

The Effects Of Food Upon Behaviour, Nutrition And Crime

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Introduction

Nutrition and Biochemistry represent two different fields with one common element - how the body responds to various stimuli. Even though the public have taken on board the theory that food can alter behaviour or cause adverse reaction, generally the medical profession has not. Doctors and Scientists are in the dilemma of having to wait for long, expensive, double blind studies to be carried out. This literary review looks into the individual subjects of behaviour and food sensitivity and attempts to discover the contributory factors behind the symptoms.

Criminal Behaviour

The single, most important reason for the failure to investigate the links between nutrition, behaviour and crime has been due to the limited number of people with the willingness or capability to carry out a multi-disciplinary approach. There has been great attention paid in recent years to crime prevention. Target hardening with mechanical or technological security measures has created a fortress mentality and raised fear of crime. The focus now is on the individuals who have the greatest propensity to re-offend. In the broadest sense, behaviour can be defined as the response of an organism to its environment. The human body is a very complex organism giving complex responses, which explains why human behaviour is so poorly understood in purely scientific terms. The contributory factors which affect behaviour being looked at here are food and diet, which includes variety, pattern, quantity and combination of foods and beverages consumed.

There are many excuses for criminal behaviour including both social and genetic ones. The social excuses for criminal behaviour such as, deprivation, poverty, single parentage and unemployment. Social behaviour is observed with our senses but if something untoward were to happen to an individual's senses, he or she would be unaware of the change due to the reliance put on those senses. It is in this way that diet affects people, in what can be described as a non-sensory manner. Metabolic disorders in many offenders include: high levels of toxic metals, mineral imbalances, blood sugar control problems and food allergies. These individuals have been at a social disadvantage throughout their lives. By the time they reach adolescence they are rebelling and being classed as juvenile delinquents. Metabolic disorders and social behaviour should be treated together.

Other effects upon behaviour are from nutrient availability in brain cells influenced by the concentration of nutrients in the plasma and rates of their transport through the Blood-Brain barrier. Changes in mental performance occur within an hour or so after eating, but actual change is related to sex, age, personality and eating habits.

Food Intolerance

- *Food Intolerance* is reproducible, unpleasant reaction to a specific food or ingredient not psychologically based even when the affected person cannot identify the type of food given.

- *Food Allergy* needs evidence of an abnormal immunological reaction to a food.
- *Food Sensitivity* covers the above two and other adverse reactions except those purely psychological in nature.
- *Food Aversion* comprises both psychological avoidance and psychological intolerance, which is an unpleasant bodily reaction caused by emotions associated with food and which does not occur when the food is given in unrecognisable form.

Current data on the prevalence of food intolerance is quite sketchy as it has generally depended upon subjective analysis, but some results show that one fifth of the male population and one quarter of the female probably suffer from some sort of food intolerance. The majority of sufferers it is believed do not undergo any type of analysis, and so carry on their lives totally unaware that they are suffering from what could potentially be the most widespread problem the world has ever seen.

Unfortunately there is no list of symptoms to describe a food intolerance as each individual reacts differently to a different set of foods. Stress can also play a part in the likelihood of symptoms occurring as it has been shown that stressful events make the immune cells far less responsive to infection. The only symptom which really can be used to differentiate food allergies from intolerances is the speed of onset of symptoms, where an allergy is usually expressed immediately, an intolerance normally takes some indeterminate amount of time before it displays its symptoms. Also a food allergy often can be set off by the tiniest amount of substance, but more usually an intolerance requires a larger amount to trigger a clinically observable reaction. Food allergies will normally persist throughout life but a food intolerance will normally disappear if the subject stops eating the incriminated food, only to reoccur again if large amounts of the food are eaten again on a regular basis. To explain the complete body approach to food intolerances, as is instantly recognisable when the scope of symptoms becomes obvious, it is necessary to note the fact that the brain has its own part to play in illnesses, which is not always removed from the things happening in the rest of the body. The most simple example of how the brain is affected by food to the same extent as the rest of the body is through migraines. It is common knowledge that chocolate and red wine can trigger off a migraine.

