

Picking A Puppy- how the genetics of behavior can help you choose the best one for you

by

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Selecting a canine companion should be a thoughtful and deliberate process in that one is making a huge financial and emotional commitment. The price of a puppy is just the beginning. We are assuming responsibility for a life and a life-time—the dog's. Our obligations do not end with their physical well being but extend to their social and emotional development as well. Unsocialized and unsupervised dogs can be dangerous. If dogs are to continue to be allowed in our society we must each hold ourselves responsible for decisions concerning our pets-not the least of which is the type of puppy we should choose.

However, if you are like most people, very little thought went into the process of selecting your new puppy. The majority of us are most often swayed by the looks of that adorable bundle of fur with little or no regard for what that puppy might eventually grow up to be as an adult. If the puppy is a purebred, you have a reasonable expectation of what the adult dog will look like, but do you really have any idea what to anticipate in the way of temperament and behavior? Unless you have thoroughly researched a breed this can come as a rude and often unpleasant surprise and is frequently the reason why so many dogs wind up at a shelter after outgrowing that cute puppy stage. Too often dogs meant to become strictly companion animals have had their basic instincts repressed and this comes out in displaced behaviors. Herding dogs like the Border Collie that herd children instead of sheep, sled dogs that pull on the lead and are difficult to train, over protective Rottweilers that are deemed aggressive are all dogs that are dumped at shelters. How do we prevent this from happening? With a little bit of effort it is possible to find a suitable dog that will 'fit' with your lifestyle and your personality. How is that you ask?

There is a genetic component to behavior. This does not mean there are genes for specific behaviors, only that genes code for the assembly and regulation of proteins that vary with their environment. It is these proteins which will provide the building blocks used in the construction of the neural networks of the brain and from which these behaviors will eventually originate. Recent advances in genetics that depend on new techniques such as recombinant DNA and linkage analysis have now been used for studies in behavior genetics. What they have discovered is there exists complexes of genes or quantitative trait loci (QTL) that influence behavior (or other traits) that can be precisely located on chromosomes. Knowing their location, researchers are able to follow how these gene groups are inherited.¹ What this means for the future is hard to say, although the new cloning project at Texas A & M University will be able to shed some insight on how much of a role genetics plays in behavior.

Suffice it to say that different breeds do have different temperaments- so how can we use this information to select the best dog for you? Say you are a sedentary person and like

nothing better than to curl up on the couch with your pup-well a Border Collie would drive you insane, but a Newfoundland would suit you perfectly. Not to say the Newfy doesn't need exercise, but they definitely have the 'couch potato' mentality. Compare a Golden Retriever puppy and a Blue-Heeler pup. If given the same stimulus-say throwing a ball for them to retrieve, most often it is the retriever pup that will chase the ball, while the heeler pup will chase the other dog and bite it's heels. When frightened, beagles freeze and terriers run around frantically. ² Why is that? German Shepherds and Airedales, when raised under similar non-stimulating conditions were both detrimentally affected, but the German Shepherd showed a greater tendency for fear-based aggression.³ How to explain this? Since all canid brains are constructed along the same basic design there must be genetic explanation. What are those 'hard wired' differences between breeds and did selection for the physical appearance of a dog influence the genetic basis of its behavior or was it selection for its behavioral characteristics that influenced its appearance?

Nature vs. Nurture

Before discussing that aspect of behavior it would be logical for us to first look at the role environment plays in moderating instincts and what part of a behavior is due to training and learning. All animals have innate species-specific behavior patterns. Even human babies when lightly touched on the cheek will turn towards that touch and seek to nurse and most of us have noticed the circling behavior of a dog preparing to lie down. When a mother bird sees the gaping mouth of her young it triggers a fixed action pattern (maternal feeding behavior) and she feeds her young. These are all examples of genetically determined programs. However, as the size and complexity of the cerebral cortex of the brain increase, experience and learning become more important factors for determining behavior. For example, innate behaviors used for finding food, such as hunting are more dependent on learning than sexual and reproductive behavior. This makes sense as some flexibility is needed when hunting as both the prey and the environment can change.

It is known that raising young animals in a sterile environment without sensory stimulation will have an effect on the development of the nervous system. Environmental deprivation will cause an animal to become hyperactive and excitable as an adult and unfortunately, the effects seem to be fairly permanent. The lack of sensory input makes the brain hypersensitive to stimulation. This is a common problem in dogs raised without proper socialization. On the other hand, stressing or handling the pregnant female will also produce nervous and excitable offspring. When choosing a puppy of any breed, look for a responsible breeder who will hand raise the litter and provide a calm and stress-free environment for their bitch. Make sure that you also check the pedigree for the degree of inbreeding practiced. Inbreeding is the term used for breeding close relatives and often has a deleterious effect on temperament and health.

