



RESEARCH

The prevention of undesirable behaviors in dogs: effectiveness of veterinary behaviorists' advice given to puppy owners

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KEYWORDS:

behavioral advice;
dog;
prevention;
puppy;
undesirable behaviors

Abstract The management of puppies is considered of great importance in raising well-behaved adult dogs. This research aimed to assess the effectiveness of advice provided by a veterinary behaviorist regarding puppy-raising practices.

Forty-six puppy owners received advice by a veterinary behaviorist concerning puppy raising during the puppy's first visit to a veterinarian. A control group was composed of 43 different dogs whose owners were not counseled by a veterinary behaviorist during the puppy's first veterinary visit. Owners were interviewed about their dog's behaviors at the time of their 1-year booster vaccination visit. The 89 dogs were clinically healthy, between 11 and 18 months old, 53% females and 47% males, of various or mixed breeds.

Dogs whose owners received advice displayed less undesirable behaviors than the control group, such as: house soiling (2% vs 23%; $\chi^2 = 19.50$; $P < .01$), mounting (26% vs 49%; $\chi^2 = 12.11$; $P < .05$), nonstop playing (0% vs 12%; Fisher's exact test $P < .05$), mouthing of people (11% vs 37%; $\chi^2 = 7.15$; $P < .01$), begging for food (17% vs 42%; $\chi^2 = 5.31$; $P < .05$), or demanding food from the table (0% vs 12%; Fisher's exact test $P < .05$). Moreover, the experimental group showed less aggressive behaviors toward unknown people (26% vs 2%; Fisher's exact test $P < .01$) and dogs (16% vs 2%; Fisher's exact test $P < .05$).

The advice provided was effective in diminishing the incidence of undesirable behaviors in the dogs studied. The positive effect of a behaviorist's advice is remarkable given that the puppies in the experimental group had remained with their mother and littermates for less than 2 months, which is believed to be a high-risk condition for development of behavioral disorders.

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Introduction

It is every behaviorist's hope to see a dog that they would like to own or have as a neighbor—a dog that can socialize

with other dogs, cope with the stresses of modern living, behave in a way that is acceptable to the wider community—and an owner that is fully informed about responsible dog ownership (Judson, 1995).

Behavioral problems are one of the major reasons behind dog abandonment, disposal (Arkow and Dow, 1984; Scarlett et al., 2002), and euthanasia (Landsberg, 1991; Overall, 1997), even with dogs under 1 year of age (Heath, 1992). After all, an animal's behavior plays an

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important role in influencing its owner's perception of, and attachment to, their pet (Serpell, 1996). It is important, therefore, to take measures early on to prevent the onset of behavioral problems, both by properly managing the genetic selection of pets and by providing information about species, breed, gender, age, and individual pet characteristics to the future owner to make a well-considered choice (Landsberg, 1991; Overall, 1997). In addition, when choosing a puppy, general observations of its behavior should be made, although no formal temperament tests have been found to reliably predict adult behavior (Landsberg, 1991; Wilsson and Sundgren, 1998).

Once the puppy has been acquired, the first veterinary examination is an important opportunity to provide owners with the information required to properly manage the puppy. Many dog owners are not aware of normal puppy or adult dog behavior, what can be expected in raising it (Landsberg et al., 2003), and how to deal with any problems that may arise. Therefore, it is recommended that owners be taught about normal canine behavior, behavioral ontogeny, the meaning of reinforcement and punishment, how to recognize potential behavior problems, and how to change them as soon as they are identified.

It is also suggested that intervention should be undertaken during the socialization period, which is marked by a quick development of social behavioral models (Scott and Fuller, 1965). Pageat (1999) reports that at this stage, processes start that will affect the dog's behaviors all through his lifetime: acquisition of self-control, intra- and interspecific communication, primary socialization (species identification), rules of group life (ie, hierarchization), detachment, exploration of the environment, and socialization with man.

