

# The SUN Centre

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*See p. 18 & 19*

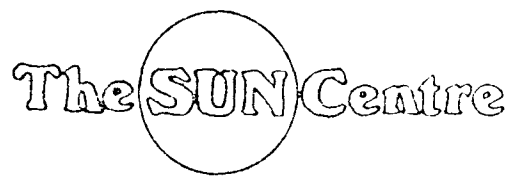
## CHILDHOOD EXPERIENCES

## AS CAUSES OF CRIMINAL BEHAVIOUR

The report to Senator Fred A. McGrand, Chairman  
The Senate Subcommittee on Childhood Experiences  
as Causes of Criminal Behaviour

This report was prepared in cooperation with  
the following members of the Society for the  
Understanding of Nutrition

Mirielle Archambault  
Sharon Auger  
Barbara Davidson  
Francine Donegan  
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April 25, 1978

THE HONOURABLE SENATOR FRED A. McGRAND  
CHAIRMAN  
THE SENATE SUBCOMMITTEE ON CHILDHOOD  
EXPERIENCES AS CAUSES OF CRIMINAL BEHAVIOUR

Honourable Senator:

Society has been debating the causes of crime since Cain slew Able. Although the discussion generally centres around social, psychological, economic, hereditary and biological factors, recently more attention has been paid to the roles of diet and learning disabilities as two of the predisposing causes of abnormal behaviour.

DIETARY FACTORS,  
LEARNING DISABILITIES  
AND  
DELINQUENCY

An increasing number of scientists and physicians are now concluding that in many children learning disabilities may be the result of nutritional deficiencies and food and other allergies. Learning disabilities, in turn, can cause frustration, a feeling of failure and rejection, disordered personal relationships and aggressive behaviour. All of these, together with the effort to excel, at least in a negative way, may lead to juvenile delinquency.

Sufficient evidence of the connection between juvenile delinquency and learning disabilities now exists. According to a report by Rosemary Brown<sup>1</sup> in "Canada's Mental Health", 80 to 90 percent of juvenile delinquents have a specific learning disability problem.

Relation of Food  
and  
Food Additives to  
Brain Activity

It is generally known that learning disabilities depend, apart from other factors such as motivation, speech abilities, proper vision, hearing, fatigue, etc., upon proper brain functions. These include concentration, attention span, ability to understand the presented material, short and long memory and the ability to recall. All of these processes are closely connected with biochemical reactions in the brain, especially with a proper balance of neurotransmitters and metabolism of RNA and peptides.

These metabolic processes are further dependent on other biochemical reactions such as the formation of neurotransmitters from amino acids. The source of amino acids is mainly food:

"You Are What You Eat"

The metabolic processes and thus the brain functions, such as concentration, attention span, etc., can be negatively influenced by food additives. Thus, the old saying, "You are what you eat", can be understood in the light of new biochemical findings. In other words, the brain is part of the body, and this physical organ requires proper nutrients in order to work right. Since the brain houses our thoughts and emotions, and is the coordinator for our senses, a chemically imbalanced brain will express itself by disordered thoughts (delusions) and emotional upsets, as well as disturbances in sensory perception (hallucinations).

Food Allergy,  
Malnutrition,  
Hypoglycemia  
and  
Abnormal Behaviour

In some individuals, the food allergy or malnutrition can unbalance mental processes and lead to violent behaviour. In other cases, a disorder known as hypoglycemia, a lower-than-normal level of sugar in the blood, can trigger irrational behaviour that can be controlled through the diet.

Role of Food  
and  
Food Additives in  
Hyperactivity,  
Learning Disabilities,  
and  
Minimal Brain Dysfunc-  
tion

Dr. Bernard Weiss<sup>2</sup> stated the following before a "Select Committee on Human Needs", of the United States Senate: "Food additives now are claimed to contribute to the prevalence of childhood disorders designated by terms such as hyperactivity, hyperkinesis, and minimal brain dysfunction. Common elements of the diagnosis criteria seem to include elevated aimless activity, difficulty in concentration, clumsiness and other neurological deficits."

According to Dr. Ben F. Feingold, certain natural foods containing salicylate groups and synthetic additives, such as colours and additives, can provoke behavioural disturbances in children with a constitutional intolerance to these substances. Dr. Feingold estimates that up to 40 percent of the children labelled as hyperkinetic, mostly boys, are actually displaying a syndrome of behavioural toxicity.

