8-1987

An Analysis of the Effects of a Low Glycemic Diet on the Antisocial Behavior of Juvenile Offenders

James Edward Longhurst
Western Michgan University

AN ANALYSIS OF THE EFFECTS OF A LOW GLYCEMIC DIET ON THE ANTISOCIAL BEHAVIOR OF JUVENILE OFFENDERS

by

James Edward Longhurst

A Dissertation
Submitted to the
Faculty of The Graduate College
in partial fulfillment of the
requirements for the
Degree of Doctor of Education
Department of Counselor Education
and Counseling Psychology

Western Michigan University
Kalamazoo, Michigan
August 1987

AN ANALYSIS OF THE EFFECTS OF A LOW GLYCEMIC DIET ON THE ANTISOCIAL BEHAVIOR OF JUVENILE OFFENDERS

James Edward Longhurst, Ed.D.

Western Michigan University, 1987

The objective of this study was to determine if a low glycemic diet contributes to a reduction in the incidence of antisocial behavior among male juvenile offenders.

One hundred forty juvenile offenders at a residential treatment center were randomly divided into treatment and nontreatment groups. The treatment group ate from a diet which contained foods low in glycemic characteristics. There was no dietary alteration for the control group.

Three instruments were used to measure differences between groups in antisocial behavior following a 5-week experimental period. These instruments include: (a) the Unusual Incident Report--a systematic and objective observer report form, (b) the Profile of Mood States--a validated mood survey, and (c) the Adaptive Behavior Scale-School Edition--a classroom behavior recording form.

Data yielded by these instruments were used to generate 19 null hypotheses related to the general purpose of the study. Analysis of variance, *t* test for mean differences, and a chi-square test of independence were applied to the data in order to evaluate the differences in antisocial behavior between the treatment and nontreatment groups.

Eighteen of the 19 null hypotheses were retained. In conclusion, the results of this study indicate that a low glycemic diet does not lead to a reduction in the occurrence of antisocial behavior of subjects having these demographic characteristics.

INFORMATION TO USERS

The most advanced technology has been used to photograph and reproduce this manuscript from the microfilm master. UMI films the original text directly from the copy submitted. Thus, some dissertation copies are in typewriter face, while others may be from a computer printer.

In the unlikely event that the author did not send UMI a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyrighted material had to be removed, a note will indicate the deletion.

Oversize materials (e.g., maps, drawings, charts) are reproduced by sectioning the original, beginning at the upper left-hand corner and continuing from left to right in equal sections with small overlaps. Each oversize page is available as one exposure on a standard 35 mm slide or as a 17″ × 23″ black and white photographic print for an additional charge.

Photographs included in the original manuscript have been reproduced xerographically in this copy. 35 mm slides or 6″ × 9″ black and white photographic prints are available for any photographs or illustrations appearing in this copy for an additional charge. Contact UMI directly to order.

UMI
Accessing the World's Information since 1938

300 North Zeeb Road, Ann Arbor, MI 48106-1346 USA

Order Number 8800680

An analysis of the effects of a low glycemic diet on the antisocial behavior of juvenile offenders

Longhurst, James Edward, Ed.D.

Western Michigan University, 1987

U·M·I
300 N. Zeeb Rd.
Ann Arbor, MI 48106

PLEASE NOTE:

In all cases this material has been filmed in the best possible way from the available copy. Problems encountered with this document have been identified here with a check mark __✓__.

1. Glossy photographs or pages _____
2. Colored illustrations, paper or print _____
3. Photographs with dark background _____
4. Illustrations are poor copy _____
5. Pages with black marks, not original copy ✓
6. Print shows through as there is text on both sides of page _____
7. Indistinct, broken or small print on several pages ✓
8. Print exceeds margin requirements _____
9. Tightly bound copy with print lost in spine _____
10. Computer printout pages with indistinct print _____
11. Page(s) _____ lacking when material received, and not available from school or author.
12. Page(s) _____ seem to be missing in numbering only as text follows.
13. Two pages numbered _____. Text follows.
14. Curling and wrinkled pages _____
15. Dissertation contains pages with print at a slant, filmed as received _____
16. Other _____

University Microfilms International

ACKNOWLEDGMENTS

I first want to thank Dr. Gil Mazer, my committee chairperson, for all his support and guidance on this project. I will always value the time we spent together. Drs. Bob Oswald and Lew Walker rounded out my committee, and I thank them for their support and helpful suggestions.

This project would not have been possible without the support and effort from my colleagues at Starr Commonwealth Schools. I am grateful to Arlin Ness and to Dr. Martin Mitchell for their approval and backing of this project, and to Christine Ameen for her time, office, and technical advice as well as her moral support. I thank Chuck Hiatt and Marty Doolittle for purchasing and distributing the foods for this study. Thanks also go to the program directors at Starr, especially Jim Clark, who provided administrative support for the project.

I want to especially thank the resident staff who went out of their way to prepare the foods. Thanks too to the students themselves who willingly made changes in their diets to make this study possible. I also should not forget to mention Dave Trahan, Ron Shoup, and Rob Armstrong; they put up with my invasion of their offices for such a long time.

There were many individuals who gave of their time and expertise through the course of this study. Martin Gold gave me early guidance and direction; David Jenkins, developer of the Glycemic Index, and

his assistant, Janet Kalmusky, were instrumental in providing a scientific basis for the dietary changes; Creta Vartti and Dianne Wingfield made it possible to analyze the nutrient levels of the foods; Marla Moss not only provided valuable nutritional information but also was instrumental in the development of the study diets. Dr. Nina Miller helped with the statistical analysis, and Lee Pakko did an extraordinary job with the editing and typing of the final manuscript. Thanks to these people.

A special thanks to my parents, Jim and Evelyn, who not only encouraged me in this project but who always have believed that all of this could really happen.

I can't forget Linda Dohn, who in 1977 gave me the boost I needed to pursue this degree. Thanks, Lin.

I dedicate this dissertation to my wife, Lynn, and to our three girls--Jamie, Jordan, and Jessie. Words cannot express how thankful I am for their patience, understanding, and hard work they contributed to the completion of this program. I'm looking forward to being with them more.

James Edward Longhurst

TABLE OF CONTENTS

Table of Contents--Continued

Table of Contents--Continued

LIST OF TABLES

List of Tables--Continued

CHAPTER I

THE PROBLEM AND ITS BACKGROUND

Background of the Problem

The study of the relationship between diet and antisocial behavior is a recent development with very few studies undertaken prior to 1975. The impetus to investigate the topic can be traced to Feingold's (1975) research into the behavioral effects of artificial food substances on the behavior of children. Feingold's diet for hyperactive children first popularized the contention that human behavior and performance could be significantly altered by the type of food which is ingested.

The Feingold (1975) Hypothesis which states that the reduction of artificial food dyes, additives, and salicylates leads to reduced problematic behavior in children has been both supported (Adamow, 1982; O'Shea & Porter, 1981; Rapp, 1978; Rose, 1978; Swanson & Kinsbourne, 1980) and refuted (Conners, Goyette, Southwick, Lees, & Andrulonis, 1976; Harley, Ray, & Tomasi, 1983; Kavale & Forness, 1983; Mattes, 1983; Milich & Pelham, 1986). The significance of these studies is that they have permitted a synthesis of earlier works and have provided the diet-antisocial behavior researcher with a legitimate foundation for further investigation.

