***FISHBOWL ACTIVITY***

**Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**



**Fishbowl Articles & Discussion Instructions:**

*Topic: Nature vs. Nurture*

You will work with your partner within your pre-assigned groups in order to complete the following tasks (so in a group of four, two people will work together to address one side of the argument while the other two people will collaborate on the other side):

**Articles** (approximately 2-3 class periods):

1. Closely read and annotate the texts on nature vs. nurture and identify the central ideas for each. You should also identify within each article the pros and cons of each side of the argument. I would suggest using different colored highlighters or pencils to do this.
2. Using evidence from the texts, develop a claim/counterclaim regarding whether nature or nurture plays a larger role in determining who we are. Be sure that the claim and counterclaim are two sides of the same coin. This should be written as one sentence. Provide evidence and details from the texts in order to support your argument.

*Sample topic*: Humans vs. technology in the workplace.

Ex. “Although the increased use of technology in the workplace can cause unemployment (COUNTERCLAIM), studies show that it can increase wealth, productivity, and efficiency; therefore, humans should be replaced by machines (YOUR CLAIM).”

-OR-

Ex. “Machines may increase productivity in the workplace (COUNTERCLAIM), but they will never be an appropriate substitute for human intelligence and ability (YOUR CLAIM).”

**Fishbowl** (one or two class periods):

1. On the day of the fishbowl discussion, you will meet with your partners for a few minutes to go over the main points and details that you will use to defend your argument. These must come directly from the text.
2. You will separate into the inner and outer circles. Two of the four group members will be on the inside, and two will be on the outside. You will decide with your partner who will speak and who will observe. Bring your articles with you.
3. Those on the INSIDE of the circle – you will discuss your ideas with each other one point at a time. Please try to limit yourself to only using information from the articles, not your own personal opinions (we’ll get to those later). You must speak at least twice in order to receive full credit. The person who is speaking will call on the next person who wants to speak, and there is no talking out of turn. Your PURPOSE is to defend your own argument while poking holes/pointing out flaws in the other side of the argument. If one person reads information from an article and you want to add onto it, defend it, or argue against it, you must use the texts. \*This is not a random sharing of facts; it is the ability to defend your argument in a logical order. You must identify the title of the article, as well as the page/paragraph numbers you’re getting your info from so that everyone can follow along.
4. Those on the OUTSIDE of the circle – write both you and your partners’ names and claim/counterclaim at the top of your notes page. Your job is to observe and take notes on any main points discussed in the fishbowl, as well as any questions that you have about the information you heard.

**Evaluation**:

Inside circle – you will be assessed on the amount you participate as well as the specific content/details you use from the articles in order to defend your argument.

Outside circle – you will be assessed on the quality and number of notes that you take during the discussion.

Each student will also complete the reflection sheet once the fishbowl discussion has been completed.

For the Observer: Discussion Notes

Fishbowl claim/counterclaim (thesis): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Point #1:

Evidence from text:

Point #2:

Evidence from text:

Point #3:

Evidence from text:

Point #4:

Evidence from text:

Point #5:

Evidence from text:

For the Speaker: Main Points

Fishbowl claim/counterclaim (thesis): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Point #1: Article title & page #\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Evidence from text:

Point #2: Article title & page #\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Evidence from text:

Point #3: Article title & page #\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Evidence from text:

Point #4: Article title & page #\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Evidence from text:

Point #5:

Evidence from text:

**Fishbowl Evaluation Form**

Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Role:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*After the Discussion:*

1. Formulate your own opinion based on today’s discussion:

 2. What were your own personal strengths / the strengths of your partner throughout this process?

3. In what area(s) can you and your partner use some improvement?

4. Questions and/or topics for further investigation:

# *Nature vs. Nurture Fishbowl Articles*

# Document #1

# “Nature vs. Nurture: New Science Stirs Debate How Behavior Is Shaped; Who's an Orchid, Who's a Dandelion”

*By JONATHAN D. ROCKOFF Via The Wall Street Journal Online, Sept. 16, 2013 6:57 p.m. ET*

Researchers are making strides in understanding how genes work with the environment to shape behavior, adding a new twist to the age-old debate over whether nature or nurture is mostly responsible for how people develop.

