Behavioral Genetics

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Behavioral Genetics; An Exploration of Personality Development in Humans

Every person has a unique set of personality traits, causing their life choices and interests to differ from those of the next person. The occurrent variation of personalities is extremely interesting, as it dictates the way people live their lives. While personalities make us unique, they are seldom understood. As a high school student, I see and interact with various people every day. As my peers and I emotionally develop, the way we interact with each other changes. This happens because the teenage mind undergoes essential developmental processes in the brain. As a student that is surrounded by many unique personalities, I grew curious to understand what factors are responsible for the individuality we see in everyday life. The field of study specifically dedicated to understanding the development of personalities is called behavioral genetics. While there are many theories regarding the ways that people obtain their personalities, very little knowledge is absolute in this field of study. It is however, known that there are both social and genetic aspects to the development of one's temperament, resulting in unique cognitive processes that influence an individual's ability to interact with the world. Personality, while not extremely well-understood, is a fascinating entity that is responsible for the way animals interact with the world and each other. All people have stimulatingly unique minds that drive the way they respond to their environments, the decisions they make, as well as their desires and interests. While studying personality development it is important to understand the genetic (or natural) components to an individual's personality. It is also important to recognize the contributions to an individual's personality that occur post-birth, known as nurture influenced

personalities. Personality is impacted by various factors; meaning it is a complex trait. Behavioral genetics should be taught in general biology class because it addresses significant biological themes including genetic heritability, evolution, and nurture theory; wide education of these topics is necessary to quickly expand research in this important field of study as there is currently little known about behavioral genetics.

An individual's unique personality is made up of a series of traits that are determined by specific genes present in an individual. "Behavioral genetics' study of personality has made it clear that genes are important. In fact, a number of personality traits have been identified as having a genetic basis. For example, family studies have led to the discovery that generalized anti-social behavior is passed down through genetic inheritance" (Roundy). Psychologists have concluded that personalities are polygenic, meaning that they are not solely driven from one gene. While personalities are complex traits that are influenced by both genetic and environmental components, it is quite difficult to identify the ratio at which these traits contribute to a person's overall behavioral characteristics. An appropriate analogy to demonstrate the problems scientists face in determining how much of personality is genetic verses environmental, is mixing paint. If red and blue paint mixes, the result is purple paint. While it is known that the purple paint was made from red and blue paint, it is impossible to separate the blue from the red to see how much of each were added to the mixture (Roundy). Psychologists know that personalities are created with a genetic background paired with life experiences, however they are unable to view the two as separate aspects of personality once they are interconnected to make up a person's traits (Bazzett). It is also quite difficult to identify what genes are responsible for a person's natural temperament. However, one relatively recent breakthrough suggests that personality genes may have relation to dopamine. When these

patterns are identified, we will come closer to isolating the specific genes that contribute to personalities. Scientists continue to search for the genes credited with giving a person their natural temperament and as of now, "many studies have found a connection between high levels of the neurotransmitter dopamine and behaviors related to novelty-seeking. That gives researchers a place to start looking--genes related to dopamine--among the nearly 50,000 in the human genome" (Azar). It has been determined that some aspects of personality are heritable, yet it is still quite difficult to draw a precise percentage stating the exact impact a person's gene pool has on the personality traits their children inherit. The estimate that is often made states that heradibility controls about fifty percent of a person's personality, however this is a loose estimate based on assumptions rather than extensive investigation. Once a person is born, and therefore has been exposed to a nurturing (good or bad) environment, it becomes nearly impossible to separate the factors from each other in order to identify the amount both factors contribute to a person's overall personality. If students studied personalities and traits in school, people would have more access to this information, and research in this field may be expanded. In time, scientists will be able to identify more patterns. "Behavioral genetics' study of personality has made it clear that genes are important. In fact, a number of personality traits have been identified as having a genetic basis. For example, family studies have led to the discovery that generalized anti-social behavior is passed down through genetic inheritance" (Roundy). This area of science is yet to be fully understood, so there is only knowledge of hereditary genes being linked with certain personality traits and a complete pattern has not been identified as of yet. It is however, known that genetic inheritance allows for evolution of personality traits through natural selection.

