



**KARMA**GENES  
meet yourself



*All you wanna know regarding  
DNA, psychology & personality*

# Karmagenes

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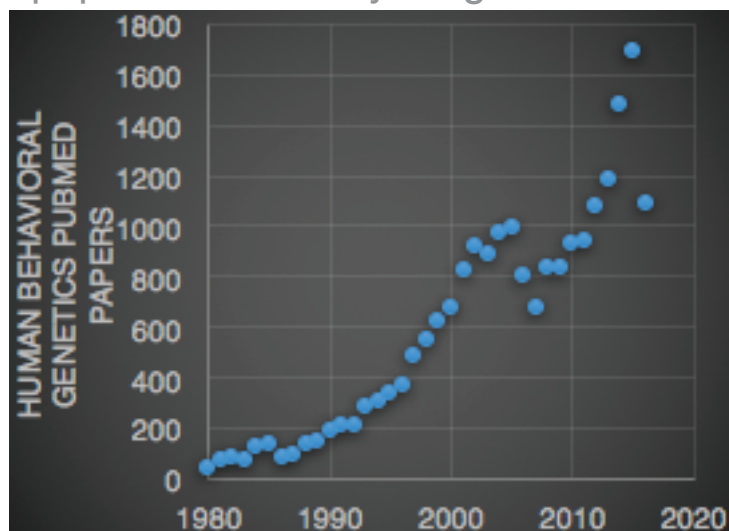
5 Factors Personality  
(Big 5/OCEAN)

# Behavioral Genetics At A Glance

Example of genetic mutations (polymorphisms) affecting behavior

Hormone/ Neurotransmitter	Gene	SNP (position)	Mutation	Effect
Dopamine	COMT	Rs4680	G:A	Executive cognition, Handling stress, Reward learning
Oxytocin	OXTR	Rs237887 Rs53576 Rs2268493	G:A G:A T:C	Empathy, Social skills, Trust, Bonding
Serotonin	SLC6A4	Rs25531 Rs25532	G:A T:C	Optimism, Handling stress, Emotional behavior
Vasopressin	AVPR1A	RS1 RS3	(GATA)14 (CT)4-TT-(CT)8- (GT)24	Altruism, Bonding, Generosity

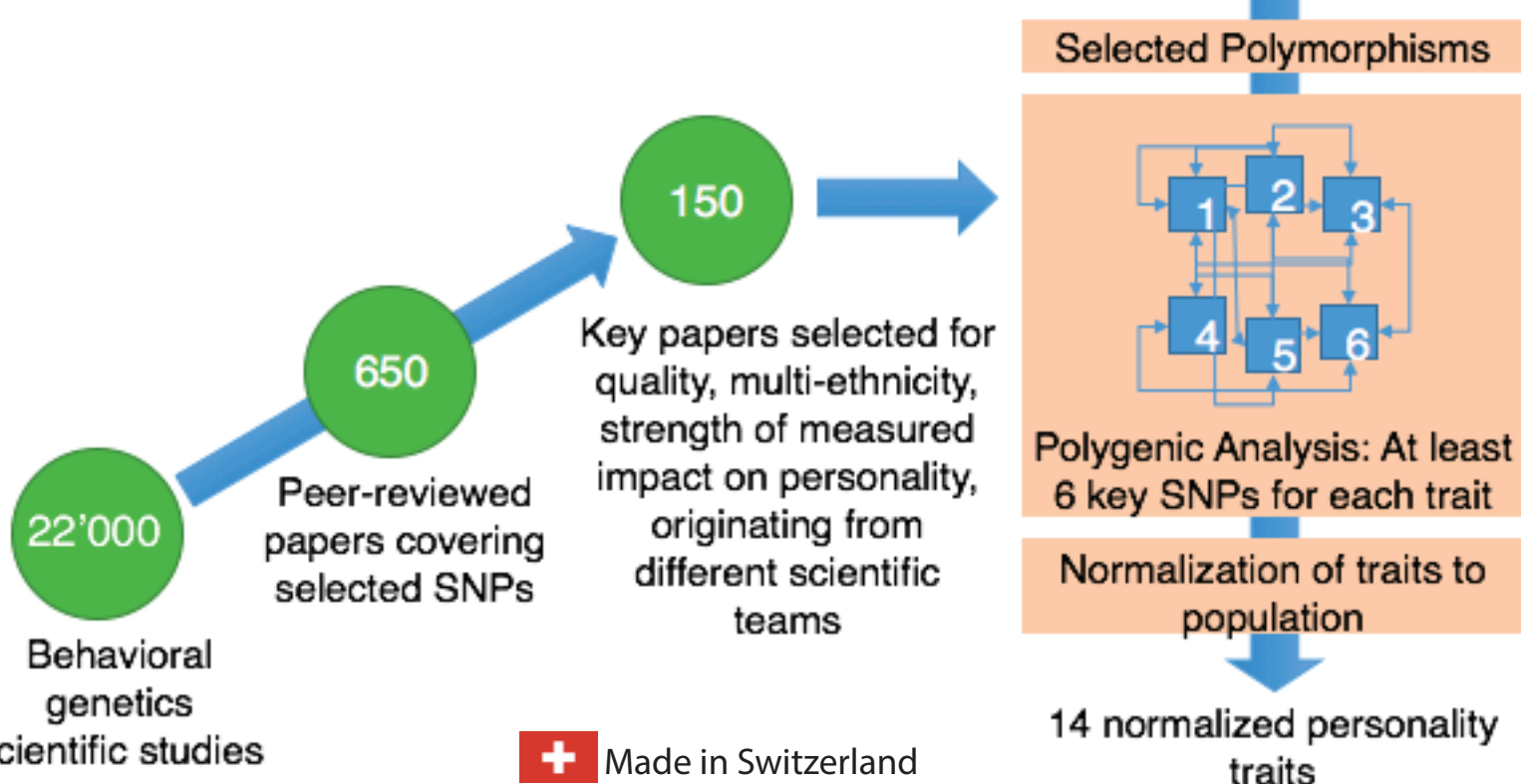
22'000 scientific papers show that your genes influence your personality