Although it is universally accepted that early measures are particularly effective in reducing the number of adult dogs showing undesirable behaviors, and that many behavioral problems potentially derive from a lack of knowledge of canine ethology by owners, scientific research in this sphere is still limited. Studies that have defined boundaries of canine sensitive periods have been conducted on laboratory dogs, where social conditions (eg, isolation from human beings or conspecifics) could be manipulated and made absolute. Although it is generally accepted that the upper limit of the socialization period is around 12 weeks, a certain discrepancy emerges, since fundamental studies have reported the possibility of recovery in dog-human interaction even after 16 weeks of isolation (Scott and Fuller, 1965), and Freedman et al. (1961) suggests 14 weeks of age for the upper limit. To our knowledge, studies exploring the socialization period in pet dogs are lacking. Conditions where minimum and incremental levels of exposure to social and environmental stimuli are guaranteed could lead to different results about the length and timing of behavioral development periods. Jagoe (1994), who studied possible correlations between the dog's early experience and environment from birth to 16 weeks of age and the display of

behavioral problems, found few associations between the age when puppies were first taken out into public areas and neophobic responses. This finding along with clinical reports (Dehasse, 1994) are in line with the current use of the term *sensitive*, and not *critical*, periods, underlining the graduality of boundaries within which particular responses or preferences are acquired more easily than at other times (Serpell and Jagoe, 1995).

This study aimed to assess the effectiveness of correct information on puppy management in preventing the onset of undesirable behaviors in adult dogs, as provided to puppy owners by a veterinary behaviorist soon after the puppy's adoption. For the purpose of this experiment, the expression "undesirable behaviors" is defined to include all behaviors displayed by the dog that are considered annoying or unacceptable by the owner or human society. This study did not evaluate canine pathological behavioral conditions that may be equivalent to certain human psychiatric conditions (Overall, 2000); an investigation that includes these pathologies might produce very different results.

Materials and methods

Animals

This prospective study was conducted in a veterinary clinic using a sample of 89 dogs, which was divided into 2 groups (experimental and control group) according to whether it was the first-year vaccination or the first yearly vaccination booster visit. The experimental group (A) consisted of 46 dogs (21 males and 25 females). The puppies had been taken to their first veterinary examination for routine vaccinations after at least 15 days from adoption, at an average of 4.9 ± 1.7 months of age (mean \pm standard deviation). At the first examination, besides the general practitioner, a veterinary behaviorist was present. The latter spent 1 hour with the owners, giving them behavioral advice in a standardized format (Table 1). These dogs were observed again at the first yearly vaccination booster visit (13.3 ± 1.3 months of age), and the owners were interviewed about their dog's and their behaviors since adoption. The veterinarians were the same involved in the first examination.

Group B was composed of 43 dogs (21 males and 22 females) that had been seen by the general practitioner for the first routine vaccinations but had received no behavioral advice. These dogs, as with dogs in Group A, were only observed once at an average age of 13.6 ± 2.1 months during their yearly vaccination booster visit. The owners were interviewed in the presence of the veterinary behaviorist involved with group A. These owners made up the control group.

The 2 groups were similar in age and gender, with no statistical difference in the composition of the groups. In both groups, 78% ($n = 69$) of the subjects were aged between 11 and 14 months, and 22% ($n = 20$) were

Table 1 Behavioral advice provided to owners in the experimental group (A)

Canine Ethology	<ul style="list-style-type: none"> • Division of behavioral ontogeny in five sensitive periods, paying great attention to the importance of gradual exposure to social and environmental stimuli within the socialization period (considered to span 3-16 weeks of age). • Importance of and ways to create a good bond after adoption. How and when to encourage generalization of attachment from a specific person to all the family members. • Improvement in the communication skills of the owners, teaching them how to read and mime canine communication, paying great attention to visual and non-verbal communication (postures, gestures etc.). • Importance of environmental enrichment and play. • Leadership without force program, explaining the importance of the owner taking the initiative and controlling resources (space, food, reproduction.)
Basic training	<ul style="list-style-type: none"> • Types of reinforcement and punishment. Negative effects of positive punishment and negative reinforcement. • Basic elements of classic and operant conditioning. • The owner as initiator of interactions. The owner decides when to play with the dog, stroke it, give it food etc. Negative effects of rewarding persistent requests and attention-seeking behaviors. • Intra- and interspecific socialization programs (without the help of a professional, such as taking the dog for a walk frequently in public areas and allowing social interactions if the dog was not showing aggressive behavior). • Housetraining: taking the dog out frequently, especially after meals and rest periods; not punishing the dog for eliminating in the house; rewarding the dog immediately upon eliminating outdoors. • Habituation to staying home alone, starting as soon as possible; with a gradual increase in the time spent alone; leaving some toys available.

between 15 and 18 months old; 47% ($n = 42$) of the animals were male, and 53% ($n = 47$) were female. Thirty-three percent ($n = 29$) of the dogs were of mixed breed, whereas 67% ($n = 60$) were of various breeds, many of them large breeds, of groups recognized by the Fédération Cynologique Internationale.