Due to hereditary components, people often resemble their parents in temperament, however inherited genes become quite complex as a person's personality genes adapt, just as genes responsible for physical traits are known to do. "At the time of conception, the genes from chromosomes of both the father and the mother fuse together and determine the traits of the offspring to be born" (Sharma). Evolutionary personality theory is a field of study that attempts to detect the psychological traits that exist as evolved adaptations. Natural selection continues to exist and function in modern day humans, contributing greatly to the personalities of one's offspring. People often choose to produce offspring with those that have the perceivably desirable personality traits. When discussing natural selection, people often imagine desired physical traits or capabilities, however by modern standards many people have children with partners possessing their desired personality traits. By Charles Darwin's Theories of Evolution and Natural Selection, animals with desired genes are often selected to mate in order to evolve the species. This theory of natural selection demonstrates how the desired human personality genes may be passed down to offspring, evolving the personality traits of humans (Buss). As new societal norms are adopted and specific personalities are valued more and less over time, those personality traits become more apparent in the offspring of that generation due to evolutionary natural selection theory. While personality traits may become more common over time through natural selection, the alteration of an individual's personality traits is possible through non-heritable processes.

While the natural causes of unique personalities are not copiously understood, psychiatrists are experts in the aspects of personality that alter based on life experiences. There are countless instances where events can shape a person's temperament. Genes have been estimated by some scientists to only account for "half of the variance in personality to genetic effects, with the

remaining variance attributed to environments that make people within the same families different" (Krueger). There are two ways non-heritable developments may occur, either over long spans of time such as characteristics that a child receives based on consistency or one memorable and/or traumatic event (Krueger). A single traumatic event has the potential to create a lasting effect on a person's personality. People can develop hypersensitivities to specific subjects or objects, or a person can strive to never be a certain way based on an experience that enlightened them to the error of their ways. These are just a few examples of the many ways a person can experience a singular memorable event that is responsible for a personality change. Long term personality progression is often referred to as the nurture aspects of personality growth. While singular events may have a lasting effect on a person's personality the more credited form of personality growth is experienced over long stretches of time. The most common example of this is a family environment. The way a person is raised by their parents is extremely important. If a person grows up in a happy family environment where good morals are instated from a young age, the odds of that child having aggressive tendencies are lower than that of a child being raised in a broken home. Experts state that, "a child can have a fairly developed personality -- or at least personality tendency -- by 7 years old, or even earlier, by 4 or 5 years old" (Brockway). Changes in a person's natural personality are most likely to occur during younger years of a person's life because the brain is growing and developing at these times. Therefore, growing up in a stable childhood home is extremely important to the development of a person's personality. Throughout a person's life one obtains various unique experiences; often causing a change in temperament of that person, while their underlying personality obtained genetically generally remains intact. The way a person interacts with their environment (their temperament) may diverge based on given conditions, while their underlying genetically

obtained personality remains the same (The Influence of Broken Homes on Children). This means that it is extremely important that children are exposed to a healthy environment from an early point in a person's life, and these exposures will likely have lasting effects on a child's adult personality.

Behavioral genetics, or the study of personality development should be integrated into general biology classes because the course comprises the studying of gene inheritance, evolution and natural selection, as well as the environmental aspects of human brain development. It is important that we grasp a better understanding of personality development. If more people study these fields, the potential exists to expand knowledge and research in this subject matter through the education of the general public. Every person's dispositions are relatively diverse due to various unique sets of traits obtained and maintained in numerous ways. These traits make up our personalities, personalities that dictate the way we coexist with the world, personalities that influence ever decision we make. Personalities make the world unique, interesting, and diverse, and are everywhere in our lives, yet there is little known about these traits. The exploration of these entities is essential and we should strive to expand our knowledge of the human mind. By educating students in these subjects, the drive to understand our temperaments will increase and humans may, in time become enlightened to the ways of our own minds. The topics that exist in behavioral genetics are extremely relevant to both general biology class and our everyday lives. Behavioral genetics is the study of personalities from a genetic and hereditary standpoint and personality is extremely complex and interesting. Not only does it connect to the biological themes of genetics and heritability, but psychiatry also plays a major role in understanding the ways we maintain and advance our personalities. These traits are fascinating because they are often unique to each individual and they can evolve alongside societal standards through natural

selection. The themes necessary to study and understand behavioral genetics are not only relevant to the themes of general biology, but the students learning the material as well.

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