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Nature versus Nurture

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NATURE VERSUS NURTURE

by

MATILDA NIKEHASANI

A master's thesis submitted to the Graduate Faculty in Liberal Studies in partial fulfillment of
the requirements for the degree of Master of Arts, The City University of New York

2018

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This manuscript has been read and accepted for the Graduate Faculty in Liberal Studies in satisfaction of the thesis requirement for the degree of Master of Arts.

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Matilda Nikehasani

Advisor: Elizabeth Macaulay-Lewis

ABSTRACT:

The purpose of this paper is to expose the differences and similarities between nature and nurture. How they correlate to each other, and shape human development. Without nature and nurture, we would all be the same, and have the same experiences. This controversial topic is one of the oldest arguments in psychology. Nature vs. Nurture states that feelings, ideas, and human behavior are innate or learned. I will be writing about when this debate first rooted, and why. I will be arguing that we are born with certain characteristics in our thinking, that are then shaped by our experiences. I will then examine about how genes do affect our behavior, and how the environment shapes behavior. To fully uncover the nature and nurture, I will conduct thorough research on the topic in autism and twins. These two case studies will help to dissect the critical issue of nurture and nature. In the thesis, I will look into different scholars' view on the nature and nurture topic.

This thesis is dedicated to the hidden strength behind my every success,

MY PARENTS

for their endless love,

Support and encouragement.

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Introduction

Physical characteristics lean more towards genes and heredity, but genes often receive less attention when discussing behavior. This is where the nature vs. nurture debate comes in. Scientists call the nature theory when people behave as they do due to heredity, genes and instincts. On the other hand, the nurture theory encompasses how behavior is taught and influenced by the environment.

There has been an ongoing debate between how human behavior is shaped, learned and acquired. Some say that behavior results from nature, or one's own genes, while others say that behavior results from nurture, or the environment. People are aware that both nature and nurture influence how humans live and think, but exactly how much of human traits are determined by either nature and nurture remains unknown. I have not heard of anyone saying that all behavior is shaped by either nature or nurture, but I have heard strong debates favoring one side. Scientists may seem more engaged in the nature theory because of the biology and chemistry involved. This in turn leads to further research in the nature field. On the other hand, psychologists research about the effects of nurture, furthering research in that category. Research can last forever because humans cannot find out everything there is to know, but the information that is found contributes to this debate.

Whether biology of a person or organism affects their behavior remains a topic of scientific discussion. This has seen the rise of nature versus nurture debate about behavior development. Unique genomic or biological features make each individual unique among others. On the other hand, nurture can also explain the behavior of an individual in relation to the environment both social and physical (Mullen, 2006). The extent to which individual abilities are presented at birth is described as nature. Therefore, nature as a theory of human behavior

describes the personality of an individual, aggression behavior and intelligence. The concepts that are presented by nature as said to be encoded in the genetic makeup of that individual as passed down from the parents. On the other hand, nurture describes individuals as products of surroundings, socialization, peer pressure, values, and labor.

Human behavior refers to the individual responses to stimuli. These stimuli can be either internal or external. The behaviors that human beings exhibit range from acceptable, common, unusual, and borderline unacceptable. According to sociologists, some aspects of human behavior are intended, usually directed to other people, while others have no motive or meaning (Bandura, 1986). These actions include those that human beings exhibit when they are on their own, as well as those they show when around others, which is referred to as social behavior (Skinner, 1957). Some of the traits of human behavior are dependent on a person's personality and temperament, which is mostly unchangeable. Others depend on other variables that keep changing the course of a person's life. Discussed herein are the factors that affect human behavior and to what extent they influence the decisions of a person.

The theory of nature argues that human behavior such as aggression is a product of genes (Torgersen, 2009). However, it has been noted that children of aggressive parents may be very polite and responsible depending on the kind of environment in which they spend most of their developmental stages. On the same point of discussion, some people who have been raised by aggressive parents change much later in life to become less violent due to the influence that their relationship with others trains them to become. In this sense, it seems that nurture is the stronger force in determining the behavior of an individual. The contribution of nature in one's behavior is demonstrated by the fact that renowned philosophers such as Descartes and Plato argued that some inborn traits cannot be changed regardless of the environmental forces and experiences

(Myers, 2013). At this point, it can be predicted that both nature and nurture have a contribution to the behavior which is exhibited by individuals.

Human nature refers to the distinguishing features that set human beings apart from other living things. These features, however, vary from person to person, depending on a number of factors. Depending on the genetic make-up of a person, the way they react to various situations and those around others is different. No matter how uniform policies and rules do to make some behaviors and actions universal, some behaviors remain unique to every individual. The biological make-up of a person determines how they think and how they view the world around them (Ekelund, 1999). It also determines how they respond to pressure and difficulty.

Proponents of the role of nurture in shaping human behavior include great thinkers and philosophers such as John Locke (Anstey, 2011). The proposition that was put forward by John Locke is that the human mind starts as a blank slate on which the experiences within the environment develop attitudes, perceptions and thus behavior (Mullen, 2006). This notion is referred to as *tabula rasa* which emphasizes that all human knowledge and behavior are constructed by their experiences within the surrounding environment. The role of nature in knowledge and behavior can be explained by the fact that an enriched learning environment contributes to academic success of an individual regardless of the genetic predispositions of intelligence. However, proponents of nature theory of human behavior argue that intelligence is all about genes (Sameroff, 2010). The discussion of nature and nurture and their role in human intelligence goes further to describe that there are many forms of intelligence. In this regard, it is said that social intelligence is an evident source of nurture and the experiences and learning that individuals achieve through their interaction with others in social settings.

It is undisputed that scientists have found human traits such as hair color to be embedded in the genes which are acquired from parents. The point of contention arises when the scientists go further to illustrate that personality, sexual orientation, intelligence and aggression are conduits of human genes (Bleidorn, et al., 2010). The postulation of personality as a behavioral gene has created a big controversy as whether behavior is a construct of nature or nurture. It can be argued that even though genetics play a role in the determination of the personality of an individual, nurture has a larger contribution to the personality that a person acquires later in life. This is explained by the fact that differences in personality are noted among children and their parents despite the closeness they have in their genetic makeup. The changes in personality are achieved by an individual through the experiences which one goes through during the life processes. The personality of an individual early in life is quite different from that of adult or elderly life due to the forces of the environment on behavior (Torgersen, 2009). Therefore, it is arguable that we can be different people as we grow regardless of the genetic predispositions that we receive from our parents.

This thesis will examine how nature and nurture (or environmental factors) impact human development in two case studies: Autistic Spectrum Disorder (ASD) and the development of twins. The origins of Autistic Spectrum Disorder (ASD) have brought great controversy among experts in the field. This question has been widely debated by scholars such that communities have emerged arguing whether, an aspect of the environment prior and, or during birth are the definite cause of ASD (Nurture). Other communities have also defended the idea that the cause of ASD is that from a mutation in certain genes during the developmental phase (Nature) (Ospina et al., 2008). Studies show that both theories have validity. This essay explores the roles of nature and nurture in ASD and attempts to demonstrate that discarding one theory will not suffice

in explaining human behavior or preventing ASD cases in the United States and worldwide nor will it give the scientific community a better understanding on how to treat it.

Furthermore, variation between these two factors exist because some say if genetics didn't play a part, then fraternal twins, reared under the same conditions, would be alike, regardless of differences in their genes. But, while studies show they do more closely resemble each other than do non-twin brothers and sisters, they also show these same striking similarities when reared apart—as in similar studies done with identical twins. On the other hand, if environment didn't play a part in determining an individual's traits and behaviors, then identical twins should, theoretically, be exactly the same in all respects, even if reared apart. But several studies show that they are never exactly alike, even though they are remarkably similar in most respects.