Brain Effects

The brain itself has no pain receptors, it is the blood vessels and the membranes that surround them in the brain that feel pain. It is these that can produce headaches. Recurring headaches are usually a symptom of food intolerance. A migraine is a severe throbbing headache usually restricted to one side of the head and accompanied by nausea and a dislike of loud noises and bright lights. Symptoms vary between individuals, some can walk around with a migraine while others are totally incapacitated. Common triggers for migraines are bright lights and oversleeping, if stress is a factor then the migraine usually comes after the pressure is reduced. Foods are known to provoke migraines as well, the most common culprits are: milk, cheese, chocolate, oranges, fish, alcohol, fatty and fried food, vegetables (especially onions), tea and coffee. The question that arises is what links these foods together to make them all cause a migraine attack? Excluding trigger foods only seems to make the migraine attacks less frequent. Removing foods which are found, after an elimination diet to cause adverse reactions does tend to remove the attacks altogether from the sufferer, trigger foods can then be tolerated.

The Brain and How it Responds

Although the brain is separated from the rest of the body by the blood-brain barrier it would be a great mistake indeed to leave the brain entirely out of the discussion involving nutrition and behaviour. Nutritional factors play vital roles in the correct functioning of the Central Nervous System and therefore by logical progression in behaviour. To put it another way nutrient deficiencies can adversely affect CNS function and also disturb normal behaviour. It is not only straight forward deficiencies which cause problems but also excesses. Excesses of heavy metals, (eg Lead, Mercury, Aluminium) lead to toxicity type symptoms but it is generally considered there are 'safe' limits of these. Safe limits are derived as the levels attainable before medical symptoms are observed but sometime before observations are recorded the patient will be suffering from the toxic build up in ways that affect both their brain functioning and behaviour. Within the last 20 years the hypothesis that minute to minute changes in nutrient levels can affect the CNS and behaviour has been proffered. This is because even minor changes in nutrient availability can alter neurotransmitter synthesis. Also by reducing activity in Serotonin containing neurones the ensuing lack of neurotransmitter, serotonin would affect the control of feeding behaviour and therefore could affect food intake. Could this be part of the answer to anorexia?

The Brain and Aggression

Whereas with the body irritants can be seen reacting in a localised area with the brain this same effect cannot be observed but it does still occur, in response to an irritant the brain will swell in a localised area. When this swelling occurs in the part of the brain containing neural connections controlling aggression the results can be both immediate and dramatic. The pressure applied by swelling can make these neural areas more sensitive so that they trigger aggression more easily or inhibitor areas may be deactivated so self-control would be lost.

Aggression is:

1. genetically controlled and everyone has aggressive energy which needs an outlet.
2. learned behaviour, we learn to use it and control it.

In relation to the idea that specific agents can cause an effect in the brain there was, even back in 1975 an abundance of evidence to show that the brain contains inborn neural networks that become active to certain specific stimuli. These stimuli may be described as cerebral allergens or addictants, to which allergies or addictions may develop.

Food Choice

The opportunity to choose exactly what we eat is affected by many factors. The biggest contributors to food choice in a country like Britain are; firstly, the amount of money available to spend on food out of the weekly budget, secondly, the increasing tendency to eat out, particularly, 'Fast Foods', and thirdly the type of food presented at the family table. This will often be chosen by one member of the family, usually the mother and so will reflect her preferences, her culinary knowledge and her experiences in her own mother's kitchen. Many other problems have been raised with regard to the demise of the family meal in recent years. Sociologists will state that the family unit is breaking up and leading to other sociological problems but one of the main worries is that with less home cooking the children of tomorrow will not know how to cook and so therefore will suffer

nutritionally because of this. Parents are increasingly having their shopping lists dictated to them by their children. Foods which children dislike such as green vegetables, brown bread and salads are under-represented in the shopping basket.

Why Do People Choose The Foods That They Do?

The real question is why do people like the foods that they do? Before this question is answered it would be interesting to look at the extreme version of food choice which is food craving or addiction. Addiction or dependence is a condition in which the discontinuation of the use of the 'drug' leads to the characteristic symptoms of withdrawal. Tolerance and dependence can occur with the use of many stimulant substances. Not only drugs such as, Heroin, Amphetamines and Cocaine but also Caffeine, Ephedrine (commonly present in coffee) and cocoa. Both caffeine and cocoa are commonly described as being addictive by the general public and so therefore this sort of addiction is not seen as a rare event. The reasons why people crave foods and become addicted to them is quite a complicated one. Firstly it is necessary to explain what endorphins and opioid peptides are. Endorphin is the name for a family of endogenous peptides which occur naturally in the brain and bind to morphine receptors, they are included in the opioid peptide family.

