

# Is it Better to Be Mixed Race ?

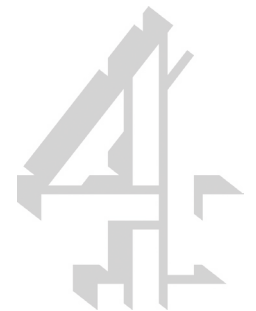


Today, many accept racial mixing as the inevitable result of globalisation. Scientists are fascinated by theories that this mixing could lead to a genetic advantage. Despite this, the reality is that historical misunderstandings of racial differences sparked Hitler's desire for a superior race and led to the Jewish Holocaust. With the increase in knowledge of genetic diversity, scientific evidence now reveals that had Hitler got his wish the result might not have been superiority but instead a weaker race.

## A modern genetic perspective

The differences between human populations are similar to if not greater than those seen between strains of plants and animals. Animals and plants born to genetically dissimilar parents often exhibit 'hybrid vigour', having higher growth rates and greater resistance to disease. They seem genetically 'better'. So, could mixed race children gain a noticeable genetic advantage and show degree of hybrid vigour? Some scientists think the answer is 'yes'. However, as in other species, environmental conditions can mask the genetic effects, and in humans the environment can play an unusually big role.

See [Let's Move On From Race] to find out more about modern measures of human difference.



## Hybrid vigour in plants and animals

For over a century animal and plant biologists have known that mixing two diverse strains of a plant or animal can result in more vigorous and healthy offspring. This "hybrid vigour" was first shown by American Plant Scientist George Shull at the Station for Experimental Evolution, Cold Spring Harbor, in 1908 when he crossed two different corn strains resulting in a more vigorous hybrid.

Today most corn, many nursery plants and even some domesticated animals are produced using this principle.

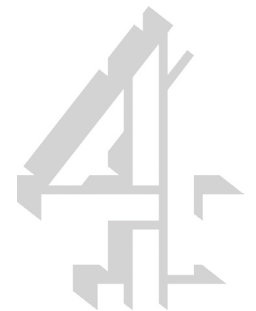
- The **Beefalo** (<http://en.wikipedia.org/wiki/Beefalo>) is a cross between a buffalo and a domestic cow;
- **Black Baldy** ([http://en.wikipedia.org/wiki/Black\\_Baldy](http://en.wikipedia.org/wiki/Black_Baldy)) cows result from a cross between a Black Angus and a Hereford;
- In pigs, **Blue Butts** (<http://www.livestocktrail.uiuc.edu/porknet/questionDisplay.cfm?ContentID=3877>) are produced by a cross between Hampshire and Yorkshire breeds.

The hybrid offspring are called the first filial or "F1" generation, hence the term gardeners are familiar with when buying seed; 'F1 hybrid'. To produce F1 hybrids, the farmer crosses two pure-bred parent strains. Often, these parent stocks are relatively small populations and hence are genetically rather uniform. For this reason, the hybrid offspring tend not only to be more vigorous than their parents, but are also relatively uniform in appearance, a second desirable trait.

### How far does hybrid vigour extend?

Hybrid vigour represents just one point on a spectrum of how related two parents are. At one end of the spectrum is inbreeding, where the parents are closely related. This tends to produce very unfit offspring, many of which die young. Better is to choose an unrelated partner. When the partner is not only unrelated but comes from a different population, this is like being 'super-unrelated' and can lead to hybrid vigour. However, there must be an end-point where the parents are too different. Most obviously this end-point comes when the parents are so unrelated they are actually different species. Thus, when a donkey and a horse mate the offspring are called mules. Mules are interesting because they show some elements of hybrid vigour, being strong and hard-working, but they are also infertile. Infertility is often the first problem to appear when hybrid vigour goes too far.

Why are mules infertile? Within each species, genes evolve to work together in harmony. When two species mate, the offspring will inherit a mixture of genes. This is a bit like trying to build a new car using the parts from two scrapped cars. If the two scrapped cars are related, being from the same manufacturer, you can probably make something that looks OK and maybe runs, even if some bits don't work. If the two parent cars are even less related, from different manufacturers, chances are that few of the parts will fit and nothing will work.



