

Brawl in the family

At least 4.1 million cases of family violence occurred between 1972 and 1981, an average of 450,000 per year, according to surveys by the federal Bureau of Justice Statistics.

Women attacked by their husbands or ex-husbands are the most common victims of family violence, and crimes between spouses are more likely to be repeated and to produce injuries than violent crimes committed by other relatives or strangers. One quarter of the victims of attack by a spouse had suffered at least three similar attacks within the previous six months. Most of the reported injuries were minor.

Family violence represents only 7.2 percent of all the violent crimes uncovered by the surveys during the nine years, but the bureau says that many instances of family violence are not reported. Survey respondents often said that the offense was a private or personal matter. The results are based on interviews every six months with about 132,000 people in 60,000 households across the country who are asked whether they have been a victim of crime.

Serotonin's social mobility

Scientists may need to take a closer look at the significance of elevated levels of the neurotransmitter serotonin for people with a variety of disorders. This suggestion, put forth by psychobiologist Michael J. Raleigh and colleagues at the University of California at Los Angeles, accompanies their finding that blood serotonin concentrations substantially increase in male vervet monkeys who attain social dominance.

In groups of captive vervet monkeys, a dominant male consistently emerges. This "top dog" is almost always avoided or submitted to by other males when he threatens them, makes aggressive displays or gets into a fight.

Raleigh and co-workers report in the April *ARCHIVES OF GENERAL PSYCHIATRY* that blood serotonin concentrations remain stable among 33 captive vervets if their social structure and environment also remain constant. But if a formerly subordinate male wrests dominance from another monkey, the researchers find that his blood serotonin concentration rises almost to the level measured in the formerly dominant vervet. Blood serotonin levels sharply decrease for the vanquished monkey.

Temporary isolation reduces serotonin concentrations in dominant males to levels measured in subordinate males. When dominant males are put in all-female groups they continue to engage in threatening and vigilant behavior, but again their blood serotonin levels drop significantly.

"The elevated blood serotonin concentrations exhibited by dominant males therefore are probably contingent on both initiating aggressive and receiving submissive behavior from other adult male group members," say the investigators.

The biological mechanisms connecting blood serotonin levels and social status among the monkeys are unknown. The researchers suggest that differences in serotonin levels may be due to intestinal tryptophan metabolism, from which serotonin is derived.

The findings for vervets may not hold for other primate species, they say. But the research could provide a model for investigating human conditions that vary along with blood serotonin concentration, diseases such as Huntington's chorea, motor neuron disease and bipolar depression. In addition, elevated blood serotonin has been observed in some autistic children and chronic schizophrenics.

The complexity of human social groups, however, throws a monkey wrench into research efforts. The best way to track social influences on blood serotonin concentrations in humans may be to follow major life changes, say the researchers, such as retirement, job demotion or promotion to leadership in a small group.

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Dietrick E. Thomsen reports from the meeting in Washington, D.C., of the American Physical Society

Ultrasound and blood

Ultrasound, very high frequency sound waves, is now more and more used in medical examinations. Some scientists are beginning to wonder whether there may be a potential for biological damage through the formation of cavities in blood or other bodily fluids. Sound-generated cavitation has long been studied in seawater, where it does serious damage to ships' propellers.

Lawrence A. Crum of the University of Mississippi in University, Miss., says he was led to study the possibility after observing ultrasound examinations prior to the birth of his daughter, now five years old. As it moves through liquid, a sound wave alternately stresses and compresses it. Under stress, if there is some defect in the liquid such as a bit of dissolved gas, a vapor-filled cavity may form. Under compression these cavities collapse, and the pressure and temperature of the dissolved gas can go to fantastic heights. Crum quotes 10,000 to 20,000 kelvins and 40,000 atmospheres. In contact with ships' propellers (whose sound fields generate them) such cavities can erode the metal severely.

Crum stresses that no clinical study has ever found evidence of cavitation damage in people exposed to ultrasound examination. However, he points out, long term studies have not been done. Some observers have suggested that there are no defects in blood around which cavities might nucleate. In rebuttal, Crum points to the disease known as bends. When deep sea divers surface too rapidly, bubbles of dissolved nitrogen form in their blood, a phenomenon similar to cavitation—if not so violent—and painful enough in its own right. Crum and others are looking into the effects of ultrasound on body fluids.

Volcanoes, climate and pizza panic

"Climate is unfair," says Paul Handler of the University of Illinois in Urbana. Volcanoes are unfair too. After the peasants have peacefully tended their vines for centuries on its warm slopes, pop goes Vesuvius, and Pompeii is no longer on the map. For a long time people have suspected a connection between volcanoes and climatic change. Handler reports that there is a statistical correlation.

He was led to the study, he says, by the coincidence of the latest example of the El Niño phenomenon and the eruption of the Mexican volcano El Chichón. El Niños are a warming of the surface of the eastern Pacific Ocean. They provoke panic in pizza parlors by triggering a decline in the anchovy harvest (SN: 4/28/84, p. 262). They are associated with changes in the corn crop in the United States, drought in Australia and South Africa, etc.

If one considers only volcanoes near the equator, Handler says, there is good correlation: "Low latitude volcanoes are highly associated with El Niños, and always precede them." Volcanoes north of the equator produce strong El Niños; those south of the equator produce weak ones, he says. The correlation is particularly strong with eruptions of high explosive power that send aerosols high into the stratosphere, where they reduce insulation against the sun's radiation.

Does proton decay cause cancer?

Protons used to be considered absolutely stable, but the latest theories call for (very rare) proton decay. W-Y Pauchy Hwang of Indiana University in Bloomington and Yun Tai Wun of Newton Square, Pa., point out that four such decays might be expected in the body of a person who lived 100 years. If a decay happened in a gene, it would change one element to another, drastically rearranging the genetic information, and possibly producing an oncogene, which could be the beginning of a cancer. The faulty genetics could also be inherited. Tai and Wun suggest statistical studies of generations of cancer patients to test the idea.

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