They are finding that sensitivity to the environment resides in the biology of the nervous system. And some people, because of their genetic makeup and life experiences, are more sensitive to outside influences than others. Scientists point to a type they call orchids—people who wilt under poor conditions but flourish in supportive climes. Meanwhile, dandelions aren't much affected by the world around them, whether supportive or harsh.

#### Who Wilts, Who Flourishes

The interplay of the brain's biology and the environment makes some people more sensitive to outside influences than others, research shows. People more susceptible to external factors, both positive and negative, are called orchids. Others are hardy dandelions.

#### Orchids

* Prone to anxiety, depression, aggression in difficult conditions
* Trouble maintaining attention amid distractions
* Act out more when parents fight, but pay more attention in school when have happy home life
* Better students, more likely to share when praised
* Poverty, marital conflict, negativity speed up puberty
* Puberty starts later and progresses more slowly if higher quality relationship with parents
* Meditation likely to reduce stress levels dramatically

#### Dandelions

* Affected relatively little by adversity
* Can focus amid distractions
* Learning doesn't vary with home life
* Sharing doesn't improve more when praised
* Whatever the family life, puberty tends to proceed at about the same pace
* Meditation cuts stress levels, but not as much as in orchids

Part of the difference stems from variation in genes like DRD4, which helps regulate a chemical in the brain called dopamine, a neurotransmitter that helps people experience pleasure and reward. Evidence suggests that people who produce less dopamine—the orchids—don't learn as well from negative feedback or in a distracting environment, but do perform well in a warm but strict setting.

About 30% of Caucasians could be called orchids as a result of the genetic variation to DRD4, one review of research on the subject has shown. Prevalence in other ethnicities is less well known.

Researchers say the most startling discovery is that while sensitive orchids are hurt by bad outside influences, they can benefit profoundly from positive environments. Children who acted out more and did worse in school than classmates while coping with fighting parents, for example, shared more and performed better than peers after an intervention to promote a happier home life, according to a 2010 study of 338 children in the journal Child Development.

"The very characteristics that were often thought of as children's greatest frailties can also be their greatest strengths," says Bruce Ellis, a University of Arizona professor of family studies and human development who helped coin the orchid and dandelion designations and develop the theory.

The most recent study, published in August in the Proceedings of the National Academy of Sciences, looked at the impact of the economy on mothers' parenting.

The study found mothers with a particular genetic variation yelled, cursed and slapped their children more as the economy plunged during the recent downturn of 2008, though they parented less harshly than mothers who didn't have the genetic change as the economy improved in the early 2000s.

Mothers with the sensitive kind of gene do parenting "worse when conditions are deteriorating," says Irwin Garfinkel, a professor at Columbia University's School of Social Work who helped author the study. "But those with the sensitive gene do better when conditions are improving."

The findings that only certain people may be sensitive to outside influences have triggered a spirited debate about how best to help troubled youths and adults. Some say treatment might need to be different for those identified as orchids than those who are dandelions.

Much is still unknown about the mechanics behind people's environmental susceptibility. It is likely that most people aren't either an orchid or a dandelion, but have the qualities of each to varying degrees.

Critics like Glenn Roisman, a professor at the University of Minnesota's Institute of Child Development, question the strength of the evidence implicating particular genetic hitches in environmental sensitivity and say more rigorous study is needed.

Dr. Roisman says the research must better distinguish how good or how bad outside influences need to be to have a significant effect, and whether a person's susceptibility is specific to certain factors.

"If you're an orchid, you may be an orchid susceptible to specific environmental circumstances," such as parenting but not peer pressure, Dr. Roisman says.

Jay Belsky, a University of California, Davis, professor of human development, was among those who pioneered the idea that certain people are developmentally malleable.