Autism, Nurture vs Nature Introduction

In this section, I will base my argument about autism on the theory of development dynamics (Lickliter, 2003). This theory argues that both environment and genetic characteristics are responsible for the development of an individual. First, I will define the autism spectrum disorder, followed by a brief history of autism. I will then examine hypotheses proposed by different scholars and their arguments. Moreover, I will relate their arguments to my own view on the nurture versus nature causes of autism. Here I argue that the genes are the cause of autism, they must have an external trigger (Tassome, 2013). This external trigger is what I call nature/environment.

I will examine specific cases, including of a child born with autism. In the nurture versus nature section, I will examine reasons behind the abnormal behaviors of autistic individuals and how they can be treated. The treatment or control of autism will also range from the environment

to genetic. Furthermore, I will examine accounts of children ages 6-10 years. These children are mainly affected by environment rather than genes. Lastly, I will examine the social learning theory of autism (Otto, 2011). The argument that proposes that people depend on what surrounds them.

Definition of Autism and its Brief History

The term autism, etymologically derives from the Greek *αὐτός* (*autos*) "same", or "himself", was coined at the beginning of the twentieth century by the Swiss psychodynamic psychiatrist Eugen Bleuler (Bleuler, 2001). The etymological origin of the term clearly refers to those communicative and social difficulties and in the shared attention that are found at various levels and according to extremely differentiated modalities in the autism spectrum disorders. Autism is a developmental disorder, characterized by the impairment of social interaction and accompanied by a deficit in verbal and non-verbal communication.

Taking the psychodynamic approach, Bettelheim (1990) proposed the hypothesis that a child, perceiving in its mother a real or imagined desire for annulment against him or her, would develop the autism spectrum disorder as a defense mechanism. This was also referred as the "Refrigerator Mother Theory". After the 1960s, however, this psychodynamic model was increasingly accused of unjustly blaming the parents of children with autism, and less scientifically accredited. In fact, the parents of children with autism showed no significant

pathological or personality traits from the parents of children without autism. It was B. Rimland, director of the Autism Research Institute of San Diego, the first to systematically support that the cause of autism was not the parents, but that the disorder had biological bases (Rimland, 1964). The psychodynamics theories that imputed the causes of autism to maternal shortcomings have now been completely discredited in literature and considered to have no scientific basis.

A Brief History of Autism is outlined chronologically below:

1908: The word *autism* is used to describe a subset of schizophrenic patients who were especially withdrawn and self-absorbed.

1944: A German scientist named Hans Asperger describes a "milder" form of autism now known as Asperger's Syndrome (Baron-Cohen, 2015). The cases he reported were all boys who were highly intelligent but had trouble with social interactions and specific obsessive interests.

1949: American child psychiatrist Leo Kanner, M.D., publishes a paper describing 11 children who were highly intelligent but displayed "a powerful desire for aloneness" and "an obsessive insistence on persistent sameness." (Kanner, 1949). He later names their condition "early infantile autism."

1967: Psychologist Bruno Bettelheim popularizes the theory that "refrigerator mothers," as he termed them, caused autism by not loving their children enough, although his theories were disproved. "Parents" advisor Fred Volkmar, M.D., director of the Child Study Center at Yale University School of Medicine and editor-in-chief of the *Journal of Autism & Developmental Disorders* "noted that Post-World War II, there was a lot of psychoanalytic work done on autism

where researchers looked solely at the impact of life experiences (Volkmar,2000). Furthermore, he notes that “they didn’t consider the role of biology or genetics, which we now understand to be main cause (Volkmar,2000). Autism is now also classified under schizophrenia in the *International Statistical Classification of Diseases and Related Health Problems*, although scientists have not identified link between the conditions.

1977: Research on twins finds that autism is largely caused by genetics and biological differences in brain development (Tidmarsh, & Volkmar, 2003).

1980: "Infantile autism" is listed in the *Diagnostic and Statistical Manual of Mental Disorders* (DSM) for the first time; the condition is also officially separated from childhood schizophrenia.

1987: The DSM replaces "infantile autism" with a more expansive definition of "autism disorder," and includes a checklist of diagnostic criteria. UCLA psychologist Ivar Lovaas, Ph.D., publishes the first study showing how intensive behavior therapy can help children with autism-- thus giving new hope to parents (Lovaas,1987).

1988: The movie *Rain Man* is released. It stars Dustin Hoffman as an autistic savant who has a photographic memory and can calculate huge numbers in his head. "This was important for raising public awareness of the disorder," Dr. Volkmar notes, although not every kid on the autism spectrum has these kinds of skills (Volkmar, 1988).

1991: The federal government makes autism a special education category. Public schools begin identifying children on the spectrum and offering them special services (Seligmann, 2001).

1994: Asperger's Syndrome is added to the DSM, expanding the autism spectrum to include milder cases in which individuals tend to be more highly functioning (Gillberg, & Ehlers, 1998).

1998: A study published in *The Lancet* suggests that the measles-mumps-rubella (MMR) vaccine causes autism. This finding was quickly disproved (Myers, & Pineda, 2008).

2000: Vaccine manufacturers remove thimerosal (a mercury-based preservative) from all routinely given childhood vaccines due to public fears about its role in autism--even though, again, the vaccine-autism link has been disproved (Chatterjee, 2013).

2009: The U.S. Centers for Disease Control and Prevention (CDC) estimates that 1 in 110 children have autism spectrum disorders, up from 1 in 150 in 2007, though the CDC notes that the increase stems at least in part from improved screening and diagnostic techniques (Centers for Disease Control and Prevention, 2007).

2013: The DSM-5 folds all subcategories of the condition into one umbrella diagnosis of autism spectrum disorder (ASD). Asperger's Syndrome is no longer considered a separate condition. ASD is defined by two categories: 1) Impaired social communication and/or interaction. 2) Restricted and/or repetitive behaviors (Lord, & Jones, 2012).

Scholarship on The Etiology of Autism

As one of the first to systematically examine and describe a cohort of children with autism, Kanner hypothesized that these children were both genetically predisposed to develop autism, but also were affected by parenting behavior. In his 1949 paper, he stated that children "come into the world with innate inability to form the usual, biologically provided affective contact with people," while he questioned, "whether or to what extent [parenting behaviors and

characteristics] contributed to the condition of the children" (Kanner, 1949). Based on his observations of the families of children with autism, he suggested that autism may be caused by a "genuine lack of maternal warmth" (Kanner, 1949). However, a psychologist named Bernard Rimland, the parent of an Autism Spectrum Disorder (ASD) child, directly challenged this idea in his book, "Infantile Autism: The Syndrome and its Implications for a Neural Theory of Behavior (Rimland, 1964).

Herein, he proposed a purely biological mechanism for the etiology of autism. One recently discovered functional class of autism-associated genes is regulated by neuronal activity, suggesting that both genetic variation and experience may contribute to the development of autism (Morrow, 2008). Thus, there are a wide spectrum of views on how different genetic, epigenetic and environmental factors may contribute to the etiology of autism.

The first signs of autism are usually noticed within the first two years of life, while the certain diagnosis usually occurs within thirty months (Hutman, 2012). The exact neurobiological causes are still unknown at the moment; Given the variety of symptoms and the complexity in providing a coherent and uniform clinical definition, many now prefer to speak of Autism Spectrum Disorders (ASD, Autistic Spectrum Disorders) rather than Autism. There are now also a wide range of pathologies or syndromes, such as the aforementioned behavioral characteristics as a common denominator, albeit at varying degrees or levels of intensity.

