Females show strong capacity for aggression

Males carry a hard-earned reputation as the more physically aggressive sex, but the female capacity for aggression and violence is surprisingly strong, according to several studies presented in Chicago last week at the annual meeting of the American Anthropological Association.

"Female aggression has been dismissed and minimized by many researchers, [because] it's not as frequent or as intense as male aggression," asserts Victoria K. Burbank of the University of California, Davis.

Physical aggression among preschool-aged girls escalates sharply in particular cultures, reports Carol Lauer of Rollins College in Winter Park, Fla. Lauer finds that girls between 1½ and 4 years old average fewer fights than boys of the same age in the United States, and that Israeli girls also fight less than their male counterparts. However, Israeli girls start fights and use physical aggression about 20 percent more often than do U.S. boys, she reports.

"Girls and boys follow cultural dictates that can overwhelm any genetic influences on aggressive behavior," she concludes.

Lauer logged 1,900 hours of observation with groups of youngsters attending a U.S. daycare center and others living on an Israeli kibbutz. The project involved a total of 160 children.

Although average gender differences in physical aggression often fell short of statistical significance in the small groups she studied, Lauer says children in both countries fought for the same reasons. Hostilities broke out most often over access to places or things, followed by aggressive incidents arising from rough-and-tumble play. Boys displayed a greater tendency to attack another child for no apparent reason, she notes.

Lauer suggests that the heightened physical aggression of Israeli boys and girls reflects the influence of living in a country that has continually prepared for war for more than 40 years. Israeli adults readily defend themselves physically and often fight over matters that seem trivial to visitors from the United States, such as saving a place in line at the grocery store, she points out.

Ethnographic work among adolescent gangs in working-class neighborhoods of Chihuahua, Mexico, yields considerable evidence of female participation in fighting and violence, says Laura L. Cummings of the University of Arizona in Tucson. The gangs she studied belong to a tough youth culture known as *cholos*.

A girl undergoing initiation into a gang typically engages in a fistfight with an established female gang member, just as a male initiate must spar with a male member, Cummings says. When male gang members find themselves outnumbered in a fight with rivals, their female compatriots immediately join the fray. Groups of knife-wielding, rock-throwing girls from rival gangs also engage in frequent brawls with each other, but male gang members stay out of those scuffles, Cummings says.

"These observations run counter to the widespread stereotype of passive Latin American women," she remarks.

In Finland, where women have long held positions of power in politics and the workplace, adolescent girls use direct physical or verbal aggression less often than do boys, but rely much more on "indirect aggression," reports Kaj Björkqvist of the University of Turku, Finland. Björkqvist and his colleagues interviewed several hundred high school students, asking each to rate every other student in his or her classroom on a list of aggressive behaviors.

Girls garnered the bulk of reports citing acts of indirect aggression, such as gossiping, breaking confidences, writing nasty notes about others and manipulating another person to do one's "dirty work." Teenage girls in Finland prove as aggressive as teenage boys when researchers combine both direct and indirect aggression, Björkqvist says.

He and his co-workers have initiated similar studies of teenagers in India, Japan, the United States, Israel, Poland, Italy and Mexico. *– B. Bower*

Split hydrogen bond allows water to flow

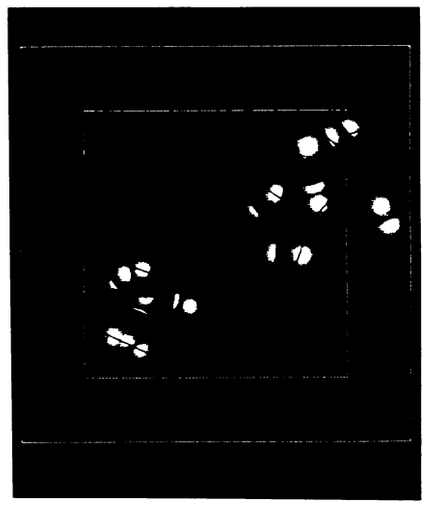
Hydrogen bonds – strong connections between hydrogen atoms and atoms belonging to other molecules – keep antifreeze from boiling away in overheated radiators and stabilize the kinks and folds of proteins. One might expect water, with two hydrogen atoms and one oxygen in each molecule, to be quite stiff because it contains so many of these bonds. Yet it manages to flow as easily as substances lacking such tight intermolecular ties.

Three researchers have now demonstrated that defects in this network of bonds may explain the apparent paradox. Usually, hydrogen bonds cause every water molecule to link up with four others. But every so often, a fifth squeezes in, and this crowding defect allows molecules to shift around, the team reports in the Nov. 21 NATURE. Physicists Francesco Sciortino and H. Eugene Stanley of Boston University conducted the work with chemist Alfons M. Geiger of the University of Dortmund, Germany.

The researchers view water as an ephemeral gel, with hydrogen bonds forming "a network, like a fisherman's net," says Stanley. Last year, he and Sciortino discovered that in computer simulations of water as a gel, some hydrogen bonds last longer than others. This contradicted the long-held idea that hydrogen bonds take a characteristic amount of energy – and time – to break (SN: 4/14/90, p.231).

From the new work, the team concludes that every so often, five water molecules get together. In order for this five-way alliance to form, one hydrogen bond splits – in an energy sense – and holds on to the fifth water molecule, leading to two weak bonds instead of one strong bond. This change "allows the network to come apart and for one molecule to go to another place," Stanley says.

He and his colleagues simulated water molecules with varying numbers of neighbors. The more crowded molecules tended to be more mobile and to rotate more easily, they found. The team also showed that in "stretched" water – with increased spacing between molecules – the liquid's mobility decreased.



Boris Ostrovsky/Boston Univ.

Lines show "fishnet" of hydrogen bonds, with cluster of four (left) and five (right) water molecules superimposed.

In experiments to be described in an upcoming JOURNAL OF MOLECULAR LIQUIDS, a separate group of German chemists observed similar effects in mixtures of organic molecules and water.

"When water is diluted by other molecules, in some ways it makes the same effect: There are fewer water neighbors," Geiger explains. "You have a new mechanism that explains several things that are not related." This mechanism can also explain why water flows faster under pressure, which forces molecules closer together, he adds.

Earlier this year, geologists at Stanford University proposed that the temporary formation of a fifth bond between silicon and neighboring oxygen atoms might explain the flow of molten rock (SN: 6/29/91, p.404). *– E. Pennisi*