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Fearfulness and failure in training working dogs

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FEARFULNESS AND FAILURE IN TRAINING WORKING DOGS

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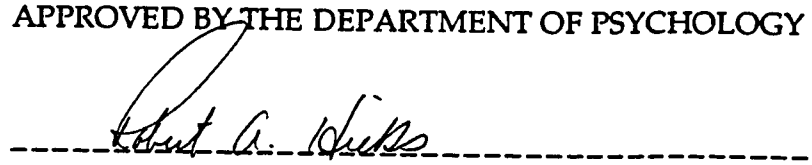

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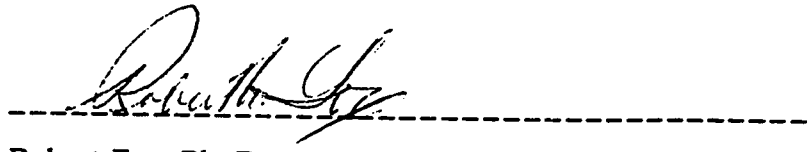

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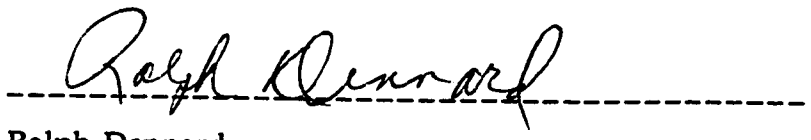

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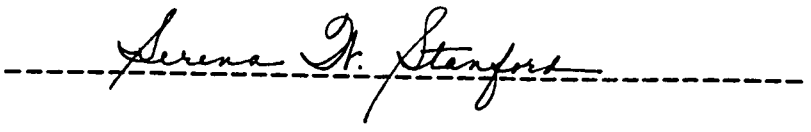

ABSTRACT

FEARFULNESS AND FAILURE IN TRAINING WORKING DOGS

by Steve Grunow

This study examines the specific fears related to the failure in training of hearing ("signal") dogs for the deaf, and service dogs for people who use wheelchairs. Subjects were 392 purebred, and 220 mixed breed dogs; 305 males and 307 females. Dogs in training were observed, and records of failed dogs were reviewed. A list of relevant fears was compiled, and their frequencies of occurrence were computed. An analysis of frequencies of occurrence of specific fears in relation to dogs' breeds and genders was performed using the chi-square procedure. Female dogs failed due to fearfulness significantly more frequently than males. Relevant fears were those of humans, traffic/public situations, novel environments/public situations, noise, and other dogs. Men and children were feared more frequently than women. Puppy socialization, fear-eliminating techniques, and pre-training screening to decrease fear-related failures are discussed.

ACKNOWLEDGMENTS

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TABLE OF CONTENTS

LIST OF TABLES

Fearfulness and Failure in Training Working Dogs

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Running Head: FEARFULNESS AND FAILURE

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Fearfulness and Failure in Training Working Dogs

Excessive fearfulness is a serious problem in guide dogs for the blind, service dogs for people who use wheelchairs, and hearing dogs for the deaf. According to Paul Keasberry, an administrator for Guide Dogs for the Blind in San Rafael, California, "Fears of some type, for example of unusual objects, certain people, or sudden loud noises, account for approximately 40% of the roughly 300 dogs that are dropped from the program annually." He added that, ". . . a trained guide dog is valued at between $18,000 and $20,000." That is, when viewed from this context, the annual cost of failure to deal with fear in these animals exceeds two million dollars per year (P. Keasberry, personal communication, 1992). Clark Pappas is the training director at Canine Companions for Independence (CCI) in Santa Rosa, California. Canine Companions for Independence trains service dogs for physically disabled people and signal dogs for the deaf. Pappas estimates that about 10% of CCI's annual production of roughly 400 dogs fail in training due to fear-related problems. This results in a loss to CCI of approximately $4,000 per dog, in breeding, maintenance, and training resources, at the point the dog is dropped, i.e., an annual cost of $160,000.00 (C. Pappas, personal communication, 1992). Ralph Dennard, director of the San Francisco Society for the Prevention of Cruelty to Animals Hearing Dog Program (HDP), acknowledges that fearfulness is a serious reason for dogs being dropped from this program, but as yet, he has not completed compiling the relevant statistics that would permit an assessment of the cost of fear-induced failures for this program (R. Dennard, personal communication, 1992). It is fair to state that fearfulness, which causes many dogs to fail in each of these training programs, represents a considerable annual financial loss to these non-profit,

human services organizations, as well as a personal loss to the disabled people who might have benefited from these dogs' services. Nationwide, these costs may be substantially higher than those given above. Thus, because dogs are so important to many people with disabilities, it is important to understand the fears that interfere with the successful training of many of these animals.

Types of fearfulness: Inherited and Learned

The relevant literature suggests that there may be several types of canine fearfulness. For example, literature on dog guides for the blind refers to a genetically inherited "general fearfulness" (Goddard & Beilharz, 1984a; 1985b). Fox (1975) refers to inherited "shyness," while Dykman, Murphree, and Reese (1979) call fear of humans "a relatively specific fear" that is apparently inherited and is less amenable to desensitization than certain other specific fears. In addition to these, conditioned taste aversion (Gustavson, Garcia, Hankins, & Rusiniak, 1974; Gustavson, Gustavson, & Holzer, 1983), escape/avoidance responses (Overmier & Wielkiewicz, 1983), and learned helplessness (Dess & Overmier, 1989; Fernandiz & Pardo, 1990; Overmier, 1983; Overmier, 1985) have all been studied. All of these forms of learned fear have been produced experimentally in dogs, and presumably mimic specific real-life canine fears. Thus it seems fair to conclude that dogs may exhibit several kinds of fears that may be either genetically determined or learned.