One of the studies (Prinz, Roberts, & Hantman, 1980) which had been originally designed to assess the efficacy of the Feingold Diet

showed that it was the ratio of sugar products to nutritional foods and the ratio of carbohydrates to protein that were associated significantly with destructive-aggressive and restless behavior in children. The importance of this study was that it validated the thesis that the ingestion of a refined carbohydrate could be a factor in behavior problems. While there had been case studies (e.g., Podolsky, 1955) and quasi-experimental research (Reed, 1977; Schauss, 1978) which suggested this notion, the Prinz et al. study provided a scientific basis for continuing the exploration into the relationship between refined carbohydrate consumption and problematic behavior. In fact, the authors did conclude that further research is needed to illuminate the behavioral effects of sugar and carbohydrate consumption.

Research attempts which followed the Prinz et al. (1980) effort confirmed the hypothesized connection between refined carbohydrate consumption and antisocial behavior in incarcerated adults (Fishbein, 1981) and in juvenile delinquents (Schoenthaler, 1982). Specifically, the findings of these studies indicated that there was a decrease in the rate of antisocial behavior in those subjects whose diets contained significantly lower amounts of refined carbohydrates, especially sugar. These studies came under criticism, however, (Gray & Gray, 1983) because they lacked the necessary controls to be able to prove conclusively a causal diet-behavior relationship.

In 1983, a series of six quasi-experimental studies were conducted by Schoenthaler (1983a, 1983b, 1983c, 1983d, 1983e, 1983f) which investigated the effects of reduced refined carbohydrate

consumption on the rates of antisocial behavior in institutionalized juvenile delinquents. Collectively, these studies showed a significant decrease in the rate of antisocial behavior among 6,033 institutionalized offenders in 10 facilities in Alabama, California, and Virginia. These studies were compelling because they represented the first institutional diet-behavior programs which were empirically tested. Furthermore, the reductions in antisocial behavior were accomplished without additional costs to the institutions or risks to the subjects.

While it can't be argued that the behavioral improvements indeed did occur as a result of these experiments, questions regarding their validity remained because of design problems. These problems included the absence of random assignment of subjects to treatment and nontreatment groups as well as a lack of control for maturation effects.

Also not explained was the question of just how the reduction of refined carbohydrate foods was responsible for the positive changes observed.

In these studies, "junk" foods such as candy bars, carbonated soft drinks, and refined carbohydrate snacks were eliminated and were replaced with more nutritious foods such as unsweetened orange juice and popcorn. It was possible that the major reduction in sugar, a highly refined carbohydrate, was responsible. However, the foods which were substituted also constituted a more nutritious diet for the experimental group; and thus, it was conceivable that an increase in essential vitamins and minerals was the underlying factor in

behavior change.

The improved behavior also might have been due to a reduced intake of food dyes, colors, or other additives which simultaneously occurred with the removal and reduction of foods high in refined carbohydrates. Finally, it could not be ruled out that either a combination of these factors or the total synergistic effect actually elicited the improvements in behavior. Clearly, research was needed to more specifically identify how refined carbohydrate consumption was related to antisocial behavior.

There exist three theoretical models which attempt to explain the diet-antisocial behavior relationship--food allergies (e.g., Feingold, 1975), malnutrition (Schoenthaler, Doraz, & Wakefield, 1986), and carbohydrate metabolism disorders (Fishbein, 1981; Hippchen, 1976, 1981; Schauss, 1980; Virkkunen, 1982a, 1982b). Of these, the most frequently cited was that refined carbohydrate consumption creates carbohydrate metabolic abnormalities, the most common of which are diabetes and hypoglycemia.

Reactive hypoglycemia, a physiological state of low blood glucose level, was postulated correctly by Harris (1924) to be caused by the ingestion of certain foods. Harris demonstrated conclusively that these foods triggered a physiological response resulting in a disturbance of the body's ability to maintain glucose homeostasis, defined by Ensinck and Williams (1974) as a balanced glucose metabolic state.

Many psychological and behavioral disorders are associated with hypoglycemia in addition to the specific physiological symptomatology

of faintness, weakness, hunger, and sweating (Conn, 1947; Harris, 1924, 1936). Research studies have suggested that these adverse psychological effects include the anxiety neuroses (Harris, 1924; Rynearson & Moersch, 1934; Wilder, 1940, 1943), violence (Kepler & Moersch, 1937; Virkkunen, 1983), aggression (Buckley, 1969, 1979; Yaryura-Tobias, 1978), personality disorders (Anthony, Dippe, Hofeldt, Davis, & Forsham, 1973), tension-depression (Rennie & Howard, 1942), and criminal behavior (Wilder, 1940). Hippchen (1976) noted also that perceptual and mood changes accompanied the hypoglycemic condition.

It has been suggested that the antisocial behavior of both adult offenders (e.g., Fishbein, 1981; Hippchen, 1976) and juvenile delinquents (e.g., Schoenthaler, 1982) is a symptom of the hypoglycemic condition which results from diet high in foods which create sharp and quick glucose and insulin responses. It has been theorized that the problems in glucose metabolism create perceptual and mood changes which are manifested with antisocial behaviors (Hippchen, 1976).

Attempts to identify the effect of refined carbohydrate consumption and glucose metabolic disorders on antisocial behavior have been inconclusive. Diet-behavior research which has been conducted neither adequately identifies nor excludes those specific foods which have been shown empirically to contribute directly to glucose metabolic problems. An experimental diet which has been empirically examined for its treatment effects for glucose metabolism disorders has not been tested even though the connection between food and behavior has been established. Although the relationship between

food consumption and behavior has been established, no study has been conducted on the effects of a diet which has been scientifically designed to control glucose metabolism.

It has been well documented (e.g., Conn, 1947; Conn & Newburgh, 1936) that the effective treatment for the reactive hypoglycemic condition is primarily dietary in nature. Early research (Conn, 1947; Conn & Newburgh, 1936) indicated that a high protein, low carbohydrate diet was the most effective dietary treatment for glucose metabolism disorders including hypoglycemia. Further research by Cleave (1974) and Burkitt and Trowell (1975) demonstrated that the reduction and/or elimination of refined carbohydrates, especially sugar, is an important treatment factor. The authors also concluded that foods high in dietary fiber contribute to more effective treatment of glucose metabolic disorders.

The Glycemic Index

In an attempt to provide a clear and accurate understanding of the impact of diet on glucose (glycemic) response as well as an effective basis from which to develop an appropriate and effective dietary treatment for these disorders, Jenkins et al. (1981) and Jenkins, Wolever, Jenkins, Josse, and Wong (1985) have compiled a Glycemic Index of Foods which assesses each food's capacity to affect blood glucose levels. Food variables that are incorporated in the Glycemic Index include the factors of food form, dietary fiber, and the nature of the carbohydrate. The Glycemic Index provides a valid and reliable means by which one can effectively treat disorders of

glucose metabolism, including hypoglycemia.

Jenkins's et al. (1981, 1985) work thus establishes a basis for a systematic exploration of the relationship between the consumption of specific foods and antisocial behavior. Studies by Schoenthaler (e.g., 1983b) have confirmed this relationship, but these investigations were based on insufficient information regarding the specific glycemic reactions caused by the foods consumed. Jenkins's et al. Glycemic Index permits researchers to correct the shortcomings seen in the studies of Schoenthaler.

