Mark Jarad Dearden

ID: UD76669HED85861

THE RELATIONSHIP BETWEEN DNA, PERSONALITY AND LEARNING

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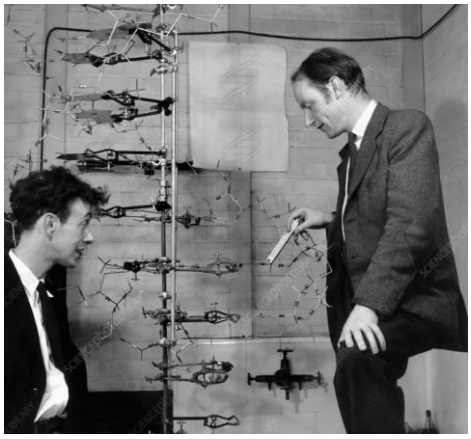
Finally, I would like to express my gratitude to the Atlantic International University for giving me the platform to study this amazing subject for my PhD. This has allowed me to achieve great things and be able to express myself in a written format.

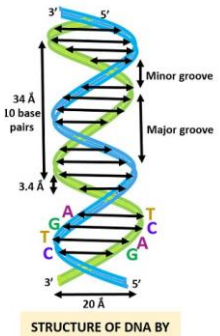
Introduction

In this thesis I will talk about the Relationship between DNA (Britannica T. E., 2022), Personality (Alan E. Kazdin, 2000), and Learning (contributors, Learning, 2022). Much is written about DNA, genomes (Eric Green, 2022), personality traits (Cherry, The Big Five Personality Traits, 2021) and learning so I will be touching on these areas with a logical reasoning (contributors, Logical reasoning, 2021).

DNA or deoxyribonucleic acid was discovered in 1953 by American James Watson (contributors, James Watson, 2022) and British Francis Crick (contributors, Francis Crick, 2022) They found the twisted ladder structure known as the double helix which was an important milestone in the history of science, and gave the rise to modern molecular biology.



Watson is the author of the bestselling book ‘The Double Helix’ which was published in 1968 (contributors, The Double Helix, 2022) Watson and Crick were both awarded the Nobel Prize in Physiology or Medicine in 1962 for his work concerning Nucleic acids.



STRUCTURE OF DNA BY WATSON AND CRICK

The landmark ideas of Watson and Crick relied heavily on the work of other scientists. DNA was first identified in the late 1860s by Swiss chemist Friedrich Miescher. (contributors, Friedrich Miescher, 2022)

For decades following Miescher's discovery, other scientists most notably Phoebus Levene (contributors, Phoebus Levene, 2022) and Erwin Chargaff (contributors, Erwin Chargaff, 2022). They carried out a series of research that revealed additional details about the DNA molecule. This included the primary chemical components and the ways in which they linked with one another.

Without the scientific foundation provided by these pioneers, Watson and Crick potentially may never have reached their ground-breaking conclusion in 1953 which discovered that the DNA molecule exists in the form of a three-dimensional double helix.

Typically, it is widely regarded that your inherent traits and environment determine your personality and ability to learn, and with that intelligence quotient (IQ) (contributors, Intelligence quotient, 2022).

Intelligence quotient (IQ) is a measure of a person's reasoning ability. It gauges how well someone can use information and logic to answer questions or make predictions. IQ tests are conducted to assess this by measuring short term and long-term memory.

They are also used to measure how well people can solve puzzles and recall information that they've heard. In the area of psychology, trait theory is an approach in the study of human personality. The primarily interest of trait theorists are in the measurement of traits, which can be defined as patterns in behaviour, thought, and emotion.

IQ tests are often used to identify students who would do well in fast-paced so called "gifted education" programs (contributors, Gifted education, 2022). Some colleges and universities use exams like IQ tests to select students. An example of this is called "intellectual aptitude tests" used in the UK for school leavers wanting to join medical school (Medicine N. L., 2005).

In the area of psychology, trait theory is an approach in the study of human personality. The primarily interest of trait theorists are in the measurement of traits, which can be defined as patterns in behaviour, thought, and emotion.

There are five personality traits known as ‘The Big Five’ (contributors, Big Five personality traits, 2022), Many contemporary personality psychologists believe that there are five basic dimensions of personality, the five personality traits described by the theory are extraversion (also often spelled extroversion), agreeableness, openness, conscientiousness, and neuroticism.

The five personality traits are widely accepted as the essential traits that serve as the building blocks of personality.

The developing world especially third world countries (contributors, Developing country, 2022), are universally accepted to be behind first word countries in intelligence studies.

But is this due to who their parents where and how they grew up? This is an area we will intensively look at in this thesis to see what the link is and if this is factually founded or not.

Learning is the process of acquiring new understanding, knowledge, behaviours, skills, values, attitudes, and preferences. Most knowledge is accumulated from repeated experiences. And often last a lifetime.

The ability to learn is possessed by humans, animals, and some machines (contributors, Machine learning, 2022); there is also evidence for some kind of learning in certain plants (contributors, Plant cognition, 2022).

Learning can be immediate or can be induced by a single event such as getting into a bath that is too hot before checking the temperature or being burnt by a naked flame.

Human learning starts at birth and continues until death because of an ongoing interaction between other people and the environment that they are experiencing.

The nature and processes involved in human learning are studied in many established scientific fields which include Educational psychology (contributors, Educational psychology, 2022), neuropsychology (contributors, Neuropsychology, 2022), experimental psychology (contributors, Experimental psychology, 2022), cognitive science (contributors, Cognitive science, 2022) and pedagogy (contributors, Pedagogy, 2022).

The research conducted in these fields have identified various types of learning. An example is of habituation (contributors, Habituation, 2022) which is a form of non-associative learning in which a non-reinforced stimulus would decrease after repeated or prolonged presentations of the stimulus.

Or classical conditioning (contributors, Classical conditioning, 2022) which is a behavioural practice in which a stimulus such as food is paired with a neutral stimulus such as a bell. Classical conditioning was first studied by Ivan Pavlov (contributors, Ivan Pavlov, 2022) who conducted these experiments with his dog.

Operant conditioning (contributors, Operant conditioning, 2022) which is distinct from classical conditioning, is a type of learning process in which a behaviour is modified by forms of reward or punishment. Such as, a child will be rewarded with candy if they solve a puzzle, or failure to do in an allotted timeframe results in a punishment of having to go to bed earlier than normal.

Other more complex activities such as play (contributors, Play (activity), 2022) can be seen only in relatively intelligent animals such as human beings although other higher-functioning animals as well, most notably mammals and birds this is also evident. Play is commonly associated with children and at juvenile level in mammals (contributors, Mammal, 2022) and birds (contributors, Bird, 2022), which activities are undertaken for recreational (contributors, Recreation, 2022) pleasure and enjoyment.

Learning may occur consciously or without conscious awareness.

Description

Governments worldwide spend a large chunk of their expenditure on scientific research for DNA and genomes (NHGRI, 2022), and education. While it is widely accepted that any research into personality is mainly done by private institutions. But do they work together hand in hand to determine if there is a relationship and how that relation exists and evolves?

Why do some people from poor conditions and countries, who maybe do not have access to adequate education still manage to excel in older life and become doctors, fighter pilots or teachers? Is it their DNA or natural selection (Geographic, 2022)?

Why do some people from very a privileged background and bloodline (contributors, Heredity, 2022) develop learning disorders (Latoya Frolov, 2021) while some become very prominent politicians and senators?

DNA

DNA stands for deoxyribonucleic acid. It's the unique genetic code that determines the characteristics of all living things. A nucleotide is one of the structural components, or building blocks of DNA, each nucleotide (Genetics Review, 1999) contains a sugar and a phosphate molecule. This makes up the backbone of DNA, and one of the four organic bases. The bases are adenine (A), guanine (G), cytosine (C) and thymine (T), the order or sequence of these bases form the instructions in the genome.

The human genome is made up of 3.2 billion bases of DNA, but other living organisms have different genome sizes.

DNA is widely regarded as the most famous biological molecule and it is present in all forms of life on earth. Virtually every cell in the human body contains DNA or the genetic code that makes you who you are. DNA is remarkable in the fact that it carries the instructions for the development, growth, reproduction, and functioning of all life on earth.

Differences in the genetic code are the reason why one person may have blue eyes rather than brown or why some people are more susceptible to certain diseases than others. If you look at the animal kingdom it's the reason why birds have two wings, why elephants have trunks and why giraffes have long necks.

If all of the DNA in the human body was unravelled it would reach to the sun and back more than 300 times which is 149.6 million km from earth. (Sharp, 2017)

Behaviour and Genes Relationship

The relationship between your genes and your behaviour can change over time as you encounter new experiences. Genes play an important role in determining your behaviour in some situations but in other situations the environment plays a bigger role in influencing your behaviour.

Studies by human behavioural geneticists of inheritance of behavioural traits and were focused on testing whether genetic influences were important in human behaviour, for example they wanted to see if genes influence human behaviour.

Human behaviour can be classified into four basic personality types: Optimistic, Pessimistic, Trusting and Envious. With Envious as the most common with 30% compared to 20% for each of the other groups.

The way that you carry a conversation, respond to failure, form relationships with others, and generally behave is in part related to your genetics. But your environment and experiences in life also shape your attitudes and behaviours. The combination of your genetics and experiences ultimately forms your identity and influences your behaviour.

Consider there are identical twin girls, and both have genes that are associated with obesity, will this mean that they will have no control over their weight?

What if the girls were separated and adopted by different families and they experience different life experiences, will their environment dictate how much they will weigh or because of the obesity gene?

Suppose one of the twins is raised by wealthy parents who have access to the healthiest of foods. Her adoptive parents cook healthy nutritious meals like vegetables and lentil soups, while limiting the amount of sugar, salt, and fat she consumes.

She loves fruits and vegetables and doesn't crave salty or sweet foods as it hasn't ever been in her diet. She spends a significant amount of time playing with her parents and leads an active lifestyle.

By eating nutritious foods and staying physically active, the genes that could potentially increase her chance of developing obesity are not expressed and she never develops obesity.

The other twin however lives the opposite type of lifestyle and is raised by low-income parents who don't have access to fresh, healthy food which is expensive.

Because she doesn't have access to fresh fruits and vegetables, she eats a lot of frozen, packaged meals and fast food, which are higher in sugar, salt, and fat. Her parents work multiple jobs, so she spends most of her time alone in front of the television.

Because of the poor diet and lack of physical activity this enhances the expression of her genes for obesity.

Genes dictate the instructions of how a person's body is made in the same way that blueprints are instructions to erect a building. The information from the genes let the body know what characteristics a person will have such a big ear or a hairy nose.

These instructions are passed on from our parents in the form of genes and when their genes are mixed our own set of genes are formed. Therefore, we often look like a mixture of both our parents, you may have your mother's eyes and your dad's chin.

Almost everyone has different information in their genes, which makes sense given how much diversity there is in how people look and act.

Scientists calculate the influence the genes have on our behaviour by using a mathematical formula called a heritability estimate. (contributors, Heritability, 2022) Heritability estimates give information about how much of an impact gene's have on a behaviour in certain environments. For example, think of your group of friends, there is probably some variation in your blood types (NHS, Blood groups, 2020).

There are 4 main blood types or groups – A, B, AB, and O. The blood group is determined by the genes that are inherited from parents.

Additionally, each group can be RhD positive or RhD negative, so this means there are a total of 8 blood groups.

The blood group is identified by antibodies and antigens in the blood. The blood is made up of red and white cells and platelets that are found in liquid form called a plasma.

The 4 main blood groups are defined by the ABO system:

Blood group A – This has A antigens on the red blood cells with anti-B antibodies in the plasma.

Blood group B – This has B antigens with anti-A antibodies in the plasma.

Blood group O – This has no antigens, but both anti-A and anti-B antibodies in the plasma.

Blood group AB – This has both A and B antigens, but no antibodies.

The most common blood group is O. 48% of the population in the United Kingdom (UK) (contributors, United Kingdom, 2022) has the blood group O.

If someone receives blood from the incorrect ABO system, this can be a threat to their life. For example, if a person has a blood group which is B and is given blood from blood group A, their anti-A antibodies will attack the group A cells.

The only blood group that can be given to any other blood group is O, as this blood group does not have any A or B antigens so is safe to give.

Differences in blood types are mostly influenced by genes then the heritability estimate would reflect that. Heritability estimates can be measured in a range from 0 to 1, and when the estimate is higher (near to 1), this means that genes have a larger influence on behaviour, as it would be with your blood type. When the estimate is lower (near to 0), it reflects of a larger impact of the environment on the persons behaviour.

The Rh system – Red blood cells sometimes have another type of antigen; this is a protein known as the RhD antigen. If this is present, your blood group is RhD positive. If it's absent, your blood group is RhD negative.

This means that you can fall within 1 of 8 blood groups:

- A RhD positive (A+)
- A RhD negative (A-)
- B RhD positive (B+)
- B RhD negative (B-)
- O RhD positive (O+)
- O RhD negative (O-)
- AB RhD positive (AB+)
- AB RhD negative (AB-)

About 85% of the UK population is RhD positive (36% of the population has O+, the most common type. O RhD negative blood (O-) can safely be given to anyone. It's often used in medical emergencies when the blood type is not immediately known.

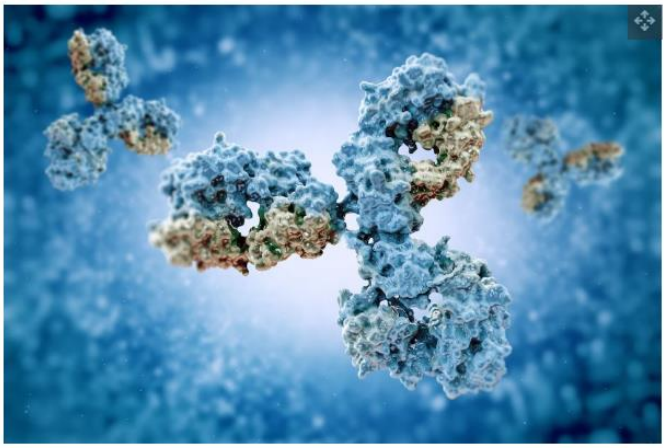
For most of the recipients this is safe as it does not have any A, B or RhD antigens on the surface of the cells, and this is compatible with every other ABO and RhD blood group.