Genetics and Fearfulness

A number of researchers (Fox, 1975; Goddard & Beilharz, 1982, 1985b; Klein, Tomai, & Uhde, 1990; Newton & Lucas, 1982; Scott & Fuller, 1965) have found fearfulness to be a characteristic that is generally dominantly

inherited in some breeds, and specific to certain bloodlines of some breeds. At least one study (Goddard & Beilharz, 1983) found female dogs to be significantly more fearful than males.

Guide Dogs for the Blind and CCI selectively breed dogs for their programs, but in spite of this, fearfulness remains a significant cause of dogs' failure. The HDP uses unreclaimed stray, or owner-surrendered dogs selected from animal shelters, and thus do not control the dogs' genetic backgrounds, and problems with excessive fearfulness are causes for failure within this program as well.

Socialization and Fearfulness

Scott and Fuller (1965) found that socialization during certain developmental periods is crucial to the prevention of fearfulness in dogs.

Guide Dogs for the Blind and CCI provide structured socialization for their puppies; yet problems with excessive fearfulness still exist. The HDP, because it uses dogs from animal shelters, has no structured socialization for dogs selected for its program, and failures due to fearfulness occur.

So in spite of the planned breeding and socialization conditions at CCI and Guide Dogs for the Blind, unpredicted, failure-inducing specific fears arise, suggesting a need to better understand and deal with these fears through pre-training testing, and through training procedures. This need is perhaps even stronger at the HDP, which does not have the benefit of pre-training control of breeding and socialization of its dogs.

The Problem and the Purpose

Each of the working dog organizations mentioned has pre-screening tests designed to assess aspects of each animal's suitability for training and work, including fearfulness. Still, each year numerous dogs fail in training,

often due to excessive fearfulness. This study is designed as a first step in addressing this problem by attempting to identify the specific fears that are related to these dogs' failures in training, and as a consequence, to identify pre-testing variables (e.g., gender and breed) as well as screening and training methodologies that could be used to deal with these fears in order to reduce the rate of fear-related failure in training.

Methods

Subjects

Data for this research were derived from two sources: the San Francisco Society for the Prevention of Cruelty to Animals Hearing Dog Program (HDP) and Canine Companions for Independence (CCI). (I was not able to obtain permission to collect data from Guide Dogs for the Blind.)

HDP subjects totaled 230 dogs. All of these animals had completed the program during the time of the study and had not, in the case of successful dogs, been subsequently retired from the program for any problems that developed in their actual performance as hearing dogs. The group of 230 dogs from HDP was made up of 165 mixed breeds and 65 purebreds. Of this group, 114 were males and 116 were females. The purebred dogs were represented in the following numbers: American Eskimos (10), Australian Shepherd (1), Beagle (1), Border Collies (11), Boston Terrier (1), Brittany (1), Cairn Terriers (3), Chihuahuas (2), Clumber Spaniel (1), Cocker Spaniels (8) Doberman Pinscher (1), English Springer Spaniels (5), Flat Coat Retriever (1), Fox Terrier (1), German Shepherd (1), Golden Retriever (1), Lhasa Apso (1), Miniature Pinscher (1), Pomeranians (2), Poodles (9), Schipperke (1), Shih Tzu (1), and Silky Terrier (1). This sample included all of the dogs trained at HDP since

1991 when this organization began keeping records on both the rejected dogs and the successful dogs.

The CCI subjects included 327 purebred dogs and 55 crossbred dogs, i.e., a total of 382 dogs. Of this group, 191 were males and 191 were females. The breeds that were represented within this group were as follows: Border Collies (5), Border Terriers (5), German Shepherds (6), German Shepherd/Golden Retriever crosses (12), Golden Retrievers (235), Labrador Retrievers (59), Labrador Retriever/Golden Retriever crosses (43), and Pembroke Welsh Corgis (17). This group included the records of all dogs born during 1989 that had either completed or would have completed training during the time of the study.

Design and Procedure

To collect the data for this study, I visited the San Francisco Society for the Prevention of Cruelty to Animals Hearing Dog Program nine times between April and July of 1992, and I visited Canine Companions for Independence six times during July and August of 1992. Each of these visits lasted from four to eight hours. During these visits, I observed kennel facilities, veterinary facilities and training facilities. I observed dogs being trained both in basic obedience, and in hearing and service work, both at the training facilities, and out in public. I reviewed the records of all the dogs that were subjects for this study, and I interviewed the training staffs and the administrations at both organizations. At CCI, I also interviewed the veterinarian, who was very involved with the training program.

In reviewing the records, I noted the success or failure of each dog. At HDP, success criteria entailed graduating from the program and being placed as a hearing dog in a client's home in all cases but one: One dog which had

graduated from the program was kept by HDP as a demonstration dog; this dog was also included in the data as a successful dog. Since CCI breeds its own dogs, a dog was considered successful if it either graduated from the program and was placed as a signal dog or a service dog in a client's home, or if it was retained as a CCI breeder. These data were summarized into tables that included breed and sex as variables.

Regarding Categorization of Fears

In this context, "general fearfulness" refers to avoidance or anxiety which prevented working in the presence of more than one of the following stimuli: humans, noise, traffic/public situations/ novel environments, novel objects, other dogs. A "specific fear" refers to avoidance/work-preventing anxiety regarding a single category. For a dog to fail from a training program due to fearfulness, the anxiety/avoidance had to be strong enough to prevent the dog from working and/or to make the dog panicky and difficult to control in the presence of the feared thing(s). In the cases of some successful dogs, the dogs may at times have displayed anxiety/avoidance, but it was not strong enough to prevent the dogs from working.

Fears of just three entities were related to rejection from hearing dog training: humans, noise, and traffic/public situations. At CCI, fears of five entities were associated with failure in training: humans, novel environments/public situations, noises, novel objects, and other dogs.