Several other problems characterized studies investigating the relationship of carbohydrate consumption and antisocial behavior in juveniles. First, although junk food had been replaced with foods with different levels and types of carbohydrates, these changes also affected the amount of essential vitamins, nutrients, and artificial dyes and colorings that were consumed by subjects. Thus these studies were not able to clearly isolate carbohydrate consumption as the only independent variable which was modified. Second, none of the studies utilized treatment diets which were empirically determined to effectively treat glucose metabolic disorders. It had been assumed in these studies that junk foods including pop, candy, and chocolate represented specific foods which were directly and solely responsible for glucose metabolic disorders. Research from leading investigators (e.g., Jenkins, Wolever, Taylor, Ghafari, et al., 1980) into the dietary treatment of glucose metabolic disorders have identified the specific starchy carbohydrate foods, including potatoes, whole wheat and white breads, and carrots as foods which should be

avoided for effective dietary treatment of diabetes and hypoglycemia. These highly glycemic foods must be replaced with rice, pastas (including noodles and spaghetti), and high amounts of legumes (beans and peas) in order to provide a more stabilized glucose response in the body. It is evident that previous diet-behavior studies had not clearly excluded those foods which have been found empirically to cause glucose metabolic disorders. This study was needed to correct these sources of error.

Statement of the Problem

In the context of the discussion above, the purpose of this study was to determine if a low glycemic diet reduces the frequency of antisocial behavior in youths. This study was intended to shed light on what particular aspects of diet are responsible for improved behavior. It examined a diet which has been shown to effectively treat glucose metabolic disorders to see if it contributes to a reduction in antisocial behavior in juvenile offenders.

Significance of the Study

This study was significant from both a theoretical and practical standpoint. Theoretically, it has been contended that diet plays a contributive role in antisocial behavior. It has not been conclusively determined what specific food substances are involved or how these substances play such a role. This study was necessary to elucidate the role diet plays in the occurrence of antisocial behavior in juveniles.

It was not the intent of this study to demonstrate that diet is the only factor in antisocial behavior emitted by adolescent youths. Diet was investigated with regard to its contributive effects on antisocial behavior. Obviously, there are other determinants of the occurrence of this behavior, including psychological, biological, economic, and sociocultural factors.

As stated, this study explored some of the specific dietary and nutritional factors which may be related to the occurrence of antisocial behavior. It has been postulated that a diet which excludes and reduces carbohydrates leads to improved behavior in juvenile offenders (Schoenthaler, 1983b). This study was necessary to elucidate the carbohydrate-antisocial behavior connection. The present study was able to isolate the differential effects of carbohydrate consumption on antisocial behavior because only the types of starchy carbohydrates were modified. All other food factors, including overall caloric intake; relative percentages of the various food groups of protein, fat, and carbohydrate; and levels of essential vitamins and nutrients, were held constant.

While it was beyond the scope of this study to measure the actual physiological responses of subjects and thus directly investigate the relationship of glucose metabolic disorders and antisocial behavior, the treatment and nontreatment diets were empirically assessed as to their capacity to affect glucose response. The treatment diet was identical to those diets which have been found to effectively treat glucose metabolic disorders. Thus it was possible to produce indirect evidence which was either supportive or

nonsupportive of the diet-behavior thesis. This study benefits the scientific community since it provides a systematic description of both the treatment and nontreatment diets, including snacks. A valid and reliable diet which has been demonstrated experimentally to be an effective treatment for glucose metabolism disorders served as the basis for the analysis.

Second, this study was significant because it was possible to randomly assign groups of subjects to the treatment and nontreatment groups. Thus it was possible to investigate the dietary effects on both the treatment and nontreatment subjects concurrently. This represents a major improvement over existing diet-antisocial behavior research which has utilized quasi-experimental time-series designs. This study provides a more powerful analysis of the results.

From a practical standpoint there are at least three points of significance. First, since the average per diem rate to place a youth in a private residential treatment facility in the state of Michigan is approximately $90, one can recognize the high cost of providing treatment for those youths who exhibit antisocial behavior. Although each treatment facility in Michigan utilizes different treatment modalities, there is one common feature among them—all provide their residents with food to eat. It would be of great benefit if it could be demonstrated that occurrences of antisocial behaviors can be effectively reduced in their frequency and severity by altering, even slightly, the menus from which these youths eat. Dietary changes could provide an additional method of treatment without incurring additional costs for training or increased

manpower.

Second, the general public would benefit by having information which could help in the understanding of how diet relates to behavior. Families would be able to consider this information in planning meals for their children.

Finally, there was a need for the present research because it was possible to either substantiate or repudiate existing diet-antisocial behavior research and clarify how further research should be conducted. Positive results would indicate that further exploration in this specific area is needed; results which do not support the general notion of a carbohydrate-antisocial behavior link would be of equal significance because research could then be directed to other, potentially more fruitful, areas of investigation.

Research Question

The central research question of this study was: Is there a relationship between a low glycemic diet and a reduction in the frequency of antisocial behavior of male juvenile offenders between the ages of 12 and 18 in a residential treatment facility? Review of previous research leads to a general hypothesis that there would be a decline in the frequency of antisocial behavioral incidents on the part of these subjects as a result of providing a diet containing foods that have reduced glycemic qualities.

Definition of Terms

Diet: This is the description of the usual or regular food and drink a person consumes most frequently. Even though the individual foods may vary from day to day, the ratios of the basic food groups (fat, protein, and carbohydrate) do not vary significantly. American diet has not changed radically over the past 80 years in that the average diet is 55% fat, 35% carbohydrate, and 10% protein (Tver & Russell, 1981).

Antisocial behavior: This concept is defined as behavior which is antagonistic, hostile, or unfriendly toward others. Very generally, this term encompasses behavior viewed by a particular society to be opposed to the social order or the principles on which that society is constituted.

Hypoglycemia: This literally is defined as "low blood sugar" and refers to an abnormally low level of glucose in the circulating blood. Ensinck and Williams (1974) described hypoglycemia as "physiological condition which results in a disturbance of the body's ability to maintain glucose homestasis" (p. 627).

Postabsorptive (postprandial), reactive, idiopathic hypoglycemia (Ensinck & Williams, 1974): This is the abnormally low level of circulating blood sugar level which occurs after (postabsorptive) the ingestion and absorption of a meal and is caused by (reactive to) the ingestion of the meal. The term idiopathic indicates that the exact reason why this condition occurs is unknown. Unless otherwise indicated, hypoglycemia will be used in this paper to indicate this

reactive hypoglycemic condition.

Glucose homeostasis: This concept refers to the balanced, dynamic state of glucose levels in the circulating blood in the system.

Glucose (glycemic) response: This is the physiological reaction of the body to food that raises blood glucose levels.

Glycemic Index (Jenkins et al., 1981, 1985): This is a systematic classification and ranking of particular foods according to ability to produce a glucose response in the body. A high-glycemic food creates a sharper and quicker glucose response; a low-glycemic food produces a less severe and less sharp response. Thus a high-glycemic diet is one which contains foods which have been identified as producing the higher glucose response; a low-glycemic diet is made up of foods which are assessed to produce a lower, less sharp response.

Overview of the Study

In Chapter I the general relationship between diet, hypoglycemia, and antisocial behavior has been discussed. It was proposed that a diet having foods low in their glycemic characteristics will reduce the frequency of antisocial behaviors among residential male juvenile offenders, aged 12 to 18, who are in treatment. A selected review of the literature on how diet, carbohydrate metabolism, and antisocial behaviors interact is presented in Chapter II. The research design and methodology, the population which was studied, and the operational definitions and hypotheses are discussed

in Chapter III. Also described in Chapter III are the methods and the rationale used in data collection, the statistical techniques in analyzing the results, and a timetable for completion of the research.

