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Suitability for field service in 4 breeds of guide dogs

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Abstract This study examines the relative importance of a longer than normal 4-month training period, or being "passed back" from the original training class to join a class in which dogs are at an earlier stage of their training, on the overall probability that a dog entering guide dog training will ultimately graduate as a guide dog. The study group consisted of dogs that were trained at The Seeing Eye guide dog school in the years 2000 through 2005. In total, 2033 Labrador retrievers (LR), golden retrievers (GR), German shepherds (GS) and Labrador retriever/golden retriever crosses (LGX) were included in the study. Of all dogs, 39% had been passed back during their training, and 56% had graduated as guide dogs. In general, females had a lower chance to be passed back than males, except for GS and LGX. Overall, GS had the highest chance to be passed back during their training. LGX had the highest, and GS the lowest, probability for graduating as guide dogs. Dogs that were passed back for behavioral reasons were only half as likely as dogs completing training normally to work as guide dogs, whereas medical reasons and "no match" reasons for being passed back hardly influenced the chances to become guide dogs. Overall, the current 4-month standard training program at The Seeing Eye seemed mostly successful for LGX and LR, whereas GS and GR had a higher success rate when being passed back, i.e., they were more likely to graduate as guide dogs when they were trained for a longer period than the standard training program.

Introduction

For over 75 years, The Seeing Eye (TSE) guide dog school in the USA has been providing trained guide dogs for people with visual impairments. Initially, TSE relied on dogs adopted as adults, but only a small proportion of these dogs proved suitable. In order to improve the success rate of potential guide dogs, TSE initiated its own breeding program in the 1940s. Today, TSE breeds German shepherds, Labrador retrievers, golden retrievers, and crosses between the last two breeds. Dogs are bred for the qualities required from high-quality guide dogs: intelligence, good health, moderate size, sound hips, and gentle temperament. To maintain an acceptable degree of genetic diversity, a small number of dogs used in the TSE breeding program also come from outside stock, eg, other guide dog schools and private breeders.

After weaning, the TSE puppies are placed with volunteer puppy-raisers, where each is taught basic obedience and socialization. Most of these dogs (90-95%) are returned to TSE for training when they are 14 to 18 months old; the rest are rejected from the training program for various health-related or behavior-related reasons. During the first month in the training kennel, the dogs that are not candidates for the breeding program are neutered and undergo a medical check, including electroretinography for ophthalmic disor-

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ders (Labrador retrievers), intestine and digestive tract check (German shepherds), height and weight scores, hip, shoulder, elbow and hock scores, and a body condition score. After the medical check, the healthy dogs are further assessed by a trainer and are then either accepted for training or rejected from the program. At this point another 5% to 10% of the dogs are rejected, and the remaining dogs start the 4-month course of training with a sighted instructor.

After two months of training at TSE, the dog and its instructor take a midterm test by walking a route while the instructor is blindfolded. The dog's performance is evaluated by a training supervisor, who scores the dog's behavior and working abilities while the dog is following the orders and guiding its instructor in different situations. The subjective evaluation of both the behavioral quality and the working ability of the dog account for an overall controllability score rated on a 5-point scale from 1 (easiest to control for a future guide dog owner) to 5 (hardest to control). At the end of the 4-month training period, the prospective guide dog has its final exam, where the instructor again wears a blindfold and walks the dog in town on a route, while the training supervisor evaluates each dog for the second time and determines another subjective controllability score. When the dog is found to master its tasks satisfactorily in this phase and its physical exam is acceptable, experienced trainers carefully match the dog with a visually impaired student, taking into consideration the controllability of the dogs and the students' lifestyles and environments. In addition, the personalities of the student and the guide dog, as well as their size, strength, pace of walk, and energy levels are matched to ensure a harmonious relationship. The ideal situation in the matching process is to have two dogs from which to choose for each student. As a consequence, there are always more dogs (about 50 to 80%) than students available. The "no match" -dogs are returned to the training kennels to wait for a new matching process.