In records at both HDP and CCI, many dogs which feared humans, feared only one category of humans (men, strangers, or children) and did not fear all humans. For purposes of analysis, occurrences of fear of any category of human was counted as fear of humans. Since fear of being touched (by humans) could logically be considered fear of humans, though it was listed as

a specific fear is some dogs' records, it was analyzed as fear of humans. At HDP some records indicated that some dogs had been rejected due to fear of traffic. Since most work that hearing dogs do occurs in the homes of their hearing-impaired owners, alerting them to sounds such as doorbells, telephones, smoke alarms, or crying babies, it might seem that fear of traffic is irrelevant; however, by law, hearing dogs have public access as do guide dogs for the blind, and HDP does not want to be represented by dogs that are "spooky" in public situations. Therefore, I was told by HDP staff that if a dog's record indicated "fear of traffic" as a cause for rejection, that could actually indicate fear of noisy, public situations, as well as of vehicular traffic *per se*, so I have identified this fear as traffic/public situations.

CCI records included some dogs rejected due to fear of "new situations" as well as some rejected due to fear of "public situations." These seemed equivalent to me, so I combined these as "novel environments/public situations."

It could be seen as intuitively logical to include fear of novel objects in the "novel environment/public situations" category, but I didn't do this. One dog specifically feared mannequins, another specifically feared trucks, and others' records indicated fear of "objects" so I chose to leave "novel objects" as a separate category, and include the dogs which feared the mannequins and the one which feared trucks, along with dogs which feared "novel objects."

Results

The numbers of male and female dogs that were successful and unsuccessful in their training at each agency (i.e., HDP and CCI) are listed in Table 1. Using data summarized in Table 1 as a first step in analyzing this data, the between-agency success rates for male and female dogs were

TABLE 1
The frequencies of male and female dogs that were successful and unsuccessful in their training at the HDP and CCI agencies

	Training Outcome		
Agencies & Sex	Successful	Unsuccessful	Totals
HDP			
Males	34	80	114
Females	27	89	116
CCI			
Males	52	139	191
Females	51	140	191
Totals	164	448	612

compared, and the differences between these distributions were not significant , i.e., $\chi^2(1) = .423, p < .75 > .50$. Thus, it seemed appropriate to combine the HDP and CCI data for subsequent analysis. Next, using the data for all animals, the relative success in training of male and female dogs was evaluated and the differences beyween these distributions were not significant, i.e., $\chi^2(1) = .607, p < .50 > .30$. Collectively, these results suggest that the outcome of training is not a function of either the animal's sex or the agency at which the training was conducted.

As has been noted, the purpose of this study was to identify fears contributing to lack of success in the training of these working dogs. As part of meeting this goal, first, the frequencies of unsuccessful animals listed within each sex by agency grouping in Table 1 were redefined into groups that were either rejected because of fear, or rejected for reasons other than fear.

These data are summarized in Table 2. The between-agency reason -for-rejection distributions for male and female animals were compared and were not significant, i.e., $\chi^2(1) = .000025, p < .99$. Therefore, with regard to these data, it seems fair to conclude that the rate of rejection based on fear is consistent between these agencies. As a consequence of this result, in comparing the rejection reasons distributions for male and female dogs, the HDP and CCI data were combined and using these data, a significant difference was computed: $\chi^2(1) = 16.32, p < .001$. By inspecting Table 2 it can be seen that a reason for this significant difference is that female dogs are 1.7 times as likely to be rejected because of fear as is the case for male dogs.

As was noted earlier, it has been stated that in addition to sex, breed is an important consideration in fears displayed by dogs. Since all of the dogs

TABLE 2
The frequencies of male and female dogs that were rejected by the HDP and CCI agencies for either fear or other reasons

	Reason for Rejection		
Agencies & Sex	Fear	Other	Totals
HDP			
Males	19	61	80
Females	36	53	89
CCI			
Males	31	108	139
Females	57	83	140
Totals	143	305	448

trained at CCI were purebred or first generation crossbred animals, these data provide a limited basis for testing this assertion. To do this, the CCI data were reorganized so that the numbers of successful and unsuccessful dogs of each breed were organized in a contingency table, Table 3. For this analysis, because their parentage was known, German Shepherd/ Golden Retriever crossbreds, and Golden Retriever/Labrador Retriever cross- breds were considered "breeds."

In constructing this table, it became apparent that gender could not, because of low cell frequencies, be treated as a variable. Thus males and females were combined for each breed. The difference between these distributions, which are presented in Table 3, was tested and found to be not significant, i.e., χ^2 (7) = 8.81, $\rho < .20 > .30$. Therefore, for the eight breeds listed in Table 3, there is no difference in their rates of success in training at CCI. However, when the reasons for rejecting the unsuccessful animals were considered, that is, when the frequencies of dogs in each breed that were rejected for fear were compared with the frequencies of dogs that were unsuccessful for reasons other than fear, there was a significant relationship between breed and reason for rejection: χ^2 (7) = 22.73, $\rho < .01$. Table 4 illustrates this relationship.

