

ALIENATION OF AFFECTION

by James W. Prescott

Deprived of their mothers, Harry Harlow's monkeys were at times apathetic, at times hyperactive, and given to outbursts of violence. Raised in isolation, they were socially inept; they often held themselves and rocked like autistic children.

What Harlow could not know at the time of his dramatic experiments in the late 1950s and 1960s was that these behavioral disturbances were accompanied by brain damage. More recent studies suggest that during formative periods of brain growth, certain kinds of sensory deprivation — such as lack of touching and rocking by the mother — result in incomplete or damaged development of the neuronal systems that control affection (for instance, a loss of the nerve-cell branches called dendrites). Since the same systems influence brain centers associated with violence, in a mutually inhibiting mechanism, the deprived infant may have difficulty controlling violent impulses as an adult.

If confirmed, these studies may have profound implications for human cultures that raise their infants with low levels of touching and movement. Children in these societies may be unable to experience certain kinds of pleasure — and be predisposed to apathy and violence.

The disturbance, I believe, has its origins in the somatosensory system of the cerebellum, which regulates the sense of movement and balance (vestibular system) and the sense of touch (somesthetic system). More than other senses, such as vision and hearing, touch and movement seem directly tied to emotions like affection. And this portion of the brain is one of those most susceptible to "shaping" — changes in neuronal structure — during a child's development. In numerous studies, laboratory animals deprived of tactile and movement stimulation have exhibited abnormal social and emotional behavior.

Harlow had explained his monkeys' behavior as caused simply by social isolation and not deprivation in specific sensory, neurobiological processes. I began to suspect that the vestibular-cerebellar system was involved after a study by psychologists William Mason and Gershon Berkson,

who reported that when a cloth-covered "surrogate mother" swung an infant monkey, the maternal-deprivation syndrome did not develop. To study that possibility, Robert Heath and Bernard Saltzburg at the Tulane University Medical School took electrophysiological recordings, by means of implanted electrodes, from the limbic and cerebellar regions of extremely violent, isolation-reared monkeys provided by Harlow. The bioelectrical signals from these electrodes displayed abnormal "spike" discharges, which were not seen in normal monkeys. The presence of the spikes was also detected by a unique computer analysis of scalp EEG recordings from the same monkeys' limbic and cerebellar regions.



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Further evidence of the cerebellum's role was provided in a study I did with A.J. Berman and Doreen Berman of the Bronx Veterans Administration Hospital in New York. Using two of Harlow's violent monkeys, the Bermans surgically removed part of the outer layers of the cortex of the "old brain" (paleocerebellar region) in one monkey and of the "new brain" (neocerebellar region) in the other. The monkey with the old-brain lesion became much more peaceful, while the one with the new-brain lesion did not. That result makes sense: the old-brain cerebellum connects primarily to the emotional centers in the limbic system, while the new-brain region connects primarily to the neocortical structures that regulate higher brain processes.

Meanwhile, Austin Riesen at the University of California, Riverside,

demonstrated that isolation-reared monkeys exhibit major differences in the brain-cell branches of the somatosensory and motor cortex, but not in the visual cortex. And at the University of Illinois, Mary Floeter and William Greenough found that monkeys raised in colonies had more extensive brain-cell branchlets in parts of the cerebellum than monkeys reared either in isolation or in pairs.

Thus, the influence of the environment seems to be imprinted on the structure of the brain, which, in turn, shapes the environment, (I call this approach to studying behavior "ecobiology", to distinguish it from socio-biology.)

In addition, cross-cultural studies have established a significant relationship between the physical affection shown human infants and rates of adult physical violence. In one study of 49 primitive cultures, I found that when levels of infant affection are low — as among the Comanches and the Ashanti — levels of violence are high; where physical affection is high — as among the Maori of New Zealand and the Balinese — violence is low. I also found that restrictions on premarital sexual affection were associated with high violence.

The possible lesson for modern countries is clear. We seem to be suffering from breakdowns in affectional bonds — reflected in everything from rates of divorce to sexual crimes, alcoholism, and drug abuse.

Culture is that handmaiden of our neurobiology, and without a proper environment for physical affection, a peaceful, harmonious society may not be possible.

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