

Measuring the Amygdala; Otherwise Recycling Lombroso Theories One and Half Centuries Later

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Abstract

Crime and perpetrators have been under scrutiny from forensic experts and psychiatrists since centuries. This interest is understandable, if we consider the social consequences of a criminal behavior. Cesare Lombroso concluded one and half centuries before that some facial and skull anthropometric parameters might suggest someone's tendency for criminal behavior. Technological advances but ethical problems as well have caused the fading up of his theories. However, recent neuro-radiological research has found correlates with volumetric values of certain brain region, and the criminal behavior. Two approaches are suggested and discussed in the present paper; the first focusing on the criminal traits of the perpetrator (including anthropometric parameters) and the second, putting under scrutiny the characteristics of the crime, rather than those of the perpetrator itself.

Keywords: Anthropometric parameters; Criminal traits; Skull circumference; Amygdala

Anthropological Approach to Criminal Traits

Trying to suggest a reason and to find out brain localization responsible for criminal behavior has been an old-dated challenge for the science and human knowledge. Translating the crime into a mere anthropometric parameter, through measuring the perimeter or the circumference of the head, has been the first suggestion.

Cesare Lombroso, a famous psychiatrist and criminal anthropologist, opened the Pandora's Box with two atlases of him, published in Paris, 1887 [1-3]. He has been widely criticized for weaknesses in the methodology of data collection, nevertheless much of his theory deepened straight into the psychiatry, sociology and criminology of the first half of twentieth century [4]. Clearly a Darwinist in his point of stance, he produced something more that lacked to the initial intuition of Darwinian criminology, and gave a measuring image – although artifactual and therefore erroneous – to the potential criminal. The 'criminal physical type' is a stereotype that we still consider as correct, and in spite of theoretical and analytical discrepancies, we largely believe on it [5,6].

Cesare Lombroso studied 383 skulls of criminals of his time, making autopsies to them and offering an anthropometric evaluation for every skull of a criminal within his scope of study. He was even able to pick up external stigmata that might help toward identifying a criminal, such as tattoos [2,3]. A correlation between tattoos and criminal traits of personality is nowadays still a deeply enrooted belief, upgraded to a scientific hypothesis [7].

Deep into the Brain: How About Measuring Amygdala Volume Instead of Skull Features?

Lombroso believed that 40% of criminals were 'born criminals' who could be distinguished by physical features including relatively long arms, prehensile feet with mobile big toes, *low and narrow forehead, large ears, thick skull, large jaw*, etc. [8].

For different reasons, his theories did not resist the proof of time, and were largely revisited or criticized, mainly on racial grounds.

However, even actually we have lot of influence from its idea. We do not speak any longer for a 'small' or a 'big' skull, but sophisticated neuro-radiology has permitted us to be more discrete.

In fact, with the help of technology, we started measuring deep brain structures, such as amygdala. The size of the latter, and of other brain structures (consider: the size, not merely the function!) has been blamed as responsible for aggression. In this field, like in other scientific domains, controversy reigns as well.

Some authors support the finding that a small amygdala leads easily to aggressive behavior, and some other authors do confirm the contrary [9,10]. Apart from these contradictions, of importance remains the fact that amygdala (and probably, its volume) has ever since raised discussions and interest with regard to aggression and antisocial behavior or personality traits. Other deep brain structures (cingulum and other limbic system parts) have as well been correlated with aggression, and volumetric or anatomic composition of the structures has been under scrutiny, thus not simply a functional hypo- or hyperactivity of any cerebral region [11,12].

Conclusions

Strong ethical dilemmas might have obliged psychiatrists, anatomists and forensic experts to abstain from overtly measuring the aggressive potentiality of an individual via simple measures of the external traits, like skull circumference and other facial measurable elements.

It seems however that two main approaches, somehow differing between each other, are dominating the discussions:

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- a. The first, focused on the criminal traits of the perpetrator;
- b. The second, focused on the characteristics and mechanics of the crime.

Lombroso and forensic psychiatry have overwhelmingly embraced the first position, but denoting or, otherwise stigmatizing a particular individual' face as 'criminal' with push forward a deterministic position. If someone has an innate keenness to commit crimes, he could be exculpated because this behavior is inherited, and out of his control. Reversely seen, we might prevent crimes through arresting in advance people that have not committed felonies at all, simply because they have the potential to do so in the future. Spielberg in his 'Minority report' has screened a highly tense situation, with crimes forecasted and therefore, prevented [13]. Albeit accurate, the famous director has focused on the crime, and not on the anthropometric characteristics of the criminal.

Describing a crime scene and upholding a position that 'opportunities cause crime' is the second approach, which at a first stance seems completely different to Lombroso and his followers' theories. Authoritative sources defend this position, but this might be related to the fact that criminology is obviously not forensic psychiatry, or vice versa [14] (Figure 1).

This impressive painting of Rembrandt *Cain killing Abel* gives us plenty of details over the crime scene and its perpetration, but



Figure 1: Cain killing Abel, by Rembrandt van Rijn (1606-1669), at the Royal Collection of Prints and Drawings, Statens Museum, Copenhagen.

grants very few anthropological elements to consider if his Cain is an innate criminal, like the patients of Lombroso. The biblical fratricide, committed many centuries before, will show us how deeply enrooted is the phenomenology we're dealing with, and how difficult is to profile the crime or its perpetrator through a single and simple set of characteristics.

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