Autism and Genes

Researchers have known that genes contribute to autism since the 1970s, when a team found that identical twins often share the condition (Robinson E.B. et al. 2016). Since then, scientists have been tracking potential genetic causes for autism, a process that DNA-decoding technologies

have accelerated in the past decade. As this work has progressed, scientists have unearthed a variety of types of genetic changes that can underlie autism. The more scientists examine DNA, the more direct the connection between autism and genes appears.

There are several conditions associated with autism that stem from mutations in a single gene, including fragile X and Rett syndromes. But less than 1 percent of non-syndromic cases of autism stem from mutations in any single gene (Dodds,2009). Therefore, at least, there is no such thing as an ‘autism gene’—meaning that no gene is consistently mutated in every person with autism. There also does not seem to be any gene that causes autism every time it is mutated (Carey and Benedict, 2012).

Still, the list of genes implicated in autism is growing. Researchers have tallied 65 genes they consider strongly linked to autism, and more than 200 others that have weaker ties. Many of these genes are important for communication between neurons or control the expression of other genes (Heck, 2012). Changes, or mutations, in the DNA of these genes can also lead to autism. Some mutations affect a single DNA base pair, or ‘letter.’ In fact, everyone has thousands of these genetic variants. A variant that is found in 1 percent or more of the population is considered ‘common’ and is called a single nucleotide polymorphism, or SNP (Ro, 2013).

Common variants typically have subtle effects and may work together to contribute to autism. ‘Rare’ variants, which are found in less than 1% (percent) of people, tend to have stronger effects. Many of the mutations linked to autism so far have been rare. It is significantly more difficult to find common variants for autism risk, although some studies are underway.

Other changes, known as copy number variations (CNVs), show up as deletions or duplications of long stretches of DNA and often include many genes (Shishido, Aleksic, and Ozaki, 2014). But mutations that contribute to autism are probably not all in genes, which make

up less than 2 percent of the genome (Dodds, 2009). Researchers are trying to wade into the remaining 98 percent of the genome to look for irregularities associated with autism. So far, these regions are poorly understood.

At the molecular level, the effects of mutations may differ, even among SNPs. Mutations can be either harmful or benign, depending on how much they alter the corresponding protein's function. A missense mutation, for example, swaps one amino acid in the protein for another. If the substitution doesn't significantly change the protein, it is likely to be benign. A nonsense mutation, on the other hand, inserts a 'stop' sign within a gene, causing protein production to halt prematurely. The resulting protein is too short and functions poorly, if at all (Jyonouchi, Sun, Le, & Itokazu, 2002).

Most mutations are inherited from parents, and they can be common or rare. Mutations can also arise spontaneously in an egg or sperm, and so are found only in the child and not in her parents. Researchers can find these rare '*de novo*' mutations by comparing the DNA sequences of people who have autism with those of their unaffected family members. Spontaneous mutations that arise after conception are usually 'mosaic,' meaning they affect only some of the cells in the body (Hallmayer et al, 2011).

Girls with autism seem to have more mutations than do boys with the condition and boys with autism sometimes inherit their mutations from unaffected mothers (Kemper, 2005). Together, these results suggest that girls may be somehow resistant to mutations that contribute to autism and need a bigger genetic hit to have the condition (Kemper, 2005).

Clinicians routinely screen the chromosomes of a developing baby to identify large chromosomal abnormalities, including CNVs. There are prenatal genetic tests for some syndromes associated with autism, such as fragile X syndrome. But even if a developing baby

has these rare mutations, there is no way to know for sure whether he will later be diagnosed with autism (Wong, 2001).

Despite extensive research on the causes of Autism Spectrum Disorder, there still exists a considerable debate on whether the reasons are solely genetic or environmental factors. Many researchers believed that autism was exclusively caused by genetic factors alone. However, other studies suggest that ASD can also emanate from environmental and cognitive outputs (Lynch, 2013). Some environmental risk factors for autism, such as exposure to a maternal immune response in the womb or complications during birth, may work with genetic factors to produce autism or intensify its features (Punnoose, 2012).

Developmental dynamics best explains this. A range of cases indicate that chromosomes, both seven and fifteen can be responsible for the onset of ASD (Schroer, 1998). This is because they are genetically inherited. According to studies done by Autism Genome Project, families with speech and language deficit has carried it along its linkage and to generation after generation (Lynch, 2013). Results from the project indicated that chromosome 11 and neurexin could be held partially responsible for the autism spectrum disorder. Brain scans carried out to autistic persons have also shown that there are fragile neural connections in the brains of the affected persons thereby disregarding the fact that genes play a role in ASD. Regarding developmental dynamics, gene inheritance cannot be the only cause for the onset of ASD (Lickliter, 2003). An environmental trigger must be present to affect the genes to form ASD. There is considerable evidence that has proved that ASD is closely related prenatal risks.

Additionally, a high percentage of babies who are born with autism have other prenatal disorders and abnormalities in their amygdalae (responsible for emotional and social behavior) and cerebella which is responsible for motion and the coordination (Christensen, 2013). All these

facts are providing enough evidence beginning from birth, and they are related to the environment since the womb of the mother is the first environment that a child interacts with. However, some may argue that the child in the womb has no contact with any environment, but all those above are genetic exposure. It is somehow right, but the genetic disorders that affect the child at birth or in the womb are environmentally triggered (Stamou, 2013).

According to the theory of development dynamics, these genetic factors must or should at some point be provoked by an external factor which acts as the stimulant (Tassone, 2013). It is therefore of utmost importance to have a clear understanding what environmental factors are. According to Freud, any human being passes through five crucial developmental stages: These stages are namely; oral, anal, phallic, latent and genital (Herrington, n.d.). Oral and anal are the essential stages when it comes to the onset of ASD. At the initial stages of breastfeeding, the child creates a stronger relationship with the mother than the father. If the theory of Freud were accurate, the possibility of a child developing antisocial behaviors from the mother would be high if the mother is also misanthropic. Between the ages of two and four, a child's defecation fixation is very high, and a child feels the pleasure of being independent of the mother. However, children born with autism are still highly dependent on their parents as they develop into adulthood. This is because, at the early stages, they never had the liberty of having pleasure in defecating (Taubman, Blum, & Nemeth, 2003).

Motherly attachment is crucial to developing mental health. To illustrate the point, the work of the psychologists Harry Harlow who experimented with monkeys to demonstrate that attachment to mother also plays a critical role in how we socialize with others (Herman, n.d.). In his experiment of the monkeys, he created two mothers; one made of wire and covered with soft clothing that was warm and the other which was made with wire without the cloth for protection

(Seskin, 2010). He observed that the baby monkey tended to hide in the monkey that had to clothe whenever it sensed danger. The experiment proved that lack of protection and compassion from the mother could be a contributor of the onset of ASD since the child does not have access to caretaker's love. Nevertheless, this can only explain the onset of ASD (Seskin, 2010).

Environment seems to be a vital factor when children go into autism during adolescence and the teenage years; these children tend to have difficulties in social interactions (Postorino, 2017) and to refrain from social interactions (Calder, 2013). They also often have the typical autistic features of speech deficits. They develop depression and anxiety. This seems to happen because they now have to cope with certain tasks like increased school work and expectations, and a lack of parental concerns. These teenagers then face rejection and lack of care from the peers and the society that directly leads to depression. Depression then accelerates the autism in the affected person (J.Olien, 2013). When faced with depression, such persons tend to devise ways of coping with it and these in turn can result in peculiar behaviors that leads the society terming them as abnormal.