At TSE, the standard training regime requires 4 months to complete, after which the trained dogs normally either graduate as guide dogs or are rejected from the program because they are not considered suitable for guide work. However, some dogs at TSE can have a longer than normal training period because they are "passed back" during their training (i.e., they are moved from their own class to join a group of dogs that are at an earlier stage in their training). Dogs can be passed back because they have not yet mastered some of the required tasks and thus are assessed to need more time to gain sufficient skills to graduate as guide dogs, or because they have some behavioral problems that need correcting. Dogs can also be passed back for a temporary medical reason (for example, an ear infection), which requires treatment before the dog can be available for matching with a student. Finally, as mentioned above, a dog may be passed back to wait for a new group of students simply because there is no match between the dog and a student in the current student group.

Rearing and training future guide dogs is costly in terms of effort, time, and resources. Consequently, it is desirable to have methods to determine the characteristics and behavioral suitability of these dogs for guide work at the earliest possible age. Therefore, the aim of this study was to gain insight into the factors that influence the decision to pass back a dog in guide dog training. Further, the eventual success rate of passed back dogs for graduating as working guide dogs was studied.

Materials and methods

1. TSE dataset and animals

The study group consisted of dogs born in 1999 to 2004 that had started training and completed the session. These dogs had either graduated or been rejected at TSE in the calendar years 2000 to 2005. Dogs that had been used in the breeding program were excluded from the analyses because the route by which they had completed the training regime was different from the normal guide dog training route. Records with missing information on a studied variable (for example, missing sire or dam identification) were excluded from the analyses regarding that particular variable. As a result, the number of observations varied somewhat per studied trait.

In total, 2033 dogs of three breeds and one breed cross, namely Labrador retriever (LR), golden retriever (GR), German shepherd (GS), and Labrador retriever/golden retriever cross (LGX) were included in this study (Table 1). Most of these dogs (81%) were bred by TSE. The LGX group consisted of both Labrador x golden retriever F1-crosses

Table 1 Data characteristics by breed

Variable	Golden retriever	German shepherd	Labrador retriever	Labrador x Golden cross
No. of males	204	301	382	172
No. of females	203	275	308	188
Total per breed	407	576	690	360
Mean training age days (sd)	519.10 (2.53)	512.62 (2.08)	513.21 (1.80)	515.70 (2.89)
No. of sires	24	21	20	0
No. of dams	45	48	58	10
No. of litters	48	137	141	35

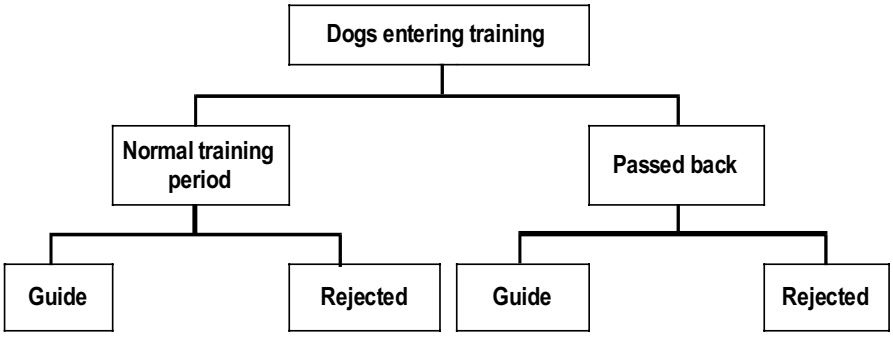

Figure 1 Four different paths for dogs entering training

and backcrosses. The study group consisted of 974 females and 1059 males, varying in age from 13 to 27 months. All dogs had been neutered after their return to TSE at the age of 1.5 years. The mean age that dogs started training increased from 16.2 months to 19.5 months during the studied years.

Once a dog had started training, there were 2 possible outcomes: (a) it successfully completed training and graduated to begin working as a guide dog, or (b) it failed to complete training and was rejected from the program. During training, there were also 2 possible paths the dog could follow: (a) it completed the standard 4-month training program within this time by staying within the same class of dogs with which it began, or (b) it got passed back to a later training class and consequently was trained for a longer period. To summarize, there were 4 different paths a dog entering training could follow (Figure 1). Each dog could only go through one of these paths, so each group was mutually exclusive.

