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# Do Our Genes Really Affect Our Relationships with Pets?

New twin study reveals the influence of genes on our desire to live with dogs.

Posted May 29, 2019

Why do some people and not others love animals? Studies have reported that kids raised with [pets](#) usually have pets when they are adults. And often, it is the same type of pet. But the tendency for pet-keeping to run in families could be either the result of early experiences with pets or the genetic setups we inherit from our parents. An important new twin study from Sweden provides intriguing answers to the question of how nature and nurture influence our desire to live with pets. You will probably find some of the results surprising.

## Fraternal and Identical [Twins](#) Are Natural Experiments

The study of twins has become a cottage industry in psychology because they enable researchers to tease out the roles of heredity and environment in human behavior. Fraternal twins are produced when a mother's ovaries release two eggs which are fertilized by different sperm. Like non-twin sibs, fraternal twin share on average 50% of their genetic variation. (Full disclosure, I am the father of fraternal twin daughters.)

Identical twins are formed when a single egg is fertilized by a single sperm, and the resulting zygote splits in half. Identical twins share 100% of their genome. Thus if a trait is influenced by genes, identical twin pairs should be more alike than fraternal twin pairs. Comparing the similarities of identical and fraternal twins allow behavior geneticists to calculate "heritability" -- the degree to which differences between individuals in a trait are attributable to the influence of genes.

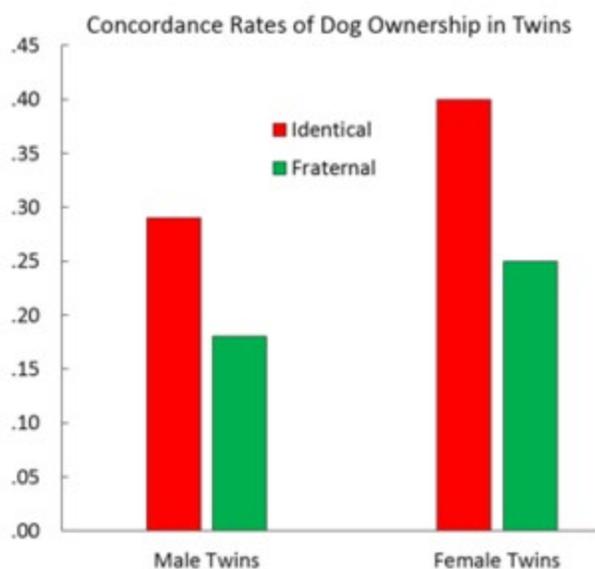
Some of the results of twin studies are about what you would expect. For example, 95% of individual differences in eye color are genetic. Twin researchers consistently find that roughly 50% of basic human [personality](#) differences result from genetic influences. But twin studies have also produced some surprises. For example, genes account for only about [33% of individual differences in sexual orientation](#).

## How Much Do Genes Influence Pet-Keeping?

The Swedish study on the heritability of pet-ownership was led by Dr. Tove Fall of the University of Uppsala and was [published in the journal Scientific Reports](#). The study was based on three enormous sets of data. The first included 35,035 pairs of identical and fraternal twins in the Swedish Twin Registry who were born between 1926 and 1996. The Swedish Board of Agriculture maintains a registry of all the pet dogs in Sweden and the Swedish Kennel Club registers pedigree dogs. The researchers were able to link these three data sets to determine dog ownership patterns among the identical and fraternal pairs of twins.

This graph shows the concordance rates of dog ownership in these twins. Concordance rate is the probability that one twin in a pair will be a dog owner if their [sibling](#) owned a dog. As you can see, a male identical twin had a 30% chance of owning a dog if his twin brother owned a dog compared to an 18%

chance for a pair of fraternal twins. The concordance rates were a bit larger for female twins. The likelihood that a female identical dog-owner's sister would also own a dog was 40% compared to 25% for a fraternal twin.

