JASs *forum*
Journal of Anthropological Sciences
Vol. 85 (2007), pp. 233-234

Brain, ethics and altruism

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Through the use of a number of neuroscientific techniques, mainly based on brain imaging, it is possible to approach empirically a number of problems within the relationships between mind and brain such as the neurological grounds of empathy or moral judgments which have been previously discussed in terms of their possible evolutionary meaning. One of the main characteristics of altruism and moral judgments is grounded on the principle of reciprocity, as to say it implies that we expect to be treated as we take care of other people.

From a neuroscientific point of view this principle is grounded upon forms of empathy which may depend on neurophysiological mechanisms similar to those characterizing mirror neurons described by Rizzolatti and his associates. Mirror neurons establish a kind of bridge between the observer and the actor, are also present in the human species and exert a critical role in imitative behaviours. In a few word, an action is understood since its motor representation is activated in our brain.

This type of mirroring and of its consequences on empathy and altruism is evident from studies on pain and on its association to systems playing a role in imitative and learning and watching such as those of Avenanti *et al.*. When we feel pain immobility (motor block) or escape reactions take place since these behaviour increase survival. However, a motor block is also evident in people watching another person's pain: in other words, empathic reactions take place involving a motor block that in the observer involve the same muscles or areas at the origin of the pain felt by another person.

In addition to that, a number of studies indicate today that the brain reacts in a different way when the situation involves a personal or impersonal (utilitaristic) moral judgment: in the first instance brain structures related to social emotions –such as the medial frontal, the posterior cingulate an the angular gyrus- become active (see Haidt, 2001, Greene *et al.*, 2004; Moll *et al.*, 2002). On the contrary, when the situation involves impersonal judgments the areas involved in working memory and analytical processes –such as prefrontal and parietal areas- become active. As suggested by Antonio Damasio, in the course of evolution a form of wisdom has been accumulated that rewards an hybrid form of moral judgments where rationality and emotion are unified.

To sum up, a number of neuroscientific attainments open a window on altruism, empathy and social judgments, or at least on those factors delimitate their meaning and their utilitaristic or non-utilitaristic consequences (Oliverio, 2005). This view from the outside has its positive aspects since it allows us to understand many facets of human nature: however, it should not push us to believe that what results "objectively" from new brain technologies is non-modifiable. We must always keep in mind that one of the most important features of our brain is its plasticity, its capacity to modify its structure an function on the ground of new experiences and learning- Also its individual variability increases the degrees of freedom of our brain that are often minimized by normative views.

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