For example, many autistic teens have difficulties in maintaining eye contact. This can be explained in the following ways (Jeffries, 2016). The lack of eye contact can be a gene in origin. But this gene came into effect after specific external triggers. This external trigger was the socialization from the very beginning when the child was born.

To further underscore my point that the environment effects autism I will examine the evolution of autism when a person enters adulthood. Several reports suggest that autism spectrum disorders become less severe during adulthood (DeNoon, 2007). This seems due to the increase in treatment for such disorder. While, the disorder does not go away, many individuals with autism are able to live a more stable life in adulthood. However, it is more difficult in

treating people with severe autism, because their communication skills are very limited and therefore the treatment is more difficult (Pearson, 2013). Despite not recovering wholly, we can infer that changes in the environment play a more significant role than variation in genes (Postorino, 2017).

ASD manifests itself differently from one patient to the other, and this can be explained by the fact that people have different genes inherited from the parents and are raised in different environments. Every setting will have distinct triggers that will affect the patient differently.

Further studies have revealed that a high number of autistic persons, live with their families alone, are institutionalized, or are homeless (Krauss M.W, 2005). Thus many people from the society are even further. Psychology studies have demonstrated that the alienation of people from the community is a significant cause of the increased risk of weakened immune system, increased depression, and premature death (Parsons, 2015).

Children with high functioning autism suffer from a more intense and frequent loneliness than non-autistic peers, despite the erroneous common belief that children with autism prefer to be alone. Creating friendship and cultivating them often proves difficult, but the quality of friendships and not the number of friends has more influence on loneliness. Functional friendship, such as those that arise in invitations to parties or social activities, can have a more incisive effect on the quality of life (Calder, 2013).

However, other adults living with autism, whether having a severe or mild diagnosis, have more difficulties in life than those who do not have ASD. Because of the complications that arise from old age, ASD patients find aging more challenging (D'Astous, 2014). These people typically require more attention from care givers than others. Since autism is often associated with retraction from society, when faced with old age, autistic people tend to become more

isolates, and as a result also suffer acute depression (Autism, 2013). This is because they often find it difficult and challenging to express themselves to their peers and their caretakers as they age.

According to (Strathen, 2009) some children exhibited autistic features and characteristics before a proper diagnosis of autism was developed. Most of these children had a history of deprivation or trauma. In the study, Strathen cites previous studies that show a correlation between maternal deprivation and autistic features that affected the development of social skills among orphans (Westby, 2013). However, some of these children responded well to treatment and therapy later in life, since the problems they faced did not originate from the genes. If these children had not responded well to the treatment, the researchers would have confirmed an autistic diagnosis. Nevertheless, according to the study, if the children without the autistic genes exhibited similar characteristics after experiencing deprivation and/or trauma, the effects would have been worse for genetically autistic children.

From the above discussions, it is evident that both genes and environmental factors play major roles in the onset of ASD. Presented herein, is the discussion of the impact of the environment on the behavior of people with autism.

Autistic Behavior

Autistic individuals show many forms of repetitive or restricted behavior, categorized as follows according to the Repetitive Behavior Scale-Revised (RBS-R) (Martinez, 2018):

- Stereotype, which is a repetitive movement.
- Compulsive behavior is expected and seems to follow rules.
- Identity is resistance to change.
- Limited behavior is focused on interests or activities.

- Self-harm includes movements that can harm or injure people.

No single repetitive or self-injurious behavior seems, however, to be specific to autism, but autism seems to have a high onset and severity of these behaviors (Freckelton, 2012).

Autism and Social Learning Theory

To understand how the theory of social learning relates to autism and its treatment, it is essential to address the following questions adequately. First, by which mechanisms do normal people develop any social behavior and second, how do they acquire language? Notably, the subject sorts to get answers on how average people achieve those things that are consequently absent in autistic people. These traits are not present at birth, they usually develop slowly and gradually. Since the process involves training and experience, then it becomes a process of learning.

Cognition is said to be derived from three sources. Reasoning, innate knowledge, and experience ((Rosenthal & Zimmerman, 1978). Social learning also directly impacts human cognition (Rosenthal & Zimmerman, 1978). The theory of social learning proposes that an individual acquires knowledge by copying others in his or her society. The individual does not come up with such learning by himself. Social learning occurs either through training or by imitation (Cohen, 1945) and it typically begins in children immediately after birth. As the infant touches his/her mother's breast and looks her into the eyes, he/she learns how she smells and thus becomes familiar with the culture of his/her surroundings. Even as the baby is ontogenically growing, absolute knowledge of his/her body, he/she becomes cognizant of his/her surroundings.

There is a common perception that autistic people are socially abnormal and disadvantaged, who need a lot of help from those around them. However, some individuals with

autism have particular if not exceptional skills when compared to other people. Certain autistic people have a very close attention to detail. They can notice any changes and fluctuations in measurable variables and prefer specifics to approximations. This attribute also makes them very observant and ready to learn from their environment (Armstrong, 2012, 77). Therefore, even in the context of classrooms, these children learn better from hands-on training as opposed to lectures. They also appreciate active learning that may involve videos, demonstrations, and experiments. Some of these actions promote teamwork, helping autistic children develop necessary social interaction skills. Thus, social learning theory can explain how these autistic children can develop strong social skills.

The social learning theory agrees and reinforces the behaviorist theories of classical and operant conditioning (Tiwana, & Bush, 2000). The proponents of this theory argue that observational learning serve as a process of mediation between the stimuli and responses. Observational learning involves the use of models that children observe to gain perspective on how people operate and respond to situations. It is a method of defining what norms should be practiced by the child. These children end up imitating this actions in the process (Howard, 2015). Therefore, the environment in which they grow determines the kind of behavior and thoughts they will uphold later in life. Autistic children show less attention to social stimuli, smile and look at others less often and respond less frequently to their name (Shafritz, 2015).

One example of how autistic children learn through observation is if one twin has autism, and the other does not, bringing them up together can have one of two outcomes (Froehlich, 2013). The autistic twin may imitate the behaviors of the other twin and grow up without too much attention to the condition. Alternatively, the healthy twin may learn from the autistic twin and develop autistic signs even without an actual diagnosis. There have been cases

where an autistic person imitates their twins' behaviors, actions, and hobbies only to be diagnosed when they are adults. A diagnosis becomes possible and apparent when they are separated, leading the autistic twin to lose their model and direction. They define their typical behavior from a model, in whose absence they feel lost (Froehlich, 2013).

Autism Treatment and Therapy

Early detection and treatment of the condition also play a significant role in the intervention services. When detected at an early stage and appropriately managed, children will respond quickly and have higher chances of gaining partial functioning as compared to those who were discovered early (Dababnah, 2011). Treatment of autism mostly involves therapy. In some cases, medicine is used, or in conjunction with therapy (Reichow, 2011). Treatment is most successful when a patient receives their diagnosis earlier in life rather than later. Occupational therapy is one form of treatment that aims at normalizing the experience of autistic patients and making them as independent as possible. It involves the incorporation of critical social skills in the day-to-day activities of a person rather than separating treatment and other activities (Maughan, 2017). It aids in assessing and improving motor and visual skills, as well as interaction. It also assists in the promotion of focus and concentration in most activities. These skills are essential in easing their life as they pursue an education and follow career paths they would not otherwise (Travers, 2017). Other forms of therapy focus on helping an individual understand themselves and their condition. This understanding is essential in moving forward with a functioning life. It helps the individual maneuver challenges in life and concentrate on improving the quality of his or her life. One classical example of success of speech therapy is Temple Grandin's case (Colorosa, 2016). Although applied behavioral analysis (ABA) didn't exist then, Temple's speech therapist worked with her on a similar type of therapy for three

hours per week. The speech therapist broke tasks down into simpler components and drilled Temple until she mastered them. In particular, the speech therapist was meticulous about articulating hard consonant sounds carefully. Speech-language pathologists (SLPs) often use drilling techniques for articulation practice to encourage children to produce specific sounds.