While these data indicate a significant but modest correlation between breed and reason for rejection (ϕ = .285), this result is hard to interpret without additional information. The Appendix shows the contribution that each cell of the contingency table (Table 4) made to the chi-square result. By inspecting the Appendix, it can be seen that two breeds, i.e., the Golden Retriever/Labrador Retriever cross and the Pembroke Welsh Corgi contributed almost 60% to the chi-square that was computed to analyze these

TABLE 3
The frequencies of eight breeds of dogs from the CCI agency that were successful and unsuccessful in their training

Breed	Training Outcome: Successful	Unsuccessful	Totals
Border Collie	3	2	5
Border Terrier	1	4	5
Golden Retriever	63	172	235
German Shepherd	2	4	6
Labrador Retriever	18	41	59
Pembroke Welsh Corgi	3	14	17
German Shepherd/Golden Retriever Cross	0	12	12
Golden Retriever/Labrador Retriever Cross	13	30	43
Totals	103	279	382

TABLE 4
The frequencies of eight breeds of dogs from the CCI agency that were rejected for fear or were rejected for other reasons

	Reasons for Rejection		
Breed	Fear	Other	Totals
Border Collie	2	0	2
Border Terrier	1	3	4
Golden Retriever	57	115	172
German Shepherd	3	1	4
Labrador Retriever	10	31	41
Pembroke Welsh Corgi	9	5	14
German Shepherd/Golden Retriever Cross	3	9	12
Golden Retriever/Labrador Retriever Cross	3	27	30
Totals	88	191	279

data. Specifically, members of the former group were infrequently rejected for fear, while the majority of the latter group were rejected for fear. It is also apparent by inspecting the Appendix that two of the breeds that were not adequately represented in the contingency table (i.e., Border Collie and German Shepherd) contributed substantially and perhaps disproportionately to the significant chi-square statistic that was computed to analyze these data.

Table 5 illustrates the frequencies of occurrence of specified fears at both agencies, both as individual specific fears, and as components of multiple fears ("general fearfulness"). At both agencies, fear of humans was the most common fear related to failure in training. At HDP fear of humans existed as a single specific fear in 34 rejected dogs and as a component of general fearfulness in 8 other rejected dogs. At CCI fear of humans existed as a single specific fear in 3 rejected dogs, and as one of multiple fears in 39 other dogs rejected for general fearfulness. Thus, fear of humans occurred in a total of 84 dogs rejected from both agencies.

Fear of traffic/public situations "tied" as numerically the second-ranked fear at HDP. This fear occurred as a single specific fear in five rejected dogs, and as one of multiple fears composing general fearfulness in two others. Fear of novel environments/public situations also was the second ranked fear at CCI, occurring as a single specific fear in four rejected dogs, and as a component of general fearfulness in 27 others. If these fears (both fears of novelty) are considered analogous, this fear was involved in the rejection of 38 dogs from both agencies, and is numerically the second most important fear studied here.

Fear of noise was numerically the third-ranking fear related to failure in training at both agencies. Fear of noise was a single specific fear related to

TABLE 5
The frequencies of occurrence of the fears related to failure in training

Reasons for Rejection

HDP

Fear	Occurrences as single, specific fears	Occurrences as components of general fearfulness
Humans	34	8
Traffic/Public Situations	5	2
Noise	6	1

Number of dogs rejected due to single, specific fears: 45

Number of dogs rejected due to multiple (general) fears: 10

CCI

Fear	Occurrences as single, specific fears	Occurrences as components of general fearfulness
Humans	3	39
New/Public Situations	4	27
Noise	3	27
Novel Objects	2	15
Dogs	0	15

Number of dogs rejected due to single, specific fears: 12

Number of dogs rejected due to multiple (general) fears: 76

failure of 6 dogs at HDP and 3 dogs at CCI. Fear of noise was a component of general fearfulness in 1 dog at HDP and 27 dogs at CCI. Between both agencies, this fear was related to the failures of 37 dogs.

The above three fears (humans, traffic/novel situations/public stuations, and noise) were documented as relating to failure in training at both CCI and HDP. In addition, some dogs at CCI were rejected due to fear of novel objects and fear of other dogs. Two CCI dogs were rejected due to a single, specific fear of novel objects, while 15 other dogs experienced fear of novel objects as a component of general fearfulness. Fifteen rejected CCI dogs evidenced fear of other dogs as a component of general fearfulness, yet none was rejected for a single specific fear of other dogs.

As noted in Table 5, 45 (82%) of HDP's 55 fear-rejected dogs were rejected for single, specific fears, while only 10 (18%) of the fear-rejected dogs were dropped due to multiple fears. Conversely, at CCI the percentages were nearly reversed, with 12 (about 14%) of the 88 fear-rejected dogs being released due to multiple fears.

Discussion

The female dogs observed in this study were 1.7 times more likely to be rejected due to fear as were the male dogs. This is congruent with research by Goddard and Beilharz (1982, 1983, 1984b, 1985a, 1985b).

Scott and Fuller (1965) found that if pups of both sexes were not exposed to humans and other new stimuli during a "critical socialization period" of seven through sixteen weeks of age, they were likely to remain fearful even if they received socialization at a later time.

Records of several CCI dogs rejected due to fearfulness are congruent

with these findings regarding socialization: One female Golden Retriever's file states, "Never left kennel--fearful." A male Golden Retriever's file notes, "Grew up in kennel--fearful of everything." Another female Golden Retriever's file says, "Kennel raised--became fearful." This study suggests that female pups may actually need quantitatively more or qualitatively different socialization experiences to combat their apparently greater tendency toward fearfulness.

In addition to reinforcing the importance in general of varied socialization during the critical socialization period, results of this research indicate that modification in socialization practices to include positive socialization specifically to humans, noise, traffic/public situations, novel environments/public situations, novel objects, and other dogs may be especially important for reducing loss of females from training due to fearfulness.

In addition to gender, breed may be a factor in reducing the rate of rejections due to fear. The limited data involving CCI's purebred dogs indicate that the probability of success *per se* was not related to breed, but that the potential for being rejected from training due to fearfulness varied significantly with the breeds used.

This would perhaps indicate that the choice of breed could be a clear-cut variable for HDP to consider in its selection of dogs from shelters, and for CCI to consider in its breeding program in order to decrease fear-related failures.

