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On the Œdipus complex, 1

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Abstract. Taking into account notable recent neuroimaging researches, it is possible to infer some first simple remarks which would suggest possible neurological bases to that fundamental psychoanalytic assumption which is the Freudian Œdipus complex. The following first very brief sketch has been just thought to simply highlight this fact.

This very brief note is concerned with remarkable recent neurological researches, namely the works (Bartels & Zeki, 2000, 2004) and (Zeki, 2007), which are centered on the possible neural correlates of maternal and romantic love.

Starting from this, our intention would be oriented toward the search for as many possible neurological basis of the well known Œdipus complex in the Freudian sense, above all, for boys.

Indeed, according to these authors, *«the tender intimacy and selflessness of a mother's love for her infant occupies a unique and exalted position in human conduct. Like romantic love, to which it is closely linked, it provides one of the most powerful motivations for human action, and has been celebrated throughout the ages – in literature, art and music – as one of the most beautiful and inspiring manifestations of human behaviour. It has also been the subject of many psychological studies that have searched into the long-lasting and pervasive influence of this love (or its absence) on the development and future mental constitution of a child [...]. Yet little is known of brain areas and pathways that correlate with this extraordinary affective state in the human. In pursuing our studies of the neurological foundations of love (Bartels & Zeki, 2000), we therefore thought it worthwhile to turn our attention next to maternal love. Maternal and romantic love share a common and crucial evolutionary purpose, namely the maintenance and perpetuation of the species. Both ensure the formation of firm bonds between individuals, by making this behaviour a rewarding experience. They therefore share a similar evolutionary origin and serve a similar biological function. It is likely that they also share at least a core of common neural mechanisms. Neuroendocrine, cellular and behavioural studies of various mammalian species ranging from rodents to primates show that the neurohormones vasopressin and oxytocin are involved in the formation and maintenance of attachment between individuals, and suggest a tight coupling between attachment processes and the neural systems for reward [...]. This is confirmed by lesion, gene expression and behavioural studies in mammals [...]. Interestingly, the same neurohormones are involved in the attachment between mother and child (in both directions) and in the long-term pair bonding between adults, although each neurohormone may have distinct binding sites and may be gender specific [...]. Such similarities, as well as the obvious differences between the two kinds of love, lead one to expect a neural architecture that differs between the two modes of love in some respects and yet is identical in others».*

The authors, Bartels and Zeki, after a long and in-depth neurological discussion of their experimental results, conclude saying as follows.

«This study complements our earlier one (Bartels and Zeki, 2000) and shows that (i) romantic and maternal love both involve a unique and overlapping set of areas, as well as areas that are specific

to each; (ii) the activated regions belong to the reward system and are also known to contain a high density of receptors for oxytocin and vasopressin, suggesting that the neurohormonal control of these strong forms of attachment observed in animals also applies to the human; (iii) both forms of attachment suppressed activity in regions associated with negative emotions, as well as regions associated with 'mentalizing' and social judgment. This suggests that strong emotional ties to another person inhibit not only negative emotions but also affect the network involved in making social judgments about that person. Overall, the results lead us to conclude that attachment processes employ a push-pull mechanism that activates a specific pathway of the reward system of the brain. At the same time, circuits that are responsible for critical social assessment and for negative emotions are deactivated. Both studies on maternal and romantic attachment revealed activity that was not only overlapping to a large extent with each other, but also with the reward circuitry of the human brain [...]. In summary, our findings show that both romantic and maternal love activate specific regions in the reward system and lead to suppression of activity in the neural machineries associated with the critical social assessment of other people and with negative emotions. Since surprisingly little is known about social processing in the human brain, we should emphasize that the following interpretations are of a rather tentative nature. There is no doubt that future studies will address these points more explicitly. Nevertheless, a potential model may be that once one is closely familiar with a person (in a positive or negative way), the need to assess the social validity of that person is reduced. This correlates with a reduction of activity in the systems necessary for doing so; these findings therefore bring us closer to explaining in neurological terms why 'love makes blind'. The neural mechanisms suppressed here might be the same that, when active, are responsible for maintaining an emotional barrier towards less familiar people, corresponding to the avoidance behaviour observed both in rats and in voles against pups or potential partners, which is reversed by administration of oxytocin [...]. Our findings of consistently activated and deactivated regions with attachment may be indicative a fine balance between activity states of these regions that needs to be maintained to ensure a healthy social interaction. This may be important for the understanding of the severe psychological and clinical consequences that ensue when elements of this circuitry are interrupted, through inheritance, lesion or upbringing [...]. The link of activated brain sites to the well-studied neurohormones, oxytocin and vasopressin and their binding sites offers a surprisingly straightforward way for pharmacological intervention that could be used both to induce and maybe more importantly to suppress feelings of attachment, as it has been successfully done in animals [...]. On the whole, our results suggest a push-pull mechanism of attachment, that on one hand deactivates areas mediating negative emotions, avoidance behaviour and social assessment, and on the other triggers mechanisms involved in reward. These results have thus brought us a little, but not much, closer to understanding the neural basis of one of the most formidable instruments of evolution, which makes the procreation of the species and its maintenance a deeply rewarding and pleasurable experience, and thereby ensures its survival and perpetuation».

Clearly, the recalls to the main points of the Freudian Œdipus complex, both in its positive and negative form (see (Laplanche & Pontalis, 1973) for the related psychoanalytic notions herein invoked), above all for boys, are manifestly foreshadowed by the conclusions of these type of neurological researches, like those achieved by (Bartels & Zeki, 2004).

Furthermore, since these last involve too some crucial social questions, it would be also of a certain interest to consider them also from the point of view of structural anthropology according to Claude Lévi-Strauss, which put the Œdipus complex, in the Freudian sense, at the centre of his celebrated theoretical framework.

All these features will be in-depth pursued later.

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