Intelligence vs. 'Trainability'

According to Stanley Coren in his book "The Intelligence of Dogs" he assesses dogs as to their trainability (working intelligence) and obedience ⁴ In his article, Wachtel took Coren's list and loosely classified the various breeds by their function rather than their

AKC groups⁵. Herding dogs were rated highest in obedience-with the Border Collie taking the top spot, followed by gundogs (spaniels, retrievers, pointers, and setters). The mastiffs and livestock guarding breeds (Rottweilers, Kuvaz, etc.) come next followed closely by the schnauzers and terriers. The spitz, including the Arctic breeds came next, and then the sighthounds, and scenthounds. Final place went to the primitive breeds like the Basenji although the Afghan hound placed absolutely last. However, is ‘trainability’ really a true indication of a dog’s intelligence. In their work, Scott and Fuller showed that intelligence can best be equated with the capacity to solve problems and that the Basenji actually rated highest for this ability, while Shelties, a former shepherd dog, had lower scores.⁶ The question you need to ask yourself though, is what do you want when picking a puppy? Do you want a dog that is easier to train or do you wish to take on a breed that perhaps is a bit more of a challenge? For example, the arctic breeds such as Malamute, Siberian and Samoyed are easily bored with repetitive training techniques. Training these breeds presents difficulties not encountered with the more tractable breeds like Labradors and Golden Retrievers. Then of course you have the highly intelligent Border Collie who is also very trainable. The difficulty with this breed is that they live to WORK. One well-known figure in the breed refers to Border Collies as ‘genetic obsessives’⁷. Anyway, the take home message is don’t get a BC unless you are willing to spend a lot of time with the dog. If left to their own devices they will find their own occupation.

Dogs as ‘super’ wolves?

It has been accepted that dogs descended from wolves and that in general both species express the same patterns of behavior.^{8 9}The only controversy seems to be is when the differentiation between the two species occurred and how the dog came to be domesticated in the first place. Recent work implies that the dog actually domesticated itself.^{10 11} However, there is little evidence that the process of domestication has resulted in the loss of basic behaviors, rather, what we see are specific behaviors that have been either accentuated or suppressed within the various breeds. The question then is how did selection for these traits occur? For instance those dogs bred for herding ability exhibit the eye/stalk/chase/and (sometimes) bite sequence of the prey drive but stop short of an actual attack.¹² Among the various types of working styles are those that work closely with their handlers, others work at a distance without direct supervision. For our purposes here we can suggest that dogs that work most closely with man tend to be better Obedience dogs than those that are doing their job in a more independent way (gundogs as opposed to hounds, shepherds compared to livestock guarding dogs). Dogs of the breeds created for the closest cooperation with humans developed a drive to act and respond on cues instead of being strictly autonomous. This does not preclude that in their work they may also partly make their own appropriate decisions.¹³

Like herding dogs, gun dogs have breed specific behaviors. Retrievers should display a spontaneous ‘chase and retrieve’ response. Grab-bites are part of the retriever’s repertoire too, but crush or kill-bites are faulted. An obvious disqualification then would be would be a dissect and eat behavior. Pointers silently hold the eye/stalk behavior until commanded to chase. Yet coonhounds and fox terriers are expected to vocalize during the chase and bring down their prey with the grab and kill-bite. Would these breeds be your first choice as the most suitable to be around children?

One popular theory suggests that dogs are actually displaying the juvenile equivalent of the wolves' 'adult' behaviors. Neotany is the term used for retention of immature features in an adult and can be expressed both physically and behaviorally. In 1979, a Russian researcher published a study in which foxes were bred for twenty generations on the basis of their 'tameness'.¹⁴ Overtime the physical appearance of the animals and their social and reproductive behavior changed: their pricked ears fell, their color went from silver to veri-colored, they started to vocalize like dogs and the females came into season twice a year instead of the usual once a year. Physiological and behavioral problems increased with each successive generation too. In fact some of the tamest foxes developed abnormal maternal behavior and cannibalized their pups. So Belayav's work has shown that the domestication process is in fact a type of 'genetic taming' that has been attributed to changes in just a few genes that control the timing of various developmental stages.

Overselection causes problems

Veterinary medical literature cites countless examples of abnormal bone structure and other physiological defects caused by overselection for strictly appearance traits in dogs. One study showed that selection for a particular head shape in Cocker Spaniels produced hydroencephaly in some of the dogs. Another well-known example of this problem is nervous pointer-breed dogs. Normally, Pointers freeze and point when they see a game bird and this behavior is related to an orientation response. A neurologically normal dog does not stay frozen in the orienting posture, but gives chase or returns to their previous activity. Later research showed that these dogs had other neurological defects as well, including deafness.¹⁵ If overselection for a particular physical trait can cause such adverse genetic changes, then we can certainly expect that selection for particular behaviors could also significantly alter the genetic makeup of the dog. When selecting a puppy be aware that all dogs have genetic problems. Reputable breeders will test for those genetic diseases that are specific to their breed/s and will openly disclose the results of those tests with their clients.