Exponential growth of human behavioral genetics scientific research field

## What Makes Karmagenes Technology Unique

DNA sequence processed by Unique Algorithm



## Behavioral Genetics Timeline

### Plato

380 BC

Since ancient times Nature and Nurture was mentioned in Protagoras dialogue. Plato laid the very foundations of Western philosophy and science.

### Hereditary Genius

1610

### William Shakespeare

Nature Nurture is mentioned in his play The Tempest by the character Prospero: "A devil, a born devil, on whose nature Nurture can never stick; on whom my pains, Humanely taken, all, all lost, quite lost; And as with age his body uglier grows, So his mind cankers. I will plague them all, Even to roaring."

1869

Sir Francis Galton (1822-1911) implemented the first scientific study regarding behavioral genetics in humans. He is considered as the founder/father of behavioral genetics. He officially said the term "Nature vs Nurture", Cousin of Charles Darwin, studied the heritability of human ability.

1913

### Theodore Roosevelt

Theodore Roosevelt letter to Charles Davenport : "Some day we will realize that the prime duty, the inescapable duty, of a good citizen of the right type is to leave his or her blood behind him in the world."

### Fitter Families

1920

Known simply as Fitter Families Contests with support from the American Eugenics Society's Committee on Popular Education, the contests were held at numerous fairs throughout the United States during the 1920s. The first Fitter Family Contest was held at the Kansas State Free Fair in 1920, competitors submitted an "Abridged Record of Family Traits," and a team of medical doctors performed psychological and physical exams on family members. Each family member was given an overall letter grade of eugenic health, and the family with the highest-grade average was awarded a trophy.

1930

### Eugenic movement

This period of time have witnessed an exponential increased number of scientific publications regarding the heritability of behavior. Giving the name Eugene to babies was really popular (7-8 per 1000).

### WWII & Eugenics

1939

Knowledge and scientific achievements can be destructive in the wrong hands and history have shown us many times the extent of harm that could be imposed when science is applied in the wrong context. Nazis focused on the racial improvement of the Germanic "Übermenschen" master race through eugenics. The British Psychological Society mentioned: 'The notion that behavioral traits are passed from one generation to another, "in the blood", has been common currency for a very long time. It has been used to justify racism, persecution and genocide, it has been used to stereotype individuals, and it has been used to proclaim the superiority of an individual or group over others.'

