

Analysis on the Influence of Environment on Aggression

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ABSTRACT

It is well known that genetics and the environment have an influence on the formation of aggressive behavior. However, little analysis has been done on the importance of them. Therefore, the present study attempts to approach this issue from a new aspect, analyzing previous studies to form the reasons why the environmental factor has a greater influence on the formation of aggressive behavior. Through a method of analyzation of past research, this paper explores the concept of nature and nurture and provides reasoning from past research to explain why the environment is more crucial in the development and change of aggression. The paper finds that the environment has a greater influence on aggression than genetics.

Keywords: *Aggression, Environment, Genetics, Dominance, Hormones*

1. INTRODUCTION

Aggression, which generally refers to the act of committing hostile action against one another, is often literally confused with temperament. Temperament, or "nature", is established innately and unchangeable throughout life. Aggression, however, according to current research, is 50% influenced by genetic factors, and 50% influenced by environmental factors [1]. Moreover, aggression can adapt and vary as a result of exposure to stimulus and trauma. As a result, the question inevitably arises: does environment have a greater impact on aggression than genetics or is it the other way around? Current researches have been mainly done on animals such as mice or dogs. The most recent research on teenagers between video games and violence by PC Addo failed to expand to a larger social environment to explain the effect of the surroundings as a whole (including living environment, friends, and family). Therefore, this paper approach to summarize researches to allow knowledge on aggression to be applied to a broader range of situations. Through a method of analyzation of past research, this paper explores the concept of nature and nurture, providing reasoning from past research to explain why environment is a more crucial factor in the development of aggression. It's hoped to provide some insights on this area of research and contribute to the progress of relevant research to some degree.

2. CONCEPT EXPLANATION

2.1 Aggression V.S. Dominance

A common misunderstanding combines the words "aggressive" and "dominant" actions together. Dominance is the power and influence over others and affects every age group. There are multiple ways to gain dominance, such as leading, taking initiative, assigning work, even using sharp looks count as a method too [2]. Interestingly, experiments have shown that bald men can make themselves appear more oppressive and dominant [3]. Social aggression can also be a method to increase dominance [2]. As expected, the two are closely related, but dominance is not just something that can be obtained only through aggression. Aggressive behaviors are often committed in an attempt to gain or maintain dominance. These behaviors intentionally create a sense of threat and fear in others to maintain their image of superiority and leadership. Aggression has a relatively greater effect at a younger age. In unhealthy adolescent friendships, the leader is statistically more likely to have a difficult time distinguishing between dominance and aggression behaviors. Which, therefore cause them to imposes dominance on others through aggressive behaviors. This explains the frequent occurrence negative behaviors such as physical fights and verbal violence, which often occur in these unhealthy friendships.

2.2 Aggression Subtypes

A common classification of aggressive behaviors is into two categories: reactive and proactive. Reactive aggression is often vindictive and very much motivated by feelings [4]. It is an impulsive action made after perceiving stimuli and danger in the environment (e.g., receiving an insult) [4]. In such a situation, a reactive, aggressive person is likely to intentionally cause injury to the other person through physical harm. Proactive attacks involve well-organized planning and are less emotional than reactive aggressive behaviors. Proactive aggression is often triggered by the misinterpretation of stimuli as threats and is most commonly seen in animals. For example, if a stranger walks by and the dog starts barking, the dog have interpreted the stranger as a threat to itself and used barking as a demonstrating of proactive aggression for self-protection. However, these two ways of classifying aggression are only limited to physical attacks and do not provide an accurate classification for all aggressive behaviors. Therefore, a new organizational method should be proposed to classify aggression into four categories: expressive, inexpressive, retaliation, and relational aggression.

2.2.1 Expressive Aggression

Expressive aggression, or direct sexual aggression, is aggression that can be distinguished by action. Expressive aggression can be divided into two types, verbal and physical. Verbal expressions including shouting and using inappropriate language to denigrate others. Physical aggression includes the most common types such as physical fist fights, or using any physical means to overpower the other person.

2.2.2 Inexpressive Aggression

Probably fooled by the name, inexpressive aggression isn't actually "inexpressive". While expressive is to directly show aggression to the person, inexpressive aggression is indirectly causing harm to the subject. The most common form of inexpressive aggression is to spread rumors.

2.2.3 Retaliatory Aggression

Retaliatory aggression is a relatively new concept and not commonly discussed yet. In common aggression organization charts, this category is usually combined with reactive aggression. However, a new concept should be proposed where retaliation aggression is a standalone act. Retaliation aggression can be both proactive and reactive, when only a matter of time separates the two types. In the presence of a threat, those with reactive retaliation aggression would choose to call them back, and exact immediate revenge on them, which is similar to the concept of reactive aggression. Proactive aggression is the

long term organized plan of revenge. Even though retaliation aggression is organized as a separate branch because the goal of this type is to exact revenge, they can use both expressive and inexpressive aggression methods.