Researchers had long thought that childhood experiences shaped how people turned out later in life. Dr. Belsky figured it made evolutionary sense that some children would be more susceptible to early influences than others because the future is uncertain.

If the future turned out as anticipated, these developmentally malleable children would be in a great position to flourish because they wound up fitting the environment in which they found themselves. But if the future was unexpected, these same kids would be mismatched, perhaps disastrously so.

To ensure survival over generations regardless of what the future brought, parents would have both orchid and dandelion offspring, Dr. Belsky thought.

Evidence hashing out the biology behind the theory and supporting its validity began pouring in about five years ago, once the technology for parsing genetic data was more widely available to researchers.

Researcher Marinus Van IJzendoorn and colleagues at Leiden University in the Netherlands took a sample of 157 children at risk for aggression and disobedience. They swabbed the inside of the study subjects' cheeks and analyzed the cells to see who had a variation of DRD4, the dopamine-regulating gene.

At a laboratory, Dr. Van IJzendoorn filmed the study subjects' mothers working with their at-risk children. Half of the parents in the study were visited six times by a social worker who reviewed the video and discussed how to be warmer while setting limits more strictly; the other parents didn't receive such training. The mothers answered questionnaires designed to assess the children's behavior.

"We found clear-cut evidence" that the children with the DRD4 variant "were more open to the changes in their parents' behavior: These children who showed most aggressive behavior without the parent training, displayed least problem behaviors after the training," Dr. Van IJzendoorn said in an email. The study was published in 2008 in the journal Developmental Psychology.

In 2011, Dr. Van IJzendoorn and colleagues published in the journal Development and Psychopathology an analysis of 15 studies involving more than 1,200 children confirming the hypothesis that dopamine-system related genes mark a person's susceptibility to the environment.

## Document #2

## “Nature vs. Nurture: Outcome Depends on Where You Live”

## *The balance of nature and nurture in influencing how a child grows up varies depending on where they live, according to a new study.*

*By Nick Collins, Science Correspondent for The Telegraph*

*2:50PM BST 12 Jun 2012*

Both nature (meaning our genes) and nurture (the environment we grow up in) are known to significantly affect traits like our height and weight, our IQ, and our chance of developing behavioural problems or autism.

But how strong environmental factors are in determining each characteristic, compared with the influence of DNA, differs significantly across the country, scientists have found.

Researchers from King's College London studied 45 childhood characteristics in 6,759 pairs of identical and non-identical twins across the UK, to determine whether their genes or their environment was more important.

A new series of "nature-nurture" maps produced by the team revealed that some areas are "environmental hotspots" for particular traits, but in other places the same attribute is mainly governed by genetics.

For example, across most of the country 60 per cent of the variation in children's behaviour at school - whether they were unruly or not - was down to their genes.

But in London environment played a greater role - possibly because wealth varies so dramatically within communities, meaning twins growing up on the same street are more likely to fall in with different groups of friends who could influence their behaviour.

Dr Oliver Davis, who led the Wellcome Trust-funded study, published in the Molecular Psychiatry journal, said: "There are any number of environments that vary geographically in the UK, from social environments like health care or education provision to physical environments like altitude, the weather or pollution.

“The message that these maps really drive home is that your genes aren’t your destiny. There are plenty of things that can affect how your particular human genome expresses itself, and one of those things is where you grow up."

**Document #3**

**“Nature versus Nurture: Human Personality”**

*By JUDY SIEGEL-ITZKOVICH via The Washington Post Online on 08/04/2012 22:44*

## Molecular geneticist, psychologist says parents shouldn't blame themselves for kids’ gene-derived behaviors.

Chicago-born molecular geneticist and psychologist Prof. Robert Plomin gives a lot of backing to genes when considering the venerable debate of whether “Nature” (genes) or “Nurture” (environment) is more important in affecting human behavior. But the senior molecular geneticist at King’s College London largely credits chance, or at least the environment, for his choice of profession and his specialty.