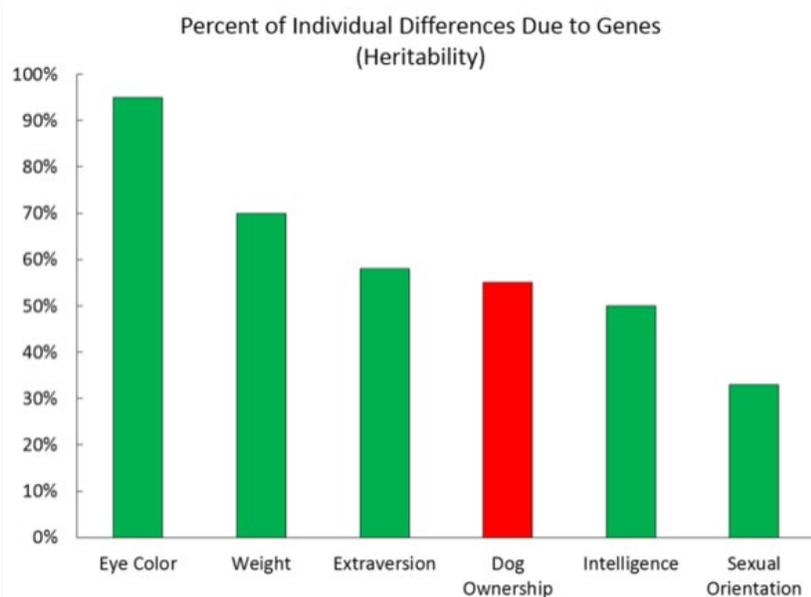


Source: Graph by Hal Herzog

The mathematics of calculating the heritability of a trait is complicated, and I don't pretend to understand it. But here is the bottom line. The researchers found that genetic factors accounted for an estimated 57% of differences in dog ownership among women and 51% in men.

The Swedish study has garnered considerable media [attention](#). As is often the case with media reports on human-animal relationships, some of them got it wrong. For example, [this article](#) claimed that the study found that whether a person was a good or bad dog owner was in their genes and that dog ownership was a "hardwired" component of human nature. Neither of these is true.

So here is my attempt to set the record straight about this important research.



Source: Graph by Hal Herzog

### Should we be surprised that dog ownership is influenced by genes?

Not at all. As the psychologist Eric Turkheimer [has written](#), the First Law of Behavior [Genetics](#) is "All human traits are heritable." To put the results in perspective, the graph below shows the impact of genes on six human traits. The Swedish researchers found that about half of the differences in dog ownership were attributable to genes. This is about the same as is true of traits such as [extroversion](#).

Does this mean that there is a gene for dog ownership?

No. Such a finding would require DNA analysis of chromosomes. More importantly, there is no "gene for dog ownership," just like there is no single gene for [intelligence](#) or [homosexuality](#). As Dr. Fall and her colleagues pointed out, like nearly all human traits, the decision to get a dog is polygenic. This means that hundreds, even thousands, of genes play a role in our decision to live with animals.

What does the research say about the impact of dogs on human health (the "pet effect")?

Some studies have found that pet-owners, and especially dog owners, have better health than non-pet owners. The pet products industry relentlessly pushes the idea that living with a pet causes people to be healthier and happier. Other studies, however, suggest the causal arrow points in the other direction. (See

[Large Study Finds Pet Owners Are Different](#)). According to Dr. Carri Westgarth, one of the study's authors, the Swedish twin results lend support to the idea that healthier people are more likely to choose to own dogs. As she explained to [Science Daily](#), "These findings are important as they suggest that supposed health benefits of owning a dog reported in some studies may be partly explained by different genetics of the people studied."