In Chapter IV the analysis and results are presented. Chapter V concludes with a summary and discussion of the findings. Limitations of the study and recommendations are also presented.

CHAPTER II

REVIEW OF THE LITERATURE

Diet and Behavior

Early Research

Awareness of a possible relationship between diet and maladaptive behavior came to the forefront largely as a result of Feingold's (1975) postulates that hyperactivity in children could be controlled and effectively treated through dietary measures. Specifically, food additives, artificial colorings and flavorings, and salicylates were identified as substances which should be reduced or eliminated in order to effectively treat hyperactive behavior and poor school performance in children. The Feingold Hypothesis was based on the assumption that these food substances produce allergic reactions in the body which result in neurophysiological disturbances that are ultimately manifested through maladaptive behaviors.

A spate of research aimed at testing the Feingold (1975) Hypothesis resulted and the findings of these projects have met with mixed results. Rose (1978) specifically examined the impact of artificial food colorings on hyperactive behavior and determined that there is a functional relationship between the ingestion of artificial food colors and an increase in both the duration and frequency of hyperactive behaviors. Similar findings were claimed by Adamow

(1982) which indicated that resolution of behavioral and learning difficulties is experienced by a small subgroup of hyperactive children when given a diet free of additives and salicylates.

Salzman (1976) investigated the effects of the Feingold Diet on 31 children with behavior problems and learning difficulties. Results of this study showed that 93% of the subjects responded with improved behavior and that sleep and enuresis problems were partially or completely resolved. Rapp (1978) found that 75% of the children at a learning disability center were made hyperactive by foods and food colors, dyes, and additives.

A problem with many of these early studies which supported the food additive-hyperactivity connection was that they lacked rigorous controls in design and were inconsistent in their definitions of terms. Moreover, the descriptions of the symptoms of subjects were not consistent with one another.

Later investigations into this area of inquiry attempted to correct these problems. In a more rigorously controlled study, Conners et al. (1976) attempted to see if a diet free of most natural salicylates, artificial flavors, and artificial colors would reduce hyperactivity of hyperkinetic children. Although results showed minor changes in behavior, the absence of complete consistency of results prevented the authors from supporting the Feingold Hypothesis.

However, in Swanson and Kinsbourne's (1980) double-blind study of children between the ages of 6 and 12, more than half of the hyperkinetic subjects reacted adversely to challenge doses of food

dyes. In support of these findings, Weiss (1982) reported that severe behavioral reactions were elicited in children given challenge doses similar to those used in the Conners et al. (1976) study. Moreover, O'Shea and Porter (1981), in their investigation of the behavioral effects of a number of substances, demonstrated that hyperkinetic children produced increased levels of hyperactive behavior when given foods with dyes, milk, peanuts, and tomatoes.

In a comprehensive analysis of hyperkinesis and food additives, Lipton, Nemeroff, and Mailman (1979) concluded that challenge studies have yielded results with both positive and negative findings. Lipton et al. suggested that current evidence from controlled clinical trials and blind challenge studies do not support the original claims of Feingold (1975) that up to 75% of hyperactive children show dramatically improved behavior when placed on an additive-free diet. In support of this finding, Kavale and Forness (1983), in a review of the research regarding the Feingold Diet, concluded that significant findings are inversely related to the quality of the research methodology; increased experimental rigor is directly associated with decreased treatment efficacy.

Schauss (1985b) critically analyzed the negative findings of several of these studies, including the Conners et al. (1976) project, and pointed out that criticisms of the Feingold (1975) Diet do not take into account the deficits in concentration, learning, and memory which have occurred when children ingest artificial food colors. In another review, Rimland (1983) identified numerous problems with studies which have investigated the Feingold Hypothesis.

Small dosage levels, the failure to recognize the role of subject nutritional status, the failure to recognize and control relevant variables, arbitrary negative conclusions, and inadequate attention to animal and in vitro studies were cited by Rimland as serious problems that affect both support and refuting studies.

It has also been suggested that a very small proportion of children show an adverse reaction to food dyes and exhibit decreased performance on laboratory learning tests but not on behavior ratings (Check, 1983). Moreover, Mattes (1983) reviewed all published, completed controlled studies concerning the Feingold (1975) Diet and concluded that the Feingold Diet may be effective for a very small percentage of children. The author observed that improvement more often seems due to the increased attention the child receives during treatment and thus may be attributed to a placebo effect only.

There remain many questions regarding the impact of food additives on hyperactive behavior in children. While a large number of investigations in the late 1970s and early 1980s have supported the Feingold (1975) Hypothesis, other studies have concluded that Feingold was wrong. The more recent reanalyses of the Feingold Hypothesis (Check, 1983; Mattes, 1983; Schauss, 1985b) all were supportive of the contention that food additives can impact a small minority of children. It was emphasized that the disagreements largely result from the unreliability of measurement devices used in these investigations.

A study by Prinz et al. (1980), which originally had been designed to test the Feingold (1975) Hypothesis, instead demonstrated

that destructive-aggressive and restless behaviors exhibited in young hyperactive children correlated with their consumption of sugar products. Food entries not permitted by the Feingold Diet were not significantly correlated with any of the behavioral variables. Only when sugar was eliminated from the diet did the hyperactive children show significant improvements in behavior. The authors explained that 85% of the food not allowed on the Feingold Diet are also in the sugar product category. It was concluded that some hyperactive children are more likely to behave in a destructive-aggressive or restless manner if artificial food dyes are combined with a high intake of sucrose. Additionally, it was postulated that high sugar intake could also adversely affect nonhyperactive children.

The Prinz et al. (1980) study provided an important stimulus for continued diet-behavior research. Sugar was now implicated as having an effect on how people behave. The investigators emphasized that it should not be assumed that diet accounted for all hyperactive behavior. "This study indicates that there exists an interaction with other factors such as past learning, organicity, and response to stimuli in the setting" (Prinz et al., 1980, p. 14). The authors concluded further that additional tests of sugar consumption and behavior are needed to determine whether a causal relationship exists and whether other segments of the population are affected.

Diet and Antisocial Behavior

The investigation of the behavioral effects of refined carbohydrates, including sugar, spread beyond the classroom and into the

juvenile detention halls and prisons. Research which followed the above studies focused on the relationship of diet and antisocial behavior in both youth and adults. This was not an altogether new area of investigation. Wilder (1940) compiled a list of crimes which had been documented in the literature to be related to disorders of glucose metabolism. These deviant behaviors included disorderly conduct, assault and battery, attempted homicides, spouse abuse, larcenies, vandalism, arson, and traffic violations. Podolsky (1955) discussed the implications of diet on criminal behavior and recommended that the study of the etiology of criminal behavior be expanded to include dietary factors.

The evidence for a diet-antisocial behavior connection up to this point was based primarily on case studies in medicine; designs with rigorous controls were not utilized and studies lacked impact upon recommended methods of treating people who demonstrated delinquent or criminal behavior.

Groesbeck, D'Asaro, and Nigro (1975) investigated the diets of adult male inmates in the Morristown, New Jersey, jail and found that the subjects consumed significantly more sugar and caffeine than noninmate controls. Although some of the methodology used has been criticized (Gray & Gray, 1983), this study demonstrated that diet education of inmates resulted in significant behavioral and attitude improvements in a 30-day period.