Most of the dogs (97%, $n = 86$) in both groups had had no other owner. All animals were clinically healthy, as they had no ongoing or previous illnesses; in addition, they were taking no drugs. The presence of pathological behavioral conditions was ruled out.

Questionnaires

Data were collected by means of a 72-item questionnaire containing closed and half-open questions, identical for both groups, during the first yearly vaccine booster visit. All dogs and owners were recruited through the Veterinary Clinics of the University of Pisa (Italy).

The questionnaire was completed by the behaviorist during a direct interview with the owners in the presence of the dog. The questionnaire was divided into 7 sections: owner's personal details, dog's anagraphical data, medical history (health problems, surgeries, medications, etc.), behavioral development, and dog's environment, training, and behaviors. For the latter, the veterinary behaviorist who completed the questionnaire asked the owners to describe the dog's behavior in specific situations (eg, what is your dog's behavior when left alone?). These answers were interpreted to fit into predetermined categories; for

descriptions that were ambiguous, nonspecific, or pertaining to complex behaviors, more detailed information was obtained from the owners to understand their responses (eg, to investigate aggression: "When your dog meets an unknown dog, does it bark, raise its hackles, growl, lunge, bite?"). When questions were half-open, similar answers were grouped into categories for analysis. In the last section, some owners' behaviors related to the advice given to owners in the experimental group were investigated.

Statistical Analysis

The number of observations in both groups was compared with the Chi-square test ($P < .05$); when the expected frequency of the observations was lower than 5, the Fisher's exact test was used ($P < .05$). Data are presented in percentage form for ease of interpretation.

Results

As the questionnaire is very long and complex, only the results that are most relevant to this research will be described.

Owner's personal details

Sample owners for the 2 groups had perfectly comparable features for the test variables, so the average data from the combined groups will be given. Sixty percent

($n = 53$) were women; as to age, 52% ($n = 46$) were aged 18 to 30, 34% ($n = 30$) 31 to 50, and 14% ($n = 13$) were older than 50. Their educational level was medium-high; at least 87% ($n = 77$) had attended at least secondary school. Most of the owners in both groups (91% ($n = 42$) of A vs 81% of B ($n = 35$); $P = .221$) had owned dogs before.

Dogs' behavioral development

No significant difference was found between groups in terms of the dam's parity. Regarding the time they had stayed with their mothers, a significantly higher number (48%, $n = 22$ vs 23%, $n = 10$; $\chi^2 = 4.484$; $df = 3$; $P < .05$) of puppies in the test group had stayed with their mothers less than 2 months; the same result was found for staying with littermates (41%, $n = 19$ vs 19%, $n = 8$; $\chi^2 = 4.398$; $df = 3$; $P < .05$). Fifty-four percent ($n = 25$) of the puppies in the test group had been adopted before the age of 2 months versus 35% ($n = 15$) in the control group ($\chi^2 = 10.14$; $df = 3$; $P < .01$). The number of puppies in the litter, however, was similar in both groups (mean values: 5.8 for A and 4.9 for B; $\chi^2 = 3.254$; $df = 3$; $P = .479$). The distribution of subjects with respect to puppies' origin (kennel, breeder, shop, foundling, born at home), and birthplace (exposure to dogs other than the mother, to different kinds of people, to noises) was equivalent between groups A and B.

Dogs' environment

Sixty percent ($n = 53$) of the dogs lived in an urban area, and as many as 71% ($n = 63$) of the total lived in houses with a garden. There was no difference regarding the presence or absence of conspecifics in the living environment (25%, $n = 11$ of group A vs 33%, $n = 14$; $\chi^2 = 0.843$; $df = 3$; $P = .359$).

Regarding the dogs' sleeping place, a higher number of the dogs in the control group slept in the owner's bedroom (28% [$n = 12$] of the control group vs 6% [$n = 3$] of the experimental group; $\chi^2 = 5.81$; $df = 3$; $P < .05$).

For dogs in the control group, toys were always kept at their disposal in 65% of cases ($n = 28$), whereas this was the case in just 6% ($n = 3$) of the dogs in the experimental group ($\chi^2 = 31.08$; $df = 3$; $P < .01$).