If a dog was passed back to a later training class, it was passed back for 1 of 3 major reasons: (a) "no match," which means that no student in the current class was a suitable match for that dog; (b) the dog developed some medical condition that prevented completion of the training process in the current class, so it was passed back to a later class to give time to treat the condition, or (c) the dog had some demonstrated behavior problem that required more time in training to correct. At any point within the training process, the decision could be made to totally reject the dog from training. Thus, it was possible for a dog to be in training for only 1 or 2 months, for example, before rejecting the dog from further training and thus halting the investment of valuable manpower resources into this particular dog.

The dogs in the dataset were classified depending on the different paths they had followed; thus, the dogs either had a normal training period or had been passed back, and they either graduated as guide dogs or were rejected from the program (Table 2). The dogs following the normal training period and graduating as guide dogs were the largest group, followed by the dogs that were rejected without having been passed back.

2. Data analyses

In this study, there were 2 different kinds of hypotheses (factors that influence the probability to be passed back, and factors that influence the probability to work as a guide dog), and therefore different models were used for studying the probability of passing back and the probability of working as a guide dog.

In the passing back model, the studied effects included breed (LR, GR, GS, LGX), sex (males and females), and training age (mean age when starting training). In addition, the effects of sire and dam for the passing back probability were studied within breeds. In the guide dog model, the studied effects included breed, sex, training age, and passing

Table 2 Dogs in data by qualification status and sex

	Passed back				Not passed back			
	Guide dog		Rejected		Guide dog		Rejected	
Sex	F	M	F	M	F	M	F	M
Golden retriever	33	54	35	35	73	49	62	66
German shepherd	69	49	56	64	71	97	79	91
Labrador retriever	52	93	48	77	135	129	73	83
Labrador x Golden cross	39	40	36	20	76	84	37	28
Total per sex	193	236	175	196	355	359	251	268
Total per group	429 (21.1%)		371 (18.2%)		714 (35.1%)		519 (25.5%)	
Total per passing back status	800 (39.4%)				1233 (60.6%)			

Table 3 Passed back dogs by passing back reason and sex

	Passing back reason					
	No match		Behavior		Medical	
	F	M	F	M	F	M
Golden retriever	35	51	19	18	14	20
German shepherd	74	54	30	34	21	25
Labrador retriever	52	94	12	31	36	45
Labrador x Golden cross	47	44	13	8	15	8
Total per sex	208	243	74	91	86	98
Total per group	451 (56.4%)		165 (20.6%)		184 (23.0%)	
TSE bred per group	356 (78.9%)		142 (86.0%)		146 (79.3%)	

back reason (medical, behavioral, or no match). In some analyses, the general passing back reason in the guide dog model could also be replaced by a specific behavioral passing back reason (needs work, lacks confidence, and other behavior), to see what influence the different behavioral passing back reasons had on the probability to work as a guide dog.

The data were analyzed with the SAS/STAT V8 (SAS Inc.) software using its logistic regression procedure LOGISTIC. The logistic regression model is used to study the association between a binary response or dependent variable (i.e., here, passing back and working as a guide), and a set of explanatory variables (i.e., here, effects such as breed or sex) (Stokes et al., 1995). The LOGISTIC procedure fits a common slopes cumulative model, which is a parallel lines regression model based on the cumulative probabilities of the response categories rather than on their individual probabilities. The cumulative logistic regression model has the form:

$$g(\Pr(Y \leq i | x)) = \alpha_i + \beta' x, i = 1, \ldots, k$$

where $\alpha_1, \ldots, \alpha_k$ are k intercept parameters, β is the vector of studied effects, and x is the observation. The LOGISTIC procedure fits linear logistic regression models for discrete response data by the method of Maximum Likelihood. In this study, the Maximum Likelihood estimation was carried out with the Fisher-scoring algorithm option.