The chief probation officer in Cuyahoga County in Ohio, Reed (1977), testified to the United States Senate Select Committee on Nutrition and Human Needs in 1977 that her probationers responded

more favorably to dietary treatment methods than to traditional rehabilitative interventions. Critics of her approach state that it may just as well had been her increased attention shown to her charges and not the interventions which yielded her results. Yet the continued failure of other psychologically or sociologically based treatments led researchers to continue to explore diet as a contributing factor in criminal behavior. Hippchen (1978) reported an increasing rate of crime and delinquency in the United States and pointed out the inability to successfully resolve these problems. The author stated that the key causative factors underlying these behaviors are not clearly identified and that treatment attempts will probably fail if biochemical factors are not included to develop a more complete criminological theory.

The efficacy of dietary treatment to reduce recidivism among probationers was examined by Schauss (1979). Of the two experimental treatments, one group received nutritional counseling and the other was provided nutrition education consisting of six sessions. These groups were compared with two control groups receiving conventional counseling approaches. Schauss concluded that the nutritional approach has a favorable impact on the recidivism rate. The experimental group which received the nutrition education sessions showed a highly significant level of reduced arrest rates. This study supported the findings of earlier attempts (e.g., Reed, 1977) and demonstrated that diet plays a role in the treatment of criminal behavior.

Schauss, Bland, and Simonsen (1979) also investigated the diets of chronic juvenile offenders. The results of this study indicated

that refined sugar, processed foods, and milk are consumed in higher quantities by offenders in comparison to nonoffenders. The findings of Reed (1977) and Schauss (1978, 1979) provided the catalyst for more rigorous investigations of the effects of specific foods on antisocial behavior in both juveniles and adults. Fishbein (1981) postulated that high dietary intake of refined carbohydrates would contribute to maladaptive behavior in adult male inmates at the Lantana Correctional Institution. Behavior was quantitatively measured by the Hoffer-Osmond Diagnostic Test (Osmond, Hoffer, & Kelm, 1975). This instrument reflects subjective mood changes and sensory perceptions. Results of this study supported the notion of a relationship between the consumption of refined carbohydrates and maladaptive behaviors. The experimental groups consumed an increased amount of more complex carbohydrates and were restricted in their consumption of refined carbohydrates. The specific contention that the experimental group would demonstrate the most significant improvements in behavior was borne out by the results.

Schmidt, Brajkovich, and Asch (1981) analyzed the diets of 26 juvenile offenders between the ages of 12 and 17. It was determined that the foods most frequently consumed by them included white bread, sucrose, and pasteurized and homogenized milk. The experimental elimination of these foods resulted in reduced behavioral fluctuations with respect to hostility, aggressiveness, irritability, and depression.

Carbohydrates and Antisocial Behavior

In what was the first empirical investigation of antisocial behavior in an institutional setting for juvenile offenders, Schoenthaler (1982) studied the effects of reduced sucrose consumption on 54 boys residing in a juvenile detention home in Virginia. The experimental group of 24 boys was provided a diet of significantly lower sucrose content. The dependent variable of antisocial behavior was the average daily number of formal disciplinary actions taken by the facility's staff against each of the 58 youths. Results showed that the 24 boys demonstrated a 45% lower incidence of antisocial behavior.

Schoenthaler's (1982) study represented an improvement over previous research because it utilized behavioral records rather than subjective measurements of antisocial behavior. Yet, limitations of this study, including the relatively small sample size (54), were cited (Gray & Gray, 1983; Schoenthaler, 1983b). With a sample this small it was possible that other factors contributed to differences observed between groups. Both authors recommended that conclusive findings required replications of this study with larger samples.

Altogether, Schoenthaler (1983a, 1983b, 1983c, 1983d, 1983e, 1983f) conducted six studies in 1983 in this field of inquiry. On a collective basis a significantly lower rate of institutional antisocial behavior (50%) occurred in 6,033 juvenile offenders held in 10 detention facilities in Alabama, California, and Virginia. It is important to review these studies in closer detail because

Schoenthaler's continuous attempts to more conclusively investigate the diet-behavior relationship and to improve research design are noteworthy.

Quasi-Experimental Research

Schoenthaler (1983b) replicated his pilot study at the same detention facility in Virginia Beach, Virginia. The specific hypothesis was that a reduction in sugar consumption would decrease the frequency of antisocial behavior of incarcerated male and female juvenile delinquents. A treatment group of 174 juveniles was given a diet with a lowered daily sucrose intake. A control group of 102 juveniles was given a diet without the lowered amounts of sucrose. Dietary changes included substituting canned fruits packed in water rather than syrup. Kool-Aid and lemonade were replaced with fruit juices. Jelly and cinnamon sugar were eliminated from the diet. Soda pop was replaced with fruit juices, and table sugar was removed and replaced with honey. Molasses was substituted for sugar in all recipes, and breakfast cereals with high sugar content were eliminated from the diet. Desserts and snacks high in sugar were eliminated as well. Pastries, ice cream, and cookies were replaced with fresh fruits, peanuts, carrots, cheese, celery, and sugar free soft drinks.

Results showed that the incidence of antisocial behavior was 48% lower in a sample of 276 juveniles which received the low-sugar diet. The percentage of very well behaved juveniles increased in the treatment group by 71%. This difference was found to be very significant,

and the author recommended that this dietary program should be of major interest to correctional, educational, and mental health policy makers.

Schoenthaler and Doraz (1983) investigated the original charges of the juvenile subjects in the study above (Schoenthaler, 1983b). Of concern was the type of offender who could likely be treated with a low-sugar diet. Additionally, the authors were interested in determining if the type of antisocial behavior reduced could be identified. Results indicated that assaultive behaviors were most significantly reduced. As well, those juveniles who were originally arrested for assault exhibited a 77% lower rate of antisocial behavior.

Replications of Schoenthaler's (1983b) study were needed. Schoenthaler's work had provided an impetus for correctional facilities to change their dietary policies. Several of these facilities participated in replication studies which Schoenthaler believed would strengthen the conclusion that diet is causally related to antisocial behavior.

Schoenthaler (1983a) followed up the Virginia study with research on 488 inmates of a juvenile detention facility in Alabama. The author instituted a time-series design in which behavioral measurements were taken for a 6-month period prior to the dietary changes. A 10-month experimental stage followed during which time dietary modifications similar to previous studies were employed. Additionally, bread which contained additives and/or preservatives was eliminated and was replaced with bread which did not contain

these substances. Results of this study showed that the offenders who were on the experimental diet exhibited a 45% lower incidence of antisocial behavior than either the preexperimental or postexperimental control groups.

Similar research was undertaken by Schoenthaler (1983e) to investigate dietary effects on 1,382 male and female detainees and in 289 male detainees in Los Angeles County, California. The methodology was a modified version of the designs employed in the previous studies; basically, a nontreatment baseline period was followed by a treatment period with the dietary changes. The subjects served as their own controls in that only those subjects who were detained both on the original diet as well as the treatment diet were included in the analysis. The dietary changes were the same as in the previous studies. A 44% reduction in antisocial behavior as measured empirically by behavioral reports resulted. The reduction in antisocial behavior was greatest in repeat offenders (86%), narcotics offenders (72%), and violent offenders (rape 62%, homicide 47%, and assault 43%). These findings offered striking evidence that diet does indeed impact human behavior.

