

The Big Fat Problem

(excerpt from *Queen of Education* by LouAnne Johnson, pub. Jossey-Bass, 2005)

Americans are too fat. We know that. We also know that childhood obesity and diabetes are running rampant in our schools, along with asthma, allergies, attention deficit, and a host of other learning disorders. Fat and failure in school may be linked, according to recent research. I had read some bits here and there about the effects of nutrition on learning and behavior, and I was intrigued. But after attending the 2003 European Council of International Schools conference in Hamburg, Germany, I am convinced that nutrition and neuroscience are going to change the way Americans view both eating and learning.

In Hamburg I had the good fortune to hear Dr. Madeleine Portwood, a senior educational psychologist from the United Kingdom, present the preliminary findings from the Durham trial, a research experiment involving elementary school students who were struggling or failing classes. Before Dr. Portwood began speaking, I had been feeling a bit sorry for myself for having to spend the Thanksgiving vacation week away from my family. After hearing Dr. Portwood, I was thankful to be thousands of miles from home, sitting on a hard plastic chair in a chilly auditorium. And I was in a hurry to go home—not just to hug my family but to share what I learned with my fellow educators and parents and anybody else who will listen.

First, a disclaimer. I am not a scientist, a chemist, or a trained nutritionist. I have read extensively about diet and nutrition, and I have conducted unofficial nutritional experiments on myself. Some were quite successful. I learned, for example, that if I take evening primrose oil and an herbal complex containing dong quai, chastetree, white willow, black cohosh, and shave grass, I have no symptoms of premenstrual syndrome. I learned that eliminating aspartame and high-fructose corn syrup from my diet eliminates depressions and headaches. Since I have no formal background in nutrition or neuroscience, however, I hope that the scientists and chemists among us will forgive me if I simplify for the sake of making a complicated subject more understandable to those of us who don't routinely ponder molecular structure and neurophysiological properties.

Necessary Fats

Fat is a dirty word in most Americans' vocabulary, and that is a big part of our problem. Essential fatty acids (EFAs) are necessary for proper brain function and health. Omega 6 (linoleic acid from plants) and Omega 3 (alpha-linoleic acid from fish and nuts) are both EFAs—*essential* meaning that the body requires them but cannot manufacture them itself. Many nutritional supplements boast that they provide Omega 3 or 6 or 9, but most do not warn consumers that the ratio of Omega 6 to Omega 3 EFAs is the most important bit of the fat picture. The optimum ratio of Omega 6 to Omega 3 is 2:1. Cream, butter, and canola oil all fit that ratio. Those foods encourage proper brain function. Yogurt has a ratio of 6:1, and soft margarine (not polyunsaturated) 4:1. Soybean oil has a 7:1 ratio, and olive oil has 11:1. With these ratios our brains are still in good shape. But when the ratio surpasses twenty to one, we have trouble because of the molecular structure and behavior of the EFAs. When Omega 6s are present in much higher ratio than Omega 3s, the Omega 6s will actually block the gaps between the molecules of Omega 3s, canceling the transmission of electrical impulses in the brain, which directly relates to the ability to think, focus, and concentrate. In clumsy, unscientific English: *eating too much of the wrong kind of fat makes us stupid.*

The American diet includes too much of the wrong kind of fat. Corn oil, perhaps the most widely used vegetable oil in the country, has an Omega 6 to Omega 3 ratio of 56:1. That is more than double the maximum ratio that the brain can handle without dysfunction. It gets worse. Sesame oil has a ratio of 144:1. Margarines and spreads that are 70 percent polyunsaturated have a ratio of 370:1, and sunflower oil has a ratio of 632:1! During her presentation Dr. Portwood said, "Give a child a bag of chips fried in sunflower oil, and a soda for lunch, and that child will be unable to learn in the afternoon."

Dr. Portwood said her research team was especially interested in the American diet because the United States tends to lead the rest of the world in diseases and problems such as attention deficit and other learning issues. She said that studies indicate 50 percent of children in the United Kingdom at age three now show signs of developing behavior and learning problems. Because the surge in attention and focus difficulties has been so sharp in the United States, and now the United Kingdom, researchers do not believe the cause is likely to be organic (within the children). When something happens so quickly, scientists look to the environment for the cause of the problems. Nutrition is one of the key environmental factors. Dr. Portwood says that 20 to 25 percent of neurobiological disorders are metabolically based, which means that they have something to do with the food we eat and the way our bodies respond to that food.