Antibodies (Ghose, 2020) are proteins that are found in the plasma and form part of your body's natural defence system. They can recognise and identify any foreign substances, such as germs, viruses, bacteria, fungi, or parasites and alert the immune system to start working and destroy them.

They are a specialized army that search and destroy and are the key players in the fight against infection.

The antibodies are Y-sharped proteins that bind to the antigen, and they can bind like a lock and key to the foreign substances. "They're released from the cell and they go out and hunt," said Dr Warner Greene, the director of the Center for HIV Cure Research at the Gladstone Institutes in San Francisco.

The antigen can be a molecule, or a molecular fragment. This is often some part of a virus or bacteria. The new coronavirus SARS-CoV-2 (Covid19) has unique "spikes" on its outer coat, and some antibodies bind to the outer coat and recognize these spike proteins.

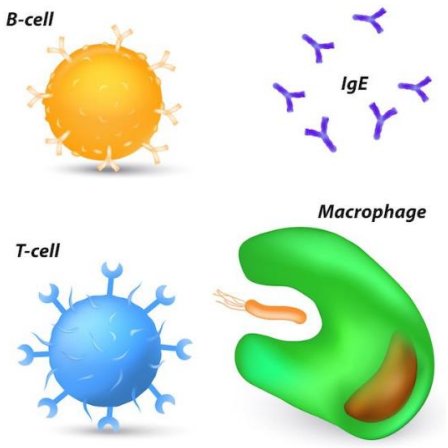


Antibodies are Y-shaped proteins. The two arms at the top of the Y bind to the intruder molecule. The bottom of the Y, or the stalk, binds to several other immune-system compounds that can help kill the intruder or signal the immune system to take care of it in other ways. (Image credit: Shutterstock)

To understand antibodies, you first need to know about B-cells, which are a type of white blood cell that forms in the bone marrow. There are about a trillion B-cells in the body, and each one has a unique IgM antibody that sits on the B-cell surface and

each bind, to one antigen, said Simon Goodman, the Science and Technology Program Manager for The Antibody Society, a non-profit organization that represents those involved in antibody research and development.

The human body doesn't just produce the single type of anybody either, it produces a chaotic zoo of they and each lock into the different part of a particular invader.



Antigens (Bottaro, 2021) is a molecule that stimulates an immune response by activating white blood cells known as leukocytes (INSTITUTE, n.d.) that fight disease.

A leukocyte is made in the bone marrow and found in the blood and lymph tissue. Leukocytes are part of the body's immune system and they help the body fight infection and other diseases.

Types of leukocytes are granulocytes (neutrophils, eosinophils, and basophils), monocytes, and lymphocytes (T cells and B cells). Checking the number of leukocytes in the blood is usually part of a complete blood cell (CBC) test that you would get at a hospital or doctor office.

The CBC test may be used to look for conditions such as infection, inflammation, allergies, and leukaemia. The test is also called a WBC test.

Antigens may be present on invaders, such as bacteria, viruses, parasites, fungi, and transplanted organs, or on abnormal cells, such as cancer cells. The antigens interact with the immune system to protect you from illness.

There are two types of Antigens – foreign antigens and autoantigens.

Foreign Antigens or otherwise known as heteroantigen (Merriam-Webster, heteroantigen, n.d.) come from outside of the body that are present on present on bacteria, viruses, snake venom, certain food proteins, and cells from other people.

Autoantigens are self-antigens that are already present in the body and shouldn't trigger an immune response in healthy individuals because the body should know they're not harmful.

However, sometimes the body erroneously acts against them which leads to autoimmune inflammation such as redness, swelling, heat and pain. This is a common effect for people with autoimmune disease such as Type 1 diabetes (Staff, 2021), Rheumatoid arthritis (NHS, Rheumatoid arthritis, 2019), Psoriasis (NHS, Psoriasis, 2022)/psoriatic arthritis (NHS, Psoriatic arthritis, 2019), Multiple sclerosis (NHS, Multiple sclerosis, 2022), Lupus (NHS, Lupus, 2020) and many more.

Vaccines (contributors, Vaccine, 2022) are used to create an immune response within the body against a particular antigen. They are administered by a medical injection or pill that contains a protein or weakened or dead version of a pathogen. The vaccine is used to create an immune response from the body against the pathogen.

When the immune system creates a specific antibody, such as an influenza (contributors, Influenza, 2022) or SARS-CoV-2 (Covid19) (contributors, SARS-CoV-2, 2022) antibody, this makes your body ready and well-equipped to fight off the virus. If the body is exposed later the body will fight the virus by using the previously created antibodies.

Once you are vaccinated, your antibodies should remain ready to fight the infection for years. However sometimes the antibodies fade over time and you may be required to get a booster dose (contributors, Booster dose, 2022) of the vaccine.

The Immune System (Medicine J. H., n.d.) protects your body from outside invaders. These include germs such as bacteria, viruses, and fungi, and toxins (chemicals made by microbes). The immune system is made up of different organs, cells, and proteins that work together.

The human body relies on this defence to help keep sickness at bay. The immune system triggers a response that produces cells and proteins to fight off infections.

There are two types of immunity that work within the body, these are called innate and acquired immunity. These two immune systems work together.

Innate immunity is what you are born with. It responds quickly to a pathogen but cannot remember individual threat and only mount a defence when the pathogen appears again.

Acquired immunity is developed when your body is exposed to microbes or chemicals released by those microbes. Acquired immunity works a lot more slowly than that of innate immunity but has the ability to remember the antigen. It responds to the treat quickly in a targeted way if you become exposed again.

When studying heritability, scientists use information from identical twins that were separated at birth, like the examples given earlier. This is a good method as the genetic material of identical twins are almost the same, which makes it easier to determine the influence of the environment each sibling is experiencing.

Personality

The details have been gathered through the result of decades' worth of psychological research into personality, this doesn't capture the idiosyncrasies of everyone's personality but is a theoretical framework in which to understand general components of our personalities. The framework identifies the most important in our social interactions with other people.

During the decade's worth of research on personality, researchers have uncovered five broad dimensions of personality.

These so called Big Five Personality Traits (Cherry, The Big Five Personality Traits, 2021) are:

Extraversion is characterised as your level of sociability, excitability, assertiveness, emotional expressiveness, and enthusiasm.

People who are generally high is extraversion tend to be outgoing and gain energy when exposed to social situations. They like being the centre of attention and prefer to start conversations and meet new people, these types of people usually have a wide circle of friends and acquaintances.

People who are generally low in extraversion often known as introverts, tend to be very reserved and less energy in a social setting. When in social settings introverts prefer to be isolated and avoid small talk. They do not like attention especially being the centre of it and find it difficult to engage starting a conversation.

Agreeableness is characterized as your level of friendliness and kindness. Other attributes are trust, kindness, and affection.

People who are generally high in agreeableness are more cooperative, have a lot of interest in other people with care and empathy. They also enjoy helping others and contribute to their happiness.

People who are generally low in agreeableness tend to be more manipulative, cunning, and competitive. They have little interest in other people and only look out for themselves. They do not have any caring at all for other people's feeling or problems and are dismissive of the same. They find it easy to insult, belittle and manipulate people for their own gain to get what they want.

Conscientiousness is characterized as your level of organization and work ethic. Other attributes are good control of impulse, goal-oriented behaviour and being thoughtful.

People who are generally high in conscientiousness tend to be very well organised and detail oriented. They make sure they spend the time to get prepared, do not procrastinate, have a high attention to detail and follow a schedule to maximise time.

People who are generally low in conscientiousness tend to dislike any kind of scheduling and structure and procrastinates the important tasks. If they make a mess, they do not put things right, or back in their rightful place. They tend to never complete tasks on time and have zero problems with this.

Neuroticism is characterized as your level of calmness and tranquillity. Other attributes are sadness, moodiness, and emotional instability.

People who are generally high in neuroticism tend to experience lots of stress as they worry about too many things and easily get upset. They can experience dramatic mood swings and feel anxious and irritable most of the time. They will find difficulty to bounce back after stressful occasions.

People who are generally low in neuroticism tend to be more emotionally stable and resilient. They can deal with any stress very well and rarely get sad or depressed. They tend to be relaxed and don't worry about things.

Openness is characterized as your level of creativity, curiosity, imagination insight.

People who are generally high in openness tend to be interested in a broad range in things and are curious about the world. They are keen to learn new things and enjoy new experiences. They tend to be creative and enjoy adventure, will try new things, and tackle new challenges head on.

People who are generally low in openness do not like change or new ideas. They do noy enjoy taking part in new things and are not imaginative.

The big five are dimensions of personality, they are not 'types' of personality. Everyone's personality is the combination of each of their big five personality characteristics. For example, someone may be very sociable (high Extraversion), not very friendly (low Agreeableness), hardworking (high Conscientiousness), easily stressed (low Emotional Stability) and extremely creative (high Openness).

A considerable amount of research suggests that personality is stable throughout life and associated with a variety of important life aspects from academic and occupational success, to marital stability and physical health and wellbeing. These

personality traits represent our most important qualities and help shape our social landscape.

Research also suggests that the biological and environmental both have a role in determining our personalities. Studies suggest that both nature and nurture (contributors, Nature versus nurture, 2022) play an important role in each of the five personality traits.

Studies also suggest that the big five personality traits tend to be relatively stable over the course of adulthood and display little change because of life events.

As people grow older, they tend to become less extraverted, less neurotic, and less open to the experience. However, agreeableness and conscientiousness tend to increase as people grow older.

A situation that a person finds himself or herself plays a major role in how the person reacts and that behaviour involves an interaction between a person's underlying personality and situational environment. However, most of the time people are consistent with their underlying personality traits.

The 5 personality traits represent wide areas of personality. Research has demonstrated that these groupings of characteristics tend to occur together in many people. An example of this are individuals who are sociable tend to be talkative, but these traits do not always occur together. Personality is very complex and variable, and each person may display behaviours across several of these personality traits.

Learning

Our memory plays a role in all our activities and helps us remember all kinds of information such as passcodes, holiday memories, weddings, anniversaries, and birthdays, these can last for a few seconds or for your entire life. Memories are essential in creating and developing our personalities, it is a direct witness of our own past (episodic memory), and of history and common knowledge (semantic memory). The memory is therefore one of the most essential cognitive functions in a person's life.

Memory can be verbal or visual and for some, it is easier to memorize visual than verbal information. Verbal memory allows you to memorize things such as a series of numbers and recall them a few minutes later whereas Visual memory depends highly on our skills of attention as the visual elements around us constantly need to be analysed to be memorized. Visual memory helps in easily finding the location of objects by precisely remembering the details of a picture we've just seen or the colour of a car we had just seen.

We often say he have a bad memory when we have forgotten something or a good memory when you do well in a quiz, we relay this by saying we have a good or bad memory, which means we tend to consider it. But remembering what we had for lunch yesterday differs greatly from remembering the fact that Abu Dhabi is the capital of the UAE. The type of information you memorized, or recall engages the brain in different ways.

Memory plays an important role in our daily lives and memory loss tends to be a major complaint and the mere thought of such deficits is a major cause of stress. Memory disorders are very common among people over 50 years old, however, it is rarely the case that memory loss is a normal part of the human aging process. Declining memory are due to various factors such as current circumstances and events, fatigue, stress, motivation, or emotions.

The memory is a cognitive function we most call upon to store all types of information such as phone numbers, where we left our keys, appointments, and meetings what we did last weekend with our friends. It also plays an essential role in various cognitive activities such as reading, reasoning, mental arithmetic, and mental imagery. Whether we're aware of it or not, we are constantly using our memory and it helps us develop a library of general knowledge, personal memories, or motor planning (Rosen, n.d.)

One of the critical aspects is “Do we learn from experience?” (contributors, Experiential learning, 2022), the consensus stipulates that as humans we do. However, history tells us that this is not always the case, such a war, pandemics, and global warming.

Fractal Time is a book written by Gregg Braden in 2009, his book and was on the bestseller list of The New York Times (Braden, 2009). It describes how patterns of time repeat over and again. Braden argued that the change in the earth's magnetic field might have effects on human DNA. He has also argued that human emotions affect DNA, and that collective prayer may have healing physical effects.

The book suggests that we are living the end of time. Not the end of the world, but the end of a world age, a suggested 5,125-year cycle of time. The present world age began in 3114 B.C. and will end in A.D. 2012, which of course it didn't as here we are fast approaching A.D 2023. The end of anything also marks the beginning of what anything that comes next. Gregg also suggests that we're also living the start of what follows the end of time: the next world age, which ancient traditions called the great cycle.

Readings from the epic poems of India's Mahabharata (contributors, Mahabharata, 2022) to the oral traditions of indigenous Americans and the biblical story of Revelation, all which report stories of 'The End' suggesting that those who have come before us knew that the end of time was coming. Apparently, they knew because it always does, every 5,125 years. Scientists tell us that the earth and our solar system reach a place in their journey through the universe that marks the end of precisely such a cycle. With that a new world age begins, apparently, it's always been this way however I feel ancient alien theorists may feel differently.

For at least four such cycles (or five, according to the Mesoamerican (contributors, Mesoamerica, 2022) traditions of the Aztec and the Maya peoples), our ancestors endured the changes in global magnetic fields, with that climate change, diminishing resources, and rising sea levels that flood coastlines and whole forgotten islands. They knew all this without such modern methods such as satellites or the Internet, neither did they has access to computer models to help them prepare for such a radical shift.