Relation of Chlorine  
and  
Flouride in Water  
to Behaviour

In my own practice, I have repeatedly observed that hyperactive children and children with learning disabilities can be negatively affected, not only by food additives and foods with salicylate groups, but also by the content of chlorine and flourine in the water supply. Keeping those children on pure water, together with avoiding processed foods, sugar, and foods to which they are sensitive, frequently improves their behaviour and learning abilities dramatically.

Lack of Animal  
Experiments on  
Effects of Food  
Additives on  
Behaviour

Food additives are studied primarily for pathological effects, that is, tissue evidence of damage, particularly cancer. The effects of food additives on the development of animals is also examined. Modern studies may include metabolic transformations, birth defects, blood indices,

Hidden Allergens  
and  
Behaviour Changes .

It is now known that low molecular chemicals produce reactions. This fact has been determined by laboratory procedures used in the field of immunochemistry. Low molecular chemicals coat the cells and combine with body protein to form complexes which possess antigenic potential. At present, many thousands of low molecular chemicals are used as additives in preparation of food, beverages, cosmetics, and pharmaceutical drugs. For example, the following is a composition of Premarin (3) which is commonly prescribed in North America to millions of women:

PREMARIN 1.25 mg.

Composition of Premarin  
(including excipients)

Methylcellulose 15 cps  
Talc Triturate  
Lactose  
\*Magnesium Stearate  
Polyethylene Glycol 20,000  
Glyceryl Monooleate  
\*Shellac  
Calcium Sulfate  
Titanium Dioxide  
Stearic Acid  
\*Edible Black Ink (Food Grade)  
Canaba Wax  
Sucrose  
Gum Acacia  
Talc  
\*Sodium Benzoate  
Gelatin  
Tween 60  
\*Propyl Paraben  
\*FD&C Yellow #5  
Calcium Carbonate  
Tricalcium Phosphate  
Solka Floc (Cellulose Type Material)  
Sodium Acetate  
Sodium Chloride  
Neutral Steroids  
\*Estrogens

\*Potential Sensitizers

Another example of such chemicals is this list of ingredients in mascara<sup>4</sup>:

Mascara Composition:

Water  
Petroleum distillate  
Carnauba  
Candelilla wax  
PEG-20 sorbitan beeswax  
TEA-Lanolate  
Ammonium acrylates copolymer (may irritate skin)  
Talc (repeated inhalation can irritate lungs)  
Beeswax  
Hydrolyzed animal protein  
Polysorbate-60  
Propylene glycol  
Potassium octoxynol-12 phosphate  
Sodium lauryl sulphate (may cause skin rashes)  
Nonoxynol-10  
Quaternium-15 (irritates skin and mucous membranes;  
oral doses larger than one ounce can  
be fatal)  
Polysorbate-20  
Methylparaben (can cause allergic skin reactions)  
Propylparaben  
P-hydroxyanisole  
Trisodium EDTA  
Phenyl mercuric acetate (can irritate skin: oral  
doses larger than a taste can  
be fatal)

Chemicals  
and  
Behaviour Changes

Many chemicals can induce an allergic reaction in sensitive individuals. Therefore, it is becoming more difficult to establish etiological factors which are responsible for various hypersensitivity reactions. It has now been definitely established that hidden allergens in the form of flavourings, colourings, preservative agents, excipients, antioxidants, stabilizers, emulsifiers, etc., cause a wide variety of hypersensitivity reactions, including changes in behaviour, hyperactivity, depression, concentration problems, and hyperirritability, to name but a few<sup>3</sup>.

Malignant Tumours  
and  
Food Additives

According to the World Health Organization Technical Report, on "Artificial Food Colourings and Malignant Tumours", 1970, the development of malignant tumours, sarcomas, was observed in rats and mice at the site of repeated injections of food colours and other additives. This finding has made possible the reevaluation of colours such as Brilliant Blue FCS, and Fast Green FCF. The demonstration that many additives produce sarcomagenic effects by virtue of physical properties such as surfact activity, rather than carcinogenic potential, has made possible the acceptance of such materials for



Norway's Ban on  
Artificial Food  
Colourings

In most western countries, many varieties of food additives are permitted. Canada is no exception. An exception is Norway, however, which in January 1978 became the first country in the world to impose a total ban on artificial colouring in foodstuffs (see Appendix).

