

## **To what extent is human behavior genetically determined?**

Behaviour can be understood as a selection of actions usually in response to a stimuli, whether it be psychological, biological or environmental, and although the brain gives us complex cognition many have pondered whether our behaviour is determined at a much more essential level, in our own genetics, and with the development of CRISPR technologies it's becoming a more important question. Could our lifestyles and actions be the results of our genetic information or maybe we react and live according to our environment? A complex topic like this takes into consideration multiple factors but I will focus on the heritability of mental behaviours and the role of external factors in development as well.

An effective way to analyse the importance of genetics in human behaviour is to look at the heritability of characteristics from a biological parent onto their offspring. We can see that mental health conditions like bipolar disorder have a substantial genetic component<sup>[1]</sup> and it has also been shown through twin studies that a significant proportion of the liability to develop any given anxiety disorder is due to genetic factors<sup>[2]</sup>. These conditions definitely have an effect on human behaviour, with anxiety possibly causing intermittent panic attacks, insomnia<sup>[3]</sup> and psychological symptoms of paranoia, irritability and concentration issues and bipolar disorder causing shifting episodes of depression and mania<sup>[4]</sup>. Many people with these conditions exhibit seemingly irregular behaviour like excessive worry<sup>[5]</sup> and extreme changes in personality<sup>[6]</sup>. So in this respect, we can see genes directly affecting how humans interact and behave with others.

Although genes play an important role, external factors also shape the way many of us behave and interact. In the United Kingdom, there is a prevalence of 61.3 cases per 10,000 births of foetal alcohol syndrome [FAS]<sup>[7]</sup>, a condition caused by the consumption of alcohol during pregnancy. FAS can cause multiple different symptoms including poor memory, learning disabilities, hyperactive behaviour, difficulty concentrating<sup>[8]</sup> (all with varying severities) and even brain damage resulting in schizophrenia

in some cases<sup>[9]</sup>. The symptoms of this condition overlap with people from all backgrounds and therefore different genetics as well, clearly showing that some behaviours in people are not solely genetically based and that some behaviour comes from the environment we are exposed to.

It has also been shown how adopted children will not only act like their adoptive family but also begin to resemble them<sup>[10]</sup>. Children spend a lot of their early development learning about the world around them and who they learn from clearly has an effect on their mental development. We copy accents from our carers and imitate behaviours from those around us too. Children show an urge to imitate the actions of others and it can be argued this is to allow for more cohesive social interaction with others<sup>[11]</sup>. This imitation is also common in other hominid species like chimpanzees<sup>[12]</sup>.

In conclusion it's clear that genetics can play a role in the heritability of human behaviour however much of our behaviour is actually shaped by external factors through our early development. Humans chiefly learn our behaviour rather than inherit it which follows a trend with many other primate species and contributes to our overall success and ability to adapt to new environments. Nurture is clearly over nature.

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<sup>1</sup>JAMA Network : The Heritability of Bipolar Affective Disorder and the Genetic Relationship to Unipolar Depression Peter McGuffin, MB, PhD, FRCP, FRCPsych; Frühling Rijdsdijk, PhD; Martin Andrew, MB, MRCPsych. May 2003. Abstract. Conclusions  
[<https://jamanetwork.com/journals/jamapsychiatry/article-abstract/207452> Last accessed : 3rd January 2021]

<sup>2</sup> Annual Reviews : Genetic Approaches to the Study of Anxiety : Joshua A. Gordon and Rene Hen: 21st July 2004. Abstract.  
[<https://www.annualreviews.org/doi/abs/10.1146/annurev.neuro.27.070203.144212?journalCode=neuro>  
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<sup>3</sup> United Kingdom National Health Service : Generalised Anxiety Disorder in Adults : Symptoms : 19th December 2019 [<https://www.nhs.uk/conditions/generalised-anxiety-disorder/symptoms/>] Last accessed : January 3rd 2021]

<sup>4</sup>United Kingdom National Health Service : Bipolar Disorder: Overview : 14th March 2019 [<https://www.nhs.uk/conditions/bipolar-disorder/>]  
Last accessed : January 3rd 2021]

<sup>5</sup>United Kingdom National Health Service : Generalised Anxiety Disorder in Adults : Diagnosis : 19th December 2019 [<https://www.nhs.uk/conditions/generalised-anxiety-disorder/diagnosis/>]  
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<sup>6</sup> United Kingdom National Health Service : Bipolar Disorder: Symptoms: 14th March 2019 [<https://www.nhs.uk/conditions/bipolar-disorder/symptoms/>]  
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<sup>7</sup> Institute of Alcohol Studies (IAS) : UK foetal alcohol rates among highest in the world : January 2017 [<http://www.ias.org.uk/What-we-do/Alcohol-Alert/January-2017/UK-foetal-alcohol-rates-among-highest-in-the-world.aspx>] Last accessed : 3rd January 2021]

<sup>8</sup>Centers for Disease Control and Prevention (CDC) : Fetal Alcohol Spectrum Disorders (FASDs)  
: May 7th 2020 [<https://www.cdc.gov/ncbddd/fasd/facts.html>] last accessed : 3rd January 2021]

<sup>9</sup>National Library of Medicine : P R Slavney and J G Grau : Fetal Alcohol Damage and Schizophrenia  
: October 1978 [<https://pubmed.ncbi.nlm.nih.gov/568621/>] Last accessed : 3rd January 2021]

<sup>10</sup> International Journal of Behavioural Development. Ina C. Uzgis. Two Functions of Imitation During Infancy. March 1st 1981. [<https://journals.sagepub.com/doi/abs/10.1177/016502548100400101>] Last accessed : 3rd January 2021]

<sup>11</sup>Open Edition Journals. M. Neilson. The imitative behaviour of children and chimpanzees: A window on the transmission of cultural traditions: Abstract. June 2007  
[<https://journals.openedition.org/primatologie/254#>] Last Accessed : 3rd January 2021]

<sup>12</sup> Lund University. Tomas Persson, Gabriela-Alina Sauciuc and Elainie Alenkær Madsen. Spontaneous cross-species imitation in interactions between chimpanzees and zoo visitors. 5th August 2017.  
[[https://link.springer.com/epdf/10.1007/s10329-017-0624-9?shared\\_access\\_token=M3Sr7sKwoKkJTmQbu81OMPe4RwlQNchNByi7wbcMAY7aT\\_NLC4NwkO148Y9xmPEXiDpC85fPQiWfP24AMRB3FOe0CrWVT-jy3tOajGmZXgJd\\_--SvqYYWuLze9XB6sD34ZLP69RD3shGDO9X0LUmdt11qS69u-pDKfRRRzpXIK0%3D](https://link.springer.com/epdf/10.1007/s10329-017-0624-9?shared_access_token=M3Sr7sKwoKkJTmQbu81OMPe4RwlQNchNByi7wbcMAY7aT_NLC4NwkO148Y9xmPEXiDpC85fPQiWfP24AMRB3FOe0CrWVT-jy3tOajGmZXgJd_--SvqYYWuLze9XB6sD34ZLP69RD3shGDO9X0LUmdt11qS69u-pDKfRRRzpXIK0%3D)] Last Accessed : 3rd January 2021]

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