Temple Grandin also attended a nursery school class for special needs children. Although none of the other children were autistic, several had down syndrome. Temple didn't share the specifics of her instruction at the nursery class, but she did note that the class was quite structured, which is beneficial for autistic children (Glanzman, 2010).

Her mother, Eustacia Cutler, also found a highly motivated nanny for her daughter for about twenty hours per week, Temple Grandin's nanny practiced social skills and turn-taking games with her. Temple and her sister would practice taking turns with a sled, for example as well as day-to-day activities which were always turned into learning activities. Temple also enhanced her skills with art projects. Additionally, Temple's mother allowed her to engage in her autistic behaviors for one hour every day, during which she might spin objects repetitively. The rest of the day, Temple understood that she was expected to communicate and practice her social skills.

These speech therapy techniques and social skills lessons helped transform Temple Grandin from a nonverbal child into a highly skilled communicator. Temple earned her Ph.D. in animal science and has been a champion of autism advocacy.

Other treatment options involve changing the patients diets (Raiten, 1986). For example, most parents of autistic children maintain a strict ketogenic diet to help reduce the intensity and frequency of seizures. Changes to diet can cause an imbalance in the body especially in the

digestive system which in turn leads to cognitive dysfunction or a condition customarily referred to as “brain fog”. Autistic patients react to the imbalance through the manifestation of dysbiosis. This imbalance can cause timid behaviors and aggressiveness. To avoid this, it is suggested that parents be extra careful when deciding the diets of these children to prevent further complications (Evidence-based practices and treatments for children with autism, 2011).

Parents also identify the triggers of such seizures and eliminate their presence and interaction with their child. These triggers include bright lights, extreme noise and other factors that are unique to each child. It also helps to seek a network of autistic patients for support and advice. Group therapy and interactions are also appropriate for these patients. Observing other people with the condition could help them imitate the actions of high-functioning autistics and improve social interactions (Cook, 2012).

Children living with autism also have respond positively to cognitive behavior therapy. This is a therapy that aims at regulating anger and anxiety. Studies have revealed that CBT improves the ability to control emotions and also increase the parent’s confidence in the children’s abilities (Kim, 2016).

Prenatal care can also be another way to prevent autism in the offspring of parents who have been diagnosed with genes of autism. As is normal within the first trimester of pregnancy, the mother should be provided with prenatal vitamins (Price, 2010). Secondly, chelation therapy should also be considered for parents who may have mercury exposure. An epidemiological study funded by the Autism Speaks organization and published in *Molecular Psychiatry* highlights a correlation between the risk of autism and the age of parents. There are increased chances of having a child who has autism for women who conceive at the age of thirty years or older (ASHA *Leader*, 2014). Analysis of the data collected by the International Collaboration for

Autism Registry Epidemiology (CARE) about 5.7 million children in five countries shows that the greatest risk for autism has been recorded when either the mother is an adolescent or fathers is over fifty years old (Callaway, 2012). The percentage of autism was in fact 66 percent higher in children born to fathers over fifty years old than those born to fathers in their twenties and 18 percent higher in children with teenage mothers than mothers in their twenties (Quinlan, 2015).

Research suggests that taking prenatal vitamins by women who embryos were at higher risk of developing autism was effective at reducing the chance of autism developing in the unborn children (Rabin, 2011). Research shows that women who did not receive the prenatal vitamins and were more vulnerable to autism genes exhibited seven times risk of delivering children with autism as compared to those who took the prenatal vitamins (Price, 2010). Scientists and researchers have shown a high level of relationship between the development of a fetus brain development to the intake of folic acid and vitamin B9. This is because folate is principally responsible for offering prevention of up to 70 percent of neural tube defects (Jain, 2015).

Although there has been no cure invented so far for the treatment of autism, scientists conquer in many cases that therapy plays major role in reducing the severe effects of autism.

Autism Case Study

In this section a case study of a child living with autism is provided. The child may exhibit all or some of the autistic characters discussed above.

Autism Case Study: Introduction

Children living with ASD employ and innovate some ways of communication that include facial expression, vocalizations, signals (conventional and unconventional). Some have technology-assisted devices to help them communicate and learn effectively. Speech-language

pathologists have been of immense support to this unique groups in coming up with the most efficient and most potent communication ways.

Because ASD manifests differently from one patient to the other, the health professionals should make decisions on how to aid the person based on evidence, their expertise and the suggestion of the family of the patient. Augmentative and Alternative Communication (AAC) techniques should have varied options for the personnel to choose from before embarking on a particular one. According to ASHA's guidelines for speech-language pathologists in diagnosis, Assessment and treatment of Autism Spectrum Disorders Across the lifespan gives the required information including the requirements needed when focusing on AAC. These guidelines assert that AAC choice must be arrived at after consideration of individual's strengths and weaknesses, motor abilities and the social level of communication skills (Ganz, 2014).

The following is a case study of a child with ASD, which also shows the different options of AAC technique employed to the patient to mitigate the ASD effects and offer support at the different age of the child.

The study involves Kelvin, a three-year-old boy living with ASD. According to Kelvin's mother, Kelvin was a full-term baby and was born without any complications. He exhibited the normal growth development as a toddler with his motor ability within the accepted clinical range for the three early stages of sitting crawling and walking. However, at four months old, he developed low tones, and his motor abilities started to have some notable inconsistencies. He could comfortably, just like the other children of the same age, use some vocals, e.g., he could express happiness and seeming to communicate but at the age of three, he had not fully developed words. His mother thought it was a general toddler delay of growth, but upon visiting a physician, she was referred to an SPL for further analysis. Kelvin was diagnosed with ASD.

Kelvin communicated nonverbally, and his communication mainly showed behavioral regulation. For example, when in need of an object, he would take the hand of anyone near him and place it on the object he desired. Kelvin had mastered approximately five signs that he would relate to and use them in communication. Although he would typically play with the toys just unlike the others, he would show no response to his name. If offended or not in agreement with what was going around, he would show this by rolling on the floor and throwing his hands up in the air.

In the assessment, Kelvin was subjected to the Communication Symbolic and Behavior Scales development profile that is used to determine competence. Although he was 36 months at the time of the assessment, Kelvin was subjected to this test because it easily determines the social communication growth in children between the ages of six months to six years.

Intervention

His mother decided to cooperate with the SPL specialists for his treatment. Verbal communication was not attained at first using joint attention, and therefore they resorted to AAC technique. He was taught some basic signs to communicate with, however this was also difficult for him to master. He had very poor retention and motor skills. Finally, they resorted to using the picture exchange communication system that provided him with a very consistent communication system. The use of symbols affected Kelvin's mind and ability to communicate, and therefore it was emphasized that they use both in school and at home.