No Data on Numbers or  
Amounts of Chemicals  
for Human Use

No data is available, not even from the Food and Drug Directorate, regarding the exact number of chemicals allowed for human use or pounds of additives, artificial colourings, flavourings and other chemicals which are added each year to our food supply. Nor do we know how many pounds of these chemicals our children are consuming annually in their food.

METABOLIC DEFECTS  
AND  
BRAIN DYSFUNCTION  
AGGRAVATED BY  
FOOD ADDITIVES

In the face of overwhelming evidence that nutritional deficiencies and food additives dramatically increase the probability of brain dysfunction in predisposed individuals, a brief examination of such dysfunctions may be in order.

Inhibition of Enzyme  
Activity by  
Food Additives and  
Lack of Vitamins  
Frequently  
Followed by  
Abnormal Brain Function

There are many thousands of inborn errors of metabolism. Most of them are characterized by an inherited enzyme defect leading to a metabolic block and further disturbances of metabolism. However, the enzyme defect may be clinically latent unless it has been further aggravated by additional factors. Such factors may be, for example, a lack of a vitamin acting as a coenzyme needed for the enzyme activity or an additional inhibition of the enzymatic activity by chemicals such as food colourings, or other food additives. As a result of further inhibition of the already insufficient enzymatic activity, clinically silent problems may become manifest and may affect the brain activity and thus behaviour.

Improvement of  
Brain Metabolism  
and  
Brain Activity  
by Vitamins  
and  
Minerals

On the other hand, such enzymatic defects may become partially or completely overcome by greatly increasing the levels of vitamins or minerals which act as cofactors for such defective enzymes. Such an improvement of metabolism will usually be followed by marked improvement or normalization of the condition of the affected individual.

There are also other possible mechanisms by which food sensitivities can affect the nervous system. For example, K.E. Moyer, a psychology professor at Carnegie-Mellon University, claims that the pressure of the inflammatory swelling of the brain makes areas which normally produce aggression more sensitive, or it activates areas that normally inhibit aggressive behaviour. The intensity of the symptoms may vary from irritability to psychotic reaction.

ORTHOMOLECULAR THERAPY  
AND  
ITS EFFECTS ON  
BEHAVIOUR  
AND  
GENERAL HEALTH

In my own experience with children, as well as adults, with so-called nervous problems, including schizophrenia, depression, etc., I have observed that dietary manipulation and supplementation with vitamins and minerals can dramatically influence their behaviour and general health.<sup>7</sup>

The method of treatment called orthomolecular therapy is the treatment of mental and other diseases by providing optimal molecular concentration of substances normally present in the human body.

Pellagra  
and  
Criminality

A classical example of the effect of nutritional factors on behaviour is pellagra, a disorder due to lack of amino acid tryptophan in food leading to a vitamin B3 (niacin) deficiency.

Pellagra is frequently associated with mental disturbances ranging from the neurasthenic syndrome to memory impairment, confusion, depression, paranoia, violent behaviour or delerium. The psychotic behaviour in pellagra and schizophrenia are often so similar that it is sometimes impossible to distinguish them by the patient's mental condition.<sup>8</sup>

Vitamin B3  
Niacin  
In the Treatment  
of Mental Problems

In both pellagra and schizophrenia, the administration of vitamin B3 in the form of niacin or niacinamide has been found to improve and frequently to clear the mental symptoms of the patient. However, at the present time there are still only a very limited number of psychiatrists who use niacin in the treatment and prevention of schizophrenia.

Dr. E. Kholy<sup>9</sup> believes that the lack of vitamin B3 (niacin) may be connected with deviant behaviour. After studying crime and pellagra from 1941 to 1946, he maintains, as do many researchers in this field, that pellagra can easily be mistaken for schizophrenia. He examined 1,150 persons who had been accused of serious crimes. He found that 206, or 18 percent, had pellagra. Their crimes included murder, threats, arson, rape, and so on. Over one third of those who were later declared to be insane murderers were found to have pellagra. Dr. E. Kholy concludes: "Had pellagra been prevented by the administration of vitamin B3, there would have been a major decrease in crimes of violence."