Dog training

For 28% ($n = 13$) of the owners of group A, the veterinary behaviorist involved in this research was the only source of behavioural advice; 30% ($n = 13$) of owners in group B did not ask for any advice at all, from any source. In both groups, one third of people contacted dog trainers for behavioral recommendations ($\chi^2 = 0.000$; $df = 3$; $p = .990$), and the remaining owners contacted general veterinary surgeons (22% of group A [$n = 10$] vs 33% of B ($n = 14$); $\chi^2 = 0.829$;

$df = 3$; $p = .363$) or veterinary behaviorists (17% [$n = 8$] vs 7% [$n = 3$]; $\chi^2 = 1.368$; $df = 3$; $p = .242$). Notably, many of these dogs had attended formal training classes. In particular, more dogs in the experimental group had attended training courses, mainly for dog sports (85% [$n = 39$] vs 62% [$n = 27$]; $\chi^2 = 4.52$; $df = 3$; $p < .05$), whereas the control group had given priority to teaching courses, for basic obedience commands (28% [$n = 12$] vs 2% [$n = 1$]; $\chi^2 = 12.34$; $df = 3$; $p < .01$).

Dog's behavior:

The presence of gender differences was investigated in all behaviors displayed by the animals in the 2 groups. Only behavioral data that showed statistically significant differences will be described.

Concerning elimination behavior, it was observed that 98% ($n = 45$) of dogs in the experimental group eliminated appropriately outside the house, whereas only 77% ($n = 33$) of dogs in the control group did so (Fisher's exact test: $P < .01$). When the sample was divided by sex, a significant difference was found in inappropriate elimination behavior in females (27% [$n = 6$] in the control group vs 4% [$n = 1$] those in the experimental group; $df = 3$; $P < .05$), and nonsignificant ($P = .107$), although still marked, in males (19% [$n = 4$] vs 0% [$n = 0$]).

A significant difference in destructive behavior was found between the 2 groups, when the sample was divided by age of occurrence. Destructive behavior was more frequent in the experimental group before 4 months of age (17% [$n = 8$] vs 2% [$n = 1$]; Fisher's exact test, $P < .05$), but more frequent in the control group after 4 months (72% [$n = 31$] compared to 57% [$n = 26$]), although the latter difference was not statistically significant. No significant difference was observed in the type of objects destroyed.

The owners' behavior when finding destroyed objects was significantly different in the 2 groups, since the owners of the animals in group A scolded less (35% [$n = 16$] vs 81% [$n = 35$]) and ignored more (65% [$n = 30$] vs 19% [$n = 8$]) the dogs that showed such an undesirable behavior ($\chi^2 = 10.609$; $df = 3$; $P < .01$).

With respect to aggressive behavior, that directed toward people (9% [$n = 4$] vs 0% [$n = 0$]; $df = 3$; $P = .051$) or unknown people and dogs (16% [$n = 7$] vs 2% [$n = 1$]; $df = 3$; $P < .05$) were more often showed by the animals in the control group. In contrast, the dogs in the experimental group were more playful with unknown dogs (93% [$n = 43$] vs 74% [$n = 32$]; $df = 3$; $P < .05$) and strangers (80% [$n = 37$] vs 58% [$n = 25$]; $\chi^2 = 4.23$; $df = 3$; $P < .05$).

With respect to social interaction, the dog owners in the experimental group allowed their dogs to interact with strangers more than control group owners (100% [$n = 46$] vs 79% [$n = 34$]; Fisher's exact test $P < .01$). The remaining owners in the control group walked their dogs but did not allow them to interact with strangers ($n = 5$) or did

not walk their dogs ($n = 4$), although the latter might have interacted with unfamiliar people who visited the home. With unknown dogs, the owners in the 2 groups behaved in an equivalent manner, proving to be less willing to let them interact (78% [$n = 36$] in group A vs 65% [$n = 28$] in group B; $\chi^2 = 1.306$; $df = 3$; $P = .253$).

Twelve percent ($n = 5$) of the dogs in the control group showed persistent playing, whereas none in the experimental group did (Fisher's exact test, $P < .05$), and significantly more dogs in the control group mouthed people (37%, $n = 16$), compared to the experimental group (11%, [$n = 5$]. $\chi^2 = 7.15$; $df = 3$; $P < .01$).

The dogs in group A were less likely to show mounting behaviors (49%, $n = 21$) in comparison to those in group B (74% [$n = 32$]; $\chi^2 = 12.11$; $df = 3$; $P < .05$).

