

GOOD DIET, EXERCISE, ENRICHED ENVIRONMENT LOWER RISK OF LATER ANTISOCIAL BEHAVIOR AND SCHIZOTYPAL PERSONALITY

A new study indicates that providing children with a better diet, more exercise, and an enriched early education may dramatically reduce the chances that they will become antisocial or develop schizotypal symptoms in the late teen or early adult years.

Adrian Raine and colleagues assigned 83 children - all participants in the long-term Mauritius Child Health Project - to an experimental enrichment group, comparing them afterward to several hundred children who did not receive special intervention. Control children were matched on a variety of variables including autonomic function, temperament, nutritional status, cognitive functioning, and demographic factors. The intervention, which began when the children were three and lasted for two years, consisted of:

- A structured nutrition program, offered by the children's nursery school, which provided the children with a hot meal, salad, milk, and fruit juice every day (compared to the typical nursery-school diet of bread and/or rice).
- A program of physical exercise including gymnastics, outdoor games, and free play.
- An enhanced educational program focusing on verbal skills, visuospatial coordination, conceptual skills, memory, and sensation and perception.

The researchers conducted follow-ups when the participants were 17 and 23 years old, using both self-reports and formal measurements to evaluate subjects for the presence of antisocial behavior, criminal behavior, conduct disorder, or schizotypal symptoms (which include unusual perceptual experiences, lack of close friends, and cognitive disorganization). Their data showed that subjects who had participated in the early enrichment program exhibited lower scores for schizotypal personality and antisocial behavior at the age of 17, and for criminal behavior at the age of 23. Raine et al. note, "The beneficial effects associated with the intervention tended to be greater for children who were malnourished at age 3, particularly with respect to outcomes for schizotypal personality at ages 17 and 23 and conduct disorder at age 17." This indicates, they say, that the nutritional component of the intervention played an important role in the children's outcome—a finding they say is consistent with other studies linking nutritional deficits to schizophrenia, schizoid personality disorder, and antisocial behavior (see related article, [Crime Times, 2002, Vol. 8, No. 3, Page 1](#)).

The researchers conclude that their findings "may be particularly relevant to poor rural areas of the United States, such as the Mississippi delta region, and also to U.S. inner cities, where rates of both malnutrition and behavioral problems in children are relatively high." In addition, they say, given the similarities between schizotypal symptoms and schizophrenia, their data suggest the possibility that early dietary enrichment could delay or even prevent the development of schizophrenia itself.

In related research, Raine, Jianghong Liu, and colleagues assessed children from the Mauritius study for malnutrition at age 3, and measured their cognitive skills at the ages of 3 and 11. The researchers report that the children who were malnourished at the age of 3 showed reduced verbal and full-scale cognitive ability at that time, and that by the age of 11 they exhibited lower verbal, spatial, and full-scale IQ, poorer reading ability, and academic and neuropsychologic deficits. "Children with three indicators of malnutrition," the researchers report, "had a 15.3 point deficit in IQ at age 11 years." The findings were true for all ethnic groups and both sexes, were stable over time, and remained significant when the researchers controlled for psychosocial adversity. They conclude, "Findings support the view that early childhood malnutrition is a potential risk factor for later cognitive deficits and, from a pediatric perspective, raise the possibility that promoting early childhood nutrition could enhance children's long-term cognitive development and school performance."

"Effects of environmental enrichment at age 3-5 years on schizotypal personality and antisocial behavior at ages 17 and 23 years," Adrian Raine, Kjetil Mellingen, Jianghong Liu, Peter Venables, and Sarnoff A. Mednick, *American Journal of Psychiatry*, Vol. 160, No. 9, 2003, 1-9. Address: Adrian Raine, Department of Psychology, University of Southern California, Los Angeles, CA 90089-1061, raine@usc.edu.

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"Malnutrition at age 3 years and lower cognitive ability at age 11 years," Jianghong Liu, Adrian Raine, Peter H. Venables, Cyril Dalais, and Sarnoff A. Mednick, *Archives of Pediatric and Adolescent Medicine*, Vol. 157, June 2003, 593-600. See address above.