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Prompt 3: Nature vs Nurture

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Genes: The Key To Success

Despite the multiple differences between the many creatures that live on Earth, they all share the same foundation; genetics. Genetics are the building blocks of life which determine the biology of every living being and the traits they carry. Every living creature is made up of them. From the ancient dinosaurs who roamed the Earth, human beings, plants, to cells themselves. Genes determine every single trait which plays a critical role in a creature's success in their environment. According to Dictionary.com, success is defined as “the favorable or prosperous termination of attempts or endeavors; the accomplishment of one's goals”. For a species to obtain success in this case, means that they must survive and thrive within their surroundings. In order to reach that goal, a creature’s genes must give them some type of advantage.

Genetics influence a number of animal characteristics which affect its survival, like speed, size, strength, and overall physical appearance such as their camouflage. This results in natural selection in which a creature's characteristics give it the advantage in its habitat while other creatures who lack those traits die off. An infamous example of this phenomenon is the peppered moth population during the Industrial Revolution in England. During this era, pollution was wreaking havoc as it led to “Atmospheric pollution, darkening of surfaces, food plant abundance and predators…” (Cook and Saccheri). The typica peppered moths (lighter colored peppered with black spots) were unable to camouflage with its polluted surroundings leading to it being hunted. This act led to the typica peppered moths dying off and the carbonaria peppered

moths (dark with light spots) to survive and reproduce therefore passing on their genes for a successful generation. In 2007, Michael E. N. Majerus had decided to conduct an experiment similar to this event but in a forested area near Cambridge instead. Due to the change in environment the opposite happened, the results “showed that birds exerted a selective pressure of about 10 per cent against melanics compared with typicals” (Cook and Saccheri). Even though both circumstances included the same species of moths and the same problem, both differed in results due to their environment. The survival of the peppered moths were based on how well they could camouflage with their surroundings. Success in this situation, for the moths and any creature living in the wild, means the survival of a species which is affected by their genes' interaction with their habitat.

Now moving on to the success of animals that aren’t in their natural environment, but are instead domesticated. Even in their case, genetics still play a role in how they thrive although it may not be the same as if they are in the wild. For domesticated animals, genes determine their quality of life or overall health and prowess. The animals that perfectly exemplifies this would be horses in horse racing. According to Emmeline Hill, a Chief Science Officer at Plusvita, “We have discovered a set of genes common to racing horses, but not all horses within a racing breed have the advantageous gene version, so these findings will be useful to identify the most suitable individuals within a breed for racing or for breeding" (“Shaping the Sport of Kings: Key Genes Linked to Successful Racehorses Identified by International Team”). Amongst the list of genes include, the speed gene, NTM for memory and learning, and MYLK2 for muscle contraction. Although a horse's success isn’t entirely based on their traits according to Varsity, as handicapping and the Horse-Jockey Relationship play a role as well, a horse's genetic makeup helps determine their potential and guide their jockeys and caretakers in how to train them

accordingly (Cruz). While genetics can create advantages for many animals besides horses, training plays a key role as it helps hone their skills and if the work pays off their genes will be passed on. Their traits are no longer in the hands of nature, but instead rely on humans and artificial breeding. The success of domesticated animals depends on what people see as valuable.

Next, how genes affect human success. There's no denying that humanity has made it this far because of evolution throughout the years. Although genes are still aiding people till this day, how are they linked to success? Many link genetic success with athletes, although partially true individual efforts are what paved their way to success rather than their DNA. Genes are connected to success through polygenic score and the DRD4 gene. A polygenic score is "an aggregate measure of variation across a person's genome" which is often used to predict the risk of developing disease is now used to determine one's education and future achievements ("Is Success in Our Genes?"). Through Daniel W. Belsky study, it was concluded that higher polygenic scores led to academic success as well as financial success regardless of their social class. Intelligence is a polygenic trait meaning that it has a variation of genes that influence it, showing how a high polygenic score equals greater intelligence. A study by Wei Chi from Tsinghua University discovered that "DRD4 gene is involved in regulating dopamine receptors, and variations in the expression of DRD4 are associated with differences in people's motivation, their responses to rewards, and their ability to engage in self-regulation." which are interpersonal skills that help people succeed in their careers ("Is Success in Our Genes?"). The variation that is best fitted for success is DRD4-7R although it has a connection with ADHD. Just like animals, genes can create certain advantages for people, however it doesn't have to be a physical characteristic. In today's world, success isn't narrowed down to surviving and reproduction but achieving individual goals and financial stability which differ from nature's definition of success.

People rely on their wits, intelligence, and personality to gain success and even so many factors like education, motivation, and origins can affect their outcome. Although genes can help humans succeed in life, each independent effort leads everyone to their own outcome.

Another way genes affect human outcome is through health as well. Although not every sickness stems from one's DNA,"family history is often one of the strongest risk factors for common disease complexes such as cancer, cardiovascular disease (CVD), diabetes, autoimmune disorders, and psychiatric illnesses." since one's family history can reveal potential health risks they may encounter later on (Hernandez and Blazer). Through DNA genetic disease can be passed such as down syndrome, type 1 diabetes, and so on, either passed down by generation or through Mendelian inheritance which means it would rarely occur. These genetics can act as setbacks as they can cause many disadvantages and even take lives. Obviously individual choices can also result in disease as "Environmental factors also vary across individuals and the combined effect of environmental and genetic heterogeneity is etiologic heterogeneity […] a phenomenon that occurs in the general population when multiple groups of disease cases [...] but are in fact the result of differing events or exposures" (Hernandez and Blazer). While humans rely on their genes for a better quality of life, not all diseases stem from DNA and thanks to the modern world dealing with these troubles is more manageable.

Unlike animals humans don't rely on their physical traits for survival in the open. Success in this case, can be defined differently: people view it as living a healthy lifestyle and achieving one's goals. Although this statement can be partially true for animals, in their natural habitat most rely on their genes in order to thrive. Humans don't rely heavily on genetics for survival or for accomplishments at the same level as some animals, yet genes still ensure that they are given a healthy and long life.

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