There were 32 cousins in his immediate American family of Polish-German origin, but he was the first among them to attend university.

“My parents were born during the Great Depression. I went to Catholic schools and made a little money shoveling snow from sidewalks and doing clerical jobs because I knew how to type.” Then he received a scholarship at DePaul University; the private Chicago institution of higher learning is today the largest Roman Catholic university in the US.

“I did well in my high school studies, so I received a full scholarship at DePaul. I started by majoring in English and philosophy, but then I ended up in psychology because I had a good adviser who encouraged me, and a lot of students moved from philosophy to psychology.

DePaul is well known for its excellent law school, and I thought at first about studying that, but I realized didn’t like the idea. I was sure it was not for me.”

Then, Plomin said in an interview with *The Jerusalem Post* on a recent visit to Israel during which he delivered a lecture on “DNA and the Mind” at the Hebrew University of Jerusalem, he received another scholarship for graduate school, this time at the University of Texas at Austin.

“I just fell into it. I studied behavioral psychology and took all the core courses. But as the university was the only place in the world then that taught behavioral genetics, I took a course in that – even though I didn’t know much about it. None of the 40 students was interested in the subject – except me. It knocked my socks off. I hadn’t thought of behavioral genetics; molecular genetics didn’t exist then. The animal studies seemed very powerful.”

Thus it was luck and the people he encountered that got him into his field, but it was certainly genetics that gave him the intelligence and the drive to succeed and made him a leading researcher in his field.

After receiving his doctorate in behavioral genetics from the psychology department at Texas University, he went to work at the Institute for Behavioral Genetics at the University of Colorado at Boulder where he became professor in 1982. After a year at the Center for Advanced Study in the Behavioral Sciences in Palo Alto, California, he moved to Pennsylvania State University to help create an interdisciplinary research center on development and human genetics. In 1994, he moved to England.

Plomin was at the Mount Scopus campus of the university to participate in an International Workshop on Temperament. Among the topics discussed were the relationship between temperament and motivation, temperament and regulation and environmental influences on the development of temperament.

Molecular genetics is a field that melds biology and genetics and studies the function and structure at a molecular level. The field studies how the genes are passed on by one generation to the next. Molecular genetics uses the methods of genetics and molecular biology.

An important area within molecular genetics is the use of molecular information to study patterns of descendants and genetic mutations that cause certain diseases, as well as why traits are carried on and how and why some may mutate.

How physical traits are handed down from parents to children has been well known since the Austrian monk, Gregor Mendel, formulated the rules of modern genetics in the 19th century. Thus we know how people inherit blue eyes, brown hair, height, fair skin and other physical characteristics. But where human behavior comes from is still being argued. We still don’t know how much is decided by the DNA in our cells and how much is determined by where and how we live, our parents and siblings and various life experiences.

Scientists have for years searched for “behavioral genes” to explain a wide variety of behavior from violence and theft to reckless driving and sexual orientation. Many people worry that genes could then be used to excuse criminal behavior and get such people out of jail.

“After 40 years of doing research on nature and nurture in psychology, there are two crucial (not just nagging) things I want to understand,” said Plomin in his lecture.

“One is about nature and one is about nurture. About Nature: Behavioral genetic research has shown that genetics is important throughout psychology. I want to find these genes in order to use them to explore the nature/nurture interface in psychology. During the past decade, methods have become available that can identify specific genes but it has proven extremely difficult to find these genes; the most likely reason is that many genes are involved and each gene has a very small effect.”

About Nurture, he continued, “behavioral genetic research has shown that environmental influences in psychology generally make children growing up in the same family different, called non-shared environment. I want to know why children growing up in the same family are so different but this has also proven difficult.”

Plomin is Medical Research Council Professor in Behavioral Genetics at the Institute of Psychiatry at King’s College London, where he is deputy director of the Social, Genetic and Developmental Psychiatry Center. In 2002, he was listed “among the 20th century’s most influential psychologists” by the Review of General Psychology.

