

COGNITIVE NEUROSCIENCE AND CRIMINAL LAW: A POSSIBLE AND FUTURE INTERACTION?

Ph.D. Mattia Di Florio

SEME - SEMinario in Scienze Economiche e Sociali

Brief history of cognitive neuroscience



The field of cognitive neuroscience was inaugurated in the late 1970s as a result of a meeting between neuroscientist Gazzaniga and cognitive psychologist Miller at a conference at Cornell University. They were focusing their research on the relationship between the functions of the physical brain (brain) and the intangible mind (mind).

The persons unconsciously decide to act well before they have made the decision, as confirmed by the **“readiness potential”** that was recorded about 550 milliseconds before the action began.

Libet argued that there is room for the concept of free will, understood as the capacity for free self-determination, since mental representation would preserve a veto over the performance of the action (free won't).

The implications of Libet's studies on free will have, over time, fueled a debate between two opposing conceptions.

A first current of thought is the determinist position taken by the **“strong program”** which says we are not free and free will is just an illusion.

The determinist position is formulated by two American cognitive psychologists, Professors Greene and Cohen



A second current of thought, which has become prevalent, is the compatibilist position, which advocates a **“weak program”**: there is free will.

Among the proponents of compatibilism is the neuroscientist Gazzaniga.

The first jurisprudential applications of the “weak program”



The first and most important jurisprudential applications are:

- **The Trieste Court of Appeal in 2009:** it opened the door to Behavioral Genetics.
- **The Como Court in 2011:** it recognized diminished capacity.
- **The Cremona Court in 2011:** it admits the use of the autobiographical memory test a-IAT (Autobiographical Implicit Association Test).



The concept of capacity: art. 85 of the Criminal Code

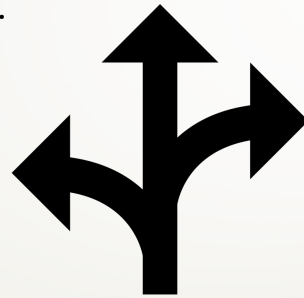
The capacity to intend can be defined as the ability to orient oneself in the external world according to an undistorted perception of reality.

The capacity of want consists of the power to control impulses to act and to determine oneself according to the motive that appears most reasonable or preferable based on a conception of value.

The criminal science has developed three different models:

The “**medical-nosographic paradigm**” upholds the organic nature of mental illness.

The “**sociological paradigm**” on the other hand, holds that the origin of mental illness should be found in social and family reality.



The “**psychological model**”: cause of mental illness should not be sought in an organic disease, but would be an expression of the conflicts of the *id* with the *superego*.

Cognitive neuroscience and psychopathy

Psychopathy is a mental illness.

Unlike psychotics, psychopaths are rational and know what they do and why they do it.

Their behavior results from a choice, exercised freely.

According to the weak program, **neuroscientific studies are not applicable to psychopathy** in view of the ancillary nature of neuroscience to the criminal law system.



Three lines of research:

- **A first line of neuroscientific research** focuses on alterations in the frontal parts of the brain and problems associated with impulse control and aggression.
- **A second line of research** studies abnormalities in the limbic system, which is a network of brain regions.
- **Third line of research:** more recently, Neurofeedback (NFB) techniques were tested on a group of psychopathic criminals.

Supreme Court in 2018 closes to neuroscience



Even in the most recent rulings there is distrust of new knowledge.

The defendant had been convicted in the first instance by the Juvenile Court of Salerno of voluntary manslaughter. The defendant appealed to the Court of Cassation.

PET and CT scans depicted impaired glucose consumption: the defendant's high impulsivity has neurological origins related to morphological, genetic, and biological aspects.

Supreme Court in 2018 closes to neuroscience



The judges of legitimacy had ruled out that the intensity of the disorder was such as to affect the defendant's capacity to understand.

In support of this conclusion, they, doubted the scientific reliability of the new knowledge.

They further asserted that the “classified disorders of behavior and mental functioning - psychopathies - are independent, as is the case with neuroscience, of studies of the organic and biochemical components of the brain”.



The latest rethinking program

The doctrine distinguishes:

- **the strong (unused) program** that sees cognitive neuroscience as a tool for “refounding” criminal law, rewritten in terms of deterrence;
- **the weak (current) program** that sees Behavioral Genetics as a technical tool for ascertaining criminal law categories;
- **the rethinking (futuristic) program**, according to which Behavioral Genetics would allow the category of imputability to be reconfigured.

Supreme Court in 2019: the opening



If we adhere to the rethinking agenda, it could be argued that neuroscience is capable of identifying neurobiological markers of mental disorders, and of reconstructing the psychopath's incapacity.

These conclusions would seem to be reached by the 2019 Supreme Court ruling that “rehabilitates” neuroscientific knowledge in a case of aggravated murder for abject reasons and with cruelty.

Supreme Court in 2019: the opening



The Supreme Court's 2019 pronouncement seems to go beyond the weak neuroscience program:

- **First:** it reaffirms the “auxiliary” role of neuroscience, namely “from the outside”;
- **Second:** it assigns the neuroscientific evidence, and Behavioral Genetics, the function of reconstructing the defendant's concept of capacity “from the inside”;
- **Third:** the environmental factor plays an important role, considering that a positive environment could foster prosocial conduct. A negative environment could induce the subject, even without a mental disorder, to develop aggressive behavior.



Partial conclusions?

The fundamental reasons that currently prevent the “overcoming” of Folk Psychology in favor of the rethinking program are two:

- The reassuring image of rationality that Folk Psychology guarantees to criminal law scholars is rooted in the patterns developed over so many years.
- Neuroscientific research, despite advances in emotionotopy, still does not allow for the development of a suitable theory to understand the full range of alterations in brain function caused by an emotional brain.