However, the issue may be more complex than that: For over twenty years, a linebred and inbred strain of genetically "nervous" pointer dogs has been maintained at the University of Arkansas in Little Rock as animal

models for studies of anxiety, phobia, and the physiology of fear. A number of researchers (Angel, DeLuca, Newton, & Reese, 1982; Dykman, Murphree & Reese, 1979; Murphree, 1973; Murphree, Angel, & Newton, 1976; Murphree, Peters, & Dykman, 1969; Newton & Chapin, 1978; Newton & Lucas, 1982) have explored various facets of fearfulness in these dogs.

In comparison with normal pointers, the nervous pointers exhibit an excessive startle reaction, retreat and/or catatonic freezing in the presence of humans, decreased exploratory behavior in the presence of novel stimuli, and lower rate of learning of a bar pressing response.

These abnormal behaviors in this line of dogs are accompanied by the following physiological traits: hyper-responsiveness to dopaminergic stimulation, and increased levels of L-DOPA in the cisternal spinal fluid; a strain-specific heart rate decrease in the presence of humans; raised levels of brain norepinephrine, and lowered levels of serotonin. Hybrid nervous-normal dogs more strongly resemble the nervous parent, suggesting dominant inheritance of the nervous trait.

The point being raised here is that both behavioral and physiological traits may vary widely within a given breed. Given these issues, over-emphasis on the selection of only certain breeds may not be productive for either HDP or CCI. Breed selection may favorably impact the rate of fear related failures as long as non-fearful individuals of any given breeds are selected for breeding and training, though some breeds do indeed seem more prone to fearfulness than others.

In addition to its findings about the relationship of sex and breed to fears, this study has found that a finite, defined set of fears (various categories

of humans, traffic/public situations/novel environments, noise, novel objects, and other dogs) accounts for many fear-related failures in training.

It is interesting to note here that at both HDP and CCI, some dogs feared humans in varying forms: Some dogs feared all humans; some feared only strangers; some feared only men, and some feared only children. No dogs were documented as fearing only women. It would appear that women as a category of humans are less threatening to dogs in general than men and children are. Ironically, at the time that data was being gathered for this study, HDP staff included several women, one man, and, of course, no children. Puppy -raisers for CCI are primarily women. So, the people evaluating the dogs for HDP at shelters and raising pups for CCI were generally women. These data indicate that dogs which are not fearful of women may later exhibit fearfulness around men and/or children. Pretraining screening involving men and children, as well as women, could de-select dogs which, if screened only by women could otherwise later be found to be fearful of men or children. Purposefully emphasizing the positive socialization of CCI puppies to men and children may also help to decrease these fears in potential working dogs.

Results of this study also indicate that evaluations of dogs' reactions to traffic and novel environments/public situations, loud noises, novel objects, and other dogs, should be important components of pre-training screening at HDP in order to eliminate dogs showing fear of these specific stimuli prior to the investment in training them. Similarly, results of this study underline the need to positively, purposefully socialize CCI puppies to these specific stimuli.

Additionally, the age at which pups are exposed to these stimuli may affect their subsequent success or failure in training as related to fear: Michael Fox (1971) established a "fear imprint period" of from eight to ten weeks of age, during which, if a puppy were exposed to a noxious stimulus, the pup would avoid that stimulus longer and more definitely than if the stimulus were presented earlier or later in the pup's socialization period.

The first three specific fears delineated above occur consistently between agencies and in widely varying canine populations. It may be useful to assume that humans (especially men and children), novel situations, and noise are at least initially inherently noxious to a significant number of dogs. Therefore it may be useful, if possible, to limit, or carefully structure puppies' exposure to humans (especially men and children), novel situations, and noise during this fear imprint period to decrease the potential for later problems involving fears of these stimuli. It may also be useful, when possible, to document information about these dogs' socialization during this period.

Remediation of Fear

The fact that fear is a significant cause for the rejection of dogs by both HDP and CCI raises the issue of what if anything can be done during training to eliminate fears. Thus, the following information about the behavioral elimination of fear is included as representative of current thinking on this subject, and because it describes specific techniques as applied to dogs. I suggest that these following examples could be useful as models both in the socialization of puppies to prevent fear of potentially fearful stimuli, and to combat fears occurring in dogs in training.

Behavioral techniques to attenuate fear include extinction, flooding, systematic desensitization, and counterconditioning. Combinations of these techniques have also been used. These techniques, emphasizing their use in dogs, will be discussed below. The example of systematic desensitization described below, and that of counter conditioning, are especially relevant here because they deal with dogs' fears of humans, noise, and novel situations--several of the specific fears that plague working dogs.

Extinction

In a sense, "extinction" can mean merely the disappearance of the response; more precisely used, "extinction" is perhaps the most "passive" of fear-reducing behavioral techniques. Seligman (1975, pp. 13-14) describes extinction as when "a response that once produced an outcome now produces nothing." In animal research relating to fear, extinction trials typically consist of exposing the subject to the fear-provoking conditioned stimulus in the absence of aversive stimulation. It has repeatedly been found that fear-conditioned avoidance responding can be very resistant to extinction in this form.

In one study (Solomon, Kamin, & Wynne, 1952), two dogs were trained to avoid shock after the sound of a buzzer by jumping a shoulder-high barrier to the opposite side of a shuttle box. After the dogs had acquired this response, extinction trials were begun: The buzzer was sounded but not followed by shock, regardless of whether the dogs shuttled. The authors expected that the avoidance shuttling would spontaneously extinguish because the shock which presumably motivated it was no longer "there." Instead, the avoidance shuttling of one dog persisted through 190 extinction trials, and that of the other dog, for 490 trials, with no sign of extinction; in

fact, the dogs' latencies (times between the CS buzzer and the jump) actually decreased during this procedure (i.e., the dogs were shuttling faster than during the original fear conditioning).

In another experiment (Black, Solomon, & Whiting, 1954), researchers conditioned hungry young dogs to avoid presented meat, which the dogs had originally preferred, and to eat kibble, instead. After conditioning, even in the authors' absence, the dogs continued to eat only the kibble and avoid the meat, even, for a time, after the level of kibble provided was insufficient to sustain the dogs.