1945

### Buck v. Bell court case

Buck v. Bell is a decision of the United States Supreme Court in which the Court ruled that a state statute permitting compulsory sterilization of the unfit, including the intellectually disabled, "for the protection and health of the state". The ruling was written by Justice Oliver Wendell Holmes, Jr. Holmes concluded his argument by declaring that "Three generations of imbeciles are enough". The effect of Buck v. Bell was to legitimize eugenic sterilization laws in the United States as a whole. The decision was largely seen as an endorsement of negative eugenics - the attempt to improve the human race by eliminating "defectives" from the gene pool.

## The TextBook

Behaviour genetics field gained momentum and gratitude as a research discipline followed with the publication of the textbook Behavior Genetics by John L. Fuller and William Robert Thompson marking the era of new discoveries.

1960

## The Jim's

The twins separated at birth and then reunited at the age of 39 have a fascinating story. They both married women named Linda then both divorced and both remarried to women named Betty. It doesn't stop here, both named their sons James Allan and James Alan while both their pet dogs were named Toy. This story is found in the scientific publication "Our findings continue to suggest a very strong genetic influence on almost all medical and psychological traits." by Thomas Bouchard.

1979

1989

## Steve Jobs

"I used to be way over on the nurture side, but I've swung way over to the nature side. And it's because of Mona and having kids. My daughter is 14 months old, and it's already pretty clear what her personality is."

1997

2003

## Used as evidence

Behavioral genetics was first time used to avoid a first-degree murder conviction by using an argument on a combination of a "warrior gene" and a history of child abuse.

2009

2013

## Swedish Twin Registry

The Swedish Registry was established in the 1960s to study how smoking affects our health. There is, at present, information on approximately 85 000 twin pairs, both monozygotic and dizygotic. There are currently around 30 ongoing various projects based on the Swedish twin registry.

1960

2015

## PubMed

Thirty three thousands six hundred fifty eight (33658) scientific publications related to behavioral genetics and twenty thousand eighty eight 20088 scientific publications related to human behavioral genetics.

2015

## Pioneering the Field

Irving Gottesman was a pioneer in the field of behavioral genetics and his Ph.D. thesis contained scientific data and publications highlighting the high levels of inheritance in the scales related on the genetics of personality.

## MISTRA

The Minnesota Study of Identical Twins Reared Apart was established in June 1989 using same gender twin pairs aged between 11 and 17 to study the genetic factor influence on individuals' personality. Major work out of this study, published by major news such as Times, New York Times as well as world reports was the conclusions reported by Bouchard. Bouchard authoring more than 170 peer reviewed scientific articles in major top notch scientific journals concluded that shyness, political conservatism, dedication to hard work, orderliness, intimacy, extroversion, conformity, leadership and a host of other social traits are largely heritable.

## Human Genome Project

Initiated in 1990 with the aim to sequence the entire human genome and map all its genes. This international largest collaborative biological project spanned over 13 years long of scientific research.

## Twin Reading Ability

Study conducted on samples from USA, Australia and Scandinavia measuring individual differences in reading ability. Both US and Australia showed primarily genetic influences whereas environmental influences coupled with genetic was observed in Scandinavia.

## Karmagenes, Inc

Karmagenes brings together Nature (DNA and Objectivity) and Nurture (Environment and Perception) by providing its DNA based personality test combined with the Big 5 psychological findings. Karmagenes vision is to bring science and genetics into people's daily life in a positive, accurate and scientific way.

# The Science behind

# Karmagenes

**S**ingle

**N**ucleotide

**P**olymorphism



**a single letter change in the DNA**



**SNPs are what make us UNIQUE**

## What is DNA?

DNA, or deoxyribonucleic acid, is the hereditary material in humans. Human DNA consists of about 3 billion bases, and more than 99,6 percent of those bases are the same in all people. DNA is stored as a code made up of four chemical bases "nucleotides": adenine (A), guanine (G), cytosine (C), and thymine (T) and their order determines the information available to be used later similar to the way in which letters of the alphabet appear in a certain order to form words and sentences.

## What is a GENE?

Made up of "small chunks" of DNA, genes act as guidelines to make molecules called proteins. Humans have two copies of each gene, one inherited from each parent. The Human Genome Project ( Approximately 3bn USD ) has estimated that humans have between 20,000 and 25,000 genes. Less than 1 percent of the total amount of genes contains a small difference that contributes to each person's uniqueness.