The studied effects (breed, sex, training age, sire and dam effect, and passing back reasons) were tested on their statistical significance for the passing back and the guide dog models based on the Wald Chi-square test statistics created by the LOGISTIC procedure. Only those factors that were statistically significant were included in the respective final passing back and guide dog models, together with their two-way interactions. Predicted population marginal means were computed for each factor in the final passing back and guide dog models. The covariate effect for training age was set equal to its mean value for computation of these predicted population marginal means in order for it to have a marginal model interpretation, as well.

The validity of the final models was tested with the use of the Hosmer and Lemeshow goodness-of-fit test (Hosmer and Lemeshow, 1989). The Hosmer and Lemeshow test divides subjects into groups based on predicted probabilities of the logistic regression models, and then computes a chi-square statistic from the observed and the expected frequencies. When the fitted logistic regression model is the correct model, the distribution of the goodness-of-fit statistic is well approximated by the chi-square distribution with g-2 degrees of freedom, where g stands for the number of groups (Hosmer and Lemeshow, 1989).

Results

1. Passing back and guide dog categories

Almost 40% of the dogs in the TSE data were passed back during their training, for various reasons (Table 2). When compared to females, more male dogs were passed back. The most frequent reason for passing back was "no match," with 56% of all dogs that were passed back, followed by medical reasons, with 23% of the dogs that were passed back (Table 3). Various behavioral reasons represented 21% of the passed back dogs. German shepherd dogs were the most commonly passed back breed for behavioral reasons, and the LR was the breed most frequently passed back for medical reasons. The LGX, and especially the LGX males, were passed back the least.

The behavioral passed back group consisted of dogs passed back for a large number of different behavioral reasons (Table 4). "Needs work," "lacks confidence," and "excessive urination" were given as the main reasons to pass a dog back for behavioral problems.

Of all the dogs in this dataset, 56% eventually worked as guide dogs. The proportion of graduated dogs was somewhat higher for dogs that were not passed back (58%), compared with the dogs that had been passed back (53%).

2. Significant passing back factors

The probability to be passed back was significantly influenced by the effects breed ($P < 0.09$), sex ($P < 0.06$),

Table 4 Overview of the different behavioral passing back reasons

Behavioral passing back reason	Frequency	Percent
Defecates on route	1	0.59
Excitable	1	0.59
Inconsistency	1	0.59
Lacks willingness	1	0.59
Nervousness	1	0.59
Poor eater	1	0.59
Protective growling	1	0.59
Self right	1	0.59
Stair issues	1	0.59
Strange behavior	1	0.59
Immature	2	1.18
Slow learner	2	1.18
Stubborn	2	1.18
Tense	3	1.78
Suspicious	4	2.37
Traffic	4	2.37
Dog/game distraction	4	2.37
Excessive urination	12	7.10
Lacks confidence	49	28.99
Needs work	77	45.56
Total	169	100.00

and the interaction of breed by sex ($P = 0.0005$). In general, females had a slightly lower chance to be passed back during the training period than males, except in the GS and LGX, where it was the other way around (Figure 2). The GS in general, and especially the GS females, had the greatest chance to be passed back, whereas the LR females had the lowest chance to be passed back.

3. Nonsignificant passing back factors

Training age did not influence the probability to be passed back, so a relatively young dog in the training had the same chance to be passed back as an older dog ($P > 0.05$). Within breeds, neither dams nor sires had a significant influence on the likelihood of their offspring being passed back ($P > 0.30$).