Schizophrenia  
and  
Criminality

In a similar way, schizophrenia, which affects about one to two percent of our population, and which occurs most often among young people, has frequently been found in those who have had criminal records.

Hypoglycemia  
and  
Criminality

Hypoglycemia, a low blood sugar condition, has been found to be connected with learning problems and in some individuals associated with brain dysrhythmias and violent behaviour.

Orthomolecular Therapy  
and  
Prevention of Crime

Therefore, we might say that, had schizophrenia, hypoglycemia, learning disabilities, alcoholism and drug abuse been prevented, for example, by using the orthomolecular approach, including a dietary regime, there would have been a major decrease in crimes of violence.

Many other disorders have been found to respond to orthomolecular therapy. These include, apart from schizophrenia, for example, hypoglycemia, hyperactivity, learning disabilities, minimal brain dysfunction, autism, alcoholism, drug addiction, and even neurosis. In the last named, symptoms such as fatigue, mild depression, insomnia, anxiety, tension and phobias respond to vitamin supplements and a dietary regime.

There are also some promising early indications of the usefulness of orthomolecular therapy in treating criminal offenders. Mrs. Barbara Reed<sup>11</sup>, a probation officer in Cahuga Falls, Ohio, told the U.S. Senate Committee that treatment of probationers with high nutrition diets and vitamin supplements had been successful. For two and a half years Mrs. Reed kept careful records of 318 probationers. She found that, of this number, 252 required vitamin supplements. According to her testimony, not one probationer who stayed on the nutritional diet had had any further trouble with the courts.

GABA  
A NATURAL TRANQUILIZER

Apart from dietary regime and supplementation with vitamins and minerals, a further promising approach to the treatment of hyperactivity and hyperirritability, including the violent behaviour and learning problems, seems to be GABA (gamma-aminobutyric acid). Under normal conditions GABA is produced in the human brain in high quantities and might be considered to be a natural tranquilizer.

Decreased Formation  
of GABA  
by Chlorine

GABA levels are increased by the administration of vitamin B6 and also by Valium, the most widely prescribed tranquilizer in North America. Formation of GABA is decreased by certain chemicals including chlorine. In my own practice, I have repeatedly observed that keeping children on pure water free from chlorine frequently results in calmer behaviour.

GABA  
and  
Huntington's Chorea

A deficiency of GABA in the brain is known to be responsible for most of the symptoms characteristic of Huntington's Chorea (HC). HC is a severe degenerative hereditary disorder of the brain. It is inherited from generation to generation, and, in each generation, about 50 percent of family members can eventually be affected. The disease is characterized by the appearance of abnormal movements and gradual deterioration of speech and intellect. The symptoms usually start between the age of thirty and forty, although they are frequently preceded by hyperirritability and a tendency to violence.

Huntington's Chorea  
and  
Delinquent Behaviour

It has been found that 25 to 50 percent of affected individuals suffering from HC have had criminal records and that delinquent behaviour occurred usually many years before the appearance of clinical symptoms.

GABA:  
Its Beneficial Effect  
on Violent Behaviour  
and  
Learning Problems

Fisher and his co-workers<sup>12</sup> observed a striking improvement in the general condition of HC patients, together with a decrease of choreiform movements, after administration of high doses of GABA. This observation points to the conclusion that supplementation of GABA, especially if started in the early stages of the disease, might be beneficial in HC in much the same way as the supplementation of L-dopa can improve the condition of many patients with Parkinson's disease. Supplementation of GABA has been accompanied by a marked decrease in irritability and a reduction of the tendency to violent outbursts.

Similarly, GABA has been known to decrease hyperritability in neurotics, as well as the tendency to violence in juvenile delinquents and improves their social behaviour<sup>13,14,15</sup>. Many other disorders, such as hyperactivity and behaviour problems<sup>16</sup>, learning disabilities and mental retardation<sup>14,17,18</sup>, cerebral palsy<sup>19</sup>, strokes<sup>20</sup>, epilepsy<sup>21</sup> and hypertension<sup>22</sup> also respond favourably to treatment with GABA.