Male vs. Female

Should you get a male or female? There is no 'hard' data that supports one gender over the other with respect to intelligence and trainability, although there are some studies that attribute higher levels of aggression to the male.¹⁶ What most behaviorists recognize is that both sexes exhibit something called sexual dimorphism. In general certain behaviors will be exhibited in one gender but are not exclusive to that sex.¹⁷ For example, marking is most often seen in males, however females in season will also exhibit that trait. Neutering the male before he is sexually mature will inhibit such 'territorial' linked behaviors like urine-marking and aggressive posturing, and the dog is much healthier overall. Likewise, spaying your female will significantly reduce the incidence of mammary cancer if done before her first heat and of course totally prevents unwanted puppies.

How to research a breed

With access to the Net, a whole host of new ways to get information about a particular dog breed is now available. If you don't own your own computer most public libraries

offer this service without charge. A casual search of these websites by the author found even the most rare of dog breeds represented. If you do have a computer, then joining a listserv is a good way of meeting people who own the type of dog you are researching, and most likely find you a reputable breeder too. Once you have made a decision it would be helpful to buy a book that is specifically about your chosen breed. A few books on training that new puppy should also be included, as choosing the breed of your dog is just the first step in owning a canine companion.

Training Your Puppy

It has been suggested, somewhat seriously, that a new dog breed should be invented; the Companion Animal. This 'perfect' dog would be an exceptionally smart, highly trainable dog with a steady temperament, a moderate, steady energy level, very low prey drive, low barkingness, etc. In short a companion that could be taken anywhere, and that could be easily trained. Unfortunately, such a dog does not yet exist. Anyway the devotees of the various breeds would all loudly proclaim that their breed was already the perfect dog. However, they don't come that way pre-formed. Just like a child, a puppy needs guidance and it is your responsibility to provide him with the training that is appropriate for his age. It is well worth the effort as it will strengthen the human-animal bond and make yours a joyous relationship.

Dogbreed Listservs:

Search The List of Lists

<http://catalog.com/vivian/interest-group-search.html>

Complete List of Dog-Related Email Lists

<http://www.k9web.com/dog-faqs/lists/email-list.html>

CataList, the official catalog of LISTSERV lists

<http://www.lsoft.com/lists/listref.html>

Welcome to Dogpile, the Friendly Multi-Engine...

<http://www.dogpile.com/>

Recommended Books and Training sites:

Don't Shoot the Dog by Karen Pryor

The Culture Clash by Jean Donaldson

Dr. P's Dog Training Library - Behav. Probs.

<http://www.uwsp.edu/acad/psych/dog/lib-prob.htm>

The Use of Operant Conditioning in Dog Training

<http://mmg2.im.med.umich.edu/~kleung/training.html>

¹ Donald McCaig Smithsonian

² H. Mahut. "Breed differences in the dog's emotional behavior". Can Journal of Psychology 12(1)35-44, 1958

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- ³ L. V. Krushinskii, In "Animal Behavior. It's Normal and Abnormal Development". J.Wortis,ed. International Behavioral Sciences Service, Consultants Bureau, New York. 1960 (Original Russian version published by Moscow University Press)
- ⁴ Stanley Coren, The Intelligence of Dogs
- ⁵ Hellmuth Wachtel personal communication September 1998
- ⁶ John Paul Scott and John L. Fuller in Genetics & the Social Behavior of the Dog pp. 257-258 University of Chicago Press, Chicago 1965
- ⁷ Donald McCaig personal communication September 1998
- ⁸ Raymond Coppinger and Lorna Coppinger. 'Differences in the Behavior of Dog Breeds'.In Genetics and the Behavior of the Domestic Animals (Temple Grandin Ph.D., ed) pp 167-202. Academic Press, San Diego 1998
- ⁹ John Paul Scott and John L. Fuller," Dogs, Wolves, and Men" in Genetics & the Social Behavior of the Dog, pp 29-56, University of Chicago Press, Chicago 1965
- ¹⁰ Morell V, The origin of dogs: running with the wolves. Science 1997 Jun 13;276(5319):1647-8
- ¹¹ Susan Crockford personal communication
- ¹² Coppinger & Coppinger
- ¹³ Hellmuth Wachtel personal communication September, 1998
- ¹⁴ D.K. Belayav, Destabilizing selection as a factor in domestication. Journal of Heredity.70,301-308(1979)
- ¹⁵ E. Klien, S. A. Steinberg, S.R.B Weiss, et al The relationship between genetic deafness and fear-related behaviors in nervous pointer dogs. Physiol behavior. 43, 307-312 (1988)
- ¹⁶ John Paul Scott and John L. Fuller, in Genetics & the Social Behavior of the Dog, pp 164-5, University of Chicago Press, Chicago 1965
- ¹⁷ Dr.Nicholas Dodman, personal communication October, 1998.