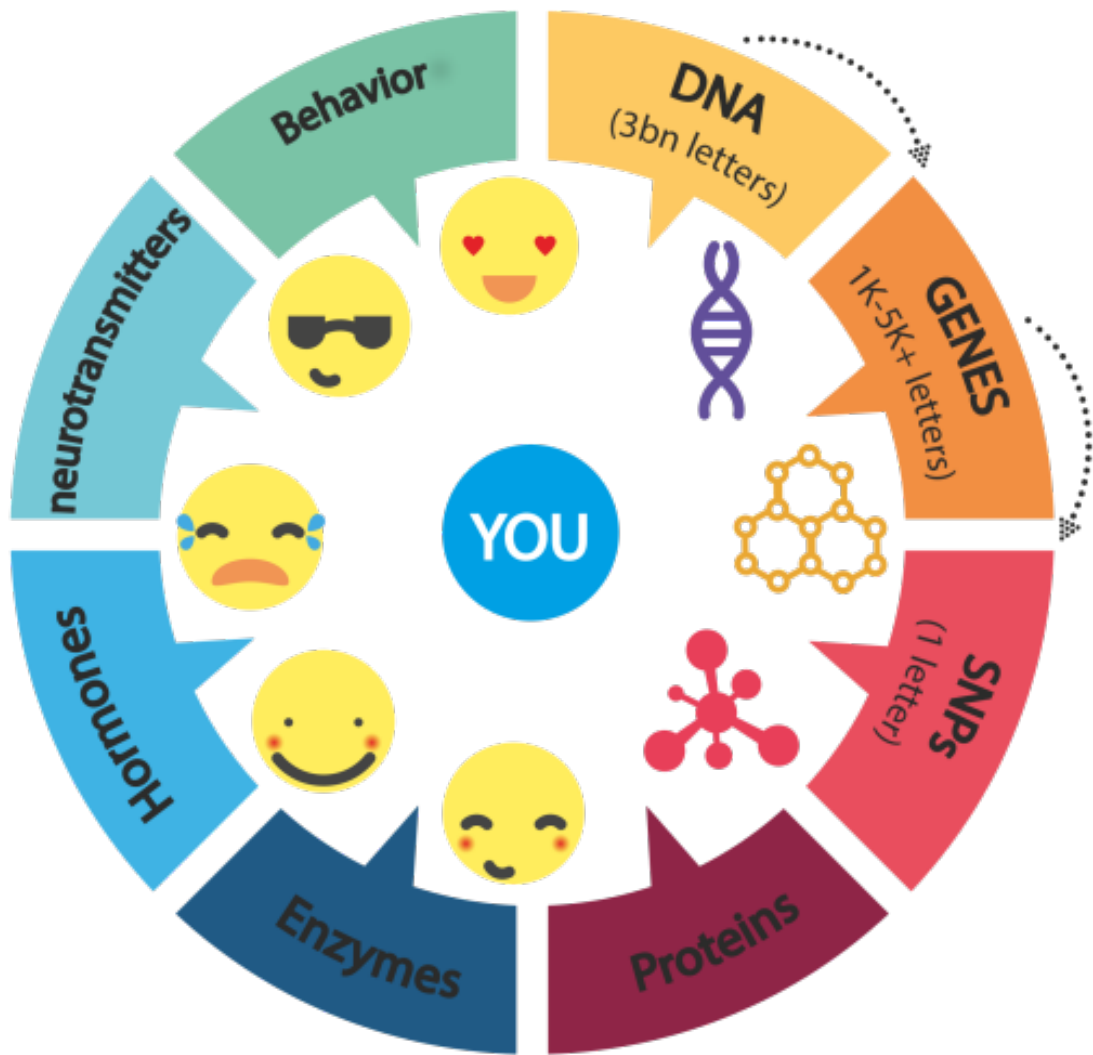
## What is an SNP?

SNPs are the most common type of genetic variation among people. Each SNP represents a difference in a single DNA building block. SNPs occur normally throughout a person's DNA. On average, they occur once in every 300 nucleotides, which means there are roughly 10 million SNPs in the human genome.