Safety of  
GABA

In Europe, GABA is obtainable without prescription and is used as a safe sleeping pill by pregnant women and old people. It is also used to treat children with behaviour problems and learning disabilities. The human organism can tolerate dosages of GABA as high as 50,000 mg/day without any serious side effects. Unfortunately, GABA is not available at the present time in Canada.

SMOKING  
AND  
HYPERIRRITABILITY

Not only what we eat, but also what we drink and breathe, can affect our health and behaviour. Such factors in our life style include, for example, coffee and alcohol. Another well-publicized hazard is smoking. Nor does the non-smoker escape. It is possible for a non-smoker to



by a person near him. Smoking has been found to have a negative effect in the long term on concentration ability. It can also induce fluctuation of the blood sugar level and increase hyperirritability.

Relation Between  
Early Smoking  
and  
Behaviour Problems

It has been observed that almost 100 percent of juvenile delinquents are heavy smokers who usually started smoking between the ages of eight and twelve years. These findings suggest that the onset of smoking at an early age, when the brain is still developing, can negatively affect not only concentration and the ability to cope with situations, but probably also the ability to control one's own behaviour.

BEHAVIOUR  
TOXICOLOGY

Relation of Chemicals  
to  
Abnormal Behaviour

Early detection of the effects of harmful chemicals (behaviour toxicology) enables the prevention or amelioration of negative effects of such compounds on the developing organism<sup>23</sup>. We now know that individuals are more vulnerable to adverse influences during the period of development (conception → puberty) than at any other time in life. This factor adds both to the sensitivity and to the complexity of behaviour toxicology testing. Subtle functional and behavioural disturbances in organisms exposed while immature may be one of the most sensitive indicators of chemical toxicity.

Use of Artificial  
Sweeteners by  
Pregnant Rats  
Followed by  
Brain Lesions  
in Offspring

Stone et al. administered to rats approximately 20 mg/kg of the artificial sweetener cyclamate daily, and found that they started to behave abnormally. Their offspring were hyperactive and slow to develop a response to food reward. Once trained, the offspring were deficient, in comparison with the controls, in tasks requiring response inhibition. These results suggest similarities between brain-lesioned rats and minimal brain-damaged offspring<sup>24</sup>.

Effects of Use of  
Artificial Sweeteners  
by Women before,  
during and after  
Pregnancy on  
Offspring

Stone and his co-workers also studied the effects of artificial sweeteners on human offspring because in the past decade large quantities of artificial sweeteners have been consumed by vast numbers of women before, during and after pregnancy. Using a questionnaire technique, they gathered data which suggest that there may be a correlation between the known use of artificial sweeteners during pregnancy and mental retardation in the offspring. Moreover, the results suggest a possible connection between ingestion of artificial sweeteners before and during pregnancy and the incidence of various abnormalities even in those children who were not mentally retarded.

Delayed Effects of  
the Chemicals

Furthermore, defects in the development process may have only delayed effects. A morphological or

on the Brain Function

biochemical lesion can be dormant and not manifest

Chemicals in the  
Brain of the Foetus

Many chemicals entering the body of pregnant women can be found ultimately in the foetus, including its brain. The studies prove that:

- the immature organism does not have the same capacity as the adult to metabolize and detoxify noxious substances
- the foetus and the newborn have not developed the mechanisms to detoxify and excrete a variety of drugs and environmental chemicals.

Increased Vulnerability  
of the  
Growing Organism  
to Chemicals

Distinguishing characteristics which cause the developing organism to be more vulnerable to chemical insult than the mature organism include the following:

- differences in metabolizing enzymes
- difference in excretory capacity
- different degree of development of protective systems such as blood-brain barrier, binding capacity of the serum and tissue proteins
- different proportion and distribution of various tissues

Negative Effects of  
Chemicals on  
Maternal Behaviour

In experiments with mice, it has been shown that maternal residual (postnatal) chemical effects may be mediated directly via the milk of the nursing mother, or indirectly by causing changes in the mother's behaviour leading to maternal neglect of the offspring, for example, aberrant maternal retrieving and grooming.

Special Affinities  
of Chemicals for  
Particular Developing  
Brain Centers

It has also been found that chemicals have special affinities for particular developing brain centres, that the developing brain is very vulnerable to insult, and that alterations in the neural development become manifest as alterations in behaviour. The developmental deviation is thought to be of a neuroanatomical or neurochemical nature. However, since behaviour represents an integrated response of the organism, an impairment in the functioning of systems other than the nervous system may also be reflected as a behavioural change<sup>25</sup>.

