Childhood origins of Type A behavior

For some time, psychologist Carl Thoresen and his co-workers at Stanford University have noticed that patients recovering from heart attacks who fit the competitive, hostile, achievement-oriented pattern of "Type A" behavior are unable to remember ever having *not* fit into a hard-driving mold. This got the scientists to wondering: What are the origins of Type A behavior?

In a three-year study presented last week at the American Psychological Association's annual meeting in Los Angeles, they report that some children and adolescents exhibit psychological and physical signposts of a Type A behavior pattern, fostered by parental child-rearing practices.

They do not yet know, however, whether Type A children are more likely to suffer heart attacks later in life.

Thoresen and psychologists Jean R. Eagleston, Kathleen Kirmil-Gray and Paul E. Bracke surveyed 700 youngsters in grades 5, 7 and 9. Using several questionnaires and interviews, they identified 93 children with the highest Type A scores and 91 with the lowest Type A scores.

The high Type As reported significantly more physical symptoms associated with stress than their low-scoring counterparts, says Eagleston. Sleep disturbances were more common among high Type As than in the "low" group. During a three-month period, they suffered many more headaches, sore throats, colds, flus and allergies than the other children. The high Type A youngsters and their parents may ignore the surplus of physical symptoms, adds Eagleston, because there were no group differences in school absences due to illness or doctor's visits.

Although adult Type As tend not to report high levels of anxiety or depression, "something different appears to be going on with Type A kids," says Kirmil-Gray. On a number of scales, high Type A children report more insecurity about how others perceive them, a greater fear of alienating others through their success and markedly lower self-esteem. High Type As have as many friends as low Type As and are able to maintain social contacts just as well, but they worry a great deal about proving their worth, even more than has been observed in adult Type As, explains Kirmil-Gray.

Type A children also reported that they were angrier more often, for longer periods of time, and were more explosive than low Type As. "Maybe the high-scorers are more prone to arousal in general," says Kirmil-Gray. "We might understand them better if we studied more positive types of arousal, such as curiosity and creativity."

In a subsample of 40 youngsters and their parents, Bracke found that the origins of Type A behavior may differ for boys and girls. The parents of high Type A boys said they criticized their sons' failures more often than did the parents of low Type A boys. When the children attempted to perform block-stacking and ring-toss exercises in the laboratory with their parents present, high Type A parents often tried to tell their sons what to do, says Bracke. In addition, the fathers of high Type A boys were more likely to use physical punishment in response to their sons' misbehavior than were fathers of low Type As. Fathers of high Type As were also far more often Type As themselves, thus serving as models of Type A behavior, notes Bracke.

Parental modeling and discipline were less clearly related to high Type A scores among girls, says Bracke. Type A girls need to be examined in more contexts at home and in the laboratory, he suggests.

The Stanford findings are provocative, says Judith Siegel of the University of California at Los Angeles, but Type A behavior remains poorly defined. "We don't know whether Type A children in this study are more aroused in general than other children and whether they are especially coronary prone," she points out.

But psychologist Martin Ford of Stanford says the data indicate that "Type A behavior is more than an isolated syndrome suffered by a few hard-driving executives." It is a general motivational pattern that is learned early, says Ford. In childhood, he observes, it is marked by a conflict between an intense desire to be accepted by others and a belief that hostility and disruptive behavior are necessary to control others, who are seen as obstacles to success.

While a child's parents may play an important role in the development of Type A behavior, "We don't know if kids are born with Type A tendencies that contribute to an early Type A environment," says Thoresen. — *B. Bower*

Rocky Mountain (sulfur) highs and lows

Sometimes, the lucky combination of geography and human activity provides just the right conditions for an important though unintentional field experiment. This was the situation that allowed a group of researchers to show recently that on the average, emissions of sulfur dioxide lead to corresponding sulfate ion concentrations in rain falling hundreds of miles away — at least in the Rocky Mountain states.

The setting for the experiment was a mountainous region between the crest of California's Sierra Nevada and the Continental Divide, which winds through Colorado and other western states. In this region, a small number of metal smelters, located mainly in New Mexico and Arizona, are responsible for most of the area's sulfur dioxide emissions.

From 1980 through 1983, emissions from these smelters fluctuated widely as plants responded to rapidly changing copper prices and general economic conditions. At the same time, National Acid Deposition Program (NADP) stations in Colorado, Wyoming and Idaho were measuring the concentration of various ions found in precipitation.

When annual sulfate concentrations for all of the monitoring stations are plotted against time, the graph, year by year, very closely follows the ups and downs of total sulfur dioxide emissions from the smelters. Reporting in the Aug. 30 SCIENCE, Michael Oppenheimer and his colleagues at the Environmental Defense Fund, Inc. (EDF) in New York City conclude, "Our study illustrates a response of precipitation chemistry to large changes in emissions at distant locations."

Moreover, the EDF analysis is one of the first studies to show explicitly a linear relationship between emissions and sulfate deposition. Two years ago, a National Academy of Sciences panel concluded that over a large enough region and averaged over a long enough time period, this was probably true for eastern North America (SN: 7/2/83, p. 7; 7/30/83, p. 72). The new study bolsters that conclusion.

"It was a nice field experiment," says James H. Gibson, NADP director and an ecologist at Colorado State University in Ft. Collins. "The only thing that may detract from it is that certain other species, particularly calcium and nitrate and possibly some other ions, also seem to follow a somewhat similar pattern."

Because smelters aren't likely to emit nitrates, for example, this means that other factors may also have influenced ion concentrations in rainwater. "But the fact that sulfate behaves so beautifully with respect to the change in smelter activity," says Gibson, "is a pretty good indication that it plays a major role in that pattern."

Oppenheimer's argument could be strengthened if sulfate deposition mirrors sulfur dioxide emissions on a month-by-month rather than just on an annual basis. He is now completing that analysis and says preliminary results support the original conclusion.

It would also be helpful to find out which particular smelters contribute to sulfate deposition in given areas. That idea may be tested when a large new Mexican smelter begins to operate at Nacozari later this year. This smelter and another nearby, slated to be expanded, have no sulfur dioxide controls. It isn't clear which way the smelter's plume of pollution will tend to travel.

"When that smelter comes on and if the plume travels in a northerly direction," says Gibson, "we ought to see its effect in the measurements." —*I. Peterson*