The book suggests that the fact that they lived to tell the story stands as a powerful testament to an undeniable truth. It tells us that the inhabitants of our planet have survived the end of world ages in the past. Beyond simply surviving, our ancestors learned from the difficulties that can accompany the change.

In the words of their day which were inscriptions, cave drawings hieroglyphs etc. they did their best to tell us what it means to live such a rare moment in history, or were these just stories? The book goes on to suggest that it's a good thing they did, because such events are few and far between, stating only five generations in the last 26,000 years have experienced the shift of world ages. And we will be the sixth in 2012, over 10 years ago.

It ends at a specific time, with a specific event, on a day that was marked on a calendar more than 2,000 years ago. There is no secret about that date. The Maya who calculated it also inscribed it as a permanent record for future generations by etching into stone monuments that were built to last until the end of time.

When the date is translated to our familiar system of time, the message becomes clear. It tells us that our present world cycle will conclude with the winter solstice that takes place on December 21 in the year 2012. It's on this date that the mysterious Maya identified the astonishing astronomical events that will mark the end of our age... and they did so more than two millennia ago.

Learning Disorders

Specific learning disorders are neurodevelopmental disorders that are typically diagnosed in early school-aged children, although may not be recognized until adulthood. They are characterized by a persistent impairment in at least one of three major areas: reading, written expression, and/or math.

There are 3 types of Learning Disorders: Dyslexia, Dysgraphia, and Dyscalculia.

Dyslexia is the term that refers to a difficulty in acquiring and processing language that is typically evident by the lack of skill in reading, spelling, and writing. People with dyslexia have difficulty connecting letters they see on a page with the sounds they make. As a result, reading becomes slower and exerts much more effort and is not an eloquent process for the individual.

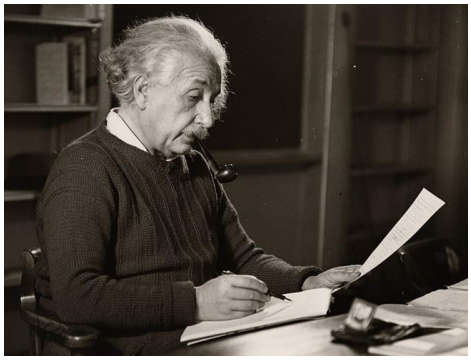
Dysgraphia is the term that refers to a difficulty with writing their thoughts on to paper. Problems with writing can include difficulties with spelling, grammar, punctuation, and handwriting.

Dyscalculia is the term that refers to a difficulty with performing mathematical calculations. Problems with mathematics can include difficulties with number sense, memorizing math facts, math calculations, math reasoning and math problem solving.

Some well-known people have excelled even with a learning disorders such as the Physicist Albert Einstein, George Washington the first president of the United States, the singer Cher and Ingvar Kamprad the founder of IKEA (contributors, IKEA, 2022).

Albert Einstein is one of the most famous figures known to have dyslexia, a theoretical physicist who won the Nobel Prize in Physics in 1921.

Though as a child and teenager Einstein showed signs of brilliance and creativity in his interests in geometry, he also showed signs of weakness in speech and verbal development, as well as several school subjects. “Nothing would become” of the boy, his teachers believed.



Throughout the years, he described writing as being a “difficult” task in which he communicated “very badly.”

“Words or language, as they are written or spoken, do not seem to play any role in my mechanism of thought,” he wrote to mathematician Jacques Hadamard in 1945 (Journal, 2017).

George Washington the first president of the United States is said to have struggled with dyslexia and dysgraphia. Historians report that Washington didn’t spend a lot of time in school and was largely self-taught. Excerpts from his journals reveal poor handwriting, spatial awareness, spelling and grammar. (Kickers, 2021)

Cher is an accomplished singer, songwriter, and TV personality which has earned her the name of ‘Goddess of Pop’. But during her childhood she suffered with dyscalculia and dyslexia. She didn’t have a stable childhood with access to the right conditions for learning which contributed to the development of these conditions.

She didn’t have stable childhood and things at home required her to take menial jobs to sustain herself. Hence, the dyscalculia didn’t affect her much as it remained undiagnosed and she was drawn to music, drama, and song-writing, etc. which didn’t require math too much. The fact remains true that she found numbers a strange thing and was never comfortable with the mathematical operations and number sense. (Singh, 2021)

Ingvar Kamprad may not exactly be a household name for anyone located outside of Sweden (contributors, Sweden, 2022) but as the founder of IKEA, you likely have some of his furniture in your home. His experience with dyslexia is one of the reasons the instructions for putting that furniture together are so visual.

Kamprad's original furniture business began as a mail-order sales business. Most of his products were identifiable by a set of numbers, but Kamprad had trouble remembering the codes for each product, which turned out to be the sign of his dyslexia.

So, instead of delegating those responsibilities to another person and avoiding the issue, he used his disability to his advantage by coming up with a more creative system for organizing his products. This turned out to be the most iconic aspect of his now-worldwide business.

Kamprad created a naming system where he gave names to each piece of furniture. For example, large furniture is given names of Swedish places, chairs and desks have men's names, and garden furniture is named after Swedish islands. This system was easier for Kamprad to remember and visualize each product, since most of the names were of places familiar to him.

Today, IKEA is one of the largest furniture stores in the world and is well-known for its unique product names. Because Kamprad decided to face his disability, he turned a once-challenging aspect of his life into a unique facet of IKEA. (Help, n.d.)

Ingvar Kamprad grew up in poverty on a small farm in Sweden. His grandfather had killed himself after realizing he could no longer afford his mortgage. His grandmother was able to save the family farm

Because Ingvar struggled in school because of his dyslexia and he shirked tasks like milking the cows, his father once told him he would never amount to anything. He

received an alarm clock as a birthday present and began setting it at 5:30 am to make sure things got done. He even removed the ‘off’ button of the clock to make sure he would get out of bed.

By the age of 6, Ingvar was selling matches; by 10, he would Criss cross the neighbourhood on his bicycle, selling Christmas decorations, fish, and pencils. He eventually bought his goods wholesale and realized a greater profit.

At the age 17, Ingvar had worked so hard in school that his father rewarded him with a small sum of money. He used that money to form IKEA, an affordable furniture company based on practicality and minimalist design.

Today Ingvar has over 300 stories in 38 countries and he is one of the wealthiest people in the world. In all that time, he never had to borrow or issue stock (Team, n.d.).

According to Malcolm Gladwell (contributors, Malcolm Gladwell, 2022) who is an English-born Canadian journalist, author, and public speaker, Ingvar possesses three personality traits helpful in an innovator: conscientiousness, openness, and disagreeableness. (Baer, 2014)

IQ Tests

IQ tests were originally created in France have been around for more than a century. They were designed to help identify students who needed additional attention in school.

The United States of America government have used modified versions of these tests during World War 1. The armed forces thought letting unqualified people into a battle environment could be dangerous endeavour, so they used the IQ tests to find potentially qualified people to join up. The US armed forces today uses the Armed Forces Qualification Test primarily as one of many IQ tests they use.

IQ tests have many different purposes, and some have been designed to assess children in specific age groups. Some that are designed for adults have been designed for people with disabilities.

Most IQ tests work well for people who share a similar cultural or social background, for example in the US. If a person who has no idea who Abraham Lincoln was probably has a below par intelligence. Whereas in let's say the Philippines, not knowing who Abraham Lincoln is doesn't say much if anything regarding the person's intelligence.

Asking questions on historical figures fall into the 'knowledge' category of IQ tests where knowledge questions test what a person knows about the world in a general sense. Another example of knowledge could be asking a person if they know why they should wash their hands after using the bathroom.

IQ tests can also include much harder questions than hand washing reasons to measure someone's knowledge. Such questions could include What is poetry? What does it mean to take a mortgage out? What is the difference between weather and climate? These sorts of questions are called crystallized intelligence and are aimed at testing if someone knows about things that are valued in their culture, crystallized intelligence is defined as a person's general knowledge, vocabulary, and reasoning based on acquired information.

However, some other IQ test types do not focus on knowledge at all, some deal with a person's memory. This type of IQ test is called fluid intelligence, which is defined as the ability to think abstractly, use logic, reason quickly and problem solve independent of any previously acquired knowledge. For example, a person who may take this test might have to work out what a particular shape would look like if it were rotated in a 3D space. Fluid intelligence is accountable for 'penny drop' moments when a person times suddenly has that moment when things fall into place.

A study was completed by Aki Nikolaidis who is a neuroscientist at the University of Illinois at Urbana-Champaign. And he wanted to find out which parts of the brain are active during those 'penny drop' moments.

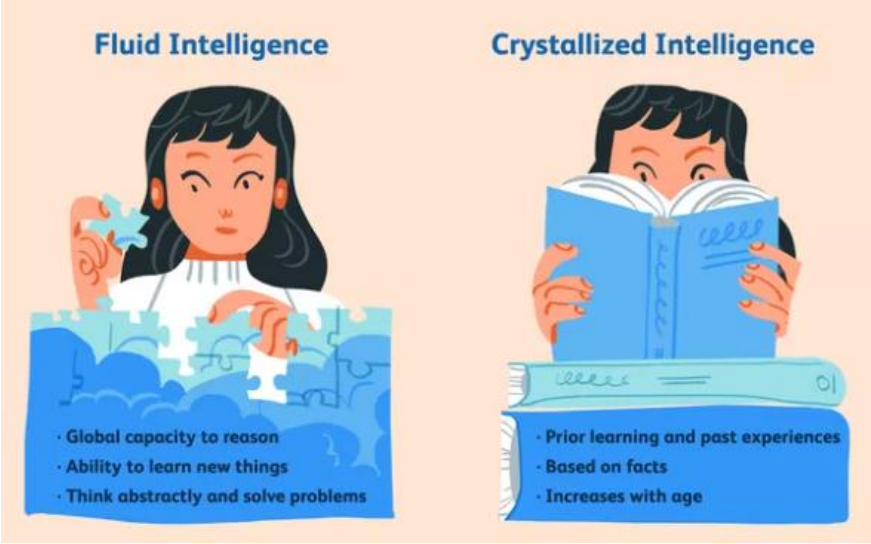
In the study Nikolaidis he and his team studied 71 adults. The team tested the volunteers' fluid intelligence with a standard IQ test that had been designed for adults. They also mapped which areas of volunteers' brains were working the hardest. They conducted brain scans using an MRS (magnetic resonance spectroscopy) (contributors, In vivo magnetic resonance spectroscopy, 2022), which uses magnets to search for molecules in the brain that are of interest. (al, 2016)

Brain cells work by eating up glucose, which is a simple sugar, and eject out unwanted leftovers. The MRS scans allow the researchers to analyse the leftovers which allows them to see the specific areas of people's brains that are working hard and breaking down more glucose.

The MRS scans show that those who scored higher on fluid intelligence tend to have more glucose leftovers in certain parts of their brains, mainly on the left and towards the front. These areas are responsible for planning movements, spatial visualization and reasoning which are all key aspects of problem solving.

Nikolaidis is quoted as "It's important to understand how intelligence is related to brain structure and function," and added that this understanding could help scientists develop better ways to boost fluid intelligence.

Crystallized intelligence and fluid intelligence (contributors, Fluid and crystallized intelligence, 2022) are closely connected and due to the multiplicity of tasks, both are used in many similar situations.



General Analysis

Does the environment such as air and water quality affect DNA, personality, and the ability to learn? This may also affect one's personality and in turn that person's ability to concentrate and learn. Does past experience help with the ability to learn?

Air Pollution Effect on DNA

Increased CO2 emissions (Roser, 2020) worldwide are causing significant health issues on top of climate change (Nations, 2022). Reports predict that the increase in atmospheric CO2 will directly affect living organisms.

Under conditions of oxidative stress, certain types of damage (cell death, some DNA lesions, mutation frequency, etc.) affecting the model organism Escherichia coli (E. coli) (contributors, Escherichia coli, 2022) tend to increase depending on the level of atmospheric CO2. (Daily, 2011)

The results show that an increase in CO2 is accompanied by an increase in various parameters, including cell death, DNA mutation frequency and the number of DNA lesions.

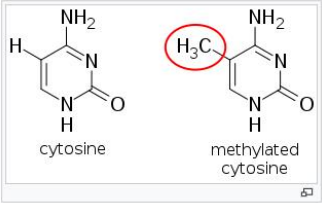
A report published in 2019 describes Air Pollution and DNA methylation and the effects of exposure in humans.

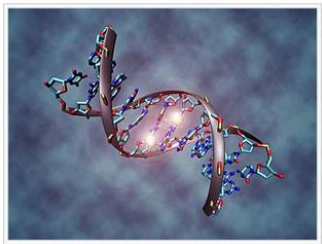
Emerging data indicate that air pollution exposure modulates the epigenetic mark, DNA methylation (DNAm), and that these changes might in turn influence inflammation, disease development, and exacerbation risk. (Carlsten, 2019)

Effects of air pollution on DNAm have been observed across the human lifespan, but it is not yet clear whether early life developmental sensitivity or the accumulation of exposures have the most significant effects on health. Air pollution exposure associated DNAm patterns are often correlated with long-term negative respiratory health outcomes, including the development of lung diseases

DNA methylation (DNAm) is a biological process by which methyl groups are added to a DNA molecule. Methylation can change the activity of a DNA segment without changing the sequence.

When located in a gene promoter, DNA methylation typically acts to repress gene transcription. In mammals, DNA methylation is essential for normal development and is associated with a number of key processes including genomic imprinting, X-chromosome inactivation, repression of transposable elements, aging, and carcinogenesis. (contributors, DNA methylation, 2022)




Representation of a DNA molecule that is methylated. The two white spheres represent methyl groups. They are bound to two cytosine nucleotide molecules that make up the DNA sequence.

