Behavior

Bruce Bower reports from San Francisco at the annual meeting of the American Psychiatric Association

Adding up violent vulnerabilities

In a highly publicized incident, a group of youths recently raped and beat a young woman in New York City's Central Park. Initial reports described the youngsters as coming from fairly stable families and having relatively crime-free, nonviolent backgrounds.

But this portrayal is probably far off the mark, according to New York University psychiatrist Dorothy Otnow Lewis. "I predict those youths who committed the assault were violent in the past and most likely came from violent families," she says.

Lewis bases her assertion on the results of an ongoing study of violent juvenile delinquents, as well as on previous research with young men on death row (SN: 10/31/87, p.287). In the latest work, she and her co-workers conducted seven-year follow-up evaluations of 95 young men first contacted at a Connecticut correctional school when they were about 15 years old. The group consisted of 77 "very violent" subjects arrested for rape, murder and other acts involving physical aggression, and 18 "less violent" subjects arrested for crimes such as shoplifting and burglary.

Violence does not necessarily breed violence, Lewis notes. A similar proportion of "very violent" and "less violent" subjects were arrested for acts of physical aggression as adults. Young men with the highest rates of aggressive criminal offenses were, however, marked by a combination of vulnerabilities: recurring psychotic symptoms, such as hallucinations and paranoia; neurological problems, including epilepsy and abnormal brain wave patterns; reading and intelligence deficits; and an upbringing in an extremely violent, abusive household.

Violent youngsters often respond well to treatment that addresses their specific problems, Lewis maintains. For instance, most youngsters in her study have significantly improved their reading and thinking skills with individual help from the researchers. In some cases where the boys' households are too violent for them to return to, she suggests placement in supervised group homes.

Driven off the road by brain disease

Preliminary data suggest elderly people with Alzheimer's disease or other brain disorders that progressively disturb memory and perception present a serious and largely unrecognized danger to society: They often continue to drive although they are at a heightened risk for causing automobile accidents.

Psychiatrist Larry E. Tune and his colleagues at Johns Hopkins University Hospital in Baltimore administered a questionnaire on driving habits to 72 patients consecutively referred to their Dementia Research Clinic. The researchers confirmed patients' reports with caregivers and relatives.

Subjects in the survey averaged 72 years of age. Most had Alzheimer's disease or brain damage due to strokes. About three years had passed since symptoms of the diseases first appeared.

Nineteen patients had never driven. Of the remaining 53 patients, 16 continued to drive. Five of them had been in at least one automobile accident since the onset of their illness. A large majority of those still behind the wheel drove alone and at night. Almost half regularly got lost while driving, and three-quarters consistently drove below the speed limit.

Scores on tests of perception and memory were no different for subjects who had accidents compared with those who did not.

Tune and his co-workers routinely advise patients suffering from Alzheimer's disease or brain damage due to strokes not to drive. Alternative transportation strategies are worked out with caregivers and relatives. The researchers also notify the state Department of Motor Vehicles if they consider a patient too impaired to drive.

Biology

Honey bees listen to the dance

Honey bees dance to tell each other precisely where food lies. Scientists have largely decoded bee dances, but they do not yet understand exactly how one bee perceives another's dance signals. Now, for the first time, researchers have shown directly that honey bees can detect and discriminate among airborne sounds simulating those created in their dances, says study coauthor William F. Towne of Kutztown (Pa.) University.

Scientists have suspected that sounds play an important role in the bees' dance communication, which takes place in the dark. Until now, however, no one could confirm that bees "hear" airborne noises. Towne and German colleague Wolfgang H. Kirchner gave feeding honey bees an electric shock shortly after exposing them to a sound of either 265 hertz, the frequency of a dancing bee's wing vibrations, or 14 hertz, the frequency of a dancer's abdominal waggling. The bees learned to withdraw from the feeder in response to the sound alone.

The experiment's success stemmed from the kind of sound the scientists produced. They used a loudspeaker to force a glass tube to resonate in a way that caused an unusual amount of air-particle movement, one component of sound. Human hearing relies on the other sound component, oscillating pressure waves. But by allowing bees to enter a closed tube in which the two components were spatially separated, the scientists showed that the insects respond only at places of air-particle movement, says Towne.

The bees probably detect shifting air particles with organs lying at the hinge of each antenna, say the researchers. These "respond best to air movement of 250 to 280 hertz, the frequency of the dance sounds," they note in the May 12 SCIENCE.

According to Princeton (N.J.) University biologist James L. Gould, the new work has prompted researchers at Odense University in Denmark to create a dancing-bee robot that can recruit real honey bees to food-gathering spots.

Fungal duo teaches evolutionary lesson

Biologists usually classify organisms by their appearance, but new research suggests this may lead to misclassifications. "Looking at molecules [as opposed to appearance] may give us better assignments for [organisms'] place within the phylogenetic tree of life," says Jeffrey D. Palmer of the University of Michigan in Ann Arbor. "And the correct phylogenetic assignment is really just the starting point to understand the evolution of that organism."

By examining DNA, Palmer and his colleagues discovered a close genetic similarity between the umbrella-shaped *Suillus* mushroom and a ball-like, soil-living "false truffle" — one of the first and perhaps most extreme cases in which scientists have found an organism to have evolved directly from another, very different-looking organism, Palmer says.

In the past, biologists were unable to confirm any relationship between the false truffle *Rhizopogon subcaerulescens* and other fungal species. They thought *R. subcaerulescens* was derived, although separate, from members of the family Boletaceae, which includes *Suillus,* but they viewed the relationship as a distant one, says coauthor Thomas D. Bruns at the University of California, Berkeley.

Bruns, Palmer and their co-workers found that the false truffle's mitochondrial DNA is structurally identical to that of 14 *Suillus* species, suggesting the two fungal types should be placed in the same subfamily, Bruns says. They theorize that the false truffle rapidly evolved its drastically different shape through changes in a small set of genes important in fungal development. These changes probably were prompted by strong selection pressure to reduce water loss and to disperse spores via animals, the researchers write in the May 11 NATURE.