In yet another study, Schoenthaler (1983f) once again showed that dietary modifications result in improved behavior. During this investigation the meals were not changed but the snacks were modified to eliminate junk foods, sweetened soft drinks, and refined carbohydrate snacks. These were replaced with more nutritious foods such as unsweetened orange juice and popcorn. Candy rewards for appropriate behavior were replaced with juice, fruit, and/or nuts. Any junk

foods brought in by families were confiscated.

Over a 24-month period the behaviors of 3,399 incarcerated juveniles were recorded and analyzed. A 21% lower incidence of antisocial behavior was reported for those males who were on the experimental snack and reward diet. It was also significant to note that a comparison of 578 female juveniles found no significant differences in behavior.

Schoenthaler (1983d) also conducted a study which differed significantly from the previous investigations. At a secure detention facility in a mid-Atlantic state, an increased amount of orange juice was provided for 242 juveniles for 6 months. A pitcher of orange juice was simply placed upon each dining room table at breakfast, lunch, and dinner along with pitchers of milk and water which were already there.

The behavioral records of these youth were compared to 239 juveniles who had been institutionalized prior to the increase in orange juice. Taking into account daily behavioral records, 28% of the baseline population as compared to 18.2% of the experimental population were involved in at least one antisocial act. The juveniles in the experimental group also averaged 35% less overall antisocial behavior. Results from this study support the notion that increased consumption of orange juice leads to decreased incidences of antisocial behavior.

Analysis of the Research

Schoenthaler's (1983a, 1983b, 1983d, 1983e, 1983f) studies have been criticized. Problems with design, including lack of random assignment, maturation effects, placebo effects, and staff perceptions, have been cited as threats to the validity of the findings (Gray & Gray, 1983; Perrello, 1984; Schoenthaler, 1984). An additional limitation cited by all three sources is that while Schoenthaler's studies demonstrated that diet indeed impacts upon human behavior, the underlying reasons for these effects have not been explained. Furthermore, the specific dietary factor responsible for the improved behavior has not been isolated and defined (Perrello, 1984). In essence, these authors stated that when junk foods are removed from the diet, not only is the amount of simple or refined carbohydrate altered, but food additives including synthetic (artificial) colors, synthetic (artificial) flavors, and preservatives are reduced or eliminated as well. Moreover, it is contended that the excluded foods which contain relatively low levels of nutrients were replaced with other foods containing higher ratios of essential vitamins and minerals. Finally, it is also conceivable that either a combination of these changes or a total synergistic effect contributed to the observed results.

Thus it is clear that the research which has been conducted is not conclusive as to whether the improved behavior can be attributed to nutritional improvements, reductions/eliminations of food additives, the reduction of simple and refined carbohydrates with a

simultaneous increase in complex carbohydrates, or other reasons. A review of the three major theoretical explanations follows in order to clarify these issues.

Malnutrition

In each of the Schoenthaler (1983a, 1983b, 1983d, 1983e, 1983f) studies it was observed that the subjects experienced no weight loss. Therefore, it can be concluded that the highly sugared foods were replaced with more nutritious ones. Thus even though the author originally had attempted to alter the types of carbohydrates, the nutrient levels of the foods were affected. Most recently, Schoenthaler et al. (1986) investigated the effects of a low food additive and sucrose diet on academic performance in 803 New York City public schools. The diet consisted of the gradual elimination of synthetic colors and flavors and preservatives. At the same time high sucrose foods were reduced or eliminated.

In this study, each of the schools administered the California Achievement Test once a year. From these scores the mean national percentile rank of each school was determined. It was then possible to analyze the change in national academic percentile ranking between years for the study group of schools. The study took place over a total of 7 years; a 3-year "before diet-change" period was followed by a 4-year "after diet-change" period. Results of this unusually comprehensive study showed that after the dietary change major improvements in overall percentile rankings for the selected schools occurred. The mean percentile rankings for the first 3 years was

41.1% as compared to a mean of 51% for the experimental period. It was seen that dietary factors were associated with improved academic performance.

Schoenthaler et al. (1986) pointed out that while the foods eliminated/reduced contained high levels of sucrose, additives, and fat, the common factor among all three is that they all are low in the ratio of essential vitamins and minerals to calories. The author stated that the subjects replaced these nonnutritious foods with foods which contained a higher ratio of nutrients to calories.

If nutritional factors are implicated in causing improved academic performance, it was plausible to consider that there exists a nutrition-antisocial behavior relationship as well. The authors summarized the results of this study as follows:

> The policies that restricted nonessential food additives coincidentally restricted dismembered foods and resulted in an uptake of nutrient-dense foods. The policies that restricted sucrose and fat would have the same result. It makes more sense to explain the widespread gain in academic performance using one variable--malnutrition--which can effect every student's performance rather than idiopathic sucrose and food additive "allergy" which tends to affect a very small proportion of the population. . . . The cause(s) will remain unverified without further research but malnutrition may be the predominant causative factor since all students have the potential of being malnourished. (Schoenthaler et al., 1986, p. 193)

Food Intolerances

The extent to which food allergies or intolerances are related to behavior was discussed earlier in this chapter. Theoretically, it was presumed that a diet which eliminates those additives also eliminates cognitive and perceptual disorders, comprehension and reasoning

difficulties, and aggressive behavior in hyperactive children. While it has been established that additives affect the behavior of a small percentage of children (Lipton et al., 1979), the original claims by Feingold (1975) that 50% to 75% of academic performance and behavior problems could be reduced through dietary measures have not been substantiated.

Carbohydrate Metabolic Disorders

The most frequently cited physiological disorder to be related to antisocial behavior has been postprandial, reactive, idiopathic hypoglycemia, commonly referred to as "hypoglycemia." This disorder is not defined as a disease in itself but rather a perturbance of the normal glucose homeostasis, a physiological condition of low blood sugar induced by the ingestion of food (Ensinck & Williams, 1974).

Hypoglycemia has long been linked with behavioral and psychological problems. Harris (1924) identified the specific physiological symptoms of hypoglycemia, including dizziness, nausea, sweating, faintness, and weakness, as well as the psychological symptoms which emulated those observed in the anxiety neuroses (Harris, 1936).

Research into how hypoglycemia affects personality and behavior has been fairly extensive. Kepler and Moersch (1937) concluded that the neurologic symptoms of hypoglycemia extend over the entire range of the psychiatric symptomatology. "The psychic manifestations during the hypoglycemic state may at times be very profound. Indeed there may be violence which requires restraint" (p. 101). Hypoglycemia was thereby regarded as being directly related to behavioral

problems.

Subsequent reports cited hypoglycemia as accounting for a number of personality problems including a decreased ability to concentrate on tasks, loss of energy, and memory problems (Vonderhae, 1936); and tension-depression (Rennie & Howard, 1942).

Wilder (1943) proposed that chronic psychoses and neuroses may be caused by hypoglycemia. It is suggested that aphasic disorders, disturbances of sensibility, and psychotic reactions are caused by chronic hypoglycemia. Similarly, Anthony et al. (1973) suggested that there is a causal association of reactive hypoglycemia with personality disorders as measured by the Minnesota Multiphasic Personality Disorder (MMPI). Anthony et al. noted that a definitive statement of the causality could not be made and that further research was recommended.

One of the earliest references concerning the relationship of hypoglycemia to antisocial behavior was made by Wilder (1940). He noted that hypoglycemia may be directly related to psychological problems which result in crimes including disorderly conduct, assault and battery, attempted homicides, spouse abuse, larcenies, vandalism, arson, and traffic violations.

