Behavior

U.S. parents score low on math help

Elementary school students in the United States generally score below their counterparts in Japan and Taiwan on mathematics achievement tests – a trend that has helped spur calls for reform in U.S. mathematics education. However, the problem lies not just in the classroom but also at home, according to a report in the September JOURNAL OF EDUCATIONAL PSYCHOLOGY. Parents of U.S. grade schoolers tend to evaluate their children's math skills less critically, provide less effective help with math problems and hold lower standards for math achievement than do parents in Asia.

In two studies directed by psychologists David S. Crystal and Harold W. Stevenson, both at the University of Michigan in Ann Arbor, experimenters interviewed a total of 2,205 mothers of either first- or fifth-graders. Roughly equal numbers of these mothers lived in the United States, Japan or Taiwan.

Compared with the Asian mothers, significantly fewer U.S. mothers believed their children had serious mathematics difficulties, although the U.S. youngsters scored substantially below the Asian children on math examinations administered by the researchers. Reports from U.S. mothers indicated that they provided less math assistance to their first-graders than did the Asian mothers. U.S. mothers of fifth-graders asked other family members for help with a child's math problems less often than their Asian counterparts. Both U.S. and Asian mothers reported that fathers seldom served as children's main source of math help. Siblings assisted the grade schoolers frequently in Asia but rarely in the United States.

In both studies, U.S. mothers said their youngsters' math problems mainly involved calculation and drill-based procedures, such as multiplication tables, whereas Asian mothers usually described difficulties with more complex, applied problems. Some of this difference may stem from the greater frequency of drills on basic math operations in Asian classrooms, as well as more interaction between teachers and students in Japanese schools, Crystal and Stevenson maintain.

Tracking teen suicide attempters

A new study suggests that concerned adults can best identify teenagers on the verge of a suicide attempt by directly asking them about recent feelings of hopelessness and thoughts about suicide. Previous studies indicated that distinguishing suicidal adolescents from their peers required a more extensive screening of prior mental problems, drug use, school failure and other factors.

One in 12 U.S. high school students attempted suicide last year, according to a national survey released last week by the Centers for Disease Control in Atlanta.

In search of clues to identify suicide-prone students, psychiatrist Susan E. Swedo of the National Institute of Mental Health in Bethesda, Md., and her co-workers studied 21 teens hospitalized after recent suicide attempts, 15 teens who had not attempted suicide but were considered at increased risk because of sexual abuse, drug abuse or severe depression, and a control group of 34 healthy teens.

Compared with the controls, attempters reported more drug abuse, depression and behavior problems, as well as poorer peer friendships, self-image and communication skills. But attempters differed from "at-risk" teens in only two respects. Attempters reported more hopelessness on a standard, 20-item questionnaire, and in three out of four cases, they said that at some time they had felt that life wasn't worth living and had considered suicide as a way out. Although many attempters cited a recent upsetting event – such as harsh punishment by parents or a romantic breakup – as the trigger for their suicide attempt, such incidents occurred just as often among the at-risk group, Swedo's team reports in the September PEDIATRICS.

Biology

Smelly spray signals free lunch for flies

Stomp on a stinkbug, and you'll get a whiff of chemical weaponry. Stinkbugs – and their cousins, the squash bugs – unleash their aromatic ammunition to ward off predators such as spiders. But ecologists have now discovered that the smelly secretions hold an allure for tiny flies known as milichiids, which often swarm in to suck a meal from bugs held captive by spiders.

The chemicals that serve as dinner bells for these freeloading flies are the same odoriferous substances that repel people and most insects, the researchers report in the Sept. 15 PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES. Thomas Eisner of Cornell University and his co-workers determined that these chemicals – hexanal and trans-2-hexenal – trigger the flies' prey-poaching behavior, known as kleptoparasitism.

The flies are too small to kill stinkbugs or squash bugs on their own. But once the bugs have been immobilized and partially digested by a spider's venomous bite, they make a perfect meal for the milichiids, which slurp their dinners through long, needle-like feeding tubes.

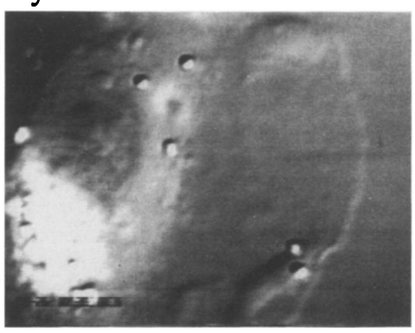
"All the flies have to do is follow the scent of the spider's prey, eat their fill and fly away," Eisner explains.

Spiders usually ignore the flies, making no effort to chase them away, the researchers observed. And because spiders usually dine on their prey at the central hub of the web – where the silk is not sticky – the flies themselves rarely become entangled.

To confirm that hexanal and trans-2-hexenal served as the chemical attractants, Eisner's group constructed gluey cardboard traps, some of which held tiny tubes of the chemicals. Each baited trap caught several flies, while the unbaited traps caught none.

Creeping cells rely on molecular motors

For years, cell biologists have theorized that a migrating cell rolls along much like a military tank tread, pulling its outer membrane across its back in order to push its underside along. But a new study shows that the cell's ruffled "leading edge" does most of the work, while the rest of the outer membrane remains fairly still.



Dennis F. Kucik and Scot C. Kuo/Duke

Two beads placed at the thin, ruffled leading edge (right) of a moving cell flow backward, while three deposited on the center of the cell membrane only jostle around randomly.

The researchers, led by Michael P. Sheetz at Duke University Medical Center in Durham, N.C., used laser "tweezers" to place tiny plastic beads on highly mobile cells taken from goldfish scales and cultured in the laboratory. In the Sept. 15 JOURNAL OF CELL BIOLOGY, they report that the beads on the cells' leading edges were swept rearward as the cells advanced, while beads at the center of the cells' membranes showed only random movement.

Sheetz and his colleagues say their finding suggests that a cell travels by "actively moving components of the cytoskeleton," the cell's inner structural network. Unidentified molecular "motors" pull on the cell's cytoskeleton, the researchers propose, attaching to proteins at the membrane's leading edge and then heaving the cell forward without affecting other membrane regions.