Theoretical reasons for the resistance of conditioned avoidance responses to extinction are as follows: According to two-factor theory (Mowrer, 1960, p. 63) fear responses become associated through classical conditioning to a CS during avoidance training. These fear responses, in turn, stimulate avoidance responding. The avoidance behavior is then reinforced by the corresponding reduction in fear. Additionally, it is pointed out (Campbell & Church, 1969, p. 249) that for the subject, training trials in which avoidance is successfully established may be difficult to discriminate from extinction trials: Once an animal has learned to consistently perform an avoidance response, it no longer experiences the unconditioned stimulus (usually shock). In extinction trials, the subject typically similarly does not receive shock. So, this argument goes, the avoidance behavior does not extinguish because the subject does not "know" that the UCS is actually no longer "there," regardless of the subject's response.

Flooding

A second fear treatment, flooding--also variously called "response prevention," "exposure," "blocking," and "implosion"--deals with the above-

mentioned difficulties with the extinction of conditioned fear and/or avoidance responding through prolonged forced confrontation of the fear-provoking situation in the absence of trauma (Baum, 1988; Boudewyns & Shipley, 1983.) According to Mowrer's two-factor theory, mentioned earlier, flooding hastens the extinction of avoidance responding because since the anxiety-provoking CS is no longer paired with an aversive stimulus, the classically conditioned fear response to the CS extinguishes; with the extinction of the conditioned fear response, there is decreased motivation for avoidance.

Solomon and his colleagues, (Solomon, Kamin, & Wynne, 1952), and Carlson and Black (1959) experimented with flooding (response prevention) in extinguishing conditioned fear/avoidance responses in dogs. Solomon and his colleagues first conditioned an avoidance response in a shuttle box. Initially, after presentation of a CS tone, a dog would be shocked in one side of the box. The shock would be terminated when the dog jumped the shoulder-high partition into the other side of the box. The dogs learned to avoid the shock by shuttling to the other side of the box upon hearing the tone. After avoidance behavior had been established, and extinction of it was to begin, Solomon implemented response prevention: On some extinction trials, a visible glass barrier was erected between the two sides of the box; during these trials, this prevented the dogs from shuttling upon presentation of the tone, which now was not accompanied by shock. Solomon and his colleagues reasoned that this prevention of shuttling was a periodic "reality test" for the dogs, which could then experience the lack of shock in the absence of shuttling. Though the dogs quickly learned to inhibit jumping when the glass was present, in only 2 out of 3 dogs was the avoidance response

extinguished in the absence of the glass barrier. Solomon's conclusion was that the visible glass barrier acted as an additional discriminatory stimulus which cued the dog that shock would not be forthcoming, and so inhibited avoidance of jumping in its presence, though avoidance responding continued in its absence.

Carlson and Black (1959) repeated Solomon and his colleagues' experiment; however, a change was made: Carlson and Black consistently prevented avoidance responding for longer series of trials, in contrast to the previous experiment in which fewer trials in which responses had been prevented had been interspersed with trials in which responses had been allowed. In Carlson and Black's dogs, the extinction of avoidance responding was complete in 5 out of 11 dogs, and partial in an additional 3. It was concluded that response prevention does facilitate the extinction of avoidance responding in dogs when avoidance responses are prevented consistently instead of being alternated with standard extinction trials in which avoidance responses are allowed.

Systematic Desensitization

Exploration of systematic desensitization in dogs was undertaken by McBryde and Murphree (1974). Subjects used were pointers, members of a breed whose "ecological niche" normally involves their use in hunting game birds, but in this case, from the genetically nervous strain, selectively bred for the study of physiological aspects of fear, and as a cross-species model of phobia and anxiety disorders. These dogs typically demonstrate timidity, hyper-startle responses, avoidance and/or catatonic freezing in the presence of humans, loud noises, and novel objects or environments; however, many

individuals of this strain have retained the interest in bird hunting typical of normal members of the breed. It was decided to use their natural hunting interest in an attempt to rehabilitate these genetically fearful dogs by training them as gundogs.

McBryde and Murphree's desensitization of these dogs to sudden loud noises (gunshots) illustrates the researchers' fulfillment of the first component of systematic desensitization: the construction of a hierarchy of potentially fear inducing stimuli. The authors actually constructed hierarchies along not one, but three dimensions: 1) gunshots further away to gunshots nearby; 2) gunshots from a .22 calibre pistol, through a .38 calibre pistol, to a shotgun; 3) the noise of quail being flushed with a normal pointer also present (which served to inhibit fear in the nervous pointers) to the noise of a quail being flushed in the absence of a normal dog.

The researchers induced relaxation in the nervous pointer, in fulfillment of the second component of systematic desensitization, in several ways: The primary way of inducing relaxation to compete with the dogs' fear responses was to arouse their innate hunting interests. This was done through the presentation of quail wings (a relatively mildly arousing stimulus), flighted live quail (a moderately arousing stimulus), or pinioned flightless quail which the dogs were allowed to chase and catch (a very arousing stimulus). The strength of the quail stimulus chosen depended on the level of fear being displayed and needing to be counteracted in a given dog at a given time. Also, since the presence of non-nervous dogs was seen to relax the nervous pointers, the dogs were kenneled and initially trained in nervous-normal pairs. Regarding systematic desensitization's final basic component, presentation of the hierarchy to the subject while the subject is in

a relaxed state, McBryde and Murphree did several things. They would fire gunshots, first from a small caliber gun, then from a larger caliber gun, over an avidly hunting dog, initially from relatively far away, then moving closer, as long as the dog did not appear fearful; if the dog began to evidence fear, the authors would withdraw further away for shooting, and/or switch to a smaller caliber gun until the dog's hunting interest was successfully inhibiting fear. Also, if fear were aroused during a shooting session, live flighted quail would be substituted for quail wings, or pinioned flightless quail. The live quail which were highly hunt-interest-arousing because the dogs could chase and catch them, would be substituted for the flighted quail to ensure relaxation and compete successfully with fear responses. In addition, after noting that the presence of normal pointers inhibited fear responses and increased exploratory behaviors in the nervous dogs, the nervous dogs were kenneled with the normal ones, and normal "teammates" were presented during a shooting desensitization session if a nervous pointer began to show fear.