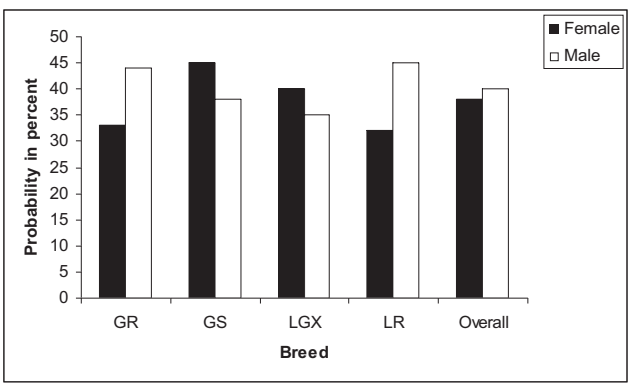

Figure 2 Probabilities of being passed back to a later training string by sex and breed for Golden retriever (GR), German shepherd (GS), Labrador by Golden cross (LGX), and Labrador retriever (LR)

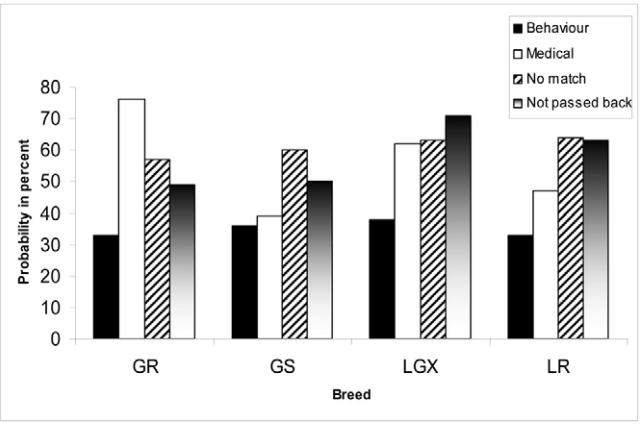

Figure 3 Probabilities to work as a guide dog by passed back reason and breed for Golden retriever (GR), German shepherd (GS), Labrador by Golden cross (LGX), and Labrador retriever (LR)

4. Significant factors for graduating as guide dog

The probability of working as a guide dog was influenced by the effects of breed ($P < 0.0001$), passing back reason ($P < 0.0069$), the interaction of passing back reason by breed ($P < 0.0072$), and the training age ($P < 0.0032$). The breed differences for graduation success were highly significant between some breeds. The LGX had the highest probability of graduating as a guide dog (59%), whereas the GS had the lowest graduation probability; in fact, fewer than half of all the GS entering training eventually worked as guide dogs (46%). The GR and LR had similar probabilities (54% and 51%, respectively) to graduate successfully from the training program.

Dogs that had been passed back for behavioral reasons were, in general, only half as likely to graduate as guide dogs than dogs that were not passed back at all (35% vs. 59%, respectively). However, dogs that were passed back for "no match" reasons had actually a slightly higher chance to work as guide dogs than dogs that were not passed back at all (61% vs. 59%, respectively). Passing dogs back for medical reasons did not influence the chances of working as guide dogs in general, but it did decrease the chances for a GS to eventually work as a guide dog (Figure 3). With the exception of the LGX, all dogs that were passed back for "no match" reasons had a slightly higher chance to become guide dogs than dogs that went through the normal training period.

The behavioral passed back group was also divided for analysis into 3 main groups over all breeds: "lacks confidence" (n = 49), "needs work" (n = 77), and other behavioral reasons (n = 43). Compared to the "overall behavioral passing back reasons" group with only 34% chance of becoming guide dogs, the dogs classified as

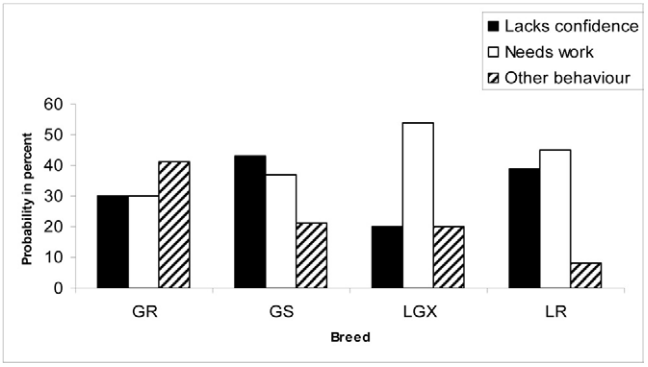

Figure 4 Predicted probability to work as a guide dog by behavioral passed back reasons and breed for Golden retriever (GR), German shepherd (GS), Labrador by Golden cross (LGX), and Labrador retriever (LR)

"needs work" actually had a 7% higher chance to graduate as guide dogs than the group passed back for behavioral reasons in general, whereas the dogs with "other behavioral reasons" had 15% lower chance to eventually work as guide dogs than the group passed back for behavioral reasons in general. The probability of the dogs classified as "lacking confidence" to graduate did not differ from the overall graduation probability of dogs passed back for behavioral reasons.

