

It is only in the past half century that careful observation of very small children has shown the enormous range and depth of emotions they can experience. The psychoanalytic method of infant and young child observation (Sternberg [2005] is the latest text) is a unique source of disciplined and detailed recording of changes in behaviour, mood, and intentions of young children.

Recent advances and hypotheses regarding the neural networks involved in cruelty and pathological aggression

Harold Mouras

INSERM, U742, Paris, F-75005 France; Université Pierre et Marie Curie, Paris 6, UMR S 742, Paris, F-75005, France; and Socio-Affective Development Group, Department of Psychology, University of Geneva, CH-1205 Geneva, Switzerland.

harold.mouras@snv.jussieu.fr

Abstract: Functional neuroimaging studies allow examination of the cerebral networks involved in human behavior. For pathological aggression, several studies have reported a involvement of frontal and temporal areas, reflecting disruption of emotional regulatory systems. Recent genetic studies that bring together reward system dysfunction and violent behavior.

Nell argues that modern neuroimaging could be used to examine the continuity between predation and cruelty, as it could be demonstrated in commonalities of their neural circuits. A number of studies have already used functional neuroimaging techniques to describe the neural networks involved in violence and aggressive behavior that could form the basis for future comparisons. In a sample of healthy males, Pietrini et al. (2000) reported reduced activity in ventromedial frontal cortex during imagination of aggression compared to imagination of a neutral scene, suggesting a functional deactivation of this part of the frontal lobe. This observation is consistent with the well-documented general role of the orbitofrontal cortex in behavioral inhibition.

In studies of violent offenders with schizophrenia or schizoaffective disorder, fluoro-deoxyglucose uptake, an indicator of neuronal activity, was reduced in anterior temporal regions as compared to healthy controls (Wong et al. 1997). Resting cerebral metabolism was reduced in the medial temporal and prefrontal regions for repeatedly violent psychiatric patients compared to healthy controls (Volkow et al. 1995). For murderers pleading not guilty by reason of insanity, cerebral metabolism was significantly lower in a continuous performance task in prefrontal areas, superior parietal gyrus, left angular gyrus, and the corpus callosum in comparison to sex- and age-matched controls (Raine et al. 1994). A following study (Raine et al. 1998) demonstrated that the reduction of activity on frontal areas was much more pronounced in "affective" than "predatory" murderers. This contrast is of interest because of the greater impulsivity of emotional than planned crimes (Hoptman 2003). Thus, several lines of evidence appear to show that violent and aggressive behaviors, in their most severe forms, involve abnormal neural correlates, particularly reduced activity in the frontal and temporal areas.

Some neuroimaging studies of the voluntary control of emotional responses have been done. Davidson et al. (2000a) instructed subjects to voluntarily regulate their emotional response to unpleasant pictures. While suppressing negative affect induced by unpleasant pictures, subjects also had a significantly diminished startle response (an index of emotional processing) compared to conditions where subjects were instructed to normally experience or enhance their reactions. There was marked individual variability in the skill in negative emotion suppression shown between subjects. Jackson et al.

(2000) further argue that the mechanism that underlined suppression of negative emotion would imply inhibitory connections from the prefrontal cortex to the amygdala, well known to be involved in anger processing. Individual differences in emotion regulation skills (particularly for negative emotion) echo the differences seen in violent offenders and might be an indicator of individual vulnerability to aggression and violence.

Among neurotransmitters, serotonin and dopamine appear to be particularly involved in the neurobiology of violence and aggression. First, disruption of the serotonergic system, which has been hypothesized to exert inhibitory control over impulsive aggression (Volavka 1999), has been linked to violent behaviors (see also Davidson et al. 2000a). In a recent study of adolescents, Chen et al. (2005) found a correlation between indexes of pathological aggressive behavior and polymorphisms of several genes of the dopaminergic system. In their paper, Chen et al. note that pathological aggression behavior involves a number of behavioral tendencies that could be linked by the emerging concept "reward deficiency syndrome" that broadly defines a predisposition to a number of addictive, impulsive, and compulsive behavioral tendencies. All substances and behaviors linked by this syndrome involve pre-synaptic dopamine release at the nucleus accumbens.

In sum, neurobiological studies have made a start in describing the neural substrates of both "normal" and pathological aggression. Although ethical considerations pose many problems for these studies, we can hope for more precision in time in the neuroanatomy and genetics of aggressive behavior.

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The affective neuroeconomics of social brains: One man's cruelty is another's suffering

Jaak Panksepp

Center for the Study of Animal Well-Being, College of Veterinary Medicine (VCAPP), Washington State University, Pullman, WA 99164-6520.

jpanksepp@vetmed.wsu.edu

Abstract: Cruelty does not emerge from a single emotional system of the brain. Its many cognitive aspects are intermeshed inextricably with the nature of negative affects ranging from fear to suffering. The rewards of cruelty may be counteracted by a variety of neurochemical factors as well as novel social policies.

Nell provocatively introduces a topic rarely brought to the scientific limelight. He shares dramatic snapshots of the possible evolutionary antecedents of our capacity for cruelty. By discussing the social and ecological history of intense human and animal aggression, he seeks neuro-causal underpinnings among ancient emotional processes we still share with other animals. As William James (1890, p. 410) reflected, "we, the lineal representatives of the successful enactors of one scene of slaughter after another must, whatever more pacific virtues we may also possess, still carry about with us, ready at any moment to burst into flame, the smoldering and sinister traits of character by means of which they lived through so many massacres."

Nell's gripping analysis may provide scientific insight into such troublesome, value-laden conceptual complexities. I have more questions than argumentation or answers: To understand this dark underbelly of human nature, may we need better taxonomies of cruelty? Can one have cruelty without the reflective desire to impart suffering? If "intention to inflict pain" (target article, sects. 1 and 2) is critical for the concept, how can one evaluate and defend knowledge derived from animals, whose cognitive ability to reflect on other minds may be rudimentary?