Formerly avoiding humans and freezing in their presence, the nervous-strain pointers in this study became friendly hunting companions for people. Their hyper-startle and other fear responses to gunshots were eliminated in the field. Several sportsmen, in addition to the researchers, pronounced the pointing and retrieving performance of these genetically fearful dogs to be indistinguishable from that of normal members of their breed. Significantly, however, this inhibition of fear did not generalize to scenarios outside the hunting situation. In the home kennels and while being subjected to routine laboratory tests for fearfulness, these "rehabilitated" dogs remained fearful.

There is an apparent contradiction in that these rehabilitated nervous dogs appear genuinely non-fearful of humans, loud noises, and novel environments in the hunting field situation in which they were systematically desensitized, yet still fearful in other situations. This paradox led the authors to speculate about the validity of tests for fearfulness applied to animals outside their ecological niches in artificial laboratory settings.

The above account of systematic desensitization is relevant to the discussion of fearfulness in working dogs in several ways. The specific fears involved are those of humans and of loud noises, two of the specific fears which relate to the failure in training of hearing dogs and service dogs. Murphree's systematic desensitization techniques, involving quail and guns, were quite elaborate, and were geared specifically to gun dogs hunting birds. However, many non-gundog breeds typically have a similar, strong prey-chase/retrieving drive which can be channeled into chasing balls or sticks, playing tug-of-war with toys, etc. This could presumably be used as Murphree used quail and hunting to induce relaxation in working dogs to systematically desensitize them to fears of humans (or specific categories of humans), or loud noises in the dogs' normal environments. Such desensitization in the dogs' normal environments might even circumvent Murphree's pointers' problem of becoming fearless in the hunting environment yet retaining fears in the kennel environment.

It seems worth noting here that even those pointers, which were ostensibly genetically fearful, were successfully rehabilitated within the context of what could be described as a very structured socialization program. This seems to underline the relative importance of appropriate socialization, regardless of genetics, in counteracting fearfulness in dogs.

Counterconditioning

The *Longman Dictionary of Psychology and Psychiatry* (Goldenson, 1984, p. 186) refers to counterconditioning as "the extinction of a particular response, such as fear, through conditioning an incompatible response to the same stimulus." Mowrer (1960, p. 390) refers to counterconditioning as "changing the meaning of a stimulus."

In a sense, counterconditioning combines flooding's emphasis on exposure to the fear-provoking stimulus with systematic desensitization's emphasis on this exposure being positive.

Tortora (1983) counterconditioned avoidance-motivated aggressive responses in dogs; the use of a "safety signal" was an integral part of this counterconditioning procedure.

The safety signal concept is related to the concept of secondary reinforcement: In the framework of Pavlov and Hull (Mowrer, 1960, p. 101), a *primary* reinforcer is a stimulus associated with the reduction of a drive of a naive animal (i.e., food, water, appropriate temperature, etc.) A *secondary* reinforcer is a stimulus which acquires reinforcing properties due to being associated with a primary reinforcer.

For example, if an animal is conditioned to press a bar to escape or avoid shock, the bar press response is reinforced by the escape/avoidance of the shock, and the reduction of related fear (Mowrer, 1960). If a light or a tone (a "safety signal") is associated with the bar pressing response (and the absence of shock and reduction in fear), the light or tone, which is not a primary reinforcer because it does not reduce basic drives, can acquire secondary

reinforcement properties, and become an additional reinforcer which the animal will "work for."

To return to Tortora's (1983) study of counterconditioning involving the use of a safety signal: The 36 dogs in this study were household pets, referred by a veterinarian because of a specific type of aggression which was generally directed at the dogs' owners, and which usually had begun in puppyhood and escalated. The dogs tended to be out of their owners' behavioral control (i.e., responded to few or no commands, and in Tortora's interpretation, had not learned appropriate, pro-social responses useful in avoiding aggression), and had experienced physical trauma and/or physical punishment for aggression. The behavior that Tortora extinguished was avoidance-motivated aggression. The stimuli whose meanings were changed for the dogs during counterconditioning were actions of humans which the dogs perceived as threatening.

The responses incompatible with aggression which were conditioned were appropriate responses to a number of commands: "sit," "stand," "lie down," "come," "stay," "go," "fetch," "hold," "drop," "go in," "get off," "jump," "go to your place," "play," and "no." These specific behaviors, and the relatively large number of responses were chosen to give the dogs a broad and "balanced" set of responses incompatible with, and useful in avoiding, aggression: "come" to balance "go"; "hold" to balance "drop"; "stand" to balance "lie down," etc. Approach responses were balanced with non-aggressive avoidance responses.

Initially, correct behaviors in response to commands were shaped through pressure on a leash attached to the dog and reinforced with play sessions. Over time, progressively shorter latencies were allowed for correct

responses and response were reinforced with release of pressure from a "choke chain" training collar. Then, immediate correct responses to commands were required. Excessive latencies, or inappropriate responses, including aggression, were followed by (1) a warning buzz from an electronic training collar worn by the dog, (2) stimulation (shock) from the electronic collar which the dog could escape by performing a correct response, followed by (3) a safety signal tone emitted by the collar signaling the absence of shock. Eventually the safety signal alone, without the warning buzz, or shock, became a conditioned reinforcer for correct responses, and presumably inhibited fear responses in training sessions by defining shock-free periods for the dogs.