The effects of air pollution on DNAm have been investigated using several different study designs:

Epidemiological-land use regression study design: This is an epidemiological study in which concentrations of specific air pollutants that are estimated, using factors such as geography, traffic patterns, and fixed air pollution sensor data.

Volunteers are recruited and give blood samples and average air pollutant concentrations at each volunteer's home address are estimated using LUR models (contributors, Land use regression model, 2022), over various time windows which are usually 1, 3, 7, and 30 days apart before their sample is collected.

Population study design: This is an alternative to the epidemiological-land use study approach. This study compares people living in different areas of air pollution concentrations.

Example of this could be an area with lots of industrial high air pollution with a rural area nearby with low air pollution.

This study design has limitations though with matching the characteristics of the volunteers living in the different regions.

There could be imbalance between areas with high and low air pollution, wealth, education, and access to health care facilities.

Controlled crossover exposure studies: In this type of study volunteers attend a facility where they are exposed to set concentration for a set time of air pollution. Then after a period the volunteers return to the facility and receive an equivalent controlled exposure of air pollution.

When comparing the response to the control and air pollution exposure in each individual volunteer, the effects of the exposure can be accurately assessed.

However, such studies are difficult to implement and have considerable costs in terms of running facilities.

In summary, each of these experimental approaches has strengths and weaknesses. There are benefits to conducting multiple experiments using the different methodologies to determine the effects of air pollution on DNAm.

DNAm data from the various studies are measurable using standard platforms and is reflective of transcription factor binding and gene expression. DNAm is, therefore, a logical tool for trying to understand air pollution's effect on genomic function and downstream measures of interest to health.

Water Pollution Effect on DNA

An article written by Anna Robuck who making waves Marine Science at the University of Rhode Island (Island, n.d.) talks in her article for Massive Science about little we know about our body's response to pollutants, but that is changing. And how fish DNA changes to cope with polluted environments. (Robuck, 2017)

She writes 'Let that sink in a minute: fish DNA actually changes to cope with polluted environments. This alters metabolism and energy allocation, thereby compromising the fish's ability to deal with other stressors in their environment. In this study, fish from polluted environments were less able to cope with increased temperatures; this has huge implications in a warming world where climate change is at work to increase water temperatures around the globe.'

'This is also troubling because mummichogs are considered extremely habitat-flexible, dealing with wide ranges in temperature and salinity. If any creature should be able to cope with thermal stress, it's these guys. Additionally, the modelling work suggested the compounded effects of altered genes, metabolism, and coping ability translates to fish being less capable of finding and traveling to an optimum environment, meaning contaminant exposure has the potential to alter the very way fish interact with the surrounding environment.'

But when it comes to larger mammals, she reminds us that 'we understand close to zilch when it comes to sublethal impacts of contaminants in wildlife.'

She describes a recent study that focussed on Arctic seabirds which 'embodies such existing gaps and highlights how tough it is to figure out how contaminants are undermining wildlife processes and function.' 'The team captured black-legged kittiwakes, a type of Arctic seabird, during their chick rearing season on Svalbard in Norway and took blood samples from captured birds for contaminant and hormone analysis. The birds were then rushed back to the lab via boat to take respirometry measurements. Respirometry essentially measures carbon dioxide respiration and oxygen consumption over time, allowing calculation of metabolic rate.'

Furthermore 'Few studies have tackled contaminant impacts on metabolism in birds, thanks to how hard it is to compare features of very different species, as well as the

fact that studying live creatures in the wild is much harder than analysing samples. Those that have forged ahead looking at bird hormone production and metabolism have seen conflicting results.'

Unfortunately, the research found no clear picture associated with the variable metabolic rate and hormone levels emerged.

The inconsistent results provided more questions than answers in terms of dissecting out the wider impact of contaminants on birds. If organochlorine (contributors, Organochlorine compound, 2022) and perfluorinated compounds (contributors, Perfluorinated compound, 2022) have opposite effects on metabolism (contributors, Metabolism, 2022), does this mean they cancel each other out?

What is the overall effect on how a bird uses their energy and what does this mean for migrating birds (contributors, Bird migration, 2022)? These birds migrate thousands of miles so do contaminants impact these feats?

It's hard to answer these questions as wild animals that live longer lives have a history full of unknown events that may easily distract the snapshots of metabolic rate or contaminant signature obtained within a given study.

In terms of study methodology, the transporting of large wild animals that are alive for metabolism measurements is extremely time-consuming, expensive, and location dependent. This contrasts with research that solely measures contaminant body burdens using tissue from dead animals. This is considerably more straightforward, and at a much lower cost.

Therefore, there are an abundance of reports describing contaminant levels in animals with little indication of how the found contaminants are impacting the animal or its day-to-day function.

However, these sorts of studies should be viewed as a challenge rather than be avoided. The need to comprehend contaminant impacts in humans and wildlife only continues to grow, due to the knowledge that thousands of chemicals are introduced each year to replace banned compounds or for novel applications, adding to the inundating chemical soup surrounding us.

Environmental Effect on Personality

Personality usually depends on a particular combination of genes that siblings don't necessarily share, but what about the environmental influences on their personality?

Consider the parents impact onto the family environment and on personality. You may expect children who are raised by the same parents in the same way in the same home will turn out similar, but strangely this isn't necessarily the case.

It is true that parenting and other environmental influences affect personality. It is estimated that the environment accounts for approximately 50 to 70 percent of personality. But environments that children from the same family share with each other can give a much weaker influence on their personalities than the environments that each child experiences separately.

Family share experiences could be that they all stayed together on a family holiday last year or that they all had dinner together as a family last night. But the majority of experiences happen to just one individual, for example siblings could have two different teachers for the same year group or grade, or one sibling plays in a sports team while the other maybe goes to chess club.

The shared experiences to all the children in a family affect their personalities far less than unshared environmental influences that each child experiences separately.

Unshared influences for example can be that the kids have different sets of friends in school and outside of school and may have different teachers in school. Parents may also treat them a bit differently as well as each child is different. Parents also change as they get older and have more children which also affect the family's finances.

The parents' marriage may have difficulties and some children may see more conflict between the parents than other siblings.

Brothers and sisters in the same family also have different personal experiences, different personal interests, different illnesses, and different injuries. And these differences help explain some of the variations in personality.

A person's environment affects their personality, but biology and genetics also play a role in determining their personality traits.

Both biology, genetics and environment influence a personality. The persons genetics play a larger role than their parents influence when it comes to behaviour. However non-shared environmental factors play an even bigger role, such as if one twin falls in with a bad crowd at school, that will have a bigger influence on their behaviour than biology and genetics.

Many other factors also influence human behaviour**,** including the environment they are raised in, genetics, culture, religion and community.

Culture for example could dictate that children should have impeccable manners such as be reserved and speak only when spoken to. Another environmental influence is their community which includes their school.

Children spend the most time in school and this can have a huge influence on their personality. If they go to a school where violent gangs hang out or there are drug users, they are more likely to engage in these behaviours themselves due to peer pressure which can be a very powerful pressure.

The climate can also have a significant influence of a person's personality. We know generally that weather affects our mood. The summer heat and sunshine seem to lift our spirits, while the cold, dark weeks of winter put us down in the dumps.

The climate we live in appears to be the starting point in shaping our personalities. People who grew up in regions with average temperatures close to 72 degrees tend to be more agreeable, conscientiousness, emotionally stable, extroverted, and open. These personality traits are what psychologists refer to as "the big five." Which we had looked at earlier in this thesis.

And what about climate change? Environmental psychologists have realized that to change behaviour and attitudes towards the environment we must be able to understand people's personalities. Targeted action is needed, without action climate change is likely to further compound inequalities, just like we are seeing during the COVID-19 pandemic.

Personality traits inform people's beliefs, values, and attitudes, and scientists have found that personality factors can influence our likelihood to engage in environmentally sensitive practices.

The Big Five Personality trait model is the most accepted psychological theory on personality traits. The Big Five Personality traits are Agreeableness, Conscientiousness, Openness to new experiences, Extroversion, and Neuroticism (or its inverse, Emotional Stability). Agreeableness is related to cooperativeness, compliance, and caring for others. Conscientiousness is related to carefulness, organization, and responsibility. Openness to new experiences is related to intelligence and aesthetics. Neuroticism is related to depression, anxiety, anger, and insecurity

Two scientists from Victoria University of Wellington and the University of Auckland examined how the Big Five personality traits are associated with individuals' environmental values.

One study asked participants about their attitudes and values about protecting the environment and preserving nature. Consistent with previous studies, they found that environmental value was significantly predicted by differences in the Big Five personality traits, specifically high levels of Agreeableness, Conscientiousness, and Openness and low levels of Neuroticism.

The second survey asked New Zealanders to rate how often they perform 13 electricity-conserving activities like turning lights off when no one is in a room and to answer questions related to the Big Five personality traits. Greater electricity conservation was associated with Agreeableness and Conscientiousness and low levels of Neuroticism, consistent with the results from the first survey. (Thomas, 2014)

Differences in personality can mean that the requirement the environment work differently for different people. Scientists use baseline information on the individual and at the country level on personality and behaviour to get the best ideas of how to tailor environmental proposals.

Environmental Effect on Learning

The environment can affect one's personality and in turn that person's ability to concentrate and learn.

There have been significant improvements in access to primary and secondary education over the 20 years, however major disproportion in learning outcomes remain with children from poor households and those in rural areas are at a consistent disadvantage.

A research study by Ella Hendrix (Hendrix, 2019) for UCAS (contributors, UCAS, 2022) 'has found that learning environments play a crucial role in student success. Several factors can affect learning ability, including seating, light, noise, and even colour. Students who study in a positive learning environment have been shown to be more motivated, engaged, and have a higher overall learning ability.'

'On the other hand, students learning in poor environments – those that are uncomfortable, loud, or full of distractions – will find it far more difficult to absorb information and stay engaged. With this in mind, let's look at how your surroundings affect the way you study, and consider some of the best ways to create your ideal learning environment.'

Comfort – Describes the areas that your desire to study in which could be your kitchen, bedroom, library, a local coffee shop which are vitally important to be a comfortable environment. People who are in a comfortable environment to study will find it easier to concentrate and stay focussed for longer periods, this in turn allows for the absorption of the information that is desired. The persons posture is also very important, so a comfortable and supportive seat is a requirement.

It is not often a second thought to people when they study but a comfortable seat should be a key aspect when planning their study time. If the person is comfortable, they are less likely to get distracted, which affects the learning process considerably.

Lighting – This also plays a key role in how effective a learning environment can be. Natural light (Merriam-Webster, natural light, 2022) is known to boost a person mood, which reducing the effects of any stress or anxiety they may be experiencing.

Studying in naturally lit environments has been studied to improve a student grades by up to 25%, then those who studied in poorly lit areas with unnatural lighting. It is suggested to avoid lamps that can produce glare which can make a person feel tired, such as fluorescent lights (Britannica T. E., 2021).

Colour – It has been observed that colour can play a key part in how effectively a person can learn and should be a consideration when finding the ideal study area. Colours can affect moods and emotions such as the colour red which is known to stimulate learning and creativity but also have a negative effect such as to raise blood pressure, the heartbeat and stress levels.

For the latter reason the colour red is not usually found in study areas, but colours like yellow are usually found in these environments. This is because the colour has been known to stimulate positivity and help with remaining focussed throughout a study session. Yellow is a great colour to enhance learning and moods why makes it a fantastic colour to use in study areas.

Noise – This is something that is usually thought of a something that is not desirable and annoying, but some noise can be of benefit when studying. Some background noise ((n.d.), Noise, 2022) such as music can be of help to some people whereas complete silence is a must for others. Some background music which a low volume can encourage the creative aspects and help with relaxation. But if the music is too loud it will become a distraction and have a negative effect on the persons focus to learn.

Other distractions should also be eliminated that can cause noise such as your mobile phones and iPod that can ring or make notification noises, these also create a negative impact on the ability to concentrate and learn.

Clutter – Many studies have suggested that people have been known to be more motivated and focussed on studying when the learning environment if clean and tidy from clutter and mess. Whereas people who are in cluttered and messy environments tend to be disorganised and have feelings of stress and anxiety. The studies inform that it is best to make sure the space is clean and tidy before commencing onto a study session.

The environment in which a person chooses to study plays a very important role in how effective they can learn and absorb the information. It is vitally important that the discussed important aspects of comfort, lighting, colour, noise, and clutter are addressed prior to a study session to create the ideal learning environment and enhance the ability of absorb information and concentrate.

However, there are also further environmental factors that can affect a learning process which is the process of acquiring new knowledge, understanding, skills, attitude, behaviour, and preferences. It is both an emotional and intellectual process.

Several other factors such as family size, culture and traditions, parents, socio-economic status, occupation, and the climate.

Family size, culture, and traditions – If we are to look at learning from a child perspective then we need to look at nuclear or joint family. In nuclear families ((n.d.), Nuclear family, 2022) the child may find a peaceful and quite environment in which to study, however they may not be able to find assistance with their studies.

In a joint family ((n.d.), Joint family, 2022) the child is more able to find family members to help and assist with their studies which aids better learning. The family size has both pros and cons than can affect the learning process of a child.

Family cultures and traditions are implanted at an early age in children and shapes their perception of the world and cognitive capacity such as religion.

Parents – The parents play a crucial role as primary caregiver to the child which affects the child learning process directly. This role directly shapes the child's personality, behaviour, and cognition.

During a child's growth stage, the child inherits their parent's traits and other attributes. The parent is the first teacher that they will have which is why the learning is affected so much in this stage by their parents own behaviour, character, attitude, personality and even their own cognitive levels.

Socio-economic status – This involves a combination of social and economic factors and has a direct influence on a child academic performance during their

learning. ((n.d.), Socioeconomic, 2022). The social class of a family can directly affect the chances of a child getting a good standard of higher education. If the family have a high social status, they will have a better chance to provide their child educational opportunities, whereas if they have a low social status then they are often overlooked for educational opportunities.

