

The Biology of Evil

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Imagine feeling no remorse, imagine not caring about people who consider you their beloved one, imagine having the urge to manipulate others into becoming players in your game, which can result in nothing else but their ultimate loss. This might merely seem like a description of a villain in a movie to most of us, yet it is a reality that some individuals between us have to deal with since their birth, others as a consequence of events in their lives. What is the scientific explanation for the origins of an evil mind?

Getting the Terms Right

Before delving deeper into biology, definitions should be clarified. Psychopathy and sociopathy are often used interchangeably in common discussions, yet they represent different realities.



The confusion between them might be caused by the fact that even the Diagnostic and Statistical Manual of Mental Disorders has not produced a firm definition of these two, therefore experts tend to classify both

of them as types of antisocial personality disorder. Both psychopathy and sociopathy are characterized by an abiding pattern of disregard for and violation of the rights of others, as manifested through three or more of the following habitual or continual behaviors: (1) serious violations of criminal laws; (2) deceitfulness for personal gain or pleasure, including lying, swindling, or trickery; (3) impulsiveness or failure to plan; (4) irritability and aggressiveness often resulting in physical assaults; (5) reckless disregard for the safety of oneself or the serious harm or distress one's actions cause other people.

Yet there is an important differentiation between psychopaths and sociopaths, which can be put rather simply: Psychopaths are born, sociopaths are made. Thus in the case of psychopathy, biology is the “bad guy“ to blame, whereas, in the case of sociopathy, it is a set of sociological factors, usually during early childhood.

Inside the Brain of a Psychopath

On a biological basis, and by thinking in terms of scientific reductionism, our behavior and feelings are ultimately encoded in the brain, which is composed of many complex interwoven structures that are involved in different roles. University of Wisconsin-Madison researchers led a study on the brains of prisoners diagnosed as psychopaths, and interesting common patterns were observed.

Two types of brain images were collected. Firstly, functional magnetic resonance images (fMRI) were used to measure brain activity by detecting changes associated with blood flow.

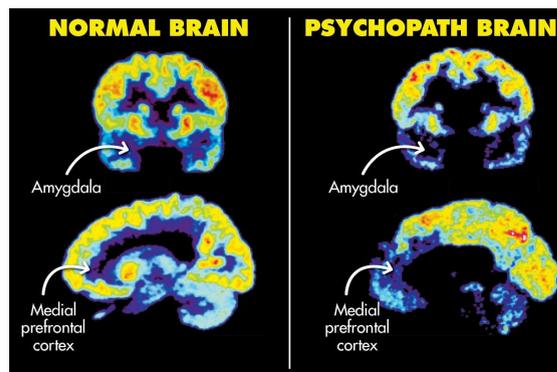
Secondly, they used Diffusion tensor images (DTI), an MRI-based neuroimaging technique that makes it possible to estimate the location, orientation, and anisotropy of the brain's white matter tracts.

In the study, the brains of psychopaths were compared to what we vaguely tend to refer to as the “normal brain”, therefore a brain of a person unaffected by any disorder.

The fMRI scans revealed that the brains of psychopaths show less coordinated activity between regions of the brain called ventromedial prefrontal cortex (vmPFC) and amygdala, while the DTI showed reduced structural integrity in the white matter fibers connecting these two areas.

The following study compared the brains of psychopaths to other criminals, and the biological underpinnings remained the same and were specific to psychopaths.

The vmPFC is located in the frontal cortex of our brains and it is implicated in the processing of risk and fear, as it is critical in the regulation of amygdala activity in humans. The amygdala is one of two almond-shaped clusters of nuclei located deep and medially within the temporal lobes of the brain in complex vertebrates, including humans. It is known for being the essential performer in the play of emotional responses, such as aggression, anxiety, or fear. Therefore, the disrupted communication between these two structures can be, based on both, experimental data, and theory, strongly correlated with the diagnosis of psychopathy.



Blaming the Genes

The notion that genes play a crucial role in psychiatric disorders is nowadays widely accepted, thus it is no surprise that the genetics behind psychopathy represents a challenge to many researchers all around the world.

There has been no single factor identified to be a direct cause of psychopathic behavior, yet one candidate is in the center of discussions, a so-called “warrior gene”. However, the idea still remains relatively controversial in the scientific community.

The “warrior gene”, more formally known as monoamine oxidase A (MAOA), controls the production of the protein that plays a crucial role in the breakdown of several mood-regulating neurotransmitters, including dopamine, serotonin, and noradrenaline.

Interestingly, a variant of this gene called MAOA – L that exhibits low levels of activity, has shown to be often present in psychopathic individuals, and leads to a lowered production of the protein that breaks down the previously mentioned signaling chemicals. This may result in their build up and consequently violent tendencies, and shows its linkage to aggression and antisocial behavior.



Dr. James Fallon is a leading scientist behind the neuroscience of psychopathy and the story of Dr James Fallon is confoundingly fascinating because the brain images he has identified possess pathological markers of psychopathy. Furthermore, he has also been identified as the bearer of the MAOA – L gene.

This brings up an important point, which is that not all psychopaths are inevitably criminals. Many of them might be among us, such as politicians, businessmen, or, as in the case of Dr. James Fallon, even scientists leading the research on psychopathy themselves.

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