Corn appears to be a major culprit in the United States. Aside from the widespread use of corn oil, high-fructose corn syrup is another staple in our diet. It is hard to find a cookie, cracker, or juice today that doesn't contain high-fructose corn syrup. (In my own experience, high-fructose corn syrup affects my ability to sit down and concentrate; it makes my brain feel fuzzy, and it also tends to cause depressions.) Dr. Portwood didn't spend a great deal of time discussing high-fructose corn syrup because the focus of her research and presentation was EFAs, but she did say that the body can't break down high-fructose corn syrup and that its consumption may lead to weight gain and other health problems. The irony is that many American foods use high-fructose corn syrup instead of sugar and that many Americans have virtually eliminated fats from their diets in the belief that fats and sugars will make us fat. It may very well be the fat and sugar substitutes we eat that are doing the damage!

Mother's Milk vs. Formula

Dr. Portwood began her presentation about the Durham trial by summarizing the results of previous studies conducted to evaluate the effect of different formulas on infants' brain activity and IQ (more specific information may be found in Appendix). These babies were not the victims of callous scientists; they were premature infants who had to be fed formula for their survival. The first studies compared two different kinds of formula, one with a superior nutritional content that resulted in significant differences in the infants' mental activity. Then scientists pitted their superior formula against mother's milk, believing that the formula would emerge as the winner. Not only were they wrong, but the babies who were fed breast milk (from their own mothers or from donors) showed significantly higher brain activity and IQs than did formula-fed infants. These results led to more studies to find out what ingredients in mother's milk made such a drastic difference. The answer: mother's milk contains two kinds of Omega 3 fatty acids: arachidonic acid (AA) and docosahexaenoic acid (DHA). DHA is the primary structural fatty acid in the gray matter of the brain and the retina of the eye; and it is important for the transmission of signals in the brain, eyes, and nervous system. Low levels of DHA have been linked to depression, memory loss, and visual problems. The infant formulas contained more linoleic acid and more alpha-linoleic acid than they did DHA and AA.

At specific times (at seven, fourteen, and twenty-eight days), there was a dramatic increase in DHA (Omega 3) in the nursing mothers' milk which directly coincided with electrical activity in the cortex of the babies' brains. Further research revealed that the amount of DHA in mother's milk varied drastically depending on the mother's diet and whether the baby was born prematurely. Babies born at six months had 50 percent of the DHA of full-term babies. Babies born at eight months had 80 percent of the DHA. This indicates that if the maternal diet is lacking in DHA, then proper levels of DHA will not be present at birth. If the level falls below 50 percent, children have metabolic difficulty breaking down Omega 3 EFAs. And children with Omega 3 deficiencies exhibit symptoms such as dry or itchy skin, eczema, asthma, lactose intolerance, sleep problems, bumpy patches on the backs of their arms, soft or easily broken nails, frequent urination, excessive thirst, dull dry hair, and allergies. But beyond physical symptoms, Omega 3 deficiency has a major effect on children's behavior and learning, according to the research of Dr. Portwood's team and that of other scientists.

Repeatedly, researchers have concluded that Omega 3 EFAs make it easier for signals to jump the gap between brain cells, which helps improve the memory and concentration. Without enough Omega 3s in the diet, the brain suffers, and electrical activity slows down or stops.

Dr. Portwood's team designed the Durham trial to test the effect of EFAs on the behavior of two hundred children, nearly all of whom had problems with physical coordination. Eighty-two of the children had been clinically diagnosed as having attention deficit hyperactivity disorder (ADHD) and forty had reading problems such as dyslexia. Instead of taking a blood test, which would have involved needles and caused fear, the scientists devised a way to use a breath test to monitor the children. Each child was given six capsules per day of a supplement containing a ratio of 20 percent Omega 6 EFAs and 80 percent Omega 3 EFAs. No other change was made to the children's diets. The supplements were administered during the school day by school staff in a blind study, which means that nobody, including the researchers, knew which children were receiving the supplement and which were receiving placebos. Two months into the study, the results began to impress the parents; and eventually they impressed the scientists as well. The researchers found a dramatic drop in excitability and improved concentration among the students taking the EFA supplements.