## How we do it?

We extract your DNA from your salivary epithelial cells (SWAB), then we sequence your DNA in an ISO certified Swiss laboratory. We use bioinformatics to analyze and identify your SNPs, then we apply our proprietary algorithm constructed on a polygenic approach that links multiple SNPs and Genes with each of the behavioral characteristics to compute the values and generate the final results.

# From DNA to BEHAVIOR



SNPs affect the level of hormones productions thus their effects on our behavior





## 5 Factors Personality Timeline

# 1880's

The Lexical Hypothesis, initiated by Sir Francis Galton in 1884, is a major foundation of the Big Five personality traits, stated that by sampling languages (17000 words) it will be feasible to develop a comprehensive taxonomy of human personality traits.

Gordon Allport and S. Odbert in 1936 placed Sir Francis Galton's hypothesis into practice by narrowing down the amount of adjectives describing possible traits from 17000 words into 4,504 labeled factors.

# 1930's

In 1957, by eliminated synonyms, Raymond Cattell reduced the total factors to 171 and then divided them into 36 traits

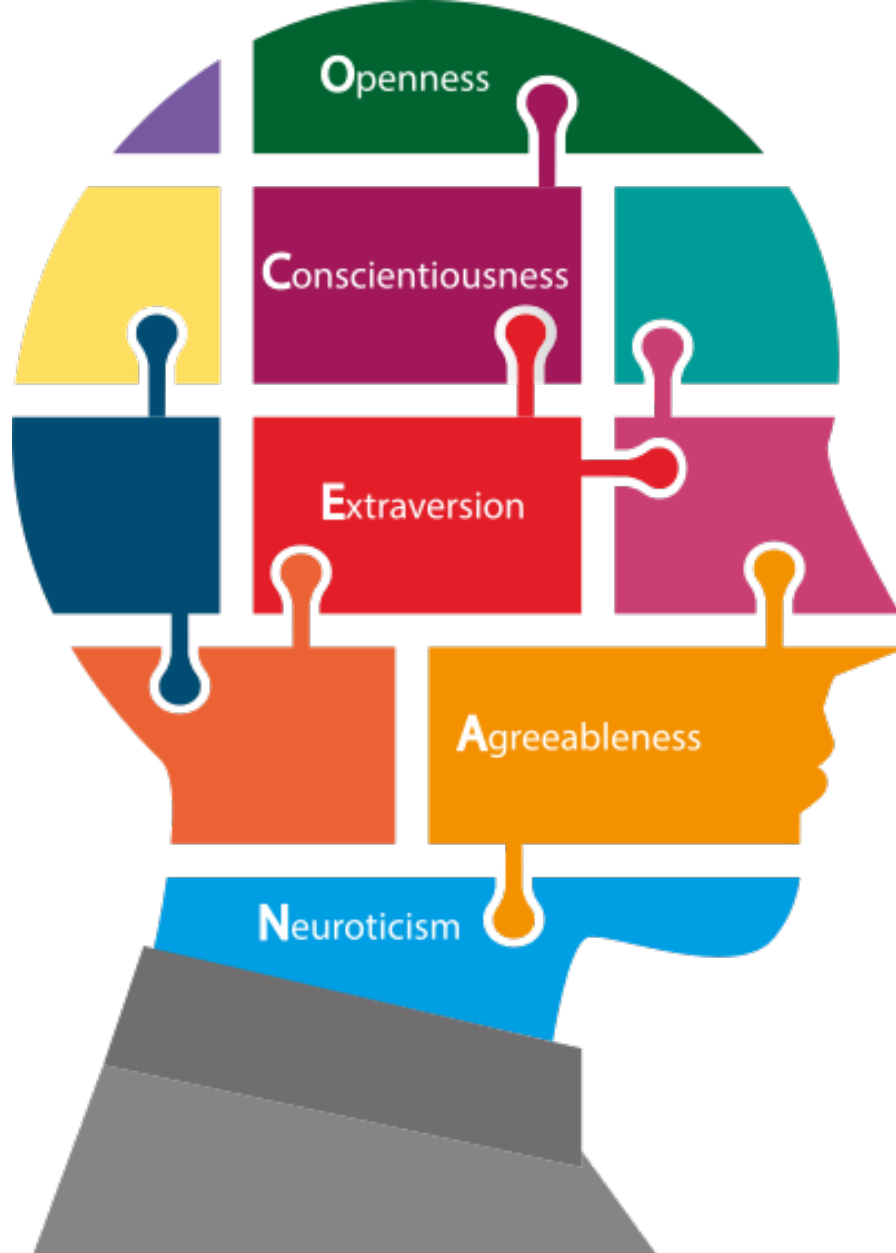
# 1950's

Warren Norman in 1963, reduced them into just 5 broad factors.

