

Promising effects of intensive preschool

Disadvantaged children who, along with their parents, take part in an intensive preschool program, reap substantially more academic benefits than peers who attend a less comprehensive preschool, say Joan E. Sprigle and Lyn Schaefer of Florida State University in Tallahassee. Their data support a long-term study by the High Scope Educational Research Foundation in Ypsilanti, Mich.; it found that high-quality preschool education can help poor children to lead significantly more successful lives by the time they reach 19 years old (SN: 9/22/84, p. 185).

"The two studies indicate that when you have dedicated, qualified teachers and parent involvement, disadvantaged kids will benefit from preschool education," says Sprigle.

The researchers followed 90 black children from the same poor neighborhood in Jacksonville, Fla., who entered one of two preschool programs in 1968. An experimental program was designed to teach problem-solving strategies in small groups and allow for play periods in a large classroom. Teachers met with parents once a month to plan ways to help children learn at home. A comparison program involved large classroom instruction and virtually no home instruction by parents.

All 4- and 5-year-olds attended preschool through kindergarten. The intensive program operated separately from the public schools through the first grade; children in the comparison group attended first grade in a public school but received additional classes.

When school records were later examined for the same children in the fourth and fifth grade, the investigators found that the experimental group had significantly higher grades in reading and mathematics. Far fewer of these children were held back a grade or required special education classes.

The experimental program was most effective for boys, says Sprigle. This finding is important but difficult to explain, she notes; boys are often academically slower and less motivated than girls in the elementary grades. The researchers will chart high school grades and dropout rates for boys from the two preschool programs to see if the differences hold up.

Academic advantages observed for the experimental group in the fourth and fifth grade disappear in the sixth grade, point out the researchers. But an unpublished follow-up of the students in junior high school finds that the achievement differences reappear, Sprigle told *SCIENCE NEWS*. High school data for the entire sample are now being analyzed.

Aside from preschool, a number of factors can affect school success, caution the

investigators, such as parents' education, occupation and presence in the home and the child's place in the birth order. But an intensive 3-year preschool program appears to foster general problem-solving skills that cut across subject areas in later grades, says Sprigle.

An intensive preschool program is not inexpensive, she adds, but its costs would be offset by the reduced need for special education later. —*B. Bower*

Alzheimer's disease: Source searching

Using brain tissue taken from living patients, British researchers have been able to get one step closer to determining the initial biochemical changes that occur in Alzheimer's disease.

The memory loss and other cognitive disorders of Alzheimer's disease are all too evident to victims and their families; the current research, reported in the July 6 *NEW ENGLAND JOURNAL OF MEDICINE*, relates the psychological effects to decreased production of the chemical acetylcholine, a neurotransmitter that is involved in memory.

The role of acetylcholine was suspected as a result of autopsy studies, and because the neurotransmitter is involved in memory. This research represents the first "live" demonstration of the connection, Alzheimer's disease researcher Joseph T. Coyle of Johns Hopkins University in Baltimore told *SCIENCE NEWS*. In rare instances brain biopsies are done to confirm a diagnosis, and the researchers, from the University of London and other institutions, studied tissue collected over about five years from 17 patients. They incubated the brain cells with a radioactive precursor of acetylcholine, and found the cells were producing less than cells from apparently normal tissue removed from brain tumor patients. The more serious the outward manifestations of Alzheimer's disease, the less acetylcholine produced.

In autopsy studies of other patients, they found that changes in other neurotransmitter systems did not correlate as neatly to previously collected psychological data, leading them to conclude that damages to the other systems are not primary events in the disease.

The finding represents bad news and good news in terms of therapy. Because the "production machinery" and not the presence of raw materials seems to be at fault, current efforts to supply an acetylcholine precursor may be inappropriate, says Neil R. Sims, a researcher on the project who now works at the Burke Rehabilitation Center in White Plains, N.Y. But the finding that acetylcholine changes occur early in the course of the disease suggests that some other way of manipulating the metabolic pathway may be worthwhile, he says. —*J. Silberner*

EPA passes new PCB regulations

The Environmental Protection Agency (EPA) issued new regulations last week that it said were intended to protect the public from potential health risks posed by fires involving electrical transformers that had polychlorinated biphenyls, or PCBs, in their cooling systems. The new rules will require landlords and utilities that own certain types of PCB-cooled transformers in commercial buildings such as hospitals, shopping centers and office buildings to remove the equipment by 1990. Other types of PCB-cooled transformers, the agency said, will not have to be removed, but they will require improvements.

The EPA action follows several fires, including one in Binghamton, N.Y., in 1981, and one in San Francisco in 1983, which ruptured transformers, spilling and partially burning the enclosed PCBs. Soot samples from both fires showed that the PCBs — which have been shown to cause tumors in animals — had turned into more lethal by-products, including dioxins.

The EPA estimates that 39,000 of the 77,000 transformers in commercial buildings are owned by utilities. Some utility companies claim that EPA's estimate that compliance with the new rules will cost U.S. businesses only \$600 million is unrealistic.

"We've voluntarily replaced 400 transformers within the last 2 to 3 years," says Tim Schulte, a spokesperson for the Chicago-based Commonwealth Edison Co., "but we still have another 2,000 that must be either removed or improved, and it's going to cost us \$200 million."

But according to Denise Keehner, chief of the regulations branch in EPA's Office of Pesticides and Toxic Substances, the \$600 million price tag is partially offset by the projected \$200 million that utilities and businesses will save in reduced fire clean up costs.

Until now, EPA had not judged PCB-cooled transformers to present any "unreasonable risk" to humans or the environment, because the PCBs were "totally enclosed" within the cooling systems. Since 1978, however, EPA has prohibited all other uses of PCBs. But that action has had little effect, according to some environmentalists, who estimate that transformers accounted for more than 90 percent of all PCB use. Moreover, they fear that the new regulations still may not be far-reaching enough. "The question is whether these regulations will affect a large enough percentage of the country's PCBs to satisfy us that we needn't go back to court," says Robert A. Michaels, a toxicologist with the Natural Resources Defense Council in New York City, which has sued EPA on the grounds that the 1978 regulations were inadequate. —*J. Mathewson*