Climate – An article by Dr Catherine Porter, Young Lives Director, for the University of Oxford (Porter, 2021) highlights an often-overlooked impact of climate change on education.

Dr Porter writes 'Young Lives' unique longitudinal research reveals in stark terms how childhood exposure to climate shocks such as droughts and floods has an unequal impact on children's development, affecting their nutrition and access to education. This impedes their learning progress, with poorest children most affected.

The climate crisis intersects with another crisis: interrupted education and widening inequalities during the COVID-19 pandemic. Urgent action and new research are required to help build resilience, enable 12 years of quality education for girls and boys, and help to prepare them to face vulnerabilities that previous generations have never had to deal with.'

Those households that are financially under pressure will be far less resilient when a climate shock takes hold and increases the risk that the child will have interrupted education. These climate shocks can impact the learning and education of children and young adults in many ways.

For example, in the Asian country of Vietnam, there has been evidence to show that low income into the household due to such things as crop failure directly has an impact on the duration that that person will spend in school or higher education. This is particularly applicable to those households that are poorer to begin with.

Some families may not have access to financial credit such as a credit card which can be used in those times of financial hardship. The credit could be used to pay for school fees and transport, books, stationary and other necessary learning materials.

These children are most likely to have to drop out of education as a temporary measure until such time as financially viable to return.

Shortage of food and clean water in times of drought and flooding adds stress that can also impact young people's lives. They may need to walk further to collect drinking water and firewood, take on extra childcare responsibilities when their brothers and sisters are unable to attend school. Additional household work will often fall on the females to complete which will also further reduce their own time to study which increases the risk of dropping out of school altogether.

If a child goes hungry this will affect the child's ability to concentrate on their studies in the classroom or at home, which will also have a bearing on whether the child continues going to school or will drop out.

COVID-19 Effect on Learning

The impact of COVID-19 on education highlights a critical need to adapt in times of crisis. Some recent surveys shows that interrupted education and a growing digital divide have increased the risk of children and young people from poor and rural backgrounds falling further behind, or never returning to education.

There are significant impacts on both girls and boys and the pressures of interrupted education, and the trend has been for households to resort to more traditional gender roles (contributors, Gender role, 2022) in times of stress. This has traditionally meant that men and women had completely opposing roles. Men were seen as the provider for the family and women were seen as the housewife taking care of both the home and the family, which has now has meant that vulnerable girls and young women, have been particularly affected.

A recent study by Maria Yankova for Unicef (contributors, UNICEF, 2022) into the impact of COVID-19 on education in Bulgaria states 'The COVID-19 pandemic led to the closure of all kindergartens and schools in Bulgaria, as of March 2020. This had an impact on the over 700,000 pre-school and school aged children and their parents'. (Yankova, n.d.)

The most severely affected by the school closures were the children of families living in poverty, and children who have parents in long-term unemployment and/or economically inactive. And those who have been most impacted by the pandemic are likely to be most vulnerable to the increasing effects of any climate crisis.

COVID-19 Effect on Personality

Much is written on this subject and there are fascinating stories and insights to be looked at, such as many conspiracy theories (Douglas, 2020). Do any of them have credibility?

There have been documented evidence that the Covid-19 virus has altered peoples brain functions and with that their personality. One such case was in New York City's Presbyterian Allen Hospital, the hospital medical director and respected emergency room doctor Lorna Breen committed suicide after contracting the virus. She was 49 years old and had no previous history of any mental illness and was regarded by her peers as a brilliant, energetic, and organized person.

After a 10-day illness since first showing symptoms, she returned to work. Her family were concerned as she was confused, hesitant, nearly catatonic, and exhausted. The family knew something was wrong. The family checked her into a psychiatric ward at University of Virginia Medical Center, Charlottesville. Soon after she was released, she took her own life. Her sister Jennifer said, "She had COVID, and I believe that it altered her brain,"

At that time the virus was new, and doctors and scientists were working hard to learn and understand how this new coronavirus targets the brain and not just the lungs and heart as like other strains of the same virus.

Other people were admitted to the hospital with depression, hallucinations, and paranoia and all were diagnosed with the COVIS-19 virus. Even after people recover from the virus long term problems can remain such as anxiety, depression, unable to think straight, brain fog, loss of memory and fumbling for words.

Little is known about the reasons behind many of these symptoms, but many professionals think that inflammation may be the key. The COVID-19 virus produces

inflammatory cytokine proteins which can trigger an unmanageable immune response that can permanently damage or destroy brain cells. When humans get damage to the brain, they are not the same person anymore.

A person's personality usually remains constant throughout adulthood, but these conditions that disrupt the brain function can prompt extreme shifts in personality. As experts continue to learn more and more about the virus the evidence is mounting that this happens for some people who contract COVID-19.

This shift in personality is referred as COVID psychosis (Sierzega, 2021) resolves itself over time for some patients. It is still not known how long such COVID-induced symptoms might persist. A study of 395 people who were hospitalized with COVID-19 found that 91 percent had cognitive issues, fatigue, depression, anxiety, sleep problems, or struggled with routine activities six months after they returned home (Guynup, 2021).

By understanding how COVID-19 affects the brain can far wider implications. Dr Maura Boldrini, a neuroscientist and psychiatrist at Manhattan's Columbia University Irving Medical Center has preserved a few dozen brains from patients who died of the coronavirus. She hopes that by comparing tissues from patients who had experienced neurological symptoms with those who hadn't, a better understanding on the role of inflammation in a wide swath of neurodegenerative diseases.

"As devastating as this disease is," she says, "maybe it will help us better understand how the brain works."

Of course, there are accompanying conspiracy theories regarding purposefully altering people's brains through Covid-19 vaccines. One such theory is the Bill Gates (contributors, Bill Gates, 2022) 'microchip' which rapidly spread across the globe as fast as the virus itself.

The conspiracy theory suggested that the coronavirus pandemic was man made cover which would allow the implantation of trackable microchips via the vaccination programs. There has not been any evidence to support this theory, and of course Bill Gates himself said that these claims were untrue.

The theory sems to have started when Mr Gates said in an interview that eventually "we will have some digital certificates" which would be used to show who had been tested, received the vaccine, and recovered, Gates made no mention of microchips.

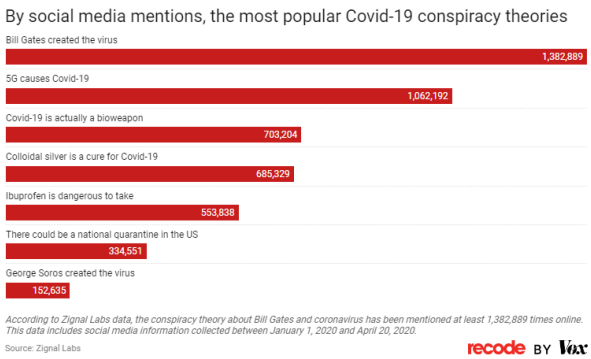
The theory suggested that the implants would dissolve under the skin and leave ‘quantum dots’ as a form of ID using ‘quantum dye technology’, however that technology does not use a microchip.

Mr Gates has been the target for even more false conspiracy theories and have even reached the Italian Parliament. An independent MP has even called for Bill Gates to be referred to the International Criminal Court for crimes against humanity. (Carmichael, 2020)

Another theory suggest that Covid-19 was created as a bioweapon. In 2020, Dr Richard M. Fleming began investigating SARS-CoV-2/COVID-19, using both his "Inflammation" Theory and Patent (FMTVDM; the first method capable of measuring regional blood flow and metabolic changes occurring inside the body, which makes it possible to accurately determine what is happening inside the body.

Fleming claims in his book (Fleming, 2020) that the key to proving and understanding this bioweapon is its spike protein. He claims this is the same spike protein now being made in millions of people after the COVID vaccines are injected into them.

Fleming claims that these vaccines are nothing more than the genetic code of this bioweapon however again there is no evidence whatsoever of genetic engineering to be found. The mutations in the virus are completely consistent with natural evolution of novel coronavirus. (Dehghani A, 2020)



Learning from Past Experiences

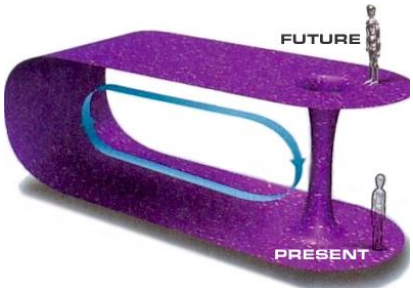
Back in 1999 when there was a furore around the Millennium year 2000, where all the world computers would stop working which they were calling ‘The Millennium Bug’ or ‘Y2K Bug’ (contributors, Year 2000 Problem, 2022) Experts were predicting problems because many programs represented four-digit years with only the final two digits making the year 2000 indistinguishable from the year 1900. Of course, 12 midnight came and passed, and we celebrated the New Year as normal without any issues.

The Mayan calendar predicts the end of the world in 2012 as described in Fractal Time, however this has been another instance of the dates that came and passed without any issues also. The world-famous French Physician Michel de Nostredame (Nostradamus) has also predicted the doomsday in 1999, of course also never happened. (contributors, Nostradamus, 2022)

Fractal Time focuses on specific cycles of time, and things happening repeatedly over set periods of time. Take déjà vu (contributors, Déjà vu, 2022) for example, which literally means ‘already seen’, humans feel that they had experienced the same at previous time in their lives. It could be they have done the same thing in the same place before which is a mini cycle of time.

Say, for example, you are traveling somewhere for the first time. You are touring a cathedral, and suddenly it seems as if you have been in that very spot before. Or maybe you are having dinner with a group of friends, discussing some current political topic, and you have the feeling that you've already experienced this very thing same friends, same dinner, same topic. Many parapsychologists (contributors, Parapsychology, 2022) believe it is related to a past-life experience.

Could time travel be possible? In the world of physics, it has been proven that if we travel faster than the speed of light, then in theory it is possible. Time machine research often involves bending space-time so far that timelines turn back on themselves to form a loop, technically known as a ‘closed time-like curve’ (contributors, Closed timelike curve, 2022), this could be how time can repeat over and again.



In actualization all things are possible although nothing has been proven nor evidence submitted for the same. Stories in ancient books and modern science advancements are two different things but may find a common understanding.

What is IQ and how much does it matter?

IQ tests are used to determine a set of skills that are important to society, but they often do not show the complete picture about someone's potential. This is because these IQ tests give an advantage to those that can think quickly on the spot which is a skill that lots of people do not have.

Psychologists usually connect a person's focused attention, self-control and problem-solving into a skill that is called executive function (contributors, Executive functions, 2022). The brain cells that are responsible for executive function are known as the frontoparietal network (FPN) or central executive network (CEN) (contributors, Frontoparietal network, 2022) and this network is activated when a person takes an IQ test.

If we look at personal intelligence, it is more to it than just executive function as it relates to your own personal aspirations and goals. If a person is working towards a particular goal, they will remain interested and focused on that goal. The person may daydream ((n.d.), Daydream, 2022) about a project even though they are not actively working on it. Daydreaming to some people may seem like a waste of time but in fact it has major benefits for the person doing it.

Daydreaming can lesson stress and anxiety, help solve problems, helps reach your goals and expands your creativity. Diverse parts of the brain are also activated during a daydream which is very sophisticated. When these different brain areas are

activated, we can access information that might have previously been out of reach or dormant. Therefore, boredom or idleness serves a great purpose. (Field, 2021)

Daydreaming is a state that is a very important part of intelligence and when the mind is in the ‘wandering’ state is usually when those sudden insights, lightbulb moments or hunches emerge.

Psychologist professional term for daydreaming is default mode network (DMN) (contributors, Default mode network, 2022) which is described as is a network of interacting brain regions that is active when a person is not focused on the outside world.

For a long time, psychologists thought the default mode network was active only when the executive control network was resting. It was thought that a person could not focus on an activity and daydream at the same time.

To see if that was true a team of researchers at the University of North Carolina in Greensboro and at the University of Graz in Austria teamed up with Scott Barry Kaufman who is a psychologist at the University of Pennsylvania in Philadelphia. The team scanned the brains of volunteers using functional magnetic resonance imaging, or fMRI (contributors, Functional magnetic resonance imaging, 2022).

This tool uses a strong magnetic field to record brain activity by detecting changes associated with blood flow. When an area of the brain is in use, blood flow to that region also increases.

During the study they scanned the brains of 25 college students and asked them to think of as many creative uses as they could for everyday objects. The students were being as creative as they possibly could, and the scans showed that parts of both the default mode network and the executive control network lit up. Kaufman suspected that the two systems weren’t at odds with each other, but in fact the two networks work together to make creativity possible.

Kaufman also stated that “Creativity seems to be a unique state of consciousness” And he thinks that creativity is an essential ingredient for problem-solving.

Potential & Achievement

If a person is classed as being intelligent doesn't mean that they will always be successful and achieve their goals. And if a person is less intelligent doesn't mean that person will not achieve their goals and be successful. Smart people don't always live up to their potential.

Angela Duckworth works at the University of Pennsylvania in Philadelphia and like many other psychologists she wonders what makes one person more successful than another. So, in 2007, she interviewed people from all walks of life. And asked them what they thought made someone successful. Most people's responses believed intelligence and talent were important.

Duckworth found that the people who performed best were those that had been promoted over and over or made lots of money, and that they all shared a trait that was independent of intelligence. Duckworth calls this trait as grit which has two parts that are described as passion and perseverance. Passion points to a lasting interest in something such as music and art. People who persevere work through challenges to finish a project even in the face of difficulty or with little or no indication of success.

Duckworth has developed a set of questions to assess passion and perseverance which she calls the 'grit scale'.