# 1960's

# 1980's

In 1981, Lewis Goldberg initiated his own lexical project, emphasizing five broad factors once again then He later coined the term "Big Five" as a label for the factors.



## BIG 5 (OCEAN)

Five factor model that describes five basic human personality traits regardless of language or culture derived from statistical analyses of which traits tend to co-occur in people's descriptions of themselves or other people. The Big Five is now the most widely accepted and used model of personality to study personality in terms of how it changes over time and how it relates to other variables.

## BIG 5 & DNA (Heritability)

Twin studies highlighted extensively the role of heritability and its influence on all five factors. Not only environmental factors contribute to personality, recent twins studies published in peer reviewed top scientific journals have showed that genetics influence the 5 factors as such: 57% openness, extraversion 54%, conscientiousness 49%, neuroticism 48% and agreeableness 42%.



**O**penness: Individuals scoring high on “openness” are adventurous, curious and creative. They are open-minded, challenge seekers and keen to step out of their comfort zone and monotonous routines to acquire novel things that boost their knowledge

**C**onscientiousness: Individuals scoring high on “conscientiousness” are self-disciplined, highly responsible, organized and punctual. They tend to be workaholics and almost never act impulsively, executing their daily tasks in the most disciplined manner.

**E**xtraversion: Individuals scoring high on “extraversion” are extremely social and friendly. They are talkative, attention seekers and uncomfortable being alone. Always present on parties and events, engaging in deep discussions at the center of the spotlights.

**A**greeableness: Individuals scoring high on “agreeableness” are associated with good behavior. They are trustworthy, honorable, well-mannered and express concern and respect in their communication. Well known to be helpful, cooperative and empathetic when interacting with other.

**N**euroticism: Individuals scoring high on “neuroticism” are moody, nervous and stressed. They are emotionally unstable and most of the time anxious. Mostly manage to grasp the negative side of things and they are susceptible to induction of negative mood.