Other significant differences between groups were associated with the dogs behavior at owners' mealtimes. More dogs in the control group begged specifically during owners mealtimes (42%, $n = 18$) than those in the experimental group (17% [$n = 8$]; $\chi^2 = 5.31$; $df = 3$; $P < .05$), with more dogs in the control group insisting in demanding food (12%, $n = 5$) compared to none in the experimental group (Fisher's exact test [stat], $P < .05$). Differences in overall begging behaviors are still present between groups even where dogs were not allowed to be present during meal times, with control group dogs begging more ($\chi^2 = 4.514$; $df = 3$; $P < .05$) and demanding food more, although the latter was not significant.

The owners' behavior at mealtime was also different between groups, with the people in the control group giving the dog more food from the table both at the first (21% [$n = 9$] vs 0% [$n = 0$]; $P < .01$) or at repeated requests from the dog (16% [$n = 7$] vs 0% [$n = 0$]; $P < .01$).

We investigated whether the differences in the undesirable behaviors were to be found mostly in those dogs who had visited the veterinarian for the first time at less than 4 months of age. The authors chose to divide the sample using this age as the cutoff because we wanted to encompass the whole of the socialization sensitive period, considered to be the time frame after which, if the majority of "desirable behaviors" (however taught to or learned by the puppy) are not displayed, we thought it was advisable to investigate the differences. We are of the opinion that the behavioral development of large breed dogs may take longer, as does their physical development.

When comparing experimental group puppies whose owners received advice before the puppy was 4 months of age versus after, we observed that as to housesoiling, destruction, nonstop playing, mouthing people, and aggressiveness to unknown people and/or dogs, the advice had led to exactly the same results, regardless of the age of the puppy when the advice was given to the owner. The only difference, just above the significance threshold ($P = .073$), was found in the mounting of people, which turned out to be more frequent when the advice was supplied when the puppy was over 4 months old (34% [$n = 13$] vs 7% [$n = 6$]).

The behaviors of dogs owned by inexperienced and experienced owners in group A were compared to test the hypothesis that advice supplied by a behaviorist might be particularly useful for first-time owners. It was found that undesirable behaviors did not have a different incidence, whether the owners were first-timers or not (P always greater than .114). In this respect, no difference was found when the puppies of the first-time owners of the experimental and control groups were compared. No statistically significant differences were noticed as to the following:

- The dog's behavior with well-known people: playful in 100% of A ($n = 46$) and in 95% of B ($n = 41$); fearful in 0% of A ($n = 0$) and in 2% of B ($n = 1$); aggressive in 0% ($n = 0$) of A and in 2% of B ($n = 1$).
- The dog's behavior when left alone: barking in 26% of A ($n = 12$) and in 29% of B ($n = 12$); whining in 22% of A ($n = 10$) and in 33% of B ($n = 14$); urinating in 4% of A ($n = 2$) and in 7% of B ($n = 3$); defecating in 2% of A ($n = 1$) and in 2% of B ($n = 1$); destroying in 11% of A ($n = 5$) and in 9% of B ($n = 4$).
- Jumping at the owners, neither when they come back (35% of A [$n = 16$] vs 47% of B [$n = 20$]) nor in any other circumstance (24% of A [$n = 11$] vs 40% of B [$n = 17$]).
- Jumping at people entering the house: 15% of the dogs in the experimental group ($n = 7$) and 19% of the dogs in the control group ($n = 8$).
- Fear of: strangers (11% of A [$n = 5$] vs 21% of B [$n = 9$]); unknown dogs (17% of A [$n = 8$] vs 12% of B [$n = 5$]); storms (37% of A [$n = 17$] vs 21% of B [$n = 9$]); loud noises (41% of A [$n = 19$] vs 40% of B [$n = 17$]).

Discussion

It is a common belief that information given by skilled professionals can positively affect the type of bond that the dog establishes with other living beings and can make the integration of this animal in our society and in our daily life easier and more acceptable. In fact, as well as organic problems, according to Turner (1997) the causes of behavioral problems in companion animals correspond to: (1) disregard (or lack of knowledge) of the biological and sociopsychological needs of the animals; (2) false expectations of the owners projected onto the animals, either at the species or at the individual level; and (3) incorrect interactive behavior with the pet.

The results of this study show that dogs whose owners were given advice by a veterinary behaviorist behaved differently in many respects than those whose owners received no advice. Specifically, they showed less inappropriate elimination, disturbance of people while eating, aggression directed toward unknown people or dogs, persistent play behavior, and mouthing at or mounting their owners.