Podolsky (1955), a criminologist, emphasized that the study of the etiology of criminal behavior needed to be expanded to include hypoglycemic effects. This was supported by Hippchen (1976, 1978) and Schauss (1980), who suggested that hypoglycemia, induced by a diet high in refined carbohydrates and sugar, contributes to the largest portion of antisocial behavior which can be treated by diet.

This hypothesis served as the foundation of the studies conducted by Fishbein (1981) and Schoenthaler (1982, 1983b).

Virkkunen (1982a, 1982b) studied the behavior of adult male violent offenders and determined that abnormal blood glucose levels, with tendencies toward clinically significant reactive hypoglycemia, were often seen in this group. Blood glucose concentrations were observed first to rise to high levels and then fall to clinically significant low levels suggesting a reactive hypoglycemic disturbance. Virkkunen (1982a) concluded that because biochemical factors may exist which contribute to the occurrence of the antisocial personality, the prognosis for successful treatment is poor because traditional treatment methods do not take these factors into account.

Virkkunen (1982b) also determined that inmates with intermittent explosive disorders experienced abnormal glucose tolerances as measured by the 5-hour Oral Glucose Tolerance Test (OGTT). There were clear differences in the results of OGTTs between violent offenders with diagnosed antisocial personalities and those offenders diagnosed as having intermittent explosive disorders.

Hypoglycemia and Behavior

There are a number of theories which purport to explain how hypoglycemia is physiologically related to behavior. It would be helpful at this point to first describe the basic physiological processes of brain glucose metabolism as described by Sokolof, Fitzgerald, and Kaufman (1977).

The brain requires oxygen to enable it to conduct physiochemical activity. Although the brain represents only 2% of the total body weight it consumes 20% of the total oxygen utilized by the body. Oxygen in the brain is almost entirely used in the oxidation of carbohydrate and to a lesser extent in the synthesis and metabolism of a number of neurotransmitters, including norepinephrine and serotonin. Glucose enters the central nervous system by traversing the blood-brain barrier and serves as the nearly exclusive substrate for the brain's energy metabolism. In this respect, cerebral metabolism is unique because the brain alone relies on carbohydrate solely for its energy. "The present evidence indicates that, except in some unusual and special circumstances, only the aerobic utilization of glucose is capable of providing the brain with enough energy to maintain normal function and structure" (Sokolof et al., 1977, p. 108). When a disorder develops which involves a decline in blood glucose in the brain, malfunctions can occur and irregular physiologic reactions and ultimately disordered behavioral patterns arise (Fishbein, 1981). Thus it has been postulated that behavioral problems including antisocial behavior is caused by a decline in the oxygen available to the brain due to a decrease in the amount of glucose in the body--the hypoglycemic condition.

It has also been theorized (Fabrykant, 1955a, 1955b) that a reaction threshold exists in which the bodily tissues are conditioned so that even mild reductions of blood glucose level produce the clinical symptoms of hypoglycemia. This theory was later supported by Buckley's (1978) hypothesis that proposes a hypoglycemic

"kindling" of the limbic system. This disorder involves repeated minor, subacute hypoglycemic stresses to the limbic system which in themselves are not clinically significant, yet over time results in subsequently lowering the limbic system response threshold level. This creates an increased emotional response to stimuli which normally would not have invoked that response.

Another theoretical syndrome put forth for consideration by Yaryura-Tobias and Neziroglu (1975) proposes that aggressive and/or assaultive behaviors are related to glucose metabolic disturbances and brain dysrythmia. It was hypothesized that aggressive behaviors are caused by a disturbance of tryptophan metabolism due to an increase in insulin output. The limbic system, commonly associated with emotions and aggression (Carlson, 1981), is thought to have an impaired chemistry due to glucose metabolic disorders. Thus it is claimed that hypoglycemia causes and increases aggressive behavior because of its interference with the electrical activity of the brain.

Fernstrom (1977), Fernstrom and Wurtman (1971), Wurtman (1983), and Wurtman and Fernstrom (1974) investigated the effects of diet on the composition of the brain. There is evidence (Wurtman, 1983) that what an animal eats can cause characteristic changes in the levels of tryptophan, an essential amino acid. Tryptophan is a precursor of serotonin, a neurotransmitter. It has been demonstrated (Wurtman, 1983) that a high-carbohydrate, protein-poor meal elevates the tryptophan in the brain. A more rapid synthesis of serotonin occurs, and this results in an increase in subjective fatigue and a diminished sensitivity to mild pain. The author stated that food constituents

affect plasma concentration subsequently altering neurochemical activity which results ultimately in an effect upon behavior.

While physiological theories abound, there was no research found which accounts for a diet-neurotransmitter-antisocial behavior relationship. At the present time the exact nature of the neurobiological and neurochemical processes involved in the analysis of hypoglycemia and antisocial behavior are unclear. While a number of theories have been proposed, further research is needed to elucidate each theory.

The current status of the hypoglycemia-antisocial behavior relationship is still marked by questions and controversy. While it has been claimed that no relationship exists (Gray & Gray, 1983), others including Fishbein (1981), Hippchen (1976), Schauss (1980), and Virkkunen (1982a, 1982b) claimed that there indeed is a relationship.

An additional criticism of most investigations of the relationship of glucose metabolism disorder and antisocial behavior is that there are no valid physiological measures which demonstrate the existence of a postprandial, reactive, idiopathic hypoglycemic condition in the subjects. Unless a 5-hour OGTT were administered, it is not possible to conclude scientifically that subjects have this disorder (Gray & Gray, 1983). To date, only the Virkkunen (1982a, 1982b) studies have utilized such measures.

All attempts to investigate carbohydrate metabolism effects have removed junk foods and a wide range of other types of foods from the experimental diet. A systematic appraisal of the actual carbohydrate properties of the experimental foods has been lacking. Moreover, the

reduced/eliminated foods were selected not on the results of valid glucose metabolic research but rather on assumptions made by investigators as to the foods' effects. In order to clearly test the diet-carbohydrate metabolism-antisocial behavior relationship, comprehensive knowledge of the foods, and more specifically the types of carbohydrates involved in glucose metabolic disorders, is needed.

As Schoenthaler (1984) pointed out, what is needed is to clearly isolate and test causal dietary determinants. Studies which have attempted to specifically investigate the impact of carbohydrates on antisocial behavior have not adequately controlled for the effects of other dietary factors, especially additives and nutrient composition. There is clearly a need to test empirically the carbohydrate factor and to exclude the effects of nutritional benefit and additive components.

Treatment of Carbohydrate Metabolic Disorders

When the glucose metabolic disorder of hypoglycemia was first described as a clinical entity (Harris, 1924), the specific foods which caused the rapid and easy formation of glucose in the bloodstream were not known. It was proposed that the excessive ingestion of glucose-forming foods was a cause of hypoglycemia, but these foods were not specified.

It was later demonstrated (Conn & Newburgh, 1936) that carbohydrate foods produce a sharper rise in the glucose (glycemic) response than do protein foods. Conn and Newburgh postulated that there was a decided advantage for patients with glucose metabolic

disorders to derive their glucose from protein foods because it would not cause abnormal glucose levels. In later research by Himsworth (1937), he ascertained that it is the carbohydrate component that is responsible for changes in glucose tolerance and insulin sensitivity in normal males. His research was instrumental in identifying carbohydrate foods as the specific components which could be altered dietarily to provide treatment for those with glucose metabolism disorders.

