Genes And Environmental Factors Impact On Developmental Psychology: Psychopathology, Cognitive Ability And Developmental Issues

Within the field of Developmental Psychology, genetics and the surrounding environment play an outsized role in factors like personality traits, emotion and language. One of the longest debates in Western intellectual history concerns the relative influence of genetic and environmental factors on human behavioural differences, also known as the nature vs nurture debate. The argument questions the extent to which acquired behaviours are a product of either inherited or acquired influences. Nature is argued to be influenced by genetic predispositions and inheritance that will cause certain characteristics, whereas nurture is usually taken as the influence of external factors after birth. However, after generations of research on the subject, researchers are led to conclude that the controversy should be retired for a modern perspective that emphasises the joint influence of genes and the environment on behaviour. Genetic and environmental factors may be linked together to influence characteristics; environmental factors may differ depending on a person's genetic vulnerability.

The aim of this essay is to critically evaluate the input of genes and environmental factors within a key few areas of Developmental Psychology, including emotional psychopathology (including major depressive disorder), cognitive ability (such as personality), and developmental issues (factors such as aggression). Many studies have been allotted in these fields, including ones by Johnson et al, Bouchard et al, Bandura et al and many more. While laying out the research for the key research areas mentioned, the studies will be assessed in-depth by questioning the reliability and validity of studies to form an argument over the contribution of genetic and environmental factors.

Depressive disorders are the most common form of psychiatric pathology; according to the World Health Organisation (2019), 264 million people are affected by this condition. Many studies have been conducted and have found a genetic link to the disorder. Raison and Miller (2016) suggested an evolutionary link to depression, implying that the same genes that increase susceptibility for depression may also increase one's immune response to infections (by increasing inflammation). The aim of the study was to test the theory that symptoms of depression may occur due to a specific selection of genes which also protects against disease. A double-blind, randomised trial was carried out with three infusions of the drug infliximab (an anti-inflammatory drug) or placebo were given to 60 participants over 6 weeks. The mean age group of participants was 43 years and the mean episode duration was 184 months for infliximab and 239 months for placebo. The researchers found that infliximab was better in reducing depressive symptoms for participants with inflammation but made little difference for other participants. The study has evolutionary support for the genetic link to depression but there are a number of considerations. As only the patients with inflammation showed improvement with the drug, it can be suggested that there may be other reasons for the disorder as the theory isn't adequate for all forms of depression. The link between genes and the environment is disregarded, which could be a reason for the unexplained lack of improvement in some participants. The research provides a breakthrough for a possible biological cause of depression, but the validity and reliability of the study can be questioned, as only 60 participants

were used and there is a lack of cultural and age validity, meaning it would be difficult to generalise to other populations.

A study carried out by Caspi et al (2003) found a role that gene mutation and epigenetics may play a role in depression. The aim of the study was to determine whether there was evidence for a gene-environment interaction for a mutation of the serotonin transporter gene (5-HTT). The researchers studied 847 New Zealand 26 year olds- all had been assessed for mental health every other year until they were 21. They were divided into three groups based on their 5-HTT alleles: Group 1 had two short alleles, Group 2 had one short and one long allele, and Group 3 had two long alleles; the mutation of the 5-HTT gene has shorter alleles. The participants were asked to fill a “stressful life events” questionnaire and were assessed for depression afterwards. Caspi et al concluded that people with one or two copies of the short allele exhibited more depressive symptoms in relation to stressful life-events. In a later study by Moffitt & Caspi (2011), the researchers took DNA samples from 127 people who were part of the longitudinal prospective study and monitored them for 25 years. They found that 80% with two short alleles became depressed after three or more negative life events in a year, whereas only 30% of participants with the long alleles developed the disorder despite having similar situations. However, much more research is needed before a clear relationship can be established between the gene and depression. The study makes an assumption that serotonin is the cause of depression. Despite this, the theory acknowledges an interaction between genetics and environmental factors in depression- this holistic approach increases the reliability of the results. To conclude depressive disorders, nature or nurture alone cannot explain why an individual may develop depression- a combination of the two determines how individuals react to life stressors, as those who have genes at risk of depression and also experience environmental stressors are more likely to develop the disorder.

