Behavior

'Reading minds' the autistic way

A number of studies suggest that between ages 3 and 5, children start to realize that people sometimes base behavior on beliefs, intentions, or other mental states. Some researchers argue that a "theory-of-mind" device in the brain makes possible the understanding of others' mental states, including false beliefs. This mechanism may sputter in children afflicted with autism, a condition marked by the inability to communicate with others or develop social skills (SN: 7/17/93, p.40).

However, some autistic youngsters manage to grasp the notion of false beliefs, according to a report in the June CHILD DEVELOPMENT. These children display far more verbal knowledge than other 3- to 5-year-olds and may work out theory-of-mind tasks in "an unusually conscious and logical way," asserts Francesca G.E. Happé, a psychologist at the Medical Research Council (MRC) Cognitive Development Unit in London.

Happé pooled data from previous investigations of 70 autistic youngsters age 6 to 18; 34 severely learning-disabled youngsters age 8 to 18; and 70 healthy 3- to 5-year-olds. Participants had completed tasks that required them to assess whether someone else could hold a mistaken belief. In one trial, for example, youngsters saw that a candy box held only crayons and then told an experimenter what another person would think the box contained upon first seeing it.

The 39 healthy children who understood false belief achieved average scores on a word knowledge test appropriate for 5-year-olds. The 20 learning-disabled students who comprehended false belief displayed the word knowledge of 6 1/2-year-olds. The 14 autistic youngsters who passed false-belief tests exhibited word knowledge typical of 9 1/2-year-olds.

Further research by Happé indicates that children who succeed at theory-of-mind tasks, including autistic children, usually understand metaphors, irony, and a range of speaker motivations, such as the intention to lie or tell a joke.

Autistic youngsters who understand someone's false belief usually give laborious explanations for their insights, indicating their use of conscious strategies to discern mental states, she contends. Most healthy and learning-disabled children cannot explain how they divine a false belief and probably "read minds" in a more fluid, unconscious manner, Happé holds.

Depression's birth in poor women

In the months before and after giving birth, poor women display more than twice the rate of depression previously noted among middle-class women, a new study finds.

Moderate or major depression during pregnancy—but not following birth—show the strongest link to a combination of poverty and the absence of a husband or live-in partner, assert Stevan E. Hobfoll, a psychologist at Kent (Ohio) State University, and his colleagues.

Pregnant, single women confront new burdens and family conflicts that would be buffered by a partner's support, the researchers suggest. Single women may gain family acceptance and aid once a child is born, thereby decreasing the emotional impact of a partner's presence, they theorize.

Hobfoll's group interviewed 192 low-income women, most on some form of welfare, on three occasions: halfway through pregnancy, 7 to 9 weeks before the expected delivery, and 7 to 9 weeks after the due date. About one in four women cited symptoms of moderate or major depression at each point, the investigators report in the June JOURNAL OF CONSULTING AND CLINICAL PSYCHOLOGY. Major depression appeared most often at the first interview, they report, "when women were first having to adjust to the fact of their pregnancy."

A woman's race (white or black in this study), number of children, number of miscarriages, and level of self-esteem showed no connection to the likelihood of depression.

Biology

Bug juice: A nutritious plant food?

Researchers have extracted a protein from grasshoppers that boosts plant growth in the laboratory, they report. Because regurgitated matter in the insects' mouths contains the protein, plants probably get a dose of it when grasshoppers feed on them.

Scientists had suspected that insects contain chemicals that help regulate plant growth, says Melvin I. Dyer of the University of Georgia in Athens, but no one had found the compounds.

Dyer and his colleagues collected over 1,000 Georgian *Romalea guttata* grasshoppers, then extracted and analyzed six different proteins from the bugs' midguts, they report in the June 6 PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES.

The scientists exposed new shoots of sorghum plants to each of the proteins, along with auxin, a major plant growth hormone. After 24 hours, one of the proteins had caused the shoots to grow more rapidly than they did when exposed to auxin alone. Even at very low concentrations, the protein quadrupled growth, Dyer and his colleagues report. The protein appears to make auxin much more efficient.

The protein acts as an epidermal growth factor (EGF), a peptide found in the salivary glands of many animals, Dyer says. EGF alters plant cell growth, seedling development, and other production processes, the authors note.

Turning the protein into a fertilizer may never be practical, Dyer admits. Instead, he says, researchers are trying to find the receptor for the chemical messenger that tells plants to grow; they will then look for the gene that controls the receptor. That discovery might enable scientists to create transgenic crops with superior growth rates, Dyer speculates.

Plants make the most of visiting ants

Many picnickers have had to relocate after ants invaded and began to carry off their summer supper. But certain epiphytes, those wily plants that live on trees, derive much of their nutrients from visiting ants, a new study shows.

In exchange for shelter, ants provide the plants with significant amounts of carbon dioxide and nitrogen, Kathleen K. Treseder of Stanford University and her colleagues report in the May 11 NATURE.

Dischidia major, an epiphyte from Sarawak, Malaysia, gets 39 percent of its carbon from carbon dioxide exhaled by ants living in its sacklike leaves, the team reports. The carbon diffuses through small openings in the leaves.

Almost 30 percent of *D. major's* nitrogen comes from ant debris, including feces, dead ants, and scavenged insect parts. Plants send their roots to areas where this nutritious debris accumulates.

Treseder and her colleagues calculated how much of the plants' carbon and nitrogen comes from the ants by analyzing isotopes of these elements, she says. Ants respire carbon dioxide that lacks carbon-13 isotopes, and ant debris is rich in nitrogen-15 isotopes, they report.

The researchers knew how much carbon-13 the plants would contain if they derived their carbon from the atmosphere only. They had also determined the nitrogen concentration of the leaves of a different *Dischidia* species that grows on the same trees but does not harbor ants.


Treseder

Malaysian epiphytes, including D. major, *the orange, vinelike plant.*