



CRIMINALS: MADE OR BORN?

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Insight

"Poor kid, the parents are criminals, so he will become a criminal too", "it was expectable that he would behave like this, the whole family are criminals" or "his bad genes made him do this". Those are just some common phrases that one can hear when a young person from an unstable family has chosen the wrong path. But the question is whether the environment is the culprit or whether genes decide a person's fate even before birth. People tend to justify their aggressive or antisocial behaviour by blaming their genes, but how much of it can actually be blamed on genes? Are criminals made by their environment or born due to their genetics? This article aims to shed light onto the investigation of "crime genes" and whether their existence will affect our justice system.

Maybe you have heard somebody say they behave a certain way because they inherited it from one of their parents. This is especially said for negative characteristics like criminal behaviour. But can you actually inherit the tendency to criminal behaviour, or is it just said as a defence for exhibiting behaviour that is generally not approved?

Definition of criminal behaviour

To be able to approach this question, criminal behaviour first needs to be defined: 'a phenotype within antisocial and aggressive behaviour characterised by the inability to commit to social norms' [1]. Antisocial behaviour is described as 'behaviour by a person which causes or is likely to cause harassment, alarm, or distress to persons not of the same household as the person' [2]. An antisocial personality is present in about 50-80% of imprisoned convicts, which is often associated with aggressive behaviour [3, 4]. Research mainly focused on the association between aggressive behaviour and genetics, which is why this article will mainly focus on aggressive behaviour in general, where the terms antisocial and aggressive behaviour are often used interchangeably.

Criminals from stable families

As early as 1985, researchers asked whether criminals are made or born. This implies that either the environment forms a criminal or that a person's fate is already fixed at birth due to genetics [5]. It is now widely known that social factors and environmental variables impact aggressive behaviour [6, 7]. But are there genes that ultimately lead to aggressive behaviour and thus to possible antisocial and criminal behaviour? Genetic factors seem to play a role in several psychiatric disorders, such as depression or anxiety disorders, which lead to the assumption that there is a chance that aggressive behaviour could have a genetic cause [8]. Additionally, aggressive behaviour has been essential for survival in ancient times, making it beneficial if encoded in genetics [9].

Crime gene MAOA

Since aggressive behaviour affects harmony and peace in a society, researchers are looking for methods to identify possibly harmful people. Therefore, scientists are looking for so-called "criminal genes" as a biomarker to identify individuals predisposed to aggressive behaviour [10, 11]. Being able to identify possible criminals early would allow the development of "anti-violence" interventions [11].

Several studies have worked on the decoding of "crime genes". One of the genes that has gotten more attention is monoamine oxidase A (MAOA). It encodes for the protein monoamine oxidase, which plays an important role in the metabolism of neurotransmitters. Due to its function, the enzyme is associated with regulating human behaviour, such as aggression [12-14]. Studies have pointed out that the loss of function or low activity of the enzyme (genotype MAOA-L) can lead to a clinical syndrome characterised by low self-control, increased impulsivity, and negative emotionality, which engages people to act aggressively and violently to minor stressors, which is why it is also called "the warrior gene" [10, 13, 15].

Crime gene MAOA

However, it has been shown that only 50% of the variance in aggressive behaviour can be explained by genetics [10]. The results mentioned earlier suggest a genetic predisposition in MAOA-L carriers; however, some studies could not replicate the association or could only find a low correlation between the gene and aggressive behaviour [12]. In general, researchers have found evidence that genotypes cannot predefine a certain personality but rather a range of possible characteristics a person can develop. For this specific case, this would mean that not every person who carries the genotype MAOA-L displays aggressive behaviour [10]. However, scientific evidence has led to the assumption that the combination of biological and psychological aspects forms human behaviour [10]. This explains why people with the same genotype (e.g., MAOA-L) do not display the same personality. Additionally, aggression is a complex behaviour and is therefore assumed to be caused by interactions between multiple genes [13]. This is why other genes should be analysed and considered in the assessment of aggression as well [14]. In other words, the MAOA gene cannot be considered a "crime gene" because more factors need to be considered, such as childhood upbringing or education [10, 13].

Gene-environment interaction

The MAOA-L variant has been associated with aggressive behaviour in several studies; however, the influence of the environment needs to be considered. Environmental factors can interact with genes and, therefore, can either increase or decrease the genetic influence on aggressive behaviour [11]. Therefore, the presence of MAOA-L alone is not enough to consider a person a criminal [10, 13]. More research is needed to assess the genetic influence on behaviour,

and even more important is the correct definition and quantification of environmental factors to determine the gene-environment interactions [11]. The “social-push”-theory describes the effect of the environment on genes resulting in a specific behaviour [16]. Especially experiencing trauma, such as maltreatment, seems to be a key playing event in a person’s life that leads to the development of aggressive behaviour [14]. However, there is evidence of a strong association between MAOA-L and criminal violence in offenders, but not in the average population. This means that offenders who carry this gene variant tend to be violent, whereas people who have not been criminal do not show this tendency [13].

Crime genes in the court

Knowing that there is evidence for the association between genes and aggressive behaviour and its tendency to criminal behaviour, it is not surprising that attorneys in the US and the Netherlands have been trying to justify their client’s crimes with their genes. However, humanity will face an ethical dilemma in the future: if behaviour is affected by genes, how can people be made responsible for their doings? Is it ethically correct to put them in jail for something they cannot control? Are people without the “crime gene” more responsible for their doing than others [17]? On the other side, this knowledge can also be helpful in the development of “anti-violence” methods in the future, such as positive environmental conditions for people with such a genetic vulnerability for aggressive behaviour [6, 13]. Genetic counselling would also allow an assessment for a proper sentence and whether a criminal should be held criminally responsible [16].

Humans are more than a collection of genes

There are many aspects and factors to consider when answering the question as to whether criminals are made or born. However, there are indeed genes that increase the tendency to aggressive behaviour. Nevertheless, it is impossible to only blame genes for aggressive behaviour. Both genetic and social factors play a role and can act together or individually, whereby the individual role of genes, such as MAOA, needs to be further elucidated. It has been shown that the effect of MAOA seems to be dependent on the interaction with the environment [16]. So maybe the gene is not the cause for aggressive behaviour but rather the result of the environment affecting the gene expression as a result of a chain of life events.

Nevertheless, scientists fantasise about anti-criminal interventions that will be based on genetics and environmental factors in the future, which is interesting to follow. However, we must remember that a person is more than a set of genes and that social factors can influence them, making it hard to pinpoint a person’s behaviour solely based on genes. Environmental and biological causes are interconnected and constantly interacting [16].

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