2.2.4 Relational Aggression

Relational aggression is a concept most common in adolescents and young people, where covert bullying or exclusion is used. Where other types of aggression can cause relationships to break apart, relational aggression's goal is to make relationships break apart. Common examples of relational aggression are exclusion, ignoring the victim, convincing others to take revenge on the victim, and threatening everyone who gets close to the victim. Relational aggression often co-occurs with either expressive or inexpressive aggression and is a product of school bullying.

2.3 Forming Aggression

2.3.1 The choice of being aggressive

From an evolutionary psychology perspective, aggressive behavior in humans is a legacy of ancestral behavior that helped humans survive and reproduce more successfully. Being aggressive can give an individual more power. Machiavelli once said that "it is better to be feared than loved". Fear brings more power, so it's understandable why one would choose to be aggressive toward others to gain that power. Well, don't parents nowadays still use aggression to gain the obedience of their children?

2.3.2 Looking at the Brain — Amygdala and the Hypothalamus

The Amygdala is also known as the emotional center of the brain that is in control of processing emotions strongly linked to intense emotions such as fear and pleasure. Amygdala is also linked to one's motivation, which is the key factor that's highly linked with aggressive behaviors. According to research, Amygdala stimulation induces aggressive behaviors, including physical and verbal violence, whereas Amygdala lesion reduces competitive behaviors. Why does the functional amygdala lead to aggressive behaviors? It's important to consider the link between motivation and competitive/violent behaviors. All aggressive behaviors can be traced back to three stimuli (or motivations): danger, power, and grievance. Amygdala activates fight-or-flight response in case of danger, so "fight" behaviors can be created according to the environment. The evolutionary theory of aggression points to aggressive behavior as a key to gaining power inside tribes, as a result of natural selection. Grievance refers to the aggressive behavior individuals display when they receive unfair treatment from the environment. Because the Amygdala

controls these motivations, it's no surprise that there's a link between amygdala activation and aggressive behavior. To further prove this theory, Vochteloo and Koolhaas performed an experiment observing the frequency of aggressive behaviors between lesioned amygdala mice and normal mice. To study dysfunctional amygdala functions, the researchers implanted an electrode in the amygdala. Results of the research show that male mice with lesioned amygdala have a prominent reduction in the frequency of aggressive behaviors compared to other mice in the experiment, therefore proving the connection between amygdala and aggression.

The hypothalamus regulates emotions by activating the sympathetic nervous system, which is in charge of the fight-or-flight system as mentioned above. The impulse for aggressive behavior as a result of self-protection is activated. In the late 1920s, Bard performed an experiment exploring the linkage between the cat's hypothalamus area and aggressive behaviors. When the hypothalamus and its connections remain intact, the cat demonstrates aggressive behaviors such as hissing. However, when the cat's hypothalamus connection was damaged by cutting, the behaviors disappeared, therefore Bard proved there's a close connection between the hypothalamus and aggression [6]. Researchers also predicted the existence of aggression-specific receptors on the hypothalamus that interact with neurotransmitters to identify aggression levels. However, more research will need to be conducted in the future to make a definite conclusion.

2.3.3 Hormones

Testosterone and serotonin are the two hormones closely linked with aggression. While prenatal illnesses like XXY chromosome patients are usually affected by lower than average testosterone levels, the resultant high cortisol levels lead to frequent aggressive behaviors. However, new research suggests testosterone levels are mainly influenced by exposure to the environment during childhood, when the male reproductive system is still developing [7]. Trumble's research found that testosterone levels are directly related to immune system function, also known as "immunomodulatory"[7]. They found that men who were frequently sick during childhood were likely to have lower average testosterone levels later in life, as killing infections was the main task during development. Durham University conducted another study on Bangladesh and the United Kingdom males prove that testosterone levels are influenced by their social environment during childhood. They measured the testosterone levels of sedentary Bangladesh men, Bangladesh men who immigrated to the United Kingdom during childhood and adulthood, Bangladesh men born and raised in the United Kingdom, and European ancestral men in the United Kingdom. The research team

discovered a similar pubertal age and testosterone level between those who immigrated to the United Kingdom during childhood, Bangladeshi men and European ancestral men born and raised in the United Kingdom, regardless of ancestry. Those who were born and raised in Bangladesh or immigrated to the United Kingdom during adulthood shared a later pubertal age and testosterone level. This result demonstrates the prediction of a correlation between childhood environment and later testosterone levels.