Endorphins are natural painkillers which explains why morphine can bind to the same sites as these peptides. Although painkilling is the main role of an Endorphin receptor there are receptors for four or five other effects present on cells in the brain. Opioides have been found to have a positive effect on mood and behaviour as can be seen after an overdose of morphine. There are three areas of positive action of opioid peptides, these are:

- a) mood and behavioural changes,
- b) effect on immune function,
- c) interaction with allergic responses.

These effects are very similar to those often associated with food intolerance:

- A) setting up of an allergic response,
- B) deterioration in the immune system so it reacts to food particles,
- C) and often a deterioration in behaviour.

Therefore it must be assumed that opioides and/or endorphins play a very important role in food intolerance. This theory is however not quite true, the real influencing factors are exorphins, those opiates that come from outside the body. Apart from morphine and heroin which are obvious exorphins, it is the unobvious exorphins contained within almost all foods which cause the problems. In order to bind to the endorphin receptor sites, the exorphin must get through the gut wall into the blood stream and past the protein cracking enzymes in the liver. Only should it manage all this will the exorphin manage to bind to the endorphin site. Once in the site the quantity will be too small for anyone to get a visible 'high' from eating any food stuffs but the levels would be high enough to produce a sense of comfort or well being. This is a typical response given by chocolate eaters as a reason why they eat the sweet. If exorphins provide a similar response to heroin but on a vastly reduced scale then it becomes easy to see why people can become addicted to certain foods and therefore have their diet chosen for them by their subconscious need for a 'fix'.

Food Additives

A food additive is any substance not commonly regarded or used as food which is added to, or used in or on, food at any stage to affect its keeping qualities, texture, consistency, taste, odour, alkalinity or acidity or to serve any other technological function in relation to food and includes processing aids in so far as they are added to, or used in or on food.

Essential Vitamins And Minerals

Vitamins and minerals can be regarded as food additives in that they are often added to foods to improve nutritional value. The difficulty is in knowing exactly how much to add. Megavitamin therapy states the more vitamins taken in the diet, the more beneficial effects will be observed. This procedure rose from 1968 when Nobel prize winner Linus Pauling proposed large concentrations of vitamins are critical for optimum mental functioning

Diets Used To Identify And Cure Food Intolerances

As is stated in innumerable prefaces in innumerable books, always seek the advice of your doctor before changing your diet, 'but what is actually required is the services of a specialist. A doctor who understands the nutritional needs of the human body and who is prepared to accept that the diet of the patient may be causing the symptoms. Such medical practitioners are not easy to find. With food allergy, when an almost immediate reaction occurs the subject themselves may be able to isolate the offending food and learn to avoid it in the future. The problem for self diagnosis comes with food intolerance when the symptoms appear an indefinite time after the ingestion of the food or alternatively when no medical symptoms are seen at all, only behavioural ones. One method of identifying problem foods is to study the patient's dietary history by using a diet diary. this is good as long as the limitations of such a record are borne in mind. If it is clear from the diet history that one or two foods are likely to be at the root of the problem then a simple exclusion diet can be used to avoid these foods. A more extreme version of the exclusion diet is a regime which is one of the most successful used, all the foods commonly associated with intolerance are removed from the diet. The Elimination diet employs a strict diet of as few foods as possible for 4 weeks during which time the body is thought to clear itself of any residues left behind from problem foods. If the symptoms do disappear during this time then one at a time the removed foods can be re-introduced into the diet.

The point behind all the different elimination diet exclusion phases is that commonly eaten foods should be avoided. If a less strict diet than mentioned above is required then the Few Foods diet can be employed, this diet is much more easy to stick to as a dozen or so foods are allowed during the exclusion phase. Not only is the few foods diet easier to follow but it is also more tailor made towards the patient's own diet history, in order to choose which foods to exclude. An extension of the few foods diet is what is called the rare food diet in which exotic foods such as yams and sweet potato are eaten. These foods are eaten as they are unlikely in a traditional western diet to have been eaten in much quantity, if at all before. The rare food has its advantage in that it is very good in identifying whether or not the subject has any food sensitivity but its disadvantage is that it tends to be more expensive to conduct than other types of diet.

The reintroduction of foods to the basic elimination diet can take some months if they are introduced singly to test for a reaction as four or five days are necessary to leave between foods to check for delayed reactions and so it is crucial that the basic diet is nutritionally adequate. This period of four to five days as the time from ingestion to that point when food is no longer a hazard has been used as the basis of another diet called the four day rotation diet. This diet employs a cross section of foods from different biological groups which are eaten on a four day rotating basis. Food relationships should be taken into account and foods from the same food family should only be eaten on one day in four. All this is accepted, but what is under debate is whether the foods chosen for the rotation should be ones shown to be safe or whether any food, if eaten on a four day rotation is safe, from any adverse reactions. It would seem reasonable to compromise here and use the rotation diet for foods which the subject is sensitive to but finds it hard to live without such as milk and wheat, but safe foods can be eaten normally. To live solely by the four day rotation diet would not only be very difficult but probably also nutritionally inadequate.