Over the past decades, much behavioural genetic research has been carried out on the genetic and environmental influences of personality characteristics. Personality traits can be defined as relatively stable patterns of thoughts and feelings which makes an individual unique. The Big Five trait model explains personality traits along five dimensions of individual differences (John et al, 2008), including 1. Neuroticism vs emotional stability, 2. Extraversion vs introversion, 3. Openness to experiences, 4. Agreeableness, and 5. Conscientiousness. According to the theory that the model reflects genetically anchored core characteristics of personality, Johnson et al (2008) found a series of individual differences in a meta-analysis that genetic factors accounted for around 50% of the variance in self-rated Big Five personality traits. The remaining variance was mostly due to environmental influences that were not shared by the participants. Although this research has support for the genetic influences, the test has a limited number of options to choose from the multiple-choice questionnaire, so participants may answer questions to make them look more appealing. Furthermore, test-takers may answer the questions with the most culturally and socially acceptable responses, so many of the results may be tainted due to cultural influences. However, the biggest limitation of this study is the disregard for environmental influences in combination with genetics, as the remaining 50% unaccounted for was reported by the researcher to have been due to other factors, but no further research was carried out to understand it better.

Most research on personality has been based on self-report questionnaire measures. Riemann et al (2006) carried out research to measure personality constructs via self and peer reports; the sample included 660 monozygotic, 104 opposite-sex and 200 same-sex dizygotic twins. Self-reports and two independent peer reports were collected for each of the twins. Previous findings

for support of substantial genetic influence on the Big Five personality types were emphasised in this study. However, genetic contributions to phenotypic variance were estimated higher when based on peer reports, which allowed researchers to separate error variance due to non-shared environmental influences. Correlations between self? and peer reports reflected the same genetic influences to a much higher extent than identical environmental effects. This research has a higher rate of methodological validity than the previous study as a combination of self and peer reports were used to compare answers and increase reliability. However, the exact relationship with the environment and genetics is still unclear as the researchers did not carry out further research on the relationship between the two variables. Through the research carried out for personality traits, it can be suggested that there is a clear impact of genetics on personality traits, but the role of the environment is uncertain; however, it can be assumed through the studies that it does play a role in traits.

Developmental factors such as aggression have been studied by researchers and have found some links between genetics and the environment for the influence of it. A classic study for the environmental influence was conducted by Bandura et al (1961) as part of the Social Learning theory, in which people are suggested to learn by observing others and imitating the behaviour. Bandura set out to demonstrate that children would be likely to imitate an adult's aggressive behaviour; 36 boys and 36 girls were split into three different groups with a male and female adult role model. The children were taken to an experimental room which was set out for a play area, but the adult was directed to a corner with some objects and an inflatable Bobo doll, after which the experimenter left the room. In the non-aggressive condition, the model assembled toys in a corner and ignored the inflatable doll. However, in the aggressive condition, the adult acted aggressively towards the Bobo doll in a distinctive way. After 10 minutes, the experimenter returned and led the child to a different room, where a number of toys were shown to the participant then told that they would not be allowed to play with any. The child was led to a different room with a number of toys, including a Bobo doll. The results found that the children who saw the aggressive model made more aggressive acts that the children who saw the non-aggressive model. This has support for the possible effect a surrounding environment could have on a child, in which the behaviour could be learnt and carried into adulthood. Furthermore, it was found that boys were overall more aggressive than girls, which links to a possibility to genetics, as boys were more aggressive despite having been shown the same act as girls. However, one should be cautious in making connections between the study and the everyday experience of children, as there is no evidence for any long-term effects of the study. Bandura (1963, 1965) proposed that aggressive behaviour can be learned, but it does not offer any evidence on whether some features of aggression may be innate.

Within the 23 pairs of chromosomes that most people have, one pair determines whether we are male (XY) or female (XX). Early research investigated the possible genetic cause of aggression within the Y chromosome. Individuals with a genotype of XYY were recruited by Court-Brown (1965); 314 participants with the genotype were studied and the researcher suggested that these patients should remain hospitalised given their increased likelihood of aggressive behaviour. This possible genetic link to aggression suggests a possibility that could be used in further research to find treatment or coping methods. However, there is once again a disregard for the impact of the environment which should be considered in order to have an unbiased view. Overall, aggression is most likely due to the result of inborn and learned traits, but as Court-Brown (1965) discovered, some genes may be more likely to instigate aggressive behaviours. Despite the studies above showing only the nature or nurture aspects of aggression, it is still unknown how much each aspect contributes to the behaviour.

In conclusion, it is better understood now that asking how much biology or environment influence a particular trait may not be the right approach, as both nature and nurture can impact behaviour and development. However, researchers and experts still debate the degree to which biology and environment influence behaviour, as there is not a simple way to disentangle the extent to which the two factors influence the development of behaviour. Furthermore, it is unknown how genetic factors interact with one another, as well as environmental interactions, such as social experiences and culture, as well as how both hereditary and environmental influences intermingle. Many researchers today are interested in seeing how genes modulate environmental influences in the hopes of better understanding the relationship between the two factors.