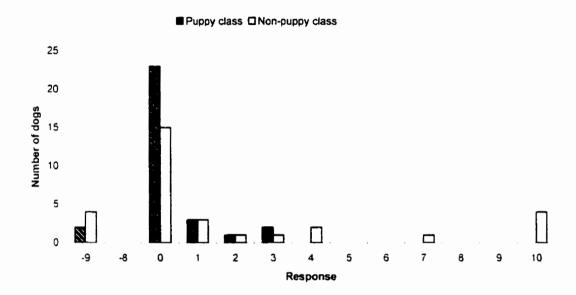
Question D32A - Frequency of aggression when being played with by a familiar person



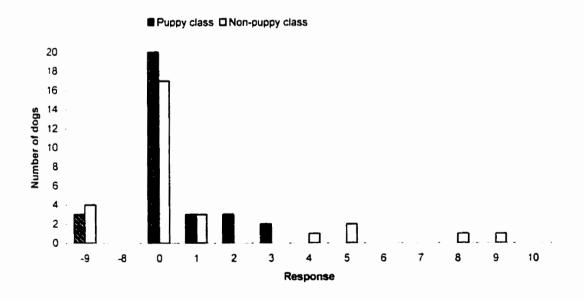
Question D54A: Frequency of aggression when played with by an unfamiliar person



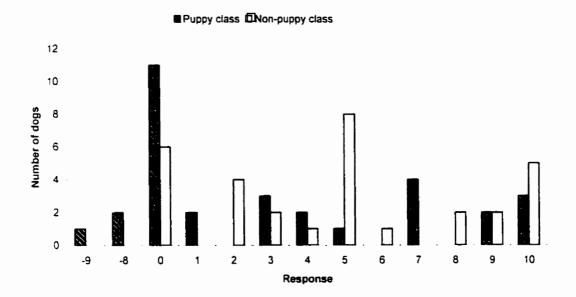
Question E20A - Frequency of aggression when the familiar dog enters the owner's property



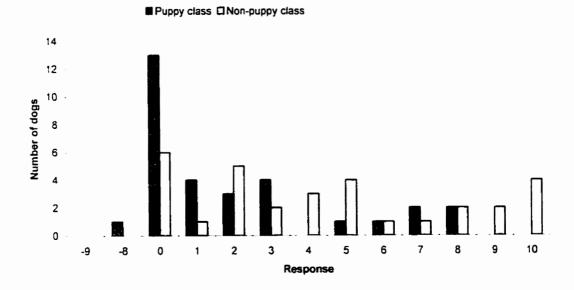
Question E26A - Frequency of aggression when a household member is giving attention (for example, petting) to an unfamiliar dog



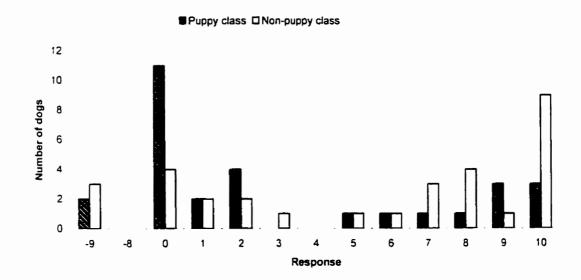
Question F1A - Frequency of fear to loud and sudden noises (for example, objects falling, gun shot, vacuum cleaner) excluding thunderstorms, fireworks and car noises



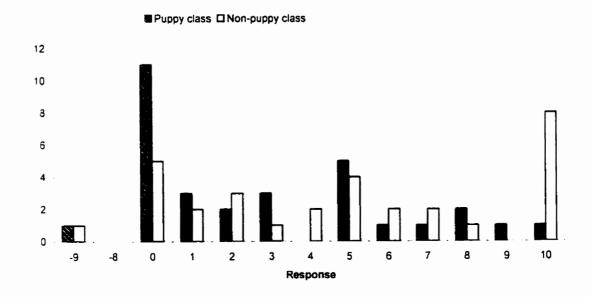
Question F17A - Frequency of fear when first exposed to unfamiliar situations (for example, the first time in an elevator and/or the first visit to a veterinarian)



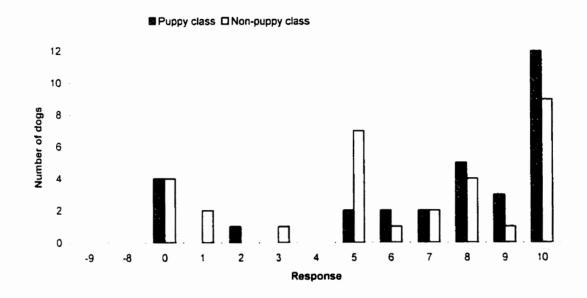
Question G2 - Frequency of escaping from the yard and roaming free if given the opportunity (for example, not tied up or gate is left open)



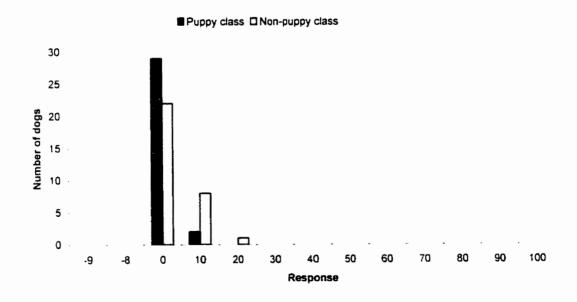
Question G11 - Frequency of begging when humans have food



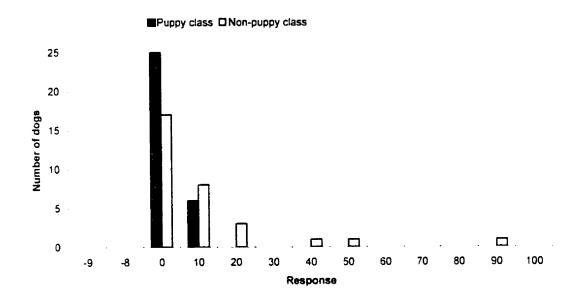
Question H5 - Frequency of retrieving objects such as balls and sticks when thrown



Question I3 - Frequency of chasing own tail/hind end (for example, spinning in circles)



Question I6 - Frequency of licking at other objects/people excessively



Question I7 - Frequency of pacing