STEVE  
JOBS

### Openess



ALBERT  
EINSTEIN

H

L

GEORGE W.  
BUSH

SARA  
PALIN

JIM  
CARREY



### Extraversion

KATY  
PERRY

H

L

ROBERT  
PATTINSON

LISA  
SIMPSON

QUENTIN  
TARANTINO



### Neuroticism

WOODY  
ALLEN

H

L

MARGARET  
THATCHER

CHUCK  
NORRIS

BILL GATES

### Conscientiousness



SUPERMAN

H

L

BIG  
LEBOWSKI

HOMER  
SIMPSON

NELSON  
MANDELA



MOTHER  
TERESA

### Agreeableness

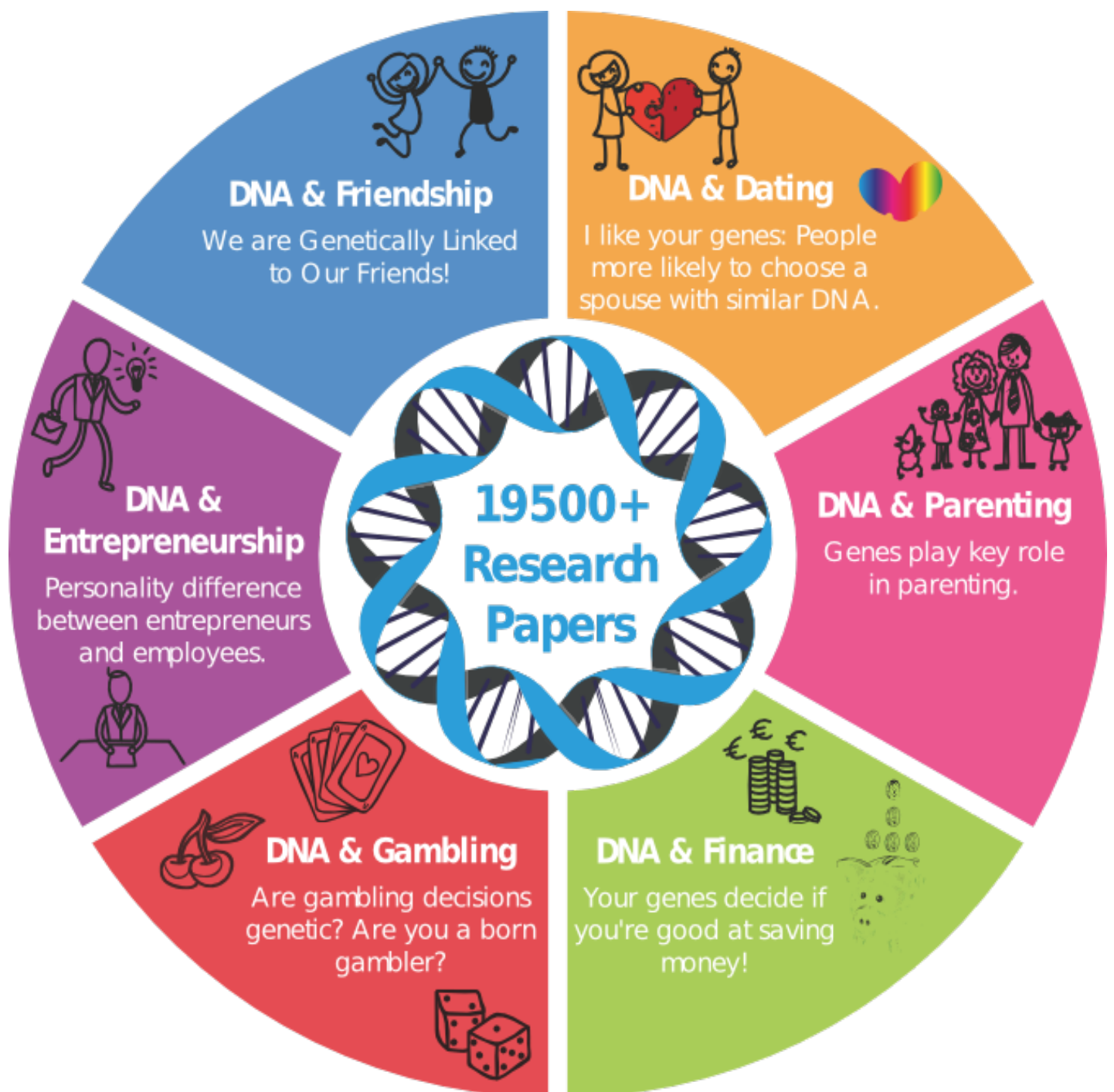
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DICK  
CHENEY

SIMON  
COWELL

# References



# Selected Literature and Readings

## DNA and behavior in the media

1. Are gambling decisions genetic? Are you a born gambler?
2. Genes play key role in parenting.
3. We are genetically linked to our friends.
4. I like your genes: People more likely to choose a spouse with similar DNA.
5. Cheating on your other half can be inherited.
6. Your genes decide if you're good at saving money, academics say.

## Big5 and Psychology

13. The Nature and Structure of Correlations Among Big Five Ratings: The Halo-Alpha-Beta Model
14. Is there a "Big Five" in Teamwork?
15. The General Factor of Personality: A meta-analysis of Big Five intercorrelations and a criterion-related validity study.

## Core Science

7. Tryptophan hydroxylase-2 gene variation influences personality traits and disorders related to emotional dysregulation.
8. Polymorphisms in the dopamine D4 receptor gene (DRD4) contribute to individual differences in human sexual behavior: desire, arousal and sexual function.
9. Oxytocin Modulates Female Sociosexual Behavior through a Specific Class of Prefrontal Cortical Interneurons.
10. The Origins of Savings Behavior.
11. The relationship between nature connectedness and happiness: a meta-analysis.
12. Classical twin studies and beyond.

## Interesting Documentaries

James Watson video "How we discovered DNA"

Professor Matt McGue: "Behavioral Genetics | How twins saved psychology"

## PubMed Library

1000+ scientific publications regarding the Big 5

20000+ scientific publications regarding Human Behavioral Genetics

34000+ scientific publications regarding Behavioral Genetics

Connect with us!