ADVANTAGES OF  
ORTHOMOLECULAR THERAPY

Thus, it appears evident that a large number of chemicals in the environment have adverse effects on the human organism, including the brain, and that these adverse effects are still more pronounced in the growing organism. Experience has shown that the orthomolecular approach, the use of pure food and vitamin and mineral supplements, may reduce or overcome some of these adverse effects and also affect beneficially such disorders as hyperactivity, hyperirritability, depression, and concentration problems.

Orthomolecular therapy has distinct advantages:

- It is less expensive because nutrients, unlike drugs, are not patentable.
- It is safer than the use of drugs because nutrients are natural substances which have been present naturally in the human body through its long evolution over millions of years.
- It is practically free from serious side effects even when administered in large quantities.
- It helps to normalize conditions in the organism instead of masking its problems.

OTHER CONTRIBUTING  
FACTORS IN  
DELINQUENCY

It is widely recognized that the individual, and especially the developing individual, is exposed to many biological, chemical, psychological, social, economic, and other influences which may either aggravate or ameliorate the negative effects of a possible original brain dysfunction. Rosemary Undersood states: "The disordered interpersonal relations of the MBD (minimal brain dysfunction) child which result from initial neurological impairment and which, in turn, foster a rejective intrafamilial process, are later compounded by other factors, especially the institutions of education, to desocialize some of these children and predispose them to criminality."

Rejection of Child as  
Predisposing Factor to  
Criminality

What we are dealing with is a chain reaction which may be set in motion at conception and become accelerated on a social level by many additional factors such as ambivalence to violence and unhealthy life styles. For example, the exposing of children from the earliest age to television violence, the sanctioning of delinquent forms of behaviour in movies, the promoting of the use of alcohol, tobacco, and junk food in the media - all these factors and others negatively affect the moral development of our children.

Ambivalence to  
Violence

Moral Development of  
Our Children  
and  
the Media

Belson's Study on  
TV and Violent  
Behaviour

According to an article in the March 1978 issue of Psychology Today, researcher William Belson of the Survey Research Centre of the London School of Economics reported in September 1977 to the British Society for the Advancement of Science on a study of TV and violent behaviour as follows: "The evidence was very strongly supportive of the hypothesis that long-term exposure to violence increases the degree to which boys engage in violence of a serious kind. The same goes for violence of a less serious kind such as swearing and the use of bad language, aggressiveness in sport or play, threats to use violence on another boy, writing slogans

on walls, breaking windows "



Belson used elaborate techniques in an effort to eliminate possible causes other than TV for a difference between the behaviour patterns of his experimental group, called Qualifiers, and his Controls. Belson found that some forms of violence on TV produce more real-life violence than others. These include the following:

- Physical and verbal violence between people in the story who have a close personal relationship.
- Stories that present violence in a very realistic fashion.
- Violence committed by good guys in pursuit of good causes.
- Violence that seems to be "just thrown in for its own sake" and does not grow out of the plot.
- Westerns.

By contrast, Belson finds that some forms of program violence do not appear to promote serious violence:

- Comedies that feature slapstick violence, verbal or physical.
- Violent cartoons. Belson suggests that this kind of violence is unrealistic and next-to-impossible to imitate.
- Sports other than boxing or wrestling.
- Science-fiction shows that include violence. They are usually not realistic.

Belson speculates that violent programs are more likely to initiate violence if they "penetrate deeply into a boy's personal value systems". As examples of the kinds of shows that do this, he cites those that deal with violence in close personal relationships and that present very realistic violence the boy can identify with. "The Untouchables" and "Hawaii Five-0" were two he mentioned. He speculates that television may lead to violent acts through a process of imitation. On balance, however, he believes his data are more consistent with the theory that constant exposure to violent acts leads to a breakdown of inhibitions against violence.

We might add this footnote: Two years ago the President of Mexico successfully prevailed upon that country's private television network to refrain from showing programs glorifying violence. Canada might do well to follow Mexico's example.