On a breed level, being passed back for "needs work" increased the chances of working as guide dogs for the LGX and LR by 15 to 20% compared to the chances of dogs being passed back for behavioral reasons in general (Figure 4). For GS, "lacks confidence" as a passing back reason increased the chances of becoming guide dogs, with 10%, compared to the chances of GS to become guide dogs when being passed back for behavioral reasons in general. Almost 45% of the GS passed back for the reason "lacks confidence" eventually graduated as guide dogs. On the other hand, the probability of graduation was very low for the LR who had been passed back for "other behavioral reasons."

In these data, older dogs had a lower probability than younger dogs to graduate as guide dogs ($P < 0.0032$). The youngest dog in this dataset (12.7 months) had almost 50 % more chance to work as a guide dog than the oldest dog (27 months). Figure 5 shows the predicted probabilities of working as guide dogs for the different training age classes of dogs that started training in the years 2000-2005. The mean training age in this period was 515 days. However, the mean training age in the data increased during these years, as shown in Figure 6.

5. Nonsignificant guide dog factors

The sex of the dog did not influence the probability to become a guide dog, as males had the same chance as females to work as guide dogs ($P > 0.095$).

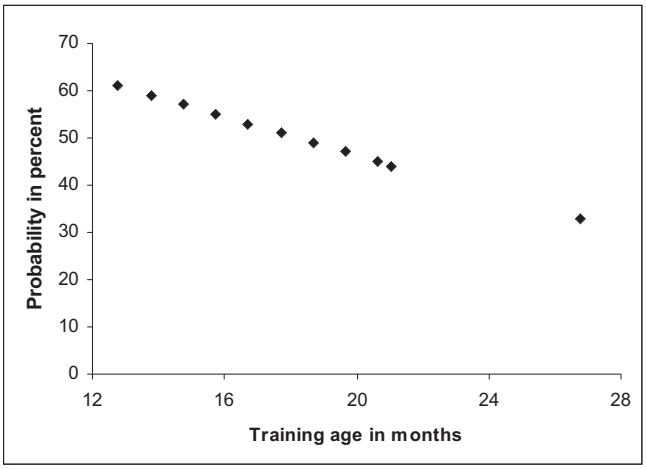

Figure 5 Probabilities of working as a guide dog for different training ages

6. Most and least favorable training paths per breed

For LGX and LR, the most favorable path to become a guide dog was to not be passed back but to complete training in normal time. On the other hand, for GR and GS, the most favorable path for graduating was to be passed back either for medical or "no match" reasons and thus have a longer than normal training period. The least favorable training path for all 4 breeds was to be passed back for behavioral reasons, as dogs that were passed back for behavioral reasons were only half as likely to work as guide dogs than dogs that were not passed back at all.

Discussion

Guide dog training is influenced by various factors, including the breed and sex of dogs and rearing and training methods (Freeman, 1991). However, passing back a dog to an earlier training string during the guide dog training period has not been discussed in the literature.