Further Research

When I returned from the Hamburg conference, I did further research on the Internet and at the library to learn more about EFAs. After reading a number of studies and journal articles, I believe that many of the health problems that plague Americans—ADHD, obesity, depression, Alzheimer's—are directly linked to an overabundance of some fats and a deficiency of others.

Of course, I am not naive enough to believe that one nutritional supplement is the answer to every problem, or even to one problem. But I have read about so many scientific studies in which nutritional changes and supplements resulted in drastic reductions in violent and aggressive behavior, as well as dramatic decreases in ADHD symptoms and allergies, that I am thoroughly convinced: if we spent more time and money on nutrition instead of powerful prescription medicines that can have serious side effects, we would have much healthier children who would be better able to learn and behave in our schools. The only real question that remains is whether we value our children's health and mental well-being more than we value the goodwill of the insurance companies, pharmaceutical manufacturers, and test makers that reap billions of dollars in profits from the desperate parents of children who are unable to sit down, concentrate, and learn.

For a quick overview of EFAs and a list of current articles and research, visit www.fatsforhealth.com on the Internet. Other articles, research studies and Web sites are included in the Appendix. After reviewing these resources, I believe even staunch skeptics will admit that there is sufficient evidence to support a nutrition-based approach to the problems of childhood obesity, diabetes, and ADHD.

Resources

Beyond Vegetarianism, “Essential Fatty Acids”

<http://www.beyondveg.com/billings-t/comp-anat/comp-anat-7h.shtml>

This excellent article for the more scientific person provides the chemical composition of all EFAs. Although not simple reading, it is within the scope of a well-educated person who is willing to devote some time to learning more about EFAs.

DC Nutrition.com

<http://www.dcnutrition.com/home.cfm>

Dr. Thomas Greene, a Texas chiropractor, provides this good primer on vitamins, minerals, and EFAs, as well as links to other nutritional information.

Dyslexia Research Trust

<http://www.durhamtrial.org> Specific details about the study involving elementary school students and EFA supplements, including feedback from parents and children.

http://www.dyslexic.org.uk/nutrition_article.html

Linked to the Durham trial site, this site offers a variety of information and links to other resources

Birch, E. E. and others. **“A Randomised Controlled Trial of Early Dietary Supply of Long-Chain Polyunsaturated Fatty Acids and Mental Development in Term Infants.”** *Developmental Medicine and Child Neurology*, 2002, Vol.42:3 pp 174-181. Scientific study of the effects of dietary docosahexaenoic acid (DHA) supply during infancy on cognitive development of infants. Babies who received supplemented formula showed a significant advantage in both cognitive and motor skills.

Willats, P., and others. **“Effect of Long Chain Polyunsaturated Fatty Acids in Infant Formula on Problem Solving at 10 Months of Age.”** *Lancet*, 1998, 352, 688-691. This study suggests that full-term infants could benefit from EFA supplementation and that effects may be lasting, resulting in higher IQ during childhood.

Pam Rotella’s Vegetarian Fun Page

<http://www.goodfats.pamrotella.com>

Cookbook author Pam Rotella knows her stuff about nutrition. She provides an easy-to-understand but comprehensive explanation of the different EFAs and lists EFA contents of different foods, as well as sample healthy recipes.

ABC News, *How to Get Fat Without Really Trying* this TV special aired Dec 7, 2003

This ABC News special hosted by Peter Jennings explores the question: Should our government protect children from junk food advertisers? It looks at the ill effects of trans-fats and saturated fats on Americans and explores why our economic system makes it so difficult to improve the quality of our foods. Jennings interviews executives from a variety of food manufacturers and advertisers and show us just how far those companies will go to make a dollar, although they are fully aware that their products are major contributors to epidemic rates of obesity and diabetes. Videotape or DVD copies are available from www.ABCNewsstore.com (click on "Home Videos").