SUGGESTIONS

Considering all of these findings on the effects of childhood experiences as causes of criminal behaviour, it would seem advisable to promote:

1. Studies on the specific therapeutic effects of orthomolecular therapy and its effect on brain functions including behaviour.
2. Longitudinal studies to assess the long term and/or delayed effects of the chemicals in our environment on biological functions and behaviour.
3. Regular examinations of safety standards for the use of all chemicals in the light of continuing research.
4. Studies to evaluate the natural ability of the brain to metabolize GABA (gamma-aminobutyric acid) and the capacity of GABA to reduce violent behaviour and to improve learning abilities.
5. Measures to ensure proper nutrition in pregnancy, childhood, and adulthood.
6. Clarification of the relationship between early smoking and delinquent behaviour.

Prevention of Child Abuse

1. All hospitals should adopt routine procedures to spot child abuse. Clearer laws on what constitutes child abuse and a uniform country-wide system of recording such cases are needed.
2. Suspected cases of child abuse should be reported promptly to a central agency.
3. Senior citizens could serve as very valuable substitute grandparents. In this capacity, they could give mothers down-to-earth advice on child rearing and baby-sitting relief.

Prevention of Juvenile Delinquency

In the early seventies, every Canadian province lowered the legal drinking age to 18 or 19. Almost immediately there were disastrous results. In Ontario, for example, alcohol-related accidents among 16 and 17 year olds jumped by 169 percent.

In 1968 a survey had found that 47 percent of all students in grades 7 to 13 were drinking regularly; by 1974 that statistic had jumped to 73 percent.

Research is beginning to show that the soundest therapeutic approach may come from setting out firm rules and regulations for children to follow. Some suggestions are:

1. Alcohol must be taken out of the schools.
2. The legal drinking age should be raised to 19 or 20 in accordance with the recommendations of the Addiction Research Foundation.
3. Family counselling clinics should be established in every province.

On the more positive side, teenagers could be given opportunities for voluntarily improving their communities (and therefore themselves). Such service might be in day-care centres, in hospitals as Candy Strippers, in nursing homes, in political party activities, and, of course, in community and school sport activities. In such ways teenagers might become convinced of their value to society, and the psychological vacuum in their lives which they so often fill with drugs might disappear.

#### Social factors

Along with such efforts and those designed to prevent neurological impairment, our society could help to reduce criminality in the following ways:

1. By supporting the family unit.
2. By providing adequate child and family care programs to promote the child's emotional development.
3. By teaching children the importance of human values rather than the acquisition of material goods.
4. By inculcating in the child respect for self, for others (including parents), for authority, for the opinions and religious beliefs of others.
5. By fostering self discipline.
6. By promoting an interest in moral and spiritual values and inner space.
7. By exalting the virtues of cooperation and compassion.

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<p>BIOLOGICAL</p>	<p>Proper family planning          Proper prenatal care          Proper delivery care          Proper postnatal care          Good nutrition          Pure food, water and air          Vitamin and mineral supplements (when indicated)          Administration of GABA (when indicated)</p>
<p>PSYCHOLOGICAL</p>	<p>Early bonding with mother          Emotional stability of the family          Acceptance of the individual as he is          Freedom from excessive stress          Religious and/or spiritual belief          Self discipline          Striving for self improvement          Volunteer work in social organizations          Involvement in useful work          Feeling to be a valid member of society          Proper parental interest in education</p>
<p>ECONOMIC</p>	<p>Good quality of education facilities          Proper education opportunities          Proper employment opportunities          Financial freedom</p>
<p>SOCIAL</p>	<p>Supporting family unit          Involvement of children and teenagers in              - crime prevention within a community              - community work (care of old &amp; sick people, etc.)          Education in- basic life skills (e.g. politeness, ability to deal with people, etc.)              - family life              - child rearing - in schools                                      - premarital courses                                      - in prenatal classes                                      - hospitals (after delivery)                                      - in schools as a part of program for parent meetings              - value of good nutrition (in schools, courses, media)          To teach children - respect for other human beings              - respect for authority              - moral values, mainly compassion          Avoidance of - violence in the media              - harmful advertising, e.g. cigarettes, liquor              - junk food in schools              - violent games          Consistent parental and school discipline          Better reporting of child abuse          Better training for those in the fields of medicine, law and social work in the rights and needs of the child          Public policy that it is a crime against humanity to produce children that cannot be adequately cared for</p>