From *"Grit: The Power of Passion and Perseverance"* By Angela Duckworth

The Grit Scale

Read more at: GetLighthouse.com/Blog	Not at all like me	Not much like me	Somewhat like me	Mostly like me	Very much like me
New ideas and projects sometimes distract me from previous ones.	5	4	3	2	1
Setbacks don't discourage me. I don't give up easily.	1	2	3	4	5
I often set a goal but later choose to pursue a different one.	5	4	3	2	1
I am a hard worker.	1	2	3	4	5
I have a difficulty maintaining my focus on projects that take more than a few months to complete.	5	4	3	2	1
I finish whatever I begin.	1	2	3	4	5
My interests change from year to year.	5	4	3	2	1
I am diligent. I never give up.	1	2	3	4	5
I have been obsessed with a certain idea or project for a short time but later lost interest.	5	4	3	2	1
I have overcome setbacks to conquer an important challenge.	1	2	3	4	5

In one of her studies of people aged 25 and above, she found that as people get older, they are more likely to stick with a project and that grit increases with more education. The study also shown that the people scored higher on the grit scale were those who had finished college, and those that shored lower were those who quit college before graduation.

In another study that Duckworth did was with college students where she wanted to see how intelligence and grit could affected performance in school. Scores were compared on college entry exams that estimate IQ, expected school grades and someone's score on her grit scale. The study showed that those students who scored higher grades tended to have more grit. Duckworth also found out that intelligence and grit don't always align together, and on average students with higher exam scores tended to be less gritty than those who scored lower.

Marcus Credé is a psychologist at Iowa State University in Ames and he thinks that grit may not be all it's cracked up to be. He pooled the results of 88 studies on grit which involved nearly 67,000 people and grit did not predict success. However, he thinks grit is very similar to the personality trait of conscientiousness and a person's ability to set goals, work toward them and think things through properly before acting.

Credé believes that a person's study habits and skills, their anxiety and class attendance is far more related to performance than grit. He says that students can be taught how to study effectively, and they can be helped with anxiety toward testing, be he isn't sure the same can be done with grit. In the end, hard work can be just as important to success as IQ.

So, the question is hard work more important or intelligence? Let's say a person is going for a job interview and does no preparation for it, and they are going to solely rely on their intelligence. Sometimes it's possible that your brain cannot conjure up an answer on the spot or you get a memory block, which means that just because someone is intelligent doesn't mean their brain won't let then down in such instances. However, if the person had put the hard work in beforehand, they will not face the same problem because they had thoroughly prepared and were ready to face any questions. So, this shows that 'INTELLIGENCE MIGHT FAIL, BUT HARD WORK WILL NEVER'.

Current Information

Genetic Links Between Personality Traits and Psychiatric Diseases

In an article for Science alert, David Nield (David Nield, n.d.) wrote about how Scientists have identified genetic links between a set of psychological factors known as 'the big five' personality traits (Nield, 2016) and how they can also influence the risk factors of certain psychiatric disorders.

It is widely established that personality is partially linked to genetics, however recent genome-wide association studies have allowed researchers to take a much closer look at which parts of our DNA code affect certain aspects of our character.

The lead researcher of the study Chi-Hua Chen of the University of California, San Diego explains "Although personality traits are heritable, it has been difficult to characterise genetic variants associated with personality until recent, large-scale GWAS," (LaFee, 2016).

Chen worked with his colleagues to analyse genetic variations amongst the big 5 personality traits, which included around 140,000 samples collected from a private company called 23andMe (23andMe, n.d.) and the rest were provided by the Genetics of Personality Consortium (Register, n.d.).

The analysis shown that the personality trait extraversion was associated with variants in the gene WSCD2 and near gene PCDH15, whereas neuroticism was associated with variants on chromosome 8p23.1 and gene L3MBTL2. It was shown that personality traits were largely separated genetically from psychiatric disorders, except for the personality traits neuroticism and openness which are clustered in the same genomic regions as the disorders.

Additionally, there were high genetic associations between extraversion and attention deficit hyperactivity disorder (ADHD) and openness was shown to relate to schizophrenia and bipolar disorder. Neuroticism was genetically connected with internalized psychopathologies, such as depression and anxiety.

Chen stated that the team had “identified genetic variants linked to extraversion and neuroticism personality traits”, but the study is still in an “early stage for genetic research in personality”. Many more genetic variants associated with personality traits are yet to be identified. The research team had found genetic connections between personality traits and psychiatric disorders, but Chen says that “specific variants underlying the correlations are unknown.”

The DNA coding that defines our personalities in likelihood also could contribute to developing psychiatric disorders. But this does not mean that the genes that we inherit upon birth will define our personality fully nor make psychiatric disorders inevitable, but the research shows that there is a link to each other.

Genetics and Learning

It is well regarded that the aspects of learning have a clear genetic background, and hereditary potential can be enhanced or decreased through educational activities. Therefore, how important is education in relation to the hereditary potential of learning activities?

A research paper by David Bueno (Bueno, 2019) suggests that ‘despite the relatively high genetic heritability shown in most brain processes associated with learning, educational practices are a key contributor to student development, allowing genetically based skills to be enhanced or alternatively diminished.’

Bueno explains that the main goal of education in an ever changing and uncertain world is to develop people who are adaptable and versatile and make the most of their capabilities.

Individual differences in educational achievement have also been shown to be highly heritable according to a study of Year 6 and 9 exam data in 24,285 pairs of twins by Pokropek and Sikora (Sikora, 2015). The study describes that ‘depending on a learning domain and classroom environment history, from 58% to 88% of variance in exam results is attributable to heritability, up to 34% to shared environment and from 8% to 15% depends on unique events in students’ lives. Moreover, between 54%

and 66% of variance in students' learning gains made between Years 6 and 9 is explained by heritability. The unique environment accounts for between 34% and 46% of that variance'.

However, the study found no classroom effects on student progress made between Years 6 and 9. This finding was contrary to the perceived view that classroom peer groups and their teachers make any impact to an adolescent learning process. The finding suggests that random experiences such as relationships between an individual and their peers and teachers have a much greater influence on educational progress rather than in general learning situations.

In another study of more than 6,500 pairs of twins, researchers from the Department of Education at the University of York and Kings College London, showed that more than 50% of the differences between pupils' educational learning performance at GCSE level (contributors, General Certificate of Secondary Education, 2022) can be explained by differences in genetics.

The research concluded that the individuals IQ showed the strongest link according to their exam scores, whereas the genetic traits like the personality and behaviour also showed some differences in attainment scores.

The research describes the word Heritability which describes the extent to which differences between children can be ascribed to DNA differences, on average, in a particular population at a particular time.

The individuals IQ accounts for more heritability than any other single domain but the contribution of the individual's self-belief, behaviour, personality, home vs school perceptions and their health accounts for the same amount of hereditary again. The differences to a large extent can be explained by differences in their DNA and this can provide support for focusing on individual personalised teaching and learning.

Dr Kathryn Asbury, one of the report authors, said: "This research makes crystal clear why there will never be a gene 'for' achievement. How well young people perform in their GCSEs is bound up with their home lives, their school lives, their personalities and their health and well-being, as well as their cognitive abilities. Understanding the genetic and environmental relationships between this

broad array of pupils' experiences and behaviour and their GCSE performance may eventually help us to personalise teaching and learning more effectively than we currently do." (Asbury, 2015)

Previously published research has already established that educational achievement is heritable. The studies show that the heritability of educational achievement is a lot more than just IQ, it is a combination of the many traits which are all heritable to certain extents.

The important thing to remember is that heritability does not mean that all things are set in stone. A simple explanation is that children differ in how easy they find learning and how and enjoyable they find it, and in fact many of these differences are directly influenced by their genetics.

Personality and Speed of Learning Relationship

Many conceptual research papers link variation in a person's personality to variation in their cognition, and in recent years have seen many factual studies testing this link. The conceptual research papers show the relationship between animal personality and cognition, and the evidence shows a small but significant relationship between personality and learning but the data is variable.

These results suggest that while personality and learning are indeed related, the direction of this relationship is highly variable and further studies into the causes and consequences of individual differences in cognitive abilities.

The link between personality and cognition was first confirmed by Ivan Pavlov in the early twentieth century while he was examining associative processes such as conditioned reflexes and digestive physiology.

Pavlov would describe four different types of nervous systems; this was based on how quickly he observed dogs forming different types of associations. One example was the 'Excitable' type that showed fast and strong excitatory conditioning (ASSOCIATION, excitatory conditioning, n.d.) but slow and weak inhibitory conditioning (ASSOCIATION, inhibitory conditioning, n.d.)

The ‘Inhibited’ type was the opposite of Excitable type and they show strong and quick inhibitory conditioning, however they also shown slow and weak excitatory conditioning. Excitable and Inhibited types both also showed low flexibility alternating between excitatory and inhibitory conditioning.

The ‘Lively’ type showed fast associative learning for both excitatory and inhibitory and could easily make conversions between the two types.

The remaining identified type is ‘Quiet’ type, which shown slow associations but were consistent, however they were less flexible than that of the Lively type, when traying to make conversions between the two types.

A research paper written by Liam R. Dougherty and Lauren M. Guillette discusses Pavlov’s experiments mentioned above and looks deeper into the relationship between personality and cognition which they say may also depend on which personality measure is being examined. (Guillette, 2018)

To make any informed prediction about the relationship between personality and cognition depends on multiple factors such as what the stimulus is, for example tone, light, conspecific (animals or plants that belong to the same species), odour, the response (making one or not making one), and the outcome (is this positive or negative?).

One of the most popular predictions based on both conceptual and empirical work is that those quicker to explore are also the fastest learners who will excel in stable environments. Those that are slow to explore are said to be more flexible and should be better at reversal learning (contributors, Reverse learning, 2022) compared with the quicker explorers.

The relationship between type of explorers and cognition may depend on the cognitive measure being used. The authors predict a positive relationship between personality and learning speed for newly acquired tasks, for example a quicker explorer will be a quicker learner. They also predict a negative relationship between personality and reversal learning, for example slower explorers will be quicker at reversal learning.

Researchers investigating if there are any biases in learning due to the type of cue associated with the reward, they can perform the Mann–Whitney U test (sometimes called the Mann Whitney Wilcoxon Test or the Wilcoxon Rank Sum Test) (contributors, Mann–Whitney U test, 2022) which is used to test whether two samples are likely to derive from the same population, to assess whether learning speed differs according to the type of cues that were matched to the reward.

To determine whether learning speed in the various tasks related to personality, researchers need to first evaluate what is normality by a visual inspection of histograms of model residuals. To obtain homogenous variances on learning speed in discriminative learning and spatial learning the researchers use the function Box-Cox test (Cox, 1964) which is an analysis of transformations (a transformation of non-normal dependent variables into a normal shape) to find suitable transformations for our response variables.

This resulting analysis of learning speed in the discriminative learning tasks and in the spatial learning task showed that learning speed in the reversal learning task was approximately normal. Those containing variables such as Sex (male or female), Exploration, Shyness, Sex Exploration, Sex Shyness and Family as fixed effects, contributed to a random effect.

Other models that investigated the effect of variation in tonic immobility included the variables of Sex (male or female), Sex Latency and Family as random effect. Full models were explored containing all variables and the results gathered were robust, because analysing the data with other distributions (negative binomial or Poisson distribution) gave statistically similar results.

Learning Cycles

If we are to believe in the fact that both ancient traditions and modern science tell us that our location in the relative universe determines how the earth experiences powerful sources of energy, such as radiation from out start The Sun and magnetic fields which radiate from our galaxy's (Milky Way) (contributors, Milky Way, 2022) core. Experts suggest that it is these cycles that may explain the mysterious patterns of biodiversity - such as the mass extinctions that happened million years ago due to floods or ice ages.

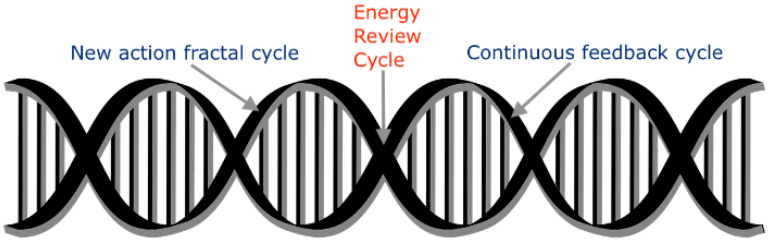
Most modern discoveries confirm that Earth's orbit and tilt throughout the journey create the ever-changing cycles that influence everything from temperature and climate to ice formations in the Polar Regions and the magnetic fields of the Earth.

If you think about time cycles in the way that the Earth's rotation makes the darkest part of the night appear just before the dawn, the Earth's position in the solar system is such that the darkest part of our world age appears right before our orbit begins the return that brings us closer to our galaxy's core. The night must pass to get to the new day, the only way for the light to arrive at the start of the new day the darkness must finish in this cycle.

It is a given and well-known fact that dark experiences exist in our world, such as murder and rape and some say this can be attributed to these dark cycles. We don't need to look far to find them and there's also more to life than the suffering that the ancients foreseen. Even in recent times of great darkness such as an earthquake in Afghanistan (Curisino, 2022), a Tsunami in Tonga (Center, 2022), or at the time of writing a war in Ukraine (contributors, 2022 Russian invasion of Ukraine, 2022), peace, healing, love, and compassion are alive and well. This is being Human.

Research suggests that our ancestors had an amazingly deep grasp of just what our experience of cosmic cycle's means on multiple levels. Somehow, they knew that Earth's position in relation to stars in the night sky would affect the physical conditions in our world. Ancient astronaut (contributors, Ancient astronauts, 2022) theorists believe that beings from the heavens gave this information to mankind.

To fully understand our time in history would mean that we need to understand nature's cycles and to use that information today to prepare for the future. Ultimately to understand the key to history repeating itself or not.