Plomin built his reputation on conducting numerous studies of identical (monozygotic) and fraternal (dizygotic) twins to try to tease out behavior from genes and non-shared environments.

If genetics didn’t play a significant part, then fraternal twins who are usually raised under the same conditions would be alike, despite the differences in their genes. But, while research does demonstrate that fraternal twins do resemble each other more closely resemble than non-twin siblings, they also show these same similarities when they are raised separately, as in similar studies of identical twins.

“My sister – a medical technician in Chicago – and I, who are not fraternal twins, are very different in personality,” Plomin said in the interview. “The rule of genetics is that ‘like begets like.’ But the second law is that non-twin siblings are not necessarily like you, and that 50 percent of your genes are different.

“There is a range of differences. The environment can also make family members different.

The assumption is that family is a unit by which environmental factors are doled out. Two kids in the same family would be thought to be similar. But they are probably alike in intelligence, they can be very different in personality.”

There are turning points in life, Plomin said.

“I had an adviser who took a personal interest in me. It seems something like chance. I might have ended up in Chicago as a lawyer or politician.” But he went to England, marrying a woman who works with the Medical Research Council.

“In the last few years, advances in DNA techniques have revolutionized behavioral genetic research. Studies on a few candidate genes have given way to systematic genome-wide association (GWA) research that scans the entire genome for associations with complex traits.

“GWA research shows that genetic influence on cognitive abilities and disabilities is caused by many genes of small effect. Because the effects are so small, it will be difficult to find and most of the genes responsible for the heritability of cognitive traits, called the ‘missing heritability’ problem. “However, even without identifying specific genes, it is possible to estimate genetic influence from DNA, called ‘genome-wide complex trait analysis.’ The next big thing is whole-genome sequencing which will capture all DNA variation throughout the three billion base pairs of the genome.”

At King’s College, he teaches graduate students while doing studies that have involved thousands of pairs of twins. Some of them are adults by now, and quite a few had been raised separately from their siblings. He and colleagues not only studied personality, but also took DNA samples and conducted molecular genetic studies. There are not many triplets, he added, and very large samples are needed for this kind of research.

“If you study identical twins, you usually look for what they have in common.

If they are fraternal twins and of the opposite sex, you can compare them,” said Plomin. “We’ve found over the years that genetics is much more important an influence on behavior and personality than people used to think. It can affect everything from reading ability to the tendency for schizophrenia.

But many laymen believe in the tabula rasa, that you can mold children to be what you want as long as you invest time and effort in them.”

“Tabula rasa” (blank slate) is a term coined by English philosopher John Locke, who postulated that people acquire all or almost all their behavioral traits from “Nurture.” But most contemporary psychologists and anthropologists regard this position as naive and outdated.

Genetics is also involved in musical or sports abilities.

“If children don’t have the physique for it, which basically comes from genetics, they won’t excel. You can improve abilities by training, but children aren’t stupid. If they see they are not so good at something, they will leave it. My advice to parents is to expose their children to as many experiences as they can, but they will go into what they like and are best at.”

Plomin has also studied shyness as a trait in children as a heritable trait. “That doesn’t mean that if you’re shy, you can’t do anything to overcome it. But if you’re shy, you’ll likely to avoid situations that expose you to a lot of such encounters. Don’t regard shyness as something that is wrong to be and that has to be fixed. I can’t understand people who love going to cocktail parties with guest you don’t know.”

Children, he continued, can adapt if they are shy and are dumped by their parents at a birthday party. That’s hard. It’s better for a parent to arrange for a shy child to go with a friend. Don’t force your child to do things that you didn’t succeed at so you feel you have finally been good at it.”

He recalled that when he taught genetics at Cambridge and Oxford, half of them really wanted to go into finance instead but were urged to take genetics courses by their families.

Plomin has also studied autism. “I’ve done surveys of parents and teachers who accept that genetics is important in the development of autism, but many academics aren’t clued up. Sociologists are generally unwilling to accept the important role of genetics in autism.”

Attention-deficit hyperactivity disorder (ADHD) is also very heritable, he said.