3. COMPARISON AND ANALYSIS BETWEEN TWO MAJOR FACTORS

3.1 Environment

When it comes to aggression, there is no way of avoiding any conversation about the bobo doll experiment designed by Albert Bandura. This is a simple yet exemplary experiment that demonstrates the relationship between observation and action. Children in Bandura's experiment exposed to an aggressive model were highly more likely to perform aggressive actions towards the bobo doll. Unfortunately, Bandura's experiment is limited to children's learning, and is unable to demonstrate the long term effect of aggression on personality. Most aggression research focuses on middle childhood (6-12 years old), as it is often considered the "critical period" for peer relationships and aggression inhibition. As puberty hits, the major influence on an individual's personality shifts from family to peer relationships. A research group completed a longitudinal study on adolescent relationship hierarchy, interpersonal skills, and aggression to understand the relationship between aggression and adolescents. They analyzed the changes in adolescents who often hang out with groups that either demonstrate reactive or proactive aggression. Since friendship has the power to frame a teenager's personality [8], the researchers concluded that adolescents in aggressive friendship tend to score low on interpersonal skills under the unstable organization of their friend group. Poor interpersonal skills create barriers for individuals to effectively communicate with others, lack of self-awareness and group dynamic awareness [8]. Which explains why many adolescents in aggressive friendship do not draw themselves out of the group. In an aggressive environment, adolescents do not develop a healthy way of dealing with interpersonal issues, and often respond with aggression. They misinterpret social cues, and therefore respond with inappropriate reactions [8]. To extend this idea, if adolescents respond with aggression, most people will respond with estrangement. The loneliness and betrayal (as a misinterpretation) lead them to create a closer bond with their aggressive friend groups. The result is a closed negative feedback loop that leads the adolescent to higher aggression. By combining the two studies, they demonstrate that environment (as in friend group) has a significant influence on aggression and

personality. When an aggressive model is exhibited in their environment, they unconsciously model the aggressive behavior of the model, and demonstrate aggression

3.2 Genetics

Considering critics supporting genetics' side, XXY chromosome abnormality provides strong evidence for predisposed aggressive behavior. A research group sampled blood from prison inmates in three Swedish institutions for criminals, and came to the conclusion that XXY abnormality appears with high frequency in criminals [9]. However, this abnormality is relatively rare as it only occurs in 1 in every 500 to 1000 males [10]. Most males with Klinefelter syndrome (or XXY abnormality) are unable to produce normal levels of testosterone and must return to normal testosterone levels in order to develop normal male characteristics. Low testosterone levels are associated with aggression, irritability, and hostility [11], as are high cortisol levels. However, high testosterone levels are also proven to increase aggressive behaviors by activating the subcortical area in the brain. Moreover, testosterone levels are proven to be heavily influenced by a child's environment. Considering both high and low testosterone levels are prone to aggressive behavior, and the rareness of the disorder, the genetic factor of XXY abnormalities cannot explain why genetics has a greater influence on aggression.

4. AGE & AGGRESSION — ADDING ON MATURATION OF PREFRONTAL CORTEX

In most aggression research, age and gender are taken into account and the effect of both is analyzed. In a study on adolescent peer acceptance, researchers concluded that age is positively correlated to the acceptance of aggression [12]. This means that as they get older (within the age range of 10–24), they are less likely to fight aggressive behavior and even adapt to it on their own [12]. Aggression can be demonstrated in many ways: bullying, physical fights, verbal aggression, etc. Therefore, ways of examining aggressive behaviors also vary. A common way of demonstrating aggression is through road rage. Research shows a correlation between age and driving aggression, where young drivers (18–26 years old) are most likely to engage in such behaviors [13]. Driving aggression includes behaviors such as deliberate honking, discriminatory gestures, yelling and cursing, deliberately slowing down to annoy other vehicles, and more [14]. Similar research also supports the correlation when 51% of youth self-reported having engaged in driving aggression within the past year. A similar study supports this correlation, with 51% of youths self-reporting having engaged in driving aggression in the past year [13]. Surprisingly, according to the Zebra statistics survey in

2019, millennials still make up 51% of the driving aggression population [14]. Moving on from the correlation between age and aggression, researchers also seem to favor certain age groups.

5. CONCLUSION

Based on the high influence of childhood environment on testosterone levels, which is primarily responsible for aggression and the cause of friend group aggression, it can be concluded that environment has a greater influence on aggression than genetics. Due to the lack of longitudinal studies on aggression, it's difficult to conclude an exact percentage of genetic and environmental influences on aggressive behaviors. More research will therefore need to be done in this field for a more clear understanding of aggression.

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