Comparison between the groups in this study was valid, since the characteristics of owners (such as whether they were first-time owners) and animals (such as age and sex)

were balanced between the groups. In this study, the effect of previous dog ownership did not influence the prevalence of unwanted behaviors, similar to the results in [Bennett and Rohlf \(2007\)](#). However, the number of first-time owners in the study reported here is relatively small, so the results should be viewed with some caution. Nevertheless, it seems that advice can be useful to all owners, regardless of their experience with dogs.

Leaving aside a breed-based analysis, because of the low number of animals from each breed group, little effect of dog gender was found on the effect of group. The exception to this finding was for inappropriate elimination behavior, where females in the experimental group showed this behavior more frequently than males if owners had not received advice about housebreaking. This difference may be owing to the sexual dimorphism observed in urinary behavior in the domestic dog ([Wirant and McGuire, 2004](#)). Because the studies on urination often focus on marking behavior ([Wirant et al., 2007](#)), there is no scientific evidence for the common anecdote that females tend to void for elimination versus marking purposes as compared to males. This possibility, which may explain the higher number of “incidents” during housetraining in females, needs to be further investigated.

The results about the effects of early behavioral advice, given to owners at or before puppies are 4 months of age, did not find any statistically significant difference in the puppies’ tendency to develop undesirable behaviors compared with owners who received such advice later. This point deserves further investigation, since most authors agree on the fact that early action is a significant factor in the prevention of behavioral disorders. Canine behavioral development is actually divided into sensitive periods of varying but still circumscribed length, during which habituation to social and physical stimuli is enhanced and outside which the possibility to learn specific abilities is thought to be remarkably reduced. It is suggested that during this time the puppy should be exposed to a wide variety of stimuli, so that he will learn the essential elements with which he or she can build his or her own future behavioral toolbox. However, our results clearly showed that this advice was helpful even when delivered to owners whose puppies were older than 4 months of age, which is usually considered to fall within the juvenile period. It could be that puppies in this period learn the importance of their own behavior and understand what behaviors are more appropriate to each situation ([Heath, 1999](#)).

The type of training that dogs received may have been an important factor in the development of undesirable behaviors ([Hiby et al., 2004](#)). When talking about what information we give and how we give dogs information for successful cohabitation with humans, it might be useful to distinguish among 3 subsets of information. Although the words educating, teaching, and training have been used interchangeably, their Latin roots imply subtle differences. These differences are still observed in a number of Romance

languages. *Educating* refers to the *upbringing* that builds the dog’s character; it includes the basic information needed to ensure a good bond between dog and owner. *Teaching* is the process by which the dog is given a body of knowledge useful for everyday life; it includes basic obedience commands. *Training* is the term that indicates specialized classes for specific tasks, for example, livestock herding, guide dogs ([Marchesini, 2007](#)). Making a comparison with children, *upbringing* occurs within the family nucleus, *teaching* occurs at school and provides a uniform and basic body of knowledge (usually, though not always, compulsory) and *training* is necessary for and specific to a career.

From the results of the study presented here, it appears that although significantly more puppies in the control group attended classes that focused on basic obedience commands, this did not reduce the appearance of undesirable behaviors. This finding is in agreement with [Seksel et al. \(1999\)](#), who found that attendance at puppy socialization classes was not related to occurrence of undesirable behavior in adulthood. One possible explanation is that puppies’ exposure to novel social and physical stimuli in the home environment may be sufficient, and an additional class aimed at “socialization” does not significantly improve the outcome, although how behavior problems are categorized in the various studies may not allow for a direct comparison of outcomes. [Voith et al. \(1992\)](#) also found that obedience training (equivalent to the teaching function previously defined) does not predict fewer behavior problems. Where training has been found to positively influence the human–canine interaction (eg, [Clark and Boyer, 1993](#)), the influence may be enhanced further with specific behavior counseling. Therefore, behavioral advice should be considered an important factor contributing to the development of a dog’s adult behavior and its relationship with owners ([Jagoe and Serpell, 1996](#)).

