

## Smile when you say that

There is something inconsistent about the human smile. In its most intense form — the open-mouthed smile — it resembles what throughout the animal kingdom is usually considered a signal of aggression or intention to attack. Seekers of the origin of smiles have long been puzzled by this apparent contradiction, but now John J. Ohala of the linguistics department of the University of California at Berkeley thinks he may have the answer. At the recent meeting in Los Angeles of the Acoustical Society of America, he suggested that “the opening of the mouth, especially the retraction of the corners of the mouth, was originally done not as part of a visual signal, but rather in order to modify the acoustic quality of an accompanying cry.”

Citing the work of Smithsonian Institution ornithologist Eugene S. Morton, Ohala explains that birds and mammals modify the pitch of cries used in face-to-face encounters to give their opponents an impression (often a false impression) of their size. The animal that feels it might lose the battle if fighting occurs would benefit by giving the impression that it is small and helpless and does not constitute a threat. A small animal would have short vocal cords that would vibrate at a higher pitch than those of a larger animal. The high-pitched whine or yelp given by the submissive or appeasing animal would, in effect, be a message saying “I’m small and helpless; don’t hurt me.”

Ohala, who has demonstrated the acoustic effects of various mouth shapes using models of the vocal tract, proposes that the open-mouthed smile originally functioned as a protective device. Opening the mouth wide and retracting the corners of the mouth changes an accompanying cry’s timbre in such a way that it resembles the cry produced by a smaller individual.

In a great many species, especially monkeys, Ohala says, the smile is invariably produced along with the submissive cry. But due to frequent association with the cry that signals submission and nonhostility, Ohala concludes, some species, including our own, have come to treat mouth corner retraction as an independent visual signal having the same meaning as the cry itself. Thus, the smile is usually made without any sound at all.

## Don’t smoke while baby is eating

Why won’t baby eat certain foods? It may be because you smoke, says psychologist Frank T. Etscorn of New Mexico Institute of Mining and Technology in Socorro.

As part of an attempt to explain food preferences in children, he showed that laboratory mice develop an aversion to sweetened water if they are exposed to cigarette smoke (in the amounts to which nonsmokers are exposed when near smokers) 30 minutes after drinking the liquid for the first time. Etscorn explains that infants are particularly sensitive to cigarette smoke because the brain’s barrier to drugs and the liver, which detoxifies nicotine, are less well developed in infants than in adults. Consequently, nicotine probably stays in an infant’s body longer and is more active. Since one drop of pure nicotine on bare skin can kill a person, and Etscorn has shown that 5 microliters on the skin or fur is enough to kill a 40-gram mouse, it should come as no surprise that nicotine can make infants nauseated when they are exposed to even small doses. If this happens at the same time or even several hours after the infant has tried a new food, says Etscorn, the child may subconsciously associate the food with feelings of nausea and reject that food in the future.

Etscorn plans to undertake further animal studies to isolate the substance in smoke that causes the aversion and to determine the duration of the effect. He also is considering a survey of parents in order to see if there is a difference in the eating habits of smokers’ children and those of nonsmokers.

## Kentucky quake aftermath

The fault zone responsible for the quake that surprised residents of Kentucky and surrounding states on July 27 (SN: 8/2/80, p. 68) may be more extensive than previously thought, according to recent magnetic surveys done by Rhonda L. Patterson of the Ohio State University in Columbus. Surveying 1,500 square miles of south-central Ohio, Patterson found that the previously detected Hickman Bryan Station fault zone — the zone believed to be the source of the quake and thought to lie only in northern Kentucky — may extend northeast into central Ohio. Her data show a deviation in magnetic readings along a 75-mile path from Logan, Ohio, to a prehistoric Indian feature called Serpent Mound in south-central Ohio. (Deviations from the expected position of the magnetic field preserved in underground rocks show how much the rock has shifted from its original position.) Like the fault zone responsible for the New Madrid, Mo., quakes of 1811 and 1812, the Hickman Bryan Station zone may be a remnant of an earlier period of rifting that left the crust weakened and “susceptible” to earthquakes.

## U.S.-China quake prediction project

The first Peoples Republic of China-United States research project in earthquake prediction began recently under the leadership of Columbia University’s John T. Kuo and Gu Gung-xu, director of the Institute of Geophysics of the State Seismological Bureau in China. The project, according to a university spokesman, will concentrate on the use of gravity measurements as a predictive tool. Fault zones and other buried geologic structures create uneven distributions of rock mass, which in turn cause minute, localized variations in the strength of the earth’s gravity field. Some scientists believe that the shifting of subsurface structures along faults prior to an earthquake can therefore be detected by gravity measuring instruments called gravimeters. In fact, Chinese scientists measured gravity changes before and after severe quakes that occurred in Haicheng in 1975 and in Tangshan in 1976, but the observations were not precise enough to link them definitely to the quakes.

Kuo, accompanied by graduate student Walter E. Brown and staff engineer Dennis Carmichael, took with him 11 gravimeters, eight of which are accurate to less than one part in a million. The scientists will set up 15 semi-permanent stations and periodically take measurements at 100 other locations in a 50,000-square-mile area around Beijing. Unlike previous gravity surveys in the United States, the instruments will make continuous measurements so that possibly predictive changes in gravity can be sorted out from normal background activity.

## Heat wave statistics

From the National Oceanic and Atmospheric Administration, some loose ends concerning this summer’s heat wave (SN: 7/26/80, p. 52), which took at least 1,265 lives and cost the nation about \$20 billion:

- Seven times more heat-related deaths occurred than in an average summer, with the highest toll in Missouri at 311.
- Total electric use from the last week in June to the first week in September averaged a record 5.5 percent above normal, with a total cost of more than \$1.3 billion.
- Heat buckled hundreds of miles of highways in midwestern and south-central states. Illinois alone suffered about \$100 million in road damage, and damage throughout the affected area is estimated at four to five times that amount.
- On July 13, three cities broke their maximum temperature records — Augusta, Ga., at 107 degrees; Atlanta, Ga., at 105 degrees; and Memphis, Tenn., at 108 degrees.