### What is the basis of 'hybrid vigour'?

There are two main components of hybrid vigour, referred to as 'outbreeding' and 'heterozygote advantage'. To understand these concepts we need to know how the genetic code is stored. DNA, the molecule that codes the blueprint for life, is stored in every cell in manageable chunks called chromosomes, like chapters in a book. Chromosomes generally come in pairs, one inherited from the mother and one from the father. Humans have 23 pairs containing about 30,000 genes. Only the sex chromosomes break the 'pairs' rule, women having two 'X' chromosomes and men one 'X' and one 'Y'.

Carrying genes in pairs brings several advantages. First, occasional genetic mutations may cause one copy to malfunction. In most cases, having one broken copy is no problem because the good copy can compensate fine; the pairs act as a back-up system. A second benefit of having paired genes can be thought of as having the 'best of both worlds'. If you carry two copies of a gene that differ slightly in how they work, it is a bit like having an extra channel on your TV set: you don't have to watch it but there may be times when the extra channel comes in handy. It gives you extra flexibility. An individual who has two identical copies of a gene (good or bad) is called a homozygote, while someone who has two copies that differ is called a 'heterozygote'.

### The benefit of outbreeding

Everyone carries a few copies of genes that are broken or malfunctioning, but the effects of these are normally minimal due to the back-up system. Only when a child inherits two broken copies of the same gene does a

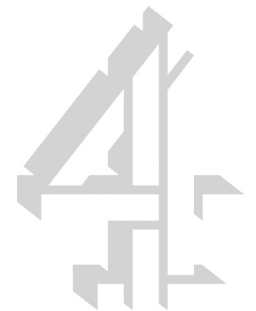
problem arise. What happens then depends on the gene and the way it is broken. In the worst cases, the child will develop a disease that eventually kills him or her. Examples of such nasty diseases are Tay Sachs and Cystic Fibrosis. Other problems are less severe. For example, they may simply make a child suffer more when they get a cold.

Broken genes are usually rare, so to inherit two broken copies of the same gene is unlucky. However, the chances increase considerably if your parents are related. This is because the more related your parents are, the greater is the chance that any particular pair of genes inherited by their child is identical 'by descent'; both copies can be traced back to the same single copy in, say, a great grandparent. With more genes that are identical by descent, a child will have more genes where both copies are broken.

If inbreeding is bad, outbreeding, marrying an extremely unrelated partner, should be good for the same reason. With a less related partner, the number of genes in your children that are identical by descent is reduced, and with it the chance that a gene has two broken copies. It is not that your children will inherit fewer broken copies in total, just that every broken copy has a much better chance of finding itself partnered with a good copy.

### The benefits of heterozygous advantage

Outbreeding can be thought of as avoiding the bad effects of having two broken copies of the same gene. Heterozygous advantage deals with the extra flexibility one may get from having two good, but slightly different copies of the same gene. It is a bit like having one thin summer coat and one warm winter coat; this is often better than having two identical coats of a type that is neither cool enough in summer nor warm enough in winter. A more concrete example might be the immune genes, the genes we use to fight disease. Immune genes tend to be very variable. In a population there will be many different copies of each gene, each one tailored to fighting one particular disease or disease strain. Here, having two different copies will protect against two different diseases and make for a healthier person.



### Is there hybrid vigour in humans?

So, what happens when people from different human populations marry - is this likely to bring the benefits discussed above? Yes, it probably will, says Amos, both by reducing the number of gene-pairs that are broken and by increasing the number that are 'both-good-but-different'. Combined, the result should be, on average, children who are genetically healthy, for example, who are less likely to catch 'flu or who live a little bit longer. However, the size of this effect is extremely difficult to measure because so much of a human's fate is due to the environment: having good genes won't stop you getting run over by a drunken motorist!