Besides a significantly reduced occurrence of undesirable behaviors in dogs, it was found that the behavioral advice had a great effect on the behavior of owners toward their dogs. An analysis of the answers shows that the owners in the experimental group used reinforcements and punishments more appropriately (they scolded less and ignored the dog more when they found destroyed objects), understood the importance of socialization (they let the puppies interact with unknown people and other dogs more than their counterparts in the control group), implemented a “leadership without force” program (control of resources: the owner takes the initiative, the dog does not sleep in the owner’s bedroom and does not have all toys available at all times) and did not involuntarily reward the animal’s undesirable behaviors (they did not feed them from the table either at the first or at the dog’s repeated requests). The differences observed in the dogs’ behaviors seem therefore to be related to the compliance of owners with the behaviorist’s advice.

This type of data collection obviously relies on the honesty of owners in accurately reporting their own and

their dog's behavior. In the case of group A, owners might try to please the advisor by withholding information about the dog's undesirable behaviors and their own low compliance. Results of owner compliance are being analyzed and prepared for future publication.

Preventive advice turned out to be particularly helpful in reducing the appearance of some undesirable behaviors, such as inappropriate elimination. Obviously a new puppy will not know what is expected in a new household. It is generally accepted that learning appropriate behaviors is achieved more reliably through reinforcing these responses, rather than punishing inappropriate behaviors (Seksell, 1997). As well as making learning appropriate behaviors more difficult, the use of punishment creates the risk of inducing fear in the dog, and hence reduces the trust that the dog has in the owner. Compliance with the advice about housetraining, therefore, may have a broader influence on the development of the dog-owner bond than just the success or otherwise of housetraining.

Another important result was found for destruction. It was observed that a significantly higher number of subjects in the experimental group destroyed objects, compared with the control group, up to 4 months of age. After the age of 4 months, when the amount of exploratory chewing naturally starts to decline in dogs, there is a trend reversal (not statistically significant). The higher incidence of destructive behavior in the experimental group could be related to the fact that a significantly higher number of these dogs remained with their mothers and the rest of the litter for less than 8 weeks (Pageat, 1999). But it could also be hypothesized that ignoring destructive behaviors initially may lead to a higher rate than would occur if chewing is inhibited by punishment. In the longer term, ignoring may lead to a lower rate because the dog is learning which behaviors are positively reinforced, and the lack of any punishment does not induce fear/conflict chewing or mouthing behaviors.

Both elimination in the house and destruction did not happen when the owner was away, since the behavior of the dogs in both groups when left on their own is totally comparable. One could assume, therefore, that this result derives not so much from a different level of attachment to the owners, but from a better understanding of the animal's needs and learning patterns (quantity and quality of activities, proper use of reinforcements and punishments, etc).

This finding could also explain why the number of dogs that persistently mouthed people or played persistently was lower in the experimental group. Following behavioral advice, owners had a proper attitude in their interaction with the animal, not reinforcing attention-seeking behaviors, deciding when it is play time, and giving enough enrichment. Play is an important part of development (Houpt, 1991). Social play is particularly important, because it helps puppies learn canine social rules, such as bite inhibition; but the play sessions must be controlled to achieve this end. Play that is too rough or boisterous can

frighten timid dogs and teach puppies bad habits (Seksell, 1997), such as gnawing hands or other body parts. Owners should be taught acceptable games to play with their pups that do not overstimulate the dog or possibly encourage aggression (Seksell, 1997; Pageat, 1999).

As to the dog's behavior with unknown dogs or people, we found that the dogs in the experimental group were more likely to initiate playful interactions. This finding would seem to be related to the owner's behavior with unknown people (allowing them to interact more), but not with unknown dogs. The dogs' wider opportunity to interact with unknown people is also probably the reason for the playful behavior, which is shown more often by dogs of the experimental group. It is suggested in the literature (Wright, 1983; Hubrecht, 1995), that puppies that do not have the opportunity to interact with other dogs during the socialization period may develop abnormal behavioral responses (aggressive or fearful responses) to other dogs later, just as puppies that are not adequately socialized with humans can exhibit undesirable responses to them. The latter are usually of greater concern to owners, especially when responses are aggressive (Beaver, 1983; Houpt, 1985). The lack of homogeneity between the dog-dog and dog-human play found by Rooney et al. (2000) seems to be confirmed by this study's results regarding the display of playful behavior with unknown dogs as well, even when the behavior of the owners of both groups is similar. This finding may be secondary to the difference existing between intra- and interspecific relationship and socialization.

In addition, the lower reported levels of "excitability" in the experimental group may have also had an effect on the development of aggressive behavior, as suggested by Guy et al. (2001). However, these results are not to be regarded as conclusive, since sometimes aggression in dogs, especially with respect to social status and inter-male aggression, is often not seen until the dog reaches social maturity, at 18-36 months of age (Overall, 1997).