Training took place in progressively more varied and intentionally distracting situations to enhance the generalization of appropriate behaviors; training situation were selected to more and more closely approximate the dogs' home situations and to generalize positive affect to potentially stressful situations similar to those which had originally elicited aggression. Finally, the dogs were returned to their homes and behavior was brought to criteria there. Electronic stimuli were faded out, presumably as internal safety cues became conditioned to correct behavior.

Complete elimination of fear-related aggression was achieved in all 36 dogs in this study, and aggression had not recurred according to follow-ups up to three years after safety signal training. In addition, improvements were noted in dogs' "carriage" or posture, indicating improved emotional stability.

Essentially, Tortora's dogs learned in potentially stressful situations to substitute appropriate, task-oriented behaviors in lieu of aggressive/fearful ones, and thus to obtain play sessions and avoid "choke-chain" pressure and

electrical stimulation. In a sense, Tortora's incorporation of the safety signal seems to have helped the dog to "believe" that performance of appropriate behaviors (instead of fearful/aggressive ones) would "protect" the dogs in potentially fear-provoking situations.

Since this technique seems to have decisively eliminated behaviors as serious as fear-related aggression toward humans, it seems logical that this technique or modifications of it could eliminate less dramatic fearful/avoidance behaviors with people, as well as with traffic/public situations/novel environments.

Practical Implications for Working Dog Organizations

Ideally, of course, preventing fearfulness is preferable to having to try to "cure" it; however, when fearfulness does occur in dogs, this review of relevant literature would seem to indicate that counterconditioning and systematic desensitization may be more effective in eliminating fear/avoidance than Pavlovian extinction or flooding. Counterconditioning and systematic desensitization may also be useful if purposefully incorporated into the socialization of puppies, as well as of dogs in training. These techniques could be especially useful around the specific stimuli (humans, traffic/public situations/novel environments, noise, novel objects, other dogs) which this study has found to be likely to relate to failures in training.

Dogs in this society have long been selectively bred as companion/working animals whose behaviors presumably are very much influenced by the people who breed/own/train them: Murphree's nervous pointers were "rehabilitated" within what Murphree referred to as their "ecological niche" as hunting dogs. Tortora's dogs (1983) learned to be fearful/aggressive within their ecological niche as household pets. It seems,

then, in an ecological sense, that a thorough understanding of fearfulness in dogs should ideally also include data about the human-canine interactions involved, information which, in the available literature, appears to exist only to a very limited extent, and only in fairly recent work.

The "ecological niche" of dogs seems especially important here, because pragmatically, whatever steps may be taken to eliminate problems with fearfulness in working dogs need to fit within the boundaries of the rearing and training philosophies and logistical constraints of the relevant working dog organizations and the people who run them.

Collecting data for this paper depended on the written records and on the memories of HDP and CCI staff. At HDP, records of 5 dogs rejected for "general fearfulness" did not specify the stimuli which the dogs feared. This was from a total of 54 dogs rejected due to fearfulness. Similarly, at CCI, 88 dogs were rejected due to fearfulness, and of these, 21 records of dogs rejected for general fearfulness did not contain specifics on fears. If these records had been more detailed, the results regarding the numbers, frequencies and rankings of specific fears may have been somewhat different, though the general results regarding rejection rates due to fearfulness, male/female differences, and breed differences in rejection rates due to fear would have remained the same. More consistent and uniform record keeping among working dog organizations would be an aid to future research in this area.

As noted earlier, at HDP only 12 dogs (22% of the 54 dogs rejected for fear) were rejected for multiple fears ("general fearfulness"). Eighty-seven percent of the dogs rejected for fear at HDP were rejected due to single specific fears. In contrast, at CCI only 12 dogs, 14% of the total of 88 dogs rejected due to fearfulness, were rejected due to single specific fears; 86% were rejected due

to general fearfulness. This is a significant difference : $\chi^2(1) = 65.645$, $p < .001$. Do these differences relate to differences between hearing dog work and signal dog work, to genetic differences between the dogs at the two agencies, or to differences in labeling and record-keeping techniques between the two agencies?

Since the same fears were seen to cause most fear-related failures at both agencies, and since the failure rates due to fears were comparable at both agencies, it seems most likely that these differences are due to differences in how fears are documented at the two agencies, rather than due to differences between the types of work or between the dogs. Since the relevant literature indicates that if specific fears are defined, appropriate techniques can eliminate the fears, it would probably be helpful to decrease fear-related failures if consistent methods of labeling fears were used within and between agencies.

Data gathered at Guide Dogs for the Blind would be an interesting complement to this effort.

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Appendix

(Illustrating the relative contribution that each cell made to the χ^2 results related to Tables 3 and 4.)

Breed	# began	% / N	# successful		# unsuccessful (due to fear)		# unsuccessful (reasons other than fear)	# unsuccessful (total)
			O	E	O	E		
Border Collie	5	1.3 %	3	1.30	2	0.63	0	2
Border Terrier	5	1.3 %	1	1.35	1	1.26	3	4
German Shepherd	6	1.6 %	2	1.62	3	1.26	1	4
Golden Retriever	235	61.5 %	63	63.36	57	54.25	115	172
Labrador Retriever	59	15.4 %	18	15.91	10	12.93	31	41
Pembroke Welsh Corgi	17	4.5 %	3	4.58	9	4.42	5	14
German Shepherd/Golden Retriever Cross	12	3.1 %	0	3.24	3	3.78	9	12
Golden/Labrador Retriever Cross	43	11.3 %	13	11.59	3	9.46	27	30
Totals	382	100.0 %	103	102.95	88	87.99	191	279