“There are two components – impulsivity and intention. They are both genetically bound. You know that such things run in families and may assume that this is evidence of the influence of environment. But in fact, it is evidence of the workings of genetics.”

The type of environmental influences in behavior that are most important, he suggested, is non-shared environment, which means that they have different experiences and teachers, have been through different things, and come out different even though they were raised in the same place by the same parents. Even uterine environment and parental preference for one child over the next can affect personality. Due to non-shared environment and genetics, two children who grow up in the same family can be just as different as those in two different families, he said.

Obesity and overweight are influenced by how your parents fed you and what, if any, exercise you had. But it turns out that children in the same family generally have similar weights because of genetics. If there are adoptive children in a family, they and the children born to the couple do not correlate in body weight even though they were fed the same, said Plomin.

“There is a lot of blame, especially against mothers, when a young adult is diagnosed with schizophrenia. The mothers are accused of ‘what they did’ to them as infants. But as it is connected to genes, you feel off the hook.

“So it’s easier. Many of those who support genetic research are parents of children with such diseases. Parents shouldn’t feel the slightest amount of guilt if they have passed on disorders because of the genes they inherited,” Plomin insisted.

 **Document #4**

**“What’s Stronger - Nature or Nurture?”**

*By Molly Edmonds (via Newsday.com)*

When a scientist makes a remarkable discovery, he or she is the one who becomes eligible for prestigious awards. When a musician delivers a blazing guitar solo, it's that performer who hears the applause and signs the [CDs](http://electronics.howstuffworks.com/cd.htm) backstage. And when a [basketball](http://entertainment.howstuffworks.com/basketball.htm) superstar makes a 3-pointer, you can be sure that the multimillion-[dollar](http://money.howstuffworks.com/currency.htm) paychecks go into that person's [bank](http://money.howstuffworks.com/personal-finance/banking/bank.htm) account. Why? Why don't these people's parents get the fame, glory and compensation? After all, they provided the [DNA](http://science.howstuffworks.com/life/cellular-microscopic/dna.htm) that allowed for such incredible success.

The debate on nature and nurture has a long history. Are people born with certain genetic gifts or curses? When a baby is born, is his or her entire life already written? The baby could have genes that are markers for intelligence, psychopathy and cancer, allowing doctors to foretell a few years of success in school, followed by a few years in jail for some violent crimes, capped off with a death from cancer. Or does nurture win out? Could the baby be born with all of those genes and manage to avoid such a gloomy fate, provided he or she lives in a loving home that models healthy relationships and behaviors?

There are people who argue passionately for both sides. Some researchers spend their entire lives hunting for the genes that cause disease, intelligence or musical ability, but there are just as many who argue that we're blank slates when we're born -- full of various genes, perhaps, but with nothing set in stone. And in an era of political correctness, it's very difficult to make an argument that men are innately more intelligent than women, that Caucasians will be more successful than African-Americans, and so on. Still, studies of identical twins -- who share the same genes -- often show us just how similar genetically matched people turn out to be.

Though members of Team Nature and Team Nurture will cringe at this, it seems unlikely that there will ever be a real winner in this debate. Nowadays, many scholars take a middle of the road approach, claiming that neither nature nor nurture is stronger. Rather, genes and the environment have an interactive relationship, in that a person's environment largely affects how a gene will express itself. From exposure to pollution to parental income levels, there are things that affect people that genes just can't overcome. For example, if a person carried a gene that triggered obesity but had parents who stressed healthy eating habits, then it's not a foregone conclusion that he or she will end up obese. On the other hand, if the person has friends who eat lunches full of cookies and cupcakes, then it's possible the outcome would be reversed.

So those high achievers we mentioned at the beginning of this article -- the scientist, the musician, the sports star -- aren't completely indebted to the fortunate coupling of two people with good DNA. Rather, their success is likely due to a healthy mix of DNA, parental support, hours of practice, the good luck of finding a job in their chosen field and countless other factors.