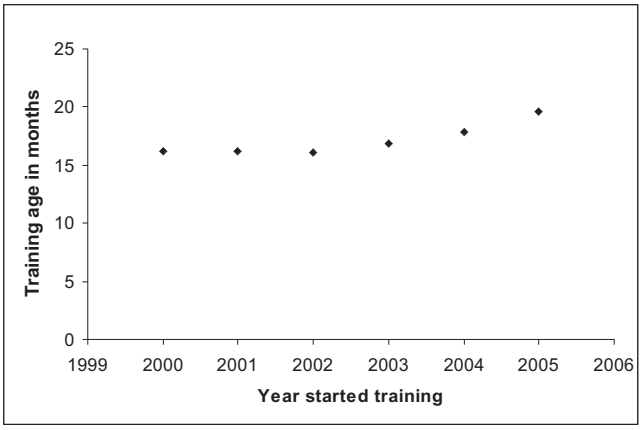

Figure 6 Mean training age for different years

There are no differences in guide dog suitability among large breeds, which is partly owing to the fact that only breeds already considered suitable are used (Scott and Bielfelt, 1976). However, a Swedish study (Wilsson and Sundgren, 1997a) found differences between German shepherds and Labrador retrievers with regard to dogs intended for different types of service work, including guide dogs. In these data, the German shepherds scored significantly higher for traits described as "sharpness" and "defense drive," whereas the Labradors scored significantly higher for traits described as "courage," "nerve stability," and "hardness." The Labradors were also described as "more cooperative" and "more affable" than the German Shepherds. Unfortunately, precise behavioral definitions of these traits were not given by the authors.

In our study, being passed back to a later training string and capability to graduate as a guide dog were both significantly influenced by the breed of the dog. The LGX dogs had the least chance to be passed back and appeared to be the most successful for graduating as guide dogs, whereas the GS had the greatest chance to be passed back and also were the least successful in graduating as guide dogs. Labrador retrievers are, in general, considered easier to handle than German shepherds (Wilsson and Sundgren, 1997a), and the LGX is a product of selection between the breeds LR and GR. Crossbreeding provides a way of benefiting from breed differences to make very rapid genetic change into the desired direction in a population. Another common reason for crossing two breeds is to benefit from the heterosis or hybrid vigor effect, i.e., an increase in the performance of crossbred animals over that of the purebred animals. The high chances of success of the LGX could thus be a consequence of both crossbreeding effects. On the other hand, the German shepherd as a breed is considered to show more defense drive and suspicious behavior (Wilsson and Sundgren, 1997a), which could make them less suitable to work as guide dogs. The GS of the TSE dataset represented the largest group of dogs being passed back for behavioral reasons (probability for a GS passed back for behavioral reasons to work as a guide dog was 0.36), which added to the expectation that their behavior made them less suitable to become guide dogs. However, because most of the dogs in this study were bred by TSE in their own, closed breeding colony, it is possible that breed differences could be different with privately bred dogs or dogs bred by another guide dog school. Differences in the characteristics of purpose-bred guide dogs and privately bred dogs have been reported (Goddard and Beilharz, 1982, 1983). Also, purpose-bred German shepherds of the Swedish Dog Training Centre had better index values for evaluated behavioral characteristics than privately bred dogs (Wilsson and Sundgren, 1997b).

Today, most guide dog schools train equal numbers of male and female dogs. Small sex differences have been found in suitability of dogs as guide dogs for the blind, with females being more fearful and distracted by scents but less aggressive and distracted by other dogs than males (Reuterwall and Ryman, 1973; Goddard and Beilharz, 1982). Female dogs have also been suggested to have more friendly relations with humans than male dogs (Lore and Eisenberg, 1986). In the Swedish study of German shepherds and Labradors, the males scored significantly higher than the females for traits described as "courage," "prey drive," and "defense drive" (Wilsson and Sundgren, 1997a). The German shepherd males also scored better than the females in "nerve stability," but there was no significant difference in the Labradors (Wilsson and Sundgren, 1997a).

In this study, the sex of the dog did not influence the chances to become a guide dog. However, sex did influence the probability to be passed back to a later training string, with females having a slightly lower chance to be passed back than males. The sex by breed interaction also influenced the chances to be passed back in this study. The female LR had the lowest chance to be passed back, whereas the GS, and especially the GS females, had the highest chance to be passed back. These sex differences are in agreement with the findings that German shepherd males are more cooperative than females, whereas it is the opposite in Labrador retrievers (Wilsson and Sundgren, 1997a). Another explanation for GS males having had less chance to be passed back than GS females could be that the more aggressive and suspicious male GS had already been excluded from the program at TSE before the actual training started.