In fact, after two years, Kelvin had shown positive responses the PEC system. He had devised a way of showing any requests and protests to what he did not desire. Kelvin had developed simple speeches that Kelvin used alongside the PEC system. By now, he could even

show some excitement and recognized people through their facial expressions. He also had, though not entirely, developed joint recognition.

Treatment

In the treatment of Kelvin, the therapists employed the ASECRET clinical reasoning model. In this model, the therapist pays attention to the following described areas. Kelvin's mother was also taught the following to practice at home. The ASECRET model was applied to Kelvin in this manner:

Attention: In Kelvin's case, he has also presented with pictures to help him understand what was needed of him. The image was used to teach him different tasks while the therapist also employed strategies to attain optimal attention.

Sensation: The sensation for a child living with autism needs some items to arouse their feelings or calm them. For instance, Kelvin seemed to be stimulated by any object that made a weird sound. He would listen to it and calm down. The therapists then suggested that Kelvin's mother buy some different toys which were soft and produced some strange sound. The toys would bring incredible joy to Kelvin, and he would calm down to concentrate on his homework or even have some sleep.

Emotional: Autistic persons have different emotions evoked by obvious objects or people. To calm this down, therapists need to come up with an emotion controller

Culture: An autistic child, responds to changes in the environment. Mothers should realize that these children are prone to processing disorder and may act in weird manners. When faced with such situations, they should try to accommodate the child and understand that the child is not rude or funny, but there is a cause for his action. For example, Kelvin's mother noted

that he wailed at night to the point that the neighbors in her apartment are complaining. The therapists explained to her that Kelvins behavior is just because of processing disorder.

Environmental: Any modification of the environment of these children can be of help. For example, Kelvin seemed stressed by climbing the double-decker bed in the room. For this reason, every bedtime was a painful moment for him. When the bed was replaced, he became jovial whenever night approached.

Task: It is essential to follow what the child does daily. Identify the problematic task and ease it. For example, in the therapy to make Kelvin socialize, he was tasked with playing football with the kids outside for one hour. The mother noticed that this fatigued him. She decided to reduce the task of playing with toys in the company of other children.

Autism Case Study: Conclusion

Both nature and nurture debates concerning autism have been supported by many studies and researchers. However, the developmental theory has not been wholly accepted as one of the discussions that help autism nurture view. In an article written by Honeycutt, he gives compelling ideas as to why both genetic and environmental factors are responsible for the development of human beings.

As discussed above, autism spectrum disorder has a wide variety of causes ranging from prenatal, genetic and environmental factors. Treatment is mainly considered to therapy because a single cause cannot be identified inside the body that could be medicated or modified.

Twins Nature versus Nurture

Twins Nature versus Nurture: Introduction

The nature versus nurture debate has emerged to be one of the most enduring debates that have spanned over decades in the field of humanities and social sciences and is becoming more heated in the recent years. The source of nature versus nurture debate usually hinges on the question of which has a more noteworthy influence on development. The problem is whether genetics or the person's environment influence an individual's innate characteristics. Almost inevitably, twins have become the subject of observation to which determines whether a person's characteristics, behavior or even personality come about as a result of genes or the environment. Researchers now see the nature vs nurture debate as obsolete since it has been determined that both play critical roles in development because they interact (Neale & Cardon, 2011). This part of my thesis will examine the role that nature and nurture play in the role in the development of twins.

Definitions

Twins are two offspring produced by the same pregnancy. Twins consist of identical, commonly known as monozygotic twins and the fraternal, universally recognized as the dizygotic twins. According to the New York's archives referencing, 2010, monozygotic twins are formed from a single zygote while the fraternal twins develop from separate zygotes because of the fertilization of eggs by two sperms differently (Levine, 2011). To compare twins, emotional, cognitive and behavioral factors of similarities must be put in place.

Nature, commonly known as hereditary, denotes to the genetic make-up that individuals carry from birth until death, and that controls one's temperaments, abilities as well as appearance. There are traits that children inherit from parents that include eye color, personality, language as

well as height and many more. The first emotion after birth is among the earliest sign of nature, where twin babies in the nursery cry concurrently as a result of empathy for each other showing that emotions are pre-programmed due to the genes. The development phase of twins also varies on a week or a supplementary scale reliant on the genes, for instance, identical twins develop simultaneously while the fraternal twins may develop separately. Nature influences physical development more than nurture does to the mental development (Keating, 2011).

Nurture, on the other hand, denotes to the environmental factors, and just like nature, an individual is exposed from birth until death. Nurture abides to different ideologies that include eating habits, socialization, and schooling and many others (Allen, 2012). In the early development phase of a person, environment stimulation is vital for brain development. The stimulation can include exposure to vision and good sense hence making the child affiliate to objects and speech.

History of the twins' nature versus nurture study

Francis Galton was the first anthropologist who performed a twin's study in 1879. His motive behind the study was that he sought to investigate and determine the magnitude to which the similarities of twins can influence their changes during developmental processes. That is, he wanted to understand what caused people to have different characteristics. His intentions also were to establish a way to study how environmental effects can influence hereditary. Galton used twins to determine the comparative effects of nature versus nurture in an 1875 paper, titled 'The History of Twins.'

As at the beginning of the twentieth century, an utmost number of people perceived nature as the most vital determinant of human behavior. In 1960s the belief shifted and people started to believe that nurture, the environmental factors was a vital determinant of human

behavior. Today, there is an agreement that heredity and environment are both important factors because development is a combination of both. The genetic make-up determines the developmental prospective of a baby. But to reach the potential, the baby is reliant on the environment the child grows up. Besides, environmental influences can stimulate a biological change.

The rationale for twins' nature versus nurture study

Twins nature versus nurture study is a way that researchers use to figure out what influences a person the most when it comes to environment and genetics. Twin studies have been an integral part of science due to the unique genetics characteristics between the twin siblings. Studies of twins are one of the utmost designed implements that most scholars have to scrutinize the comparative contributions of heredity and environment. It is because it involves the makeup of a distinct human natures (Tabery, 2014).

Twins studies are suitable since twins, especially the identical twins are the only ones close to a natural clone of an individual. It is because identical twins share a hundred percent of their genes; as a result, it is easier to determine whether nurture plays a significant or insignificant role in a person's life. Fraternal twins, on the other hand, are resourceful when it comes to the study of nature versus nurture because they, first of all, tend to share fifty percent of their genes ("Twins," n.d). Therefore, in case change occurs in a similar environment, then the fraternal twins lead a researcher to understand the extent to which nature plays a role in an individual's life.

New York University Case Study

According to a case study conducted by Dr Peter Neubauer, a psychiatrist at the psychoanalytical Institute of New York University, he rooted in the study of twins to determine developmental personalities and extent of hereditary (Twins. (n.d.). A research was conducted on two twins who were identical and raised in two different environments. The twins are known in the humanities literature as Amy and Beth. Neubauer thought that these twins would present a comprehensive, detailed case study when raised separately. Besides, the twins were separated distantly, so they did not know that they were twins. The approach was to help Neubauer determine the developmental trends and behavior as well as the magnitude of heredity in regards to nurture and nature respectively (BBC Worldwide Ltd, Films for the Humanities & Sciences (Firm), & Films Media Group, 2010).

Neubauer acknowledged that the study of twins raised apart was the most exceptional tool that researchers have to help them bring out the possibilities and relativity of nature and nurture. The observation of identical twins raised in separate environments gives a picture of their differences throughout the developmental stages. Neubauer used Amy and Beth to evaluate the genetic and environmental effects on the twin's personalities, intelligence, health and behavior. Amy and Beth were put under observation by a team that consisted of researchers, psychiatrist, and psychologist that followed them from infancy to adolescence.

