

## Foragers challenge key child-care theory

The Efe, a group of forest-dwelling foragers in Africa also referred to as pygmies (a term they dislike), may force psychologists to revise widely held assumptions about child care and infant social and emotional development.

Compared with youngsters in Western cultures and other hunting and gathering groups, Efe babies and toddlers spend an unprecedented amount of time away from their mothers in the care of numerous older children and adults, asserts a research team led by psychologist Edward Z. Tronick of Children's Hospital in Boston. Shared child-rearing of this magnitude challenges the basic precepts of attachment theory, or what Tronick calls "the continuous care and contact model" of child development.

Over the last 25 years, attachment theorists have generally argued that an infant progresses from a primary relationship with one person — usually the mother — or at most a few people to a growing number of social connections, with the primary relationship serving as a model for those that come later.

"Attachment theory has important cultural limits," Tronick contends. "An Efe child experiences several models of parenting and forms a sense of self that is radically different from that observed in the United States."

Scientists currently cannot identify core, universal child-rearing behaviors, Tronick adds. "We don't yet know the full range of human caretaking," he says.

The first phase of Tronick's study lasted from 1981 to 1983, when his team studied the social lives of 23 Efe children whose ages ranged from 1 to 3. The second phase, conducted from 1988 to 1989, examined caregiving arrangements for 17 Efe infants at either 5 months or 8 months of age.

In both studies, researchers first visited Efe camps regularly for five to seven months to learn the group's practices and accustom the foragers to observation by outsiders. Experimenters then gathered data on each participating child's daily activities for up to two weeks.

In the July *DEVELOPMENTAL PSYCHOLOGY*, the scientists report that Efe infants and toddlers spent about half their time with people other than their mothers; for 3-year-olds, that figure rose to 70 percent. Contact with fathers remained stable for all ages, accounting for around 8 percent of the children's social activities.

The proportion of time spent with other children jumped from an average of 29 percent for 5-month-olds to 62 percent for 3-year-olds. Frequency of social contact with other adults held fairly constant at all ages, ranging from an average of 16 percent to 28 percent.

When necessary, Efe women breast-feed the infants of others, Tronick notes.

Efe youngsters seldom find themselves alone, the researchers assert. For example, caregivers hold infants throughout the day, rarely putting them down. And 1-year-olds stay within sight or hearing range of about 10 people at all times.

Efe children maintain close emotional ties to many caretakers, comparable in intensity to those experienced with far fewer caretakers in other communities, the researchers say.

Although Efe infants deal effectively with multiple caretakers, Tronick says the data do not imply that early day care will proceed smoothly in the United States. Caretaking arrangements should feel natural and "culturally appropriate," he says. Efe infants get passed among familiar caretakers whom they see every day. Moreover, Efe caretakers were raised in the same way and consider it normal.

In contrast, U.S. children leave their homes to go to day-care centers that often have a high staff turnover, Tronick says. Even well-trained staff often did not grow

up in a day-care setting and probably experience some "disquiet" with the situation, just as parents often report unease or guilt at sending their offspring to day care, he maintains. As today's U.S. youngsters reach adulthood and bear children, they will approach day care with less ambivalence, Tronick argues.

"I entirely agree with Tronick that babies can form secure attachments to any number of people," says Tiffany M. Field, a psychologist at the University of Miami Medical School. She finds generally positive effects of high-quality day care, with youngsters forging close bonds with peers as well as with parents.

However, the Efe studies do not conclusively topple traditional attachment theory, holds Jay Belsky, a psychologist at Pennsylvania State University in University Park. Efe infants and toddlers may prefer some caregivers over others, he notes. The Efe live within large extended families and offer no clear implications for day care or child-rearing in the United States, he adds.

"But these are provocative data," Belsky says. — B. Bower

## Do clouds provide a greenhouse thermostat?

Earth's oceans have a natural thermostat that — at least for the present — keeps their surface waters from warming above 32°C. Understanding that thermostat may be critical for predicting how the climate will change, but new research shows that the problem does not yield to a simple explanation.

Last year, hope for a straightforward answer ran high. V. Ramanathan and William Collins of the Scripps Institution of Oceanography in La Jolla, Calif., proposed that cirrus clouds regulate ocean surface temperatures in the tropical Pacific (SN: 5/11/91, p.303).

This week, however, a group of atmospheric researchers disputes the cirrus thermostat model. "Our contention is that clouds are really not the story," says Anthony D. Del Genio of NASA's Goddard Institute for Space Studies in New York City, a coauthor of the study led by Rong Fu of the University of California, Los Angeles. They report their work in the July 30 *NATURE*.

Ramanathan and Collins presented satellite data suggesting that cirrus clouds helped limit ocean temperatures in 1987, when an El Niño warming brewed in the equatorial Pacific. The data showed that as the sea surface warmed in the central and eastern equatorial Pacific, cirrus clouds reflected more sunlight back into space, cutting down the light reaching the ocean surface.

Fu and her colleagues counter with evidence that sea surface temperatures do not control cirrus cloud formation. Using satellite data for the whole tropical Pacific, they find that cirrus clouds

across this broad region remained nearly normal during the 1987 El Niño, even though sea surface temperatures rose by 2°C to 3°C through the area, says Del Genio. Looking at years without El Niño warmings, the researchers found enhancements in cirrus clouds even when ocean temperatures did not increase, indicating that some other factor controlled the cloud properties.

If cirrus clouds don't cap ocean temperatures, evaporation may, suggest the researchers. Water evaporating from the ocean releases heat into the atmosphere, cooling off the sea surface, just as evaporating sweat chills a person's skin. Ocean circulation could also help regulate temperatures by carrying warm water away from the tropics, Del Genio says.

Ramanathan and Collins contend they are not through yet. Collins told *SCIENCE NEWS* that several groups have papers pending that contradict the conclusions of Fu and her co-workers. Part of the discrepancy arises because Fu's group looked at the entire tropics, effectively diminishing the importance of the El Niño warming near the equator, Collins says.

The debate is important because the tropical Pacific has Earth's strongest greenhouse effect and one most sensitive to change. Climate experts need to understand the tropical thermostat in order to predict how it will function when global temperatures increase. A major international experiment planned for later this year in the western Pacific should provide some of the needed information.

— R. Monastersky