The DNA of cultural evolution over time

Conclusions

The purpose of this thesis was to investigate the relationship between DNA, Personality and Learning, while also being written at a time when we are still in a global pandemic although widely regarded as coming out the other side after nearly 3 years.

How has the Covid19 virus affected DNA, personalities, and Learning? Is COVID-19 the cause of psychosis or just a coincidence?

There are vast amounts of written sources on this subject and this thesis looked at the data from a different research teams' perspective.

The research studies suggest that we still don't know the potential effects of COVID-19 on the brain, and that doctors and scientist are learning about this virus all the time. These experts are constantly on the lookout for new onset of psychiatric disorders, even if the patient with has no previous history of mental illness.

Many unanswered questions remain regarding whether a person's genetic makeup or a previously undetected vulnerability for psychiatric illness can increase that risk, or for how long the psychosis lasts. Studied cases of post covid-19 infection psychosis have also transpired with previous pandemic viruses. Examples of this include the 1918 Spanish flu (contributors, Spanish flu, 2022) and coronaviruses SARS (contributors, 2002–2004 SARS outbreak, 2022) and MERS (contributors, MERS-CoV, 2022).

By 1919, just 1 year into the pandemic the Spanish Flu had spread the influenza virus to a third of the world's population, at that was estimated to be around 500 million people. Psychiatrist Karl Menninger was treating people who had recently been infected at Boston Psychopathic Hospital. Many of the patients had symptoms exceeding that what is usually associated with influenza virus.

Menninger wrote a paper on 100 cases that he had seen over a three-month period, in which he described seeing extreme mental disturbances. More than 50% of his patients had some sort of psychosis, and nearly 75% hallucinated.

The same also happened during the SARS epidemic in Hong Kong, Hallucinations, mania, and depression were observed post the SARS epidemic. In 2015, researchers reported two cases of children who had H1N1 influenza and psychosis that eventually went away (Love, 2020).

The link between viral infections and effects on the central nervous system has been studied with viruses such as MERS. It has been documented that like COVID-19, this virus is been able to produce symptoms of psychosis in patients with no prior psychiatric conditions, just as other coronaviruses have been also.

Published studies show that COVID-19 can cause severe neuropsychological stress-inducing psychosis in affected patients. The studies cover the relationships between COVID-19 and psychosis, and they demonstrate there is an increased rate of psychotic symptoms such as paranoia, delusions of persecution, and auditory and visual hallucinations in populations with high amount of COVID-19 infection (Guitelle St. Victor, 2022).

This thesis looked upon research in psychology, DNA and genomes, and environmental effects of personality and learning, the research has found that exposure coronavirus can cause change in DNA and personality which are linked together, which in turn can affect a person's ability to learn. But do we as a species learn from global pandemics or maybe wars?

Fighting and war-torn countries are evident throughout the world as they have been throughout recorded history, Gregg Braden in his book Fractal time recommends that we should just stop the wars. But is it as simple as that? Wars are initiated through financial wealth greed for commodities such as gold, oil, and territory.

But what it we could stop all wars and end poverty, this would in theory end the cycle at the end of the next cycle. No wars or poverty means that wars and poverty won't be repeated according to the Fractal time argument.

If it becomes possible to travel faster that the speed of light or take advantage of wormholes bending time back upon itself, this will enable mankind to 'Time Travel' and revisit past disasters such as mass extinctions. Not mass extinctions such as the demise of the dinosaurs as this was due to an asteroid hitting earth and changing the

climate. But whole races that had been eradicated due to food shortages or exposure to radiation.

Travelling through time to stop a major event happening can also have a detrimental effect, cause and effect which is the relationship between two events of things. (contributors, Causality, 2022), or every action has an equal and opposite reaction which was Newton's Third Law (contributors, Newton's laws of motion, 2022). We would need to be very careful going down a route of this nature as it could cause more harm than good.

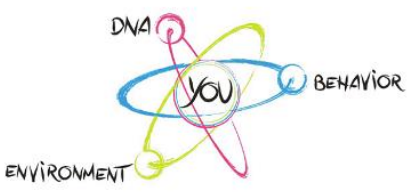
In the modern-day of 2022 huge corporations and stockbroker markets should be monitored for world trends, which they or course do to make money. However, this can also be used as a heads up to the next cycle of a crash, the Wall Street crash of 1929 (contributors, Wall Street Crash of 1929, 2022) when the New York Stock Exchange (contributors, New York Stock Exchange, 2022) collapsed with it the start of a 12-year depression, this was a start of a cycle and repeats can be avoided.

Albert Einstein's attributed most famous quote "The definition of insanity if doing the same thing over and over and expecting different results". (Wilczek, 2015)

DNA, personality, and learning are all interlinked.

A person's DNA directly affects their personality, but their environment that they live in and their schools also play a huge part in developing a person's personality. The DNA is also affected by external environmental aspects such as the climate, air and water quality and viruses.

The learning abilities of an individual is directly affected by that persons DNA, personality, and their environment. If the DNA is corrupted then the personality is affected adversely, and the ability to lean is severely hindered.



Bibliography

References

(n.d.), M.-W. (2022, July 15). *Daydream*. Retrieved from Merriam-Webster.com dictionary: https://www.merriam-webster.com/dictionary/daydream

(n.d.), M.-W. (2022, June 28). *Joint family*. Retrieved from Merriam-Webster.com dictionary: https://www.merriam-webster.com/dictionary/joint%20family

(n.d.), M.-W. (2022, June 28). *Noise*. Retrieved from In Merriam-Webster.com dictionary.: https://www.merriam-webster.com/dictionary/noise

(n.d.), M.-W. (2022, June 28). *Nuclear family*. Retrieved from Merriam-Webster.com dictionary: https://www.merriam-webster.com/dictionary/nuclear%20family

(n.d.), M.-W. (2022, June 28). *Socioeconomic*. Retrieved from Merriam-Webster.com dictionary: https://www.merriam-webster.com/dictionary/socioeconomic

23andMe. (n.d.). *23andMe*. Retrieved from 23andMe: https://www.23andme.com/en-int/

al, A. N. (2016). Multivariate associations of fluid intelligence and NAA. *Cerebral Cortex*, http://www.nature.com/articles/srep10964.

Alan E. Kazdin, P. (2000). *American Psychological Association.* Retrieved from apa.org: https://www.apa.org/topics/personality#:~:text=Personality%20refers%20to%20individual%20differences,such%20as%20sociability%20or%20irritability.

Asbury, D. K. (2015, January 6). *Twins study shows exam success is strongly influenced by DNA*. Retrieved from University of York: https://www.york.ac.uk/research/themes/educational-achievement-heritable/

ASSOCIATION, A. P. (n.d.). *excitatory conditioning*. Retrieved from APA Dictionary of Psychology: https://dictionary.apa.org/excitatory-conditioning

ASSOCIATION, A. P. (n.d.). *inhibitory conditioning*. Retrieved from APA Dictionary of Psychology: https://dictionary.apa.org/inhibitory-conditioning

Baer, D. (2014, October 14). *Malcolm Gladwell Says IKEA Built A Multibillion-Dollar Brand Because Its Founder Had This Disagreeable Personality Trait*. Retrieved from Business Insider: https://www.businessinsider.com/malcolm-gladwell-on-ikea-founder-personality-trait-2014-10#:~:text=IKEA%20founder%20Ingvar%20Kamprad%20cares,conscientiousness%2C%20openness%2C%20and%20disagreeableness.

Bottaro, A. (2021, June 11). *What Is an Antigen?* Retrieved from verywellhealth: https://www.verywellhealth.com/what-is-an-antigen-5083801

Braden, G. (2009). *FRACTAL TIME.* Hay House.

Britannica, T. E. (2021, August 12). *fluorescent lamp*. Retrieved from Encyclopedia Britannica: https://www.britannica.com/technology/fluorescent-lamp

Britannica, T. E. (2022, June). *DNA chemical compound.* Retrieved from britannica.com: https://www.britannica.com/science/DNA

Bueno, D. (2019, July 10). *Genetics and Learning: How the Genes Influence Educational Attainment*. Retrieved from frontiers: https://www.frontiersin.org/articles/10.3389/fpsyg.2019.01622/full

Carlsten, C. F. (2019, September 3). *Air pollution and DNA methylation: effects of exposure in humans*. Retrieved from Clinical Epigenetics: https://clinicalepigeneticsjournal.biomedcentral.com/articles/10.1186/s13148-019-0713-2

Carmichael, J. G. (2020, May 30). *Coronavirus: Bill Gates 'microchip' conspiracy theory and other vaccine claims fact-checked*. Retrieved from BBC NEWS: https://www.bbc.com/news/52847648

Center, I. T. (2022, January 15). *15 January 2022, Hunga-Tonga Hunga-Ha'apai Volcanic Eruption and Tsunami*. Retrieved from International Tsunami Information Center: http://itic.ioc-unesco.org/index.php?option=com_content&view=article&id=2186&Itemid=3265

Cherry, K. (2021, February 20). *The Big Five Personality Traits.* Retrieved from verywellmind.com: https://www.verywellmind.com/the-big-five-personality-dimensions-2795422#:~:text=The%20five%20broad%20personality%20traits,how%20many%20personality%20traits%20exist.

Cherry, K. (2021, February 20). *The Big Five Personality Traits*. Retrieved from verywellmind: https://www.verywellmind.com/the-big-five-personality-dimensions-2795422

contributors, W. (2021, November 6). *Logical reasoning*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Logical_reasoning&oldid=1053910109

contributors, W. (2022, June 13). *2002–2004 SARS outbreak*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=2002%E2%80%932004_SARS_outbreak&oldid=1092886618

contributors, W. (2022, July 17). *2022 Russian invasion of Ukraine*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=2022_Russian_invasion_of_Ukraine&oldid=1098887203

contributors, W. (2022, July 2). *Ancient astronauts*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Ancient_astronauts&oldid=1096082048

contributors, W. (2022, July 10). *Big Five personality traits*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Big_Five_personality_traits&oldid=1097336084

contributors, W. (2022, July 14). *Bill Gates*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Bill_Gates&oldid=1098232595

contributors, W. (2022, July 12). *Bird*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Bird&oldid=1097843778

contributors, W. (2022, July 17). *Bird migration*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Bird_migration&oldid=1098773559

contributors, W. (2022, June 30). *Booster dose*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Booster_dose&oldid=1095733426

contributors, W. (2022, June 5). *Causality*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Causality&oldid=1091684818

contributors, W. (2022, April 3). *Classical conditioning*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Classical_conditioning&oldid=1080791079

contributors, W. (2022, June 26). *Closed timelike curve*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Closed_timelike_curve&oldid=1095071131

contributors, W. (2022, July 18). *Cognitive science*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Cognitive_science&oldid=1098944820

contributors, W. (2022, July 15). *Default mode network*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Default_mode_network&oldid=1096090195

contributors, W. (2022, May 20). *Déjà vu*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=D%C3%A9j%C3%A0_vu&oldid=1088924734

contributors, W. (2022, July 16). *Developing country*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Developing_country&oldid=1098603302

contributors, W. (2022, June 27). *DNA methylation*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=DNA_methylation&oldid=1095233323

contributors, W. (2022, May 12). *Educational psychology*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Educational_psychology&oldid=1087432447

contributors, W. (2022, June 28). *Erwin Chargaff*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Erwin_Chargaff&oldid=1095459291

contributors, W. (2022, July 15). *Escherichia coli*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Escherichia_coli&oldid=1098306017

contributors, W. (2022, July 15). *Executive functions*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Executive_functions&oldid=1095744661

contributors, W. (2022, June 9). *Experiential learning*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Experiential_learning&oldid=1092330835

contributors, W. (2022, July 9). *Experimental psychology*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Experimental_psychology&oldid=1097257016

contributors, W. (2022, July 15). *Fluid and crystallized intelligence*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Fluid_and_crystallized_intelligence&oldid=1074352182

contributors, W. (2022, July 15). *Francis Crick*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Francis_Crick&oldid=1098384131

contributors, W. (2022, July 16). *Friedrich Miescher*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Friedrich_Miescher&oldid=1098662845

contributors, W. (2022, July 15). *Frontoparietal network*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Frontoparietal_network&oldid=1044104090

contributors, W. (2022, July 15). *Functional magnetic resonance imaging*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Functional_magnetic_resonance_imaging&oldid=1095793810

contributors, W. (2022, June 7). *Gender role*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Gender_role&oldid=1091963939

contributors, W. (2022, July 14). *General Certificate of Secondary Education*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=General_Certificate_of_Secondary_Education&oldid=1098118281

contributors, W. (2022, June 25). *Gifted education*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Gifted_education&oldid=1095008112

contributors, W. (2022, June 14). *Habituation*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Habituation&oldid=1093015464

contributors, W. (2022, May 18). *Heredity*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Heredity&oldid=1088437741

contributors, W. (2022, June 30). *Heritability*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Heritability&oldid=1095738590

contributors, W. (2022, July 16). *IKEA*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=IKEA&oldid=1098514337

contributors, W. (2022, July 15). *In vivo magnetic resonance spectroscopy*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=In_vivo_magnetic_resonance_spectroscopy&oldid=1090268293

contributors, W. (2022, July 9). *Influenza*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Influenza&oldid=1097207892

contributors, W. (2022, July 14). *Intelligence quotient*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Intelligence_quotient&oldid=1098116530

contributors, W. (2022, July 17). *Ivan Pavlov*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Ivan_Pavlov&oldid=1098773149

contributors, W. (2022, June 18). *James Watson*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=James_Watson&oldid=1093662974

contributors, W. (2022, June 30). *Land use regression model*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Land_use_regression_model&oldid=1095774510

contributors, W. (2022, June 24). *Learning.* Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Learning&oldid=1094738830

contributors, W. (2022, July 6). *Machine learning*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Machine_learning&oldid=1096715930

contributors, W. (2022, July 18). *Mahabharata*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Mahabharata&oldid=1095329517