Although the study was slanted towards the psychoanalytical concerns, it still brought a clear picture of the twin's nature and nurture, relaying variables that influence the developmental process. Neubauer stated that the reason for placing the identical twins in a separate environment is to show the dynamism of influence by genes and environment. Another objective of putting

the twins in a different environmental setting is to enable them to measure the validity of the assumption that “the environment shapes a person into the person he or she becomes.”

Amy and Beth were placed under adoption into families with quite similar characteristics. The mothers stayed at home with no commitments but just to raise them, and both families had a son of seven years older than the twins. Both families were Jewish. On the contrary, the environments were intensely dissimilar in a profound way, in that, Amy was absorbed in a family setting living below the poverty line while Beth was placed in a well-off family. Amy’s mother was an introvert with low self-esteem due to her overweight body. She had a kind side to her nature with a great sense of insecurity due to Amy’s attractiveness and treated her as a problem.

Beth’s mother, on the other hand, is described as an extrovert and tried as much as possible to bring Beth more closely to the family. Amy’s father came to terms that Amy was a disappointment while Beth’s father was compassionate and reassuring. Amy’s brother was an academic star while Beth’s brother was a stubborn one who never valued education due to his exposure to materialistic possessions.

Developing Twins nature versus nurture theories from the case study

Initially, in the mid-term century, it was believed that environment influenced the behavior of an individual, that is, it can bring out the perfection or imperfection of a person based on the ideality of the environment. However, in the modern era, some compartments have deemed to backtrack to our DNA. Therefore, coming to the understanding that genes play a vital role although not merely exclusive to find out the behavior of a person.

According to the precise and extended study of Amy and Beth, it shows the significance of the different general cognitive ability. For instance, the case study involves observing the identical twins that are Amy and Beth since they share the same DNA and especially those

separated and raised in different environments. The above factors of nature versus nurture have effects when it comes to the socio-emotional, physical, cognitive as well as the human development stages as depicted in the case study.

Physical development

Physical development denotes the nervous system, brain as well as behavior change. Genes, as a factor of influence, determines the physical development of an individual. It is because the genes are the baseline for physical development hence the environment shapes an individual in accordance to the avenue provided by a person, either to allow or restraint from taking in what comes from the environment (Santrock, 2011).

Even though identical twins have the same genes, it is empirically proven that identical twins are not behaviorally or physically similar to each other. For example, the twins can have different heights and weights when subjected to diverse diets. Besides, when the twins grow up they tend to have different interests from the other twin, for example, they might have a different sense of fashion, socialize with groups that differ in personalities or even indulge himself or herself in activities different from the other twin. On the other hand, the fraternal twins despite sharing half of their genes, they also tend to be different from each other depending on the domination of the environment.

In the case of Amy and Beth, although they are identical twins, the environment that each grew in shaped them coherently. In accordance with the exposure and subjection to stress, Amy ended up with fluctuating weight scale due to deteriorating diet that she received and the unsettling psychological satisfaction. Beth on the other hand, had no psychological disturbances from her family thereby having healthy developments all along the ten years of study.

Cognitive development

Cognitive denotes to knowledge and the thought process. Identical twins are used to determine how environment shapes their intelligence is that they share the same genes. Fraternal twins are also used as standard siblings since they share half of their genes. Some environmental variables have a linkage to cognitive skills such as secondary circular reactions as well as responsiveness. Conversely, genes play a vital role in motor development according to Francis Galton; he defines that children inherit intelligence from parents. However, there is a belief that genes and environment work in handy to aid in cognitive development (Simonton, n.d.). Therefore, genes and parents not only influence the mental capability of a child but also the home environment. The environment comprises of culture and peer pressure that significantly impacts on the psychological behavior of a person.

Today, scientists use the IQ testing to gauge the intelligence of a person that is his or her ability to solve problems or reason. The argument always revolves around how much of what intelligence is hereditary. The field of the nature versus nurture debate is determined by the case of Amy and Beth, signifying that the development of a person's personality is defined by his genes, with diminutive regards to the environment one is raised in. For the case of Amy, for instance, her problems progressed in an uncertain environment leading her to suffer from a learning disorder. It is because her parents concentrated on her brother's academic performance and left her since they deemed her stubborn. If only her parents were forthcoming and tolerant to her educational limitations, Amy's life could have turned for the better regarding cognitive ability. Beth on the other hand had a better education from her parents. The parents were not as demanding as Amy's. Her family paid more attention to materialism than education.

These matters intuitively seem to be a consideration of a personal capability such as social orientation and other commitments seemingly determined by genetic control. The field of

behavioral genetics, for instance, has been used to complement the study of Amy and Beth in that it has been used to show traits such as subject or course satisfaction, hobbies and uncertainties. The results propose that there is a significant genetic influence in such cases. It shows and calculates the possibility of the twins to earn the potential for higher education (Neale & Cardon, 2011).

Social-emotional development

Most twins tend to date, marry and have children at about the same time. For the identical twins, 45 percent chance fell in the same time frame while the fraternal twins have a thirty percent chance. It is because they go through the phase of development simultaneously and the inherited personality traits. Genes influence optimism and pessimism. Shared environment, on the other hand, impacts only optimism, according to a study conducted by Francis Galton. Genes and family life can also pleasantly influence the outlook of optimism hence affecting the physical health and the mental state; however, genes control pessimism. Amy turned out to be a pessimist since most of her prospects turned out to be undefined. Beth, on the other hand, turned out to be an optimistic type of a person due to the exposure she had that brought her close to people giving her hope that the world is a better place (Loehlin & Nichols, 2012).

Amy for instance, did not have a clear picture of her sexual role because the father was inconsistent and not affectionate. If Amy had been raised in Beth's home, she would be spared the mortifying comparison since her immaturity phase would have been erased, presuming her wholeness. Beth did seem to be more successful with her friends and less confused than Amy, but she was also less connected to her feelings.

Human development stages

The prenatal stage is the first stage of human development, and it embraces conception to birth. The prenatal phase begins once there is the fertilization of the egg and which happens when the egg and sperm meet, commonly known as a zygote. Twins can develop at this stage where there is a split off of the ovum that occurs in the first two weeks of pregnancy. In this case, dizygotic twins can occur due to the fertilization of two separate eggs by two different sperms.

The second phase of human development is infancy that ranges from one month old to one year. At this stage, most children develop motor and gross skills. Children tend to develop personalities at this stage. For instance, in the case of identical twins, you might find out that one is outgoing and the other tends to become an introvert. As a result, it is easier to associate the twins with the characteristics of their parents respectively. Amy, for instance, emitted signs of being an introvert due to the lack of exposure since her mother minimally associated with a stimulating environment (Keating, 2011). At school unlike Amy, Beth did seem to be more successful with her friends and less confused than Amy. She was an outgoing girl just like her mother but not that much like her “brother”.

At this stage, a parent can instill discipline and nurture personality traits that consequently determines the behavior of the twins around the parents. For example, if the father is stricter than the mother, the children will seem to be more apprehensive in his presence. On the other hand, they tend to develop their traits freely around their mother. As a result, this can be argued as a nurture trait between the twins that will differ based merely on their sentiments. Amy, for example, was raised by strict parents and as a result, she was uncomfortable in their presence. It made her have an impassionate heart as well as difficult moments. Beth was raised in a home

that both the parents were supportive, giving her a whole internal element of personality development.