### The Future

**In the 21<sup>st</sup> Century, as more and more populations move and mix with each other, scientists predict that genetic heterozygosity will increase. However, it won't increase indefinitely, but should reach a peak and then either stabilise or decrease depending on how future generations choose to live.**

## Racial Mixing: A History

### Racial Mixing in the UK

In Britain after World War I a surplus of women and an influx of men from the colonies led to many mixed race couplings and increased concerns about miscegenation. By World War II any form of intimate relationship between a white woman and non-white man was considered unacceptable. In 1958, 71 per cent of Britons in a Gallup pole strongly disapproved of interracial mixing.

By 1980, 27 per cent of Britons still objected to mixed-race marriage, even among close relatives. The pop band Madness's song *You're an Embarrassment* takes it's theme from the saxophonist's sister's mixed race pregnancy. The lyrics describe the unfolding turmoil as uncles, aunts, mum and dad react.

*'Our uncle he don't wanna know he says,  
We are a disgrace to the human race he says,  
How can you show your face,  
When you're a disgrace to the human race?  
No commitment, you're an embarrassment,  
Yes, an embarrassment, a living endorsement'*

By 2000, the UK had the highest number of inter-racial couples in the world and the following year the UK added 'mixed race' to the census - 1.4% of the population respond. Birth records for the UK show that at least 3.5% of newborn babies are mixed race and today mixed race is the fastest growing demographic predicted to become Britain's largest ethnic group by 2020.

### Racial Mixing and the USA

Miscegenation laws against interracial marriage (including living together and having children out of wedlock) were put in place in the US during the colonial era and by 1913, 29 states enforced these laws. 22 states had stiff penalties for miscegenation – fines of up to \$2,000 and/or prison terms of up to 10 years.

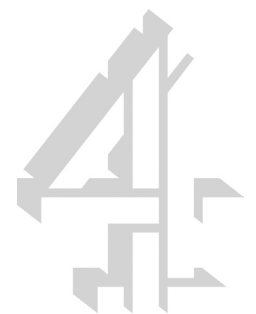
Eugenicists actively supported the strengthening of old laws and the enactment of new ones: the eugenicist-inspired Virginia Integrity Act of 1924 prohibited marriage between a white person and anyone with a trace of blood other than Caucasian. This led to the 'one drop' colloquialism which literally translated meant that anyone with just one drop of African ancestry was categorised as black.

In those days it was the belief that the crossing of such diverse types would lead to an inferior race.

The Virginia Act was finally struck down, along with all other anti-miscegenation laws, in 1967, the year before the assassination of black Civil Rights leader Martin Luther King.

### Racial Mixing in Europe

After the First World War, France occupied the German Rhineland. The French army of occupation included African soldiers from the French colonies. Some of them had children with German women. These children were known as the *Rhineland bastards*. The Nazis thought it was a scandal that White German women had children with Africans from an enemy army and in 1937, 385 of these children were rounded up and sterilised in clinics.



## Racial Mixing: The Eugenic Perspective

After hybrid vigour was first discovered a natural next question was could it, or a form of it, exist in humans? But pondering this did not sit well with 20<sup>th</sup> century eugenicists who believed in the supremacy of Europeans and wanted to avoid mixing with other populations at all cost. Indeed they subscribed to a theory of *hybrid degeneracy* and believed that miscegenation (race mixing) would produce undesirable results.

In 1916 in his influential book, *The Passing of the Great Race*, eugenicist Madison Grant warned that racial mixing was “a social and racial crime” that would lead to the demise of white civilization.

George Shull's advisor, eugenicist Charles Davenport, Director of the Biological Laboratory at Cold Spring Harbor, could not completely ignore the human implications of Shull's work on hybrid vigour. The idea of potential vigour based on continual mixing of the 'races' was unpalatable and in 1929 he published '*Race Crossing in Jamaica*', a 512 page study on the '*problem of race crossing with special reference to its significance for the future of any country containing a mixed population*'. He even found some evidence for increased vigour among the mixed race people of Jamaica but ultimately concluded that race crossing led to behavioural *disharmony* and wrote that '*a population of hybrids will be a population carrying an excessively large number of intellectually incompetent persons*'.