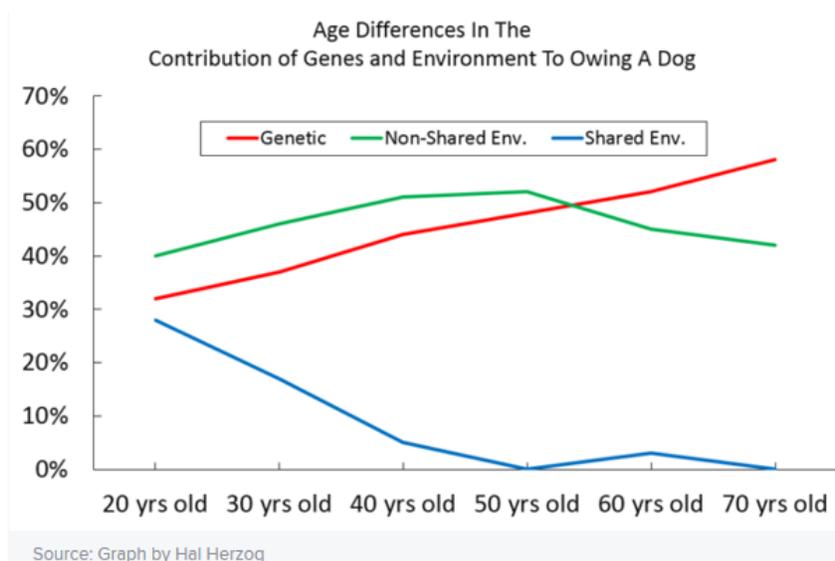
### **Does the strong influence of genes on dog ownership prove that our love for pets is an evolutionary adaptation?**

No. Genetic influences on dog ownership might be the result of selection for traits not directly related to pet-keeping. These could include genes influencing traits like [agreeableness](#), extraversion, and [empathy](#), or perhaps genetic influences on being energetic and having good health. Indeed, as Dr. Fall points out, a paradox of behavior genetics is that traits under a high degree of natural selection have LOW heritability. That's because almost all the differences between individuals are due to the impact of experiences. For example, having four fingers instead of five on one of your hands is usually due to factors such as accidents or non-genetic prenatal environmental problems rather than a genetic trait.

### **What do the results reveal about the impact of how we are raised on our choices of pets?**

A lot. But here things get complicated. As Robert Plomin points out in his book [Blueprint: How DNA Make Us What We Are](#), two very different types of environmental factors influence how we turn out. Shared environment makes kids in the same family more alike, for instance, living in the same home, having permissive or restrictive parents, and being exposed to the same foods and TV shows. In contrast, nonshared environmental factors make siblings, including twins, different from each other. These include idiosyncratic and random experiences such as having different friends, being treated differently by your parents, or being bitten by a dog. In addition to telling us the degree to which a trait is influenced by genes, twin studies also allow behavior geneticists to tease out the relative impact of shared and nonshared environments on human traits.

The graph below shows the relative impact of genes (red), nonshared environment (green) and shared environment (blue) on dog ownership in people as they age.



environment (blue) on dog ownership in people as they age. For me, the biggest surprise of the study was that except in young adults, shared family environments had no impact on whether or not people owned a dog. I should not have been surprised. After all, only one of my three kids is an animal person even though they all grew up in a home full of pets. The University of Chicago behavior geneticist Kristen Jacobson and her colleagues obtained the same result in their twin study of how middle-aged men played with

their dogs. (See [Are You An Animal Person? It Could Be In Your Genes.](#))

### **As people get older, genes have more (not less) influence on their behavior.**

You might expect that as people get older, their genes have less influence on their life. But this is not necessarily the case. The genetic influence on variation in cognitive abilities increases from about 25% in

infancy to about 50% at the age of 10 to 70% by the age of 18 ([here](#)). During this time, the influence of shared environment on cognitive abilities drops remarkably from about 65% to 0%.

The Swedish twin researchers found the same pattern when studying genetic influences on dog ownership. As you can see in the graph above, the impact of genes on dog ownership increased from about 30% to nearly 60% between the ages of 20 and 70. And, just as with cognitive abilities, the influence of family upbringing on dog ownership dropped from 30% to 0%.

### **Take Home Messages: The Nature and Nurture of Owning A Dog**

The results of the Swedish twin study are important. Here's a recap.

- Individual differences in decision to own a dog are influenced roughly equally by genes and experiences—just like human personality traits.
- Being raised with a dog has little or no impact on decisions to live with a dog when we are adults.
- The fact that pet-owning runs in families is probably due to the influence of genes, not early experiences with pets.
- Research showing that pet-owners are healthier than non-pet owners may actually reflect the influence of genes on human health and not the beneficial impact of living with a dog.
- As we age, genes play an increasing role in whether we have a dog in our lives.

FYI – While my kids were raised with animals, neither Betsy nor her twin sister Katie has any interest in having a pet. All of my four grandchildren, however, are gaga over animals.

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