The third stage of human development is early childhood development that ranges between birth and schooling. It is the most critical developmental period. In this case, there has been a lot of debate whether a child's nurture or nature is most affecting. My leading hypothesis is that there is a balance between the two. In the case of identical twins, they can accomplish things at an individual pace based on the exposure of environment (Munsch, 2011). Nature that is genetics plays a vital role at this stage since the children inherit their personality and look from the parents turning out to be a combination of both. Nurture, on the other hand also plays a vital role in this stage since, a parent can instill different forms of parenting techniques, home environment and interactions hence controlling the type of person the child can become. Beth's parent instilled a unique style of parenting that involved freedom and socialization making her unreserved and building up her confidence.

The adolescent stage is the subsequent step of human development, where twins at this age tend to establish own distinctive characteristics. There might be no necessary linkage between their interests to their genetic make-up or environment factors. One twin may end up timid while the other a gregarious. Socialization seems to be more on the environment side of the scale.

On the other hand, when the twins are apart, they sometimes end up doing the same things without their knowledge as a result of the gene factor. For example, although Beth's personality followed her environment exposure, in nearly every aspect, they conveyed similar lockstep. They both emitted identical signs during their developmental stages. That is, they both

sucked thumbs, bit nails, clenched blankets, and wet their beds at infancy to having course and sex-role problems at their adolescent stage.

In addition, they were both hypochondriacs and just like Amy; Beth was afraid of being left alone and of the dark. Phobia as thought by many may be as a result of environmental exposure of which may well be a genetic element (Loehlin, 2012). Amy and Beth emanated the phobia of darkness showing that there is a tremendous genetic connection that is imminent.

If anything more profound, Beth just like Amy was lost in role-playing and the simulated nature, in that, they both experienced similar problems with their peers and in school. They both also longed for maternal affection. On the contrary, due to their difference in the socialization process, Amy was not successful with her friends since she turned out to be an introvert, unlike Beth whose feelings and emotions were connected to her cycle of friends. It is evident that both genetic and environmental factors play an integral role in our Twins study (Twins. (n.d.)...

The twin case study proves that influence in development is as a result of genes and environments influence special versions and instability. The difference between the girls can be described as merely stylistic thus pointing out that indeed environment played a role in their behaviors though very minimal since they exhibited nearly the same traits despite being brought up in different settings.

Twins Nature versus Nurture: Conclusion

In conclusion, nature is influenced by genetic inheritance and other biological factors while nurture is the influence of external factors after conception. Twins pose questions that are settling since they allow us to ascertain ideas of how we are the way we are. The nature-nurture

debate according to the surfeit of data, nature and nurture has identical influences on a person's behavior, consequently, suggesting that, generally, as beings, we are a combination of both (Allen, 2012). Genes link with the environment produce to a complex human trait. Genetic determinism and environmentalism state that people are genetically programmed and the environment makes an appreciable difference in certain conspicuous aspects such as improving or reducing test scores just like in the case study of Amy and Beth.

Therefore, the environment in which identical twins grow and develop shapes their behavioral and physical appearances. The potential genome codes are deterministic to nature and nurture. Twins have distinct personalities, and yet have identical DNA, but the only difference is the situations each encounter and the environment in which they are subjected to immersion.

Conclusion

Discussion on the role of nature versus nurture in human behavior has been a debatable issue among scholars, thinkers, psychologists and the society in general. It has been argued that the behavior of an individual is predetermined by the genes which are acquired from the parents regardless of the experiences within the environment. At the same time, the human mind has been described as a blank slate on which behavior develops during the experiences which one goes through in the social, political and political environments. Even though it is undisputable that people inherit genes from their parents, the traits which stem from genes are bound to be modified by the forces within the environment. Personality, sexual orientation, aggression and intelligence have been said to be solely products of genes. This has been disproved through the demonstration of forces of the environment such as learning and education on one's intelligence, aggression and personality. Genes have been used to justify violent behavior and sexual

orientations such as gay relationships. Proponents of nurture on the other hand have argued how the environment through the media, peer pressure, stress and role modeling as social, political and economic frameworks which stipulate behavior. Because people change during the course of life and the experiences they go through, it is thus conclusive that nurture plays a leading role in shaping behavior.

In every society, people interact differently from one another. However, there are certain groups of people that exhibit features that are the result of genetic variations and interference. For example, autism is a behavioral condition that is the result of genetic variation (Bailey, 1995). Discussed in this paper is autism as a condition that effectively illustrates the role of genes and the environment in the growth and development, as well as the behavior of a child. Understanding people with autism is necessary to aid in the interpretation of their behavior and actions as they interact with factors in their environment.

In line with autism are other mental conditions linked to the same genetic variation. These mental conditions affect the way a person reasons and how they interact with their environment. They include severe depression, bipolar disorder, and schizophrenia. The overlap that exists between the disorders in this group vary with each pair and is not total. These relationships increase the chances of developing one condition if they already have another influenced by the same gene. Understanding these variations and the overlap in their development could be a major milestone towards developing proper diagnoses and treatment of these conditions (Green, 2001). All these conditions, when they originate from genetic variations, affect the behavior of a person towards their environment. Though they may be influenced by other factors, it remains that the underlying course is genetics.

Much of the argument over individual differences in intelligence, for instance, arises from the variation between IQ test scores of identical and fraternal twins, the difference being a measure of how much of what we call intelligence is inherited. The field of psychology has been shaken by separated-twin studies, such as the one of Amy and Beth, suggesting that the development of an individual's personality is guided by his genes, with little regard for the family in which he is raised. Because of the growth of twin studies, and also adoption studies (Burt, 1966), which examine unrelated individuals reared together (and which complement the study of twins reared apart), the field of behavioral genetics has been able to study traits such as criminality, alcoholism, smoking, homosexuality, marriage and divorce, job satisfaction, hobbies, fears; the results suggest that there are significant genetic contributions in all cases. Even disciplines such as linguistics and economics have seized upon twins as a way of understanding language formation (by looking at twins who create a private idiom), or of calculating the additional earning potential of higher education (by comparing twins who go to college versus twins who don't) (Twins. (n.d.). There is an air of irrefutability about such studies that make them so appealing. When Linus Pauling proposed that vitamin C could cure the common cold, for instance, twin pairs were separated into two groups, one of which received vitamin C and the other a placebo. Both caught colds, which effectively destroyed Pauling's theory. There are now so many scientists seeking to study twins that the annual festival of twins in Twinsburg, Ohio, allows researchers to set up carnival tents, where browsing twins can stop to take stress tests or fill out questionnaires about their sex lives. Festival organizers even sponsor a prize for the best research project. Last year 90,000 people--most of them twins--attended the event (Twins Days Festival in Twinsburg, Ohio, n.d.).

All this comes after several decades of heightened political struggle between those, on the one hand, who believe that people are largely the same and that differences are imposed upon them by their environment, and those, on the other hand, who conclude that people differ mainly because of their genes, and that the environments they find themselves in are largely of their own making or choosing.

This argument has been raging for centuries, with science entering evidence on either side or public opinion shifting in response. Using twins, and also data derived from adoption studies, scientists can now estimate what proportion of the variation in our intelligence, our personality, our behavior, and even seemingly random life events such as bankruptcy or the death of a spouse, might be caused by inherited tendencies. The broad movement from environmentalism to genetic determinism that has occurred in psychology over the last thirty years has foreshadowed the increasingly popular belief that people are genetically programmed to become the way they are, and therefore little can be done, in the way of changing the environment, that will make an appreciable difference in improving test scores or lowering crime rates or reducing poverty, to name several conspicuous examples.

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