In this study, training age did not have an effect on the likelihood of passing back, but it influenced the chances of becoming a guide dog, with older dogs (27 months) having a lower probability to graduate than younger dogs (12.7 months). This effect has not been discussed in literature before, and it was probably more a by-product of the data structure than a "real" age effect. The whelping production in the TSE breeding colony improved dramatically after moving into a new breeding station in January 2002, and as a consequence the number of dogs available to start training has increased since that time. However, since only a limited number of dogs are required to start field service every year, the dogs currently have to stay longer with their foster families, and thus they are older when they start training than before 2002. When there are more dogs available for selection to training and the number of graduating guide dogs per year is fixed, the probability to work as a guide dog will decrease when training age increases for all the dogs that started training.

Behavior or temperament problems represent one of the most commonly reported reasons for disqualifying dogs from serving as guide dogs (Goddard and Beilharz, 1982, 1983). Guide dog centers have found that fewer than half of the puppies they acquire eventually prove capable of being trained as guide dogs (Goddard and Beilharz, 1982). This number is in accordance with the findings in this study, where 53% of the dogs that entered training (which in turn is about 85 to 90% of the total population bred by TSE) were successful as guide dogs.

The most common specific behavioral reason to reject a trainee guide dog is fearfulness (Goddard and Beilharz, 1982, 1983). Excessive fearfulness interferes with the dog's performance of many learned tasks, and may increase its aggressive behavior (Goddard and Beilharz, 1983, 1984). Two other important traits causing dogs to be unsuitable as guide dogs were found to be when the dog becomes too easily distracted, especially by other dogs, and aggressiveness (Goddard and Beilharz, 1982).

In these data, it was not possible to classify behavior in separate behavioral problems such as fearfulness and aggression, but it was clear that the behavioral reasons, in general, decreased quite dramatically the chances of working as a TSE guide dog. Behaviors that were described by the TSE trainers as "suspiciousness," "distraction," and "excessive urination," decreased the chances for graduating as guide dogs, especially for LR and GR. However, the low sample numbers in these particular groups render them somewhat unreliable. On the other hand, the chances to work as a guide dog actually increased for LR and GR when they were passed back for behavioral "needs more work" reasons compared to when they were passed back for behavioral reasons in general. "Needs work" is a very general description that could include all sorts of reasons, for example immaturity and being a slow learner. Usually these problems can be solved with a longer training period, and thus the overall chances of a dog graduating as a guide dog need not be affected.

Likewise, in this study the chances to work as a guide dog actually improved when a dog was passed back for "no match" reasons compared to dogs not being passed back at all. Having been passed back for medical reasons also increased slightly the dog's chances to work as a guide dog compared to dogs not being passed back at all, especially for GR. The intensive medical check the dogs go through before entering training already filters out dogs with serious medical problems, like eye disorders and severe digestive problems. The genetic selection conducted at TSE has improved the health of the dogs, as well. For example, earlier about 30% of all the dogs selected for guide dog training had to be eventually rejected because of poor hip quality, whereas today TSE has managed to reduce the hip dysplasia frequency in their breeding population to almost zero (Leighton, 1997). Thus, if a dog is passed back today for a medical reason, it is most likely for a fairly simple and treatable medical condition such as an ear infection, which does not have a long-term effect on the graduation chances of a dog. Consequently, the underlying mechanism for improving the graduation success of a dog after being passed back for medical or "no match" reasons seems mainly to be the longer time they are offered to finish their training program.

Conclusions

Being passed back for behavioral reasons during the training period decreased the chances of a dog to eventually graduate as a guide dog, with 50% eventually working as guide dogs, whereas being passed back for (minor) medical reasons or no match with a prospective guide dog handler in the current class had no influence or even improved the eventual graduation probability. Golden retrievers and the German shepherds, especially, seemed to benefit from the longer training period resulting from being passed back for medical or no match reasons. Consequently, prolonging the normal training period for these 2 breeds could improve their graduation success rates as guide dogs.

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