As to mounting, another behavior that is particularly undesirable for the owners, the dogs of the experimental group showed it less than the dogs of the control group. In this study, it was not possible to identify the cause of mounting. One possible explanation is better control by owners of puppies in group A (achieved without force by simply controlling access to resources) and/or a lack of reinforcement when the dog used mounting as an attention-seeking behavior.

Finally, with respect to begging and demanding food from the table, it is often not owners, but guests or visitors who might find such behavior unacceptable. Hence the owners reinforce begging by giving the dogs food, and only find the behavior "undesirable" when it is directed at visitors or people eating in other situations (in a restaurant, in a park, etc.). "Behaving oneself" has been defined as "acting in a socially acceptable manner" (Horwitz et al., 2004). In this respect, explaining to the owners the importance of not rewarding the animal's asking for food from

the table means helping the dog fit into the human community. The results of this study do not at first appear to be consistent with Voith et al. (1992), who reported that spoiling activities (including feeding the dog at the table) were not related to problem behaviors. However, whereas Voith et al. (1992) recorded behaviors that were a problem to the owner, in the study reported here, any undesirable behavior was recorded, whether or not the owner found its occurrence problematic. Moreover, the investigation of owner and dog behaviors in a specific context may represent a more reliable assessment of the consequences of the owner's conduct on the dog's behavior.

In conclusion, behavioral counseling can be regarded as an effective tool to prevent the most widespread undesirable behaviors (Haupt, 1985). Contrary to the expectations of many owners, dogs do not instinctively know how to interact and behave in the human environment, and appropriate education and teaching are necessary to establish a good, positive, and satisfying interaction (Clark and Boyer, 1993). Since the behavior of pets contributes to the richness of their relationships with people (Hart and Hart, 1984), and owner's level of attachment is influenced by any discrepancy between their expectations of an ideal pet and the actual pet that they own (Serpell, 1996), reducing the number of undesirable behaviors in dogs can only have a positive effect on the strength and longevity of the dog-owner bond. The entire effect of giving owner advice on the bond between owner and dog may not be immediately apparent; influencing owners' perceptions of their dogs' needs and providing them with ethical training methods may well continue to influence how the dog interacts right through life. It is also likely to have a positive influence on the welfare of the dogs, although that was not measured directly in this study.

In addition, many dogs with behavioral problems are often relinquished (Salman et al., 2000). In this study it could not be investigated whether the lower proportion of undesirable behaviors also has a positive effect in reducing the number of animals that are abandoned, given away, or taken to an animal shelter. On the other hand, the only certain information we have is that none of the 46 puppies whose owners received advice moved to another household or to a shelter over 1 year of age. This is a good indication of a continuing strong relationship between owners and their dogs, especially as owners did not report behavior problems particularly associated with relinquishment, such as aggressiveness and inappropriate elimination (Scarlett et al., 2002). In this respect also, therefore, preventing the development of behavior problems through giving appropriate advice is of benefit to the welfare of dogs.

The genesis and maintenance of a strong bond between humans and pets are of paramount importance to veterinarians for ethical and economical reasons. Veterinarians cannot assume that new pet owners (whether first-time or more experienced owners) are knowledgeable about and capable of successful training (Scarlett et al., 2002). According to a recent study (Shaw et al., 2004), veterinarians

spend about half of their time providing information to their clients; 19% of such information concerns the pet's activities and interactions. Out of the total information provided to the client, 18% consists of counseling statements that are persuasive and motivating in nature, designed to influence the client's behavior. These proportions remarkably increase when the advice concerns the pet's behavior. First-opinion veterinarians should, therefore, have an adequate knowledge of the principles of behavioral advice to give to owners at the first puppy visit. The availability of educative material for vets, and behavior training within veterinary schools, is quite variable between countries and regions, but it is clearly an area where even basic levels of knowledge would have influence on the prevention of undesirable behaviors.

Conclusions

The results support the hypothesis that providing an owner with advice regarding their own behavior toward their puppy, and the appropriate education of their puppy, leads to better informed owners, but also dogs with reduced numbers of undesirable behaviors. Therefore, providing behavioral advice to puppy owners should be regarded as an effective tool and a service that should be provided by veterinarians for their clients.

Acknowledgement

The authors are grateful to Dr. Soraya Juarbe-Diaz for her technical help.

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