contributors, W. (2022, July 11). *Malcolm Gladwell*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Malcolm_Gladwell&oldid=1097576167

contributors, W. (2022, July 16). *Mammal*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Mammal&oldid=1098638114

contributors, W. (2022, July 15). *Mann–Whitney U test*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Mann%E2%80%93Whitney_U_test&oldid=1097171816

contributors, W. (2022, July 13). *MERS-CoV*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=MERS-CoV&oldid=1098039917

contributors, W. (2022, July 9). *Mesoamerica*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Mesoamerica&oldid=1097240872

contributors, W. (2022, July 11). *Metabolism*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Metabolism&oldid=1097553266

contributors, W. (2022, July 17). *Milky Way*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Milky_Way&oldid=1098854189

contributors, W. (2022, June 25). *Nature versus nurture*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Nature_versus_nurture&oldid=1095021695

contributors, W. (2022, June 27). *Neuropsychology*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Neuropsychology&oldid=1095327073

contributors, W. (2022, July 13). *New York Stock Exchange*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=New_York_Stock_Exchange&oldid=1097949486

contributors, W. (2022, July 16). *Newton's laws of motion*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Newton%27s_laws_of_motion&oldid=1098495004

contributors, W. (2022, June 28). *Nostradamus*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Nostradamus&oldid=1095424997

contributors, W. (2022, June 26). *Operant conditioning*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Operant_conditioning&oldid=1095174188

contributors, W. (2022, June 26). *Organochlorine compound*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Organochlorine_compound&oldid=1095175217

contributors, W. (2022, July 11). *Parapsychology*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Parapsychology&oldid=1097659860

contributors, W. (2022, June 23). *Pedagogy*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Pedagogy&oldid=1094565911

contributors, W. (2022, July 6). *Perfluorinated compound*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Perfluorinated_compound&oldid=1096755236

contributors, W. (2022, February 27). *Phoebus Levene*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Phoebus_Levene&oldid=1074264451

contributors, W. (2022, May 28). *Plant cognition*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Plant_cognition&oldid=1090333493

contributors, W. (2022, June 28). *Play (activity)*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Play_(activity)&oldid=1095426941

contributors, W. (2022, June 24). *Recreation*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Recreation&oldid=1094848479

contributors, W. (2022, July 15). *Reverse learning*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Reverse_learning&oldid=1049257906

contributors, W. (2022, July 3). *SARS-CoV-2*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=SARS-CoV-2&oldid=1096337980

contributors, W. (2022, June 21). *Spanish flu*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Spanish_flu&oldid=1094318174

contributors, W. (2022, July 17). *Sweden*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Sweden&oldid=1098775235

contributors, W. (2022, February 17). *The Double Helix*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=The_Double_Helix&oldid=1072407208

contributors, W. (2022, June 29). *UCAS*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=UCAS&oldid=1095615666

contributors, W. (2022, June 28). *UNICEF*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=UNICEF&oldid=1095429316

contributors, W. (2022, July 18). *United Kingdom*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=United_Kingdom&oldid=1098929505

contributors, W. (2022, July 13). *Vaccine*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Vaccine&oldid=1097876628

contributors, W. (2022, July 1). *Wall Street Crash of 1929*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Wall_Street_Crash_of_1929&oldid=1095913819

contributors, W. (2022, July 13). *Year 2000 Problem*. Retrieved from Wikipedia, The Free Encyclopedia: https://en.wikipedia.org/w/index.php?title=Year_2000_problem&oldid=1097980583

Cox, G. E. (1964). An Analysis of Transformations. *An Analysis of Transformations*, all.

Curisino, L. S. (2022, June 22). *Afghan earthquake: At least 1,000 people killed and 1,500 injured*. Retrieved from BBC NEWS: https://www.bbc.com/news/world-asia-61890804

Daily, S. (2011, March 4). *Science News*. Retrieved from Science Daily: https://www.sciencedaily.com/releases/2011/03/110304091454.htm#:~:text=The%20results%20show%20that%20an,of%20DNA%20lesions%20(3).

David Nield. (n.d.). *David Nield*. Retrieved from Science alert: https://www.sciencealert.com/david-nield

Dehghani A, M. G. (2020, October). *Could SARS-CoV-2 or COVID-19 Be a Biological Weapon?* Retrieved from Iranian journal of public health: https://doi.org/10.18502/ijph.v49iS1.3691

Douglas, K. M. (2020). COVID-19 conspiracy theories. *SAGE*, 1-6.

Eric Green, M. P. (2022, June). *National Human Genome Research Institute.* Retrieved from genome.gov: https://www.genome.gov/genetics-glossary/Genome#:~:text=The%20genome%20is%20the%20entire,individual%20to%20develop%20and%20function.

Field, B. (2021, August 20). *5 Positive Effects of Daydreaming*. Retrieved from Verywell Mind: https://www.verywellmind.com/positives-about-daydreaming-5119107

Fleming, R. M. (2020). *Is COVID-19 a Bioweapon?* Skyhorse.

Genetics Review. (1999, September 29). Retrieved from NCBI: https://www.ncbi.nlm.nih.gov/Class/MLACourse/Original8Hour/Genetics/nucleotide.html

Geographic, N. (2022, June). *Natural Selection.* Retrieved from education.nationalgeographic.org: https://education.nationalgeographic.org/resource/natural-selection

Ghose, T. (2020, July 17). *What are antibodies?* Retrieved from livescience.com: https://www.livescience.com/antibodies.html

Guillette, L. R. (2018, August 13). *Linking personality and cognition: a meta-analysis*. Retrieved from The Royal Society Publishing: https://royalsocietypublishing.org/doi/10.1098/rstb.2017.0282

Guitelle St. Victor, M. F. (2022, June 2). *Psychosis in the Patient With COVID-19: An Emerging Psychopathology?* Retrieved from Psychiatric Times: https://www.psychiatrictimes.com/view/psychosis-in-the-patient-with-covid-19-an-emerging-psychopathology-

Guynup, S. (2021, December 29). *Can COVID-19 alter your personality? Here's what brain research shows.* Retrieved from National Geographic: https://www.nationalgeographic.com/science/article/can-covid-19-alter-your-personality-heres-what-brain-research-shows

Help, D. (n.d.). *Ingvar Kamprad*. Retrieved from Dyslexia Help: http://dyslexiahelp.umich.edu/success-stories/ingvar-kamprad#:~:text=It%20was%20from%20its%20founder,the%20sign%20of%20his%20dyslexia.

Hendrix, E. (2019, December 19). *How your surroundings affect the way you study*. Retrieved from ucas.com: https://www.ucas.com/connect/blogs/how-your-surroundings-affect-way-you-study#:~:text=Several%20factors%20can%20affect%20learning,a%20higher%20overall%20learning%20ability.

INSTITUTE, N. C. (n.d.). *leukocyte*. Retrieved from NATIONAL CANCER INSTITUTE: https://www.cancer.gov/publications/dictionaries/cancer-terms/def/leukocyte

Island, U. o. (n.d.). *Anna Robuck is making waves in marine science*. Retrieved from The Campaign for teh University of Rhode Island: https://campaign.uri.edu/story/environmental-protagonist-anna-robuck/

Journal, i. (2017, November 21). *12 Famous People Who Struggled With Dyslexia Before Changing The World*. Retrieved from imse Journal: https://journal.imse.com/12-famous-people-who-struggled-with-dyslexia-before-changing-the-world/

Kickers, P. C. (2021, July 29). *Famous people with dysgraphia*. Retrieved from Princesses Can Wear Kickers: https://princessescanwearkickers.com/famous-people-with-dysgraphia/

LaFee, S. (2016, December 8). *Personality Traits and Psychiatric Disorders Linked to Specific Genomic Locations*. Retrieved from UC San Diego News Center: https://ucsdnews.ucsd.edu/pressrelease/personality_traits_and_psychiatric_disorders_linked_to_specific_genomic_loc

Latoya Frolov, M. M. (2021, August). *What Is Specific Learning Disorder?* Retrieved from American Psychiatric Association: https://www.psychiatry.org/patients-families/specific-learning-disorder/what-is-specific-learning-disorder

Love, S. (2020, March 17). *The Strange Link Between Pandemics and Psychosis*. Retrieved from Vice: https://www.vice.com/en/article/g5x3gq/link-between-pandemics-and-psychosis-spanish-influenza-and-psychotic-disorders

Medicine, J. H. (n.d.). *The Immune System*. Retrieved from John Hopkins Medicine: https://www.hopkinsmedicine.org/health/conditions-and-diseases/the-immune-system#:~:text=What%20is%20the%20immune%20system,and%20proteins%20that%20work%20together.

Medicine, N. L. (2005, September 10). *Intellectual aptitude tests and A levels for selecting UK school leaver entrants for medical school*. Retrieved from nih.gov: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1200591/

Merriam-Webster. (2022, June 28). *natural light*. Retrieved from Merriam-Webster: https://www.merriam-webster.com/dictionary/natural%20light

Merriam-Webster. (n.d.). *heteroantigen*. Retrieved from Merriam-Webster: https://www.merriam-webster.com/medical/heteroantigen#:~:text=Medical%20Definition%20of%20heteroantigen,an%20individual%20of%20another%20species

Nations, U. (2022). *What is Climate Change?* Retrieved from United Nations Climate Action: https://www.un.org/en/climatechange/what-is-climate-change

NHGRI. (2022). *Introduction to Genomics*. Retrieved from National Human Genome Research Institute: https://www.genome.gov/About-Genomics/Introduction-to-Genomics

NHS. (2019, December 19). *Psoriatic arthritis*. Retrieved from nhs.uk: https://www.nhs.uk/conditions/psoriatic-arthritis/

NHS. (2019, August 28). *Rheumatoid arthritis*. Retrieved from nhs.uk: https://www.nhs.uk/conditions/rheumatoid-arthritis/

NHS. (2020, April 20). *Blood groups*. Retrieved from nhs.uk: https://www.nhs.uk/conditions/blood-groups/#:~:text=There%20are%204%20main%20blood,there%20are%208%20blood%20groups.

NHS. (2020, September 23). *Lupus*. Retrieved from nhs.uk: https://www.nhs.uk/conditions/lupus/

NHS. (2022, March 22). *Multiple sclerosis*. Retrieved from nhs.uk: https://www.nhs.uk/conditions/multiple-sclerosis/

NHS. (2022, April 8). *Psoriasis*. Retrieved from nhs.uk: https://www.nhs.uk/conditions/psoriasis/

Nield, D. (2016, December 16). *Scientists Have Found Genetic Links Between Personality Traits And Psychiatric Diseases*. Retrieved from Science alert: https://www.sciencealert.com/scientists-find-genetic-links-between-personality-traits-and-psychiatric-diseases

Organization, W. H. (2022). *Coronavirus disease (COVID-19)*. Retrieved from who.int: https://www.who.int/health-topics/coronavirus#tab=tab_1

Porter, D. C. (2021, November 8). *Education is under threat from climate change - especially for women and girls*. Retrieved from University of Oxford: https://www.ox.ac.uk/news/features/education-under-threat-climate-change-especially-women-and-girls#:~:text=Young%20Lives'%20unique%20longitudinal%20research,with%20poorest%20children%20most%20affected.

Register, N. T. (n.d.). *GPC - The Genetics of Personality Consortium*. Retrieved from Nederlands Tweelinggen Register: https://tweelingenregister.vu.nl/gpc

Robuck, A. (2017, October 4). *Fish DNA can change in response to pollution. What about the rest of us?* Retrieved from Massive Science: https://massivesci.com/articles/the-contaminants-are-even-in-my-dna/

Rosen, P. (n.d.). *Motor Planning:What you Need to Know*. Retrieved from understood.org: https://www.understood.org/en/learning-attention-issues/child-learning-disabilities/movement-coordination-issues/motor-planning-what-you-need-to-know

Roser, H. R. (2020). *CO2 emissions.* Retrieved from Our World in Data: https://ourworldindata.org/co2-emissions

Sharp, T. (2017, October 19). *How far is the Earth from the Sun?* Retrieved from space.com: https://www.space.com/17081-how-far-is-earth-from-the-sun.html

Sierzega, J. (2021, April 22). *What is post-COVID-19 psychosis and who's at risk?* Retrieved from Edward-Elmhurst Health: https://www.eehealth.org/blog/2021/04/covid-19-psychosis/

Sikora, A. P. (2015, May 5). *Heritability, family, school and academic achievement in adolescence*. Retrieved from Science Direct: https://www.sciencedirect.com/science/article/abs/pii/S0049089X15000952?via%3Dihub

Singh, M. (2021, August 23). *7 Famous People With Dyscalculia*. Retrieved from numberdyslexia.com: https://numberdyslexia.com/7-famous-people-with-dyscalculia/

Staff, M. C. (2021, March 27). *Type 1 diabetes*. Retrieved from Mayo Clinic: https://www.mayoclinic.org/diseases-conditions/type-1-diabetes/symptoms-causes/syc-20353011

Team, D. A. (n.d.). *Creator of IKEA, Ingvar Kamprad – Dyslexic Entrepreneurs*. Retrieved from Dyslexic Advantage: https://www.dyslexicadvantage.org/creator-ikea-ingvar-kamprad/

Thomas, L. (2014, March 31). *How personality traits are associated with environmental engagement*. Retrieved from Yale Environment Review: https://environment-review.yale.edu/how-personality-traits-are-associated-environmental-engagement-0

Wilczek, F. (2015, September 23). *Einstein's Prable of Quantum Insanity*. Retrieved from Scientific American: https://www.scientificamerican.com/article/einstein-s-parable-of-quantum-insanity/

Yankova, M. (n.d.). *Rapid Assessment of COVID-19 impact on education in Bulgaria*. Retrieved from Unicef: https://www.unicef.org/eca/rapid-assessment-covid-19-impact-education-bulgaria