

The Mode Gene

I am sure you have been to a scientific meeting in Washington DC or San Francisco and been instantly able to distinguish the scientists attending the meeting from all of the locals. Scientists dress like slobs and it's not just the Americans. The Germans look just as bad, even in their leather jackets and the Swiss stick out because of their really bad haircuts. I had always assumed this was because of scientists' relatively low pay or the excuse that they work in labs so their clothes are always at risk. Maybe it is the ivory tower life style that isolates them from conventional influences, or maybe it's peer pressure that suggests that anyone who dresses nicely is more concerned with style than substance.

A recent paper in Nature Genetics has shown that my assumptions were completely wrong. Scientists' lack of style consciousness is actually due to their expressing a rare allele of the "mode" gene, the genetic loci that determines a person's ability to perceive style and wear clothes in a chic manner.

Researchers working for DNKY, a biotech company with labs in New York, Paris and Milan, have identified a fascinating gene. They had set out to look for human pheromones that could be included in expensive perfumes and colognes to make the scents especially attractive to members of the opposite sex. The researchers were searching EST (expresses sequence tag) databases with sequences from brain and endocrine organs looking for sequences that were homologous to moth pheromones. By accident they stumbled on an unrelated but very large set of sequences that were homologous to each other and also homologous to homeobox (hox) genes. As you probably know, hox genes are regulatory genes that determine the expression of large sets of genes and are critical for the development of specific structures, such as limbs or parts of the brain. The researchers early work suggested they had stumbled upon a large set of related genes that were located adjacent to one another in small regions of the genome, just like hox genes. Much to their surprise, further analysis revealed that the different ESTs were actually different alleles of a single gene. Many genes have only one common allele coding for a single protein product, such as the gene that codes for collagen type IV. Other genes can come in a variety of "flavors" such as the gene that determines hair color. Different alleles code for slightly different amounts of pigment leading to different hair color.

While the gene they had discovered was a regulatory gene it was not immediately obvious what kind of genetic program was being controlled by the gene. It was possible the gene might determine something like body type; tall and skinny versus short and thick. Alternatively the gene could control something more localized, such as the shape of the ear or the type of connections in the hippocampus. They rejected the conventional approach of doing RFLP analysis of large families and adopted a novel strategy. They set up video cameras at McDonalds drive thrus so they could get license numbers and then got DNA samples off of the money people paid for their big Macs. They hired a small IT company in Hyderabad, India to get credit card purchase records, income tax returns and health records on thousands of individuals to correlate with the DNA data. Next they hired

the faculty in the Psychology Dept at a small college in Vermont who collated the data. They were able to do all of this for the cost equivalent of 1 NIH RO1 grant.

Due to the focus of DNKY, the researchers had a diverse group of consultants who assisted with the phenotypic analysis of the individuals. Not only did they have physicians and geneticists on the team, they also had psychologists, sociologists, marketing analysts, political scientists, economists, artists and fashion consultants. In the end it was the sociologists and the fashion consultants who solved the riddle of the new gene. They found that the gene was responsible for determining the kinds of clothes a person likes to wear and how he or she wears the clothes. The gene determines a set of connections between the frontal cortex, the infratemporal cortex, the hypothalamus and the amygdala. These are all brain regions that are important in emotion, memory and decision-making.

In the course of the analysis the sociologists and fashion consultants constructed a scale to permit quantitative analysis of a person's style consciousness. The so-called "Mode Scale" is similar to the pH scale, spanning 1-14 and is a log scale. So a person with a pM of 14 has 100,000,000,000,000 times more style consciousness than a person with a pM of 1. People with pM of 14 are invariably members of the super rich/jet set class or cover girls. Japanese women clock in at 12, Italian women and neurosurgeons are at 11. Executives of Fortune 500 companies have pM's around 10 and physicians have pM's of about 9. People from Chicago have a pM of 7, while Texans have a pM of 3. Scientists have a pM of 2, just below the homeless at 2.5 and above Madonna and Dennis Rodman at 1.5.

Perhaps the most fascinating part of the story is how the different alleles interact. Since the Mode gene is an autosomal gene everyone gets two copies. The jet set allele is dominant over all other alleles, explaining why there are no super rich scientists. Other alleles interact in more complex ways. So a person who gets one Italian woman allele and a Texan allele is likely to dress like someone from Chicago. Tragically, alleles near the bottom of the scale also tend to be dominant. So a person with a Chicago allele and a scientist allele will be a slob, dressing even worse than someone from Texas.

It was also found that stress could inhibit expression of some alleles. So if a person has a Chicago allele and a scientist allele and is stressed by giving a talk at a meeting in Japan or going to her/his own wedding there is a transient inhibition of the scientist allele, permitting the person to dress as well as someone from Chicago. The effect is very short lived, however, lasting only a few hours and explains why a scientist can appear before a congressional subcommittee wearing a tie and sports coat along with blue jeans and tennis shoes.

So the discovery of the Mode gene has resolved yet another controversy of nature versus nurture. Unfortunately, or perhaps fortunately, for the scientists of the world it shows that their inability to dress properly is an inalterable part of their genetic make up and no amount of complaining by girl-friends, husbands or mothers-in-laws will be able to change them.

(This essay was conceived after I shocked some Japanese scientists by appearing at a meeting in Tokyo wearing a sports coat and tie along with jeans and tennis shoes)