Nutrition

The WHO (World Health Organisation) definition of health is, 'The state of complete mental, physical and social well being and not merely an absence of disease and infirmity'. If a person is in prison for committing a crime then they are naturally suffering from a lack of social well being and therefore they are by the above definition not healthy, the question is, are they also suffering from mental and physical ill health? The hypothesis of this author is that they are. Three components of ill health cannot be separated from one another. In this section we are looking at the way nutrition affects their well being, and from a purely nutritional point of view if they are ill they must be suffering from malnutrition.

There are many causes of malnutrition apart from lack of food. Some other causes are poor food selection, impaired digestion and inadequate or substandard utilisation at cellular level which can be traced back to problems in the womb. Every stage in the development of the human body is critical but no where is it more so than during the gestation period and the first few years of life.

Nutrition has a very wide-ranging effect on brain development. Results of studies on brain development show that the brain is most vulnerable to malnutrition during periods of rapid growth such as occurs in late pregnancy and the first several months of postnatal life. Although all of the above developmental problems may occur it may not mean that a person is clinically diagnosed as suffering from malnutrition. Before any physical symptoms appear brain function and behaviour are affected. The normally observed stages in a standard depletion study are:

- 1) Low Dietary Intake,
- 2) Low Tissue Reserves,
- 3) Low Body Fluids,
- 4) Low Intracellular Concentrations,
- 5) Impaired Cellular Function, and then
- 6) Appearance of Physical symptoms.

Therefore by the time the physical signs are observed the subject will already have spent some time suffering effects of malnutrition. From the known stages of nutrient depletion

Schoenthaler (1992) made two assumptions:

- A) The majority of offenders are not chronically or sub-clinically malnourished due to wide-spread absence of physical symptoms.
- B) There clearly exists an unknown minority who are marginally nourished with improved cellular function.

It is the minority mentioned that are expected to improve their health on nutrient supplementation. Malnutrition does not occur in a vacuum, it can not be separated from the complex social structure which includes poverty, disease and the lack of appropriate support systems. This picture can be seen the world over, malnutrition is not just a third world problem, to one extent or another it is everyone's' problem, the real disappointment is that most people do not realise it. It is fairly widely known that we all need in our diet protein, fat, carbohydrate and water on a macro scale. We also need many more nutrients on a much smaller scale, including fatty acids, amino acids, vitamins and minerals. Although recommended daily intakes of some of these nutrients have been published each one is only at best an average and at worse a guess because each person has a very individual list of requirements depending upon their activities, stage of growth, health and ability to absorb specific nutrients. This nutrient fingerprint can not be measured and so guesswork is resorted to, another complication when developing the ideal diet is the variable loss of nutrients during cooking which can sometimes rid a food completely of a specific vitamin or mineral.

To be in a full state of health as far as the science of Nutrition is concerned it is vital that at every stage of life the body's own requirement of nutrients is met, this is nutritionally speaking the greatest challenge of our time.

Psychology

Of the people attending G.P doctors' surgeries, 30% have symptoms traceable exclusively to food and chemical allergies while 30% have only partially traceable symptoms. The further 40% have symptoms which are untraceable to food or chemical allergies. Among the partial food/chemical sufferers there may well be some psychological factors therefore psychotherapy may help. In the treatment of diseases of the body as well as the mind, it is never possible to separate the body and the mind.

Conclusion

There are many disciplines in human science and art that have links with Nutrition and Behaviour including Sociology, Psychiatry, Anthropology and History. The overall or holistic picture is much more important than the individual components. Theorists and practitioners should pool their knowledge in order to proceed onwards together breaking down the barriers of ignorance. It is hoped that the subject of Nutritional Criminal Prevention will be thrust into the media spotlight. Perhaps only by the implementation of action based upon the findings in this paper will the crime figures stand a chance of dropping significantly, the current system is not able to perform the job of preventing crime that is needed in this modern age and so a new string to the bow of lawfulness needs to be added so that the youth of tomorrow will have a chance of Going Straight by having a chance of - **Growing Straight**.