Conn (1947) recommended a dietary treatment for reactive hypoglycemia which called for foods high in protein and low in carbohydrates. The rationale behind this treatment is that the postprandial sharp rise in blood glucose caused by the absorption of carbohydrate needed to be avoided because this initial rise in blood glucose was the stimulus which produces a sharp and quick subsequent fall of blood glucose--the condition of hypoglycemia.

Subsequent research (e.g., Dahlqvist & Borgstrom, 1961; Trowell & Burkitt, 1975) elucidated the nature of carbohydrate metabolism. It became clear that carbohydrates are divided into groups according to their relative complexity and size of their molecules. The simple sugars, monosaccharides, are quickly and easily absorbed into the bloodstream. Disaccharides and either oligosaccharides or polysaccharides are more complex carbohydrates which must be broken down into simple sugars through the digestive process before they can be absorbed and utilized by the body. As a result the more complex carbohydrates are associated with slower and flatter rises in glucose levels.

Among the carbohydrates are sugars, starches, and celluloses. Sugars are generally simple carbohydrates and include sucrose (from cane or beet sugar), dextrose, fructose, lactose, maltose, and glucose which naturally occurs in fruits and in combination with sucrose and dextrose. Starch consists of glucose units and is the only polysaccharide that humans can use efficiently. Potatoes, cereal grains, rice, wheat, corn, and rye are carbohydrates which are rich in starch. Celluloses are polysaccharides which are not digestible. Cellulose is important because it combines with lignin to make up dietary fiber. Dietary fiber is defined as the remnants of the plant cell wall that are not digested in humans.

Carbohydrates of simple sugars and those sugars and starches which have been refined or purified were said to be more quickly and easily digested by the body (Heaton, 1975). Heaton concluded that this in turn increases the availability of glucose for absorption and sets into motion the sharp response from the body's insulin producing apparatus. Unrefined starchy roots, tubers, fruit, and unrefined legumes, including various peas and beans, were found to be more slowly digested (Trowell & Burkitt, 1975). As a result these foods do not stimulate the sharp production of insulin which results in an abnormally low blood glucose level.

Trowell and Burkitt (1975) pointed out that modern diets in Western cultures include an increased consumption of sugar accompanied by a reduction in starchy carbohydrate food. The authors proposed that this diet leads to many physiological disorders including hypoglycemia. A significant point in their conclusions was that

fiber is hypothesized to be the "connecting link" underlying disorders of glucose metabolism. Deficiencies of dietary fiber, consumption of fiber-deficient starch, and high consumption of refined sugar were postulated to be the major causative factors. Trowell and Burkitt pointed out that fiber varies according to its source. They recommended fiber-rich carbohydrates including unprocessed or lightly processed cereal products and leguminous seeds for consumption and that all refined carbohydrate food consumption be decreased.

Further research by Crapo, Reaven, and Olefsky (1976) confirmed that when different cooked starches were compared, blood glucose and insulin responses were significantly lower in those foods which had smaller carbohydrate molecules. Rice caused a 50% lower response than the potato. These investigators confirmed earlier findings that complex carbohydrates (starches) result in lower glucose and insulin responses than equivalent amounts of glucose in monosaccharides or disaccharides.

These findings led to further research which attempted to ascertain if there were significant differences among all complex carbohydrates (Crapo, Reaven, & Olefsky, 1977). The effects of potato, rice, corn, and wheat on postprandial plasma glucose and insulin responses also were studied. It was found that potato ingestion caused the highest glucose response while rice, corn, and bread have lower responses. Thus it was demonstrated that not only are there different effects among types of carbohydrates, but that individual starches vary in their respective glycemic effects.

Haber, Heaton, Murphy, and Burroughs (1977) analyzed the role of fiber in glucose response levels and found that fiber free apple juice could be consumed 11 times faster than intact apples containing equivalent amounts of dietary components. With the rate of ingestion equalized there was a striking blood glucose fall after the juice ingestion which was not observed with the apples. Among the conclusions drawn was that an abnormal glucose response resulted from the removal of fiber from the food. This was significant because although it had been determined that fiber which was added to meals lowered postprandial glucose levels (e.g., Cleave, 1974), it was now demonstrated that removing fiber from a food alters the blood glucose reactivity to that particular food.

The specific physical factors of foods which influence postprandial glucose responses were investigated (O'Dea & Nestel, 1981). They determined that any physical or chemical factor which restricts or slows down the rate of digestion or subsequent absorption would decrease the glycemic responses. For example, ground rice elicited a sustained and significant increase in insulin secretion compared with unground rice. The authors suggested that fiber is not the only factor in food which is related to glucose and insulin responses.

Jenkins, Wolever, Taylor, Barker, and Fielden (1980) analyzed a variety of dried leguminous seeds (beans) and 24 common foods drawn from grains, cereals, pasta, breakfast cereals, biscuits, and tuberous vegetables for glycemic responses. Results of their investigations showed that beans give a flatter blood glucose response than other foods which contain equivalent amounts of carbohydrate. A

high-fiber, high-carbohydrate diet containing high quantities of beans was recommended to achieve a lower glycemic response. The authors recommended a diet with high quantities of beans could moderate the glycemic response.

It became clear that the carbohydrate exchange lists which had served as the basis for the dietary treatment of glucose disorders did not reflect the actual physiological effects of foods. Jenkins et al. (1981) evaluated the effect of 62 different foods on the blood glucose levels. The largest rises were observed with vegetables followed, in decreasing order of effect, by breakfast cereals, cereals and biscuits, fruit, dairy products, and dried legumes. There was great inequality in the degree to which different carbohydrate sources raised the blood glucose level. There were significant differences observed not only between but within most of the food groups. For example, among cereals, wholemeal bread created a sharper and quicker rise than wholemeal spaghetti. Jenkins and his colleagues also found that there was no significant relationship between the amount of fiber in a food and the ability to create a glucose response. Surprisingly, sugar content was not found to be related to blood glucose responses. Both fat and protein showed a significant negative correlation with glycemic response.

Jenkins et al. (1981) proposed that the differences in the glucose response to different carbohydrate foods cannot be explained on the basis of simple sugars which elicit higher glycemic responses. They concluded that the differences in glycemic response cannot be predicted from a knowledge of the nutrient components. The

researchers claimed that factors affecting the glycemic response include hydration of the starch, particle size, the quality, nature, and the physical state of the associated dietary fiber. The type of starch and sugars and the presence of antinutrients also influence the glycemic response. The nature and amount of protein and fat, because of their effect on delaying gastric emptying (Thomas, 1967), are also involved in the effect on glucose response.

Jenkins et al. (1981, 1985) recognized the need to be able to more accurately and systematically understand the impact foods have on glucose metabolism. Thus the researchers developed a classification of foods in terms of their glycemic index in an effort to more accurately reflect the physiological response to these foods.

The Glycemic Index is provided in Appendix A. This system provides a basis for more clearly understanding and assessing each food's specific glycemic characteristics. It should be noted that the food found to be most effective in lowering the glucose response is the bean. Subsequent studies (e.g., Jenkins, Wolever, & Wong, 1984) have confirmed these findings.

Summary

It has been shown that diet affects behavior. Specifically, in controlled studies, antisocial behavior has been shown to be affected by dietary changes. A number of explanations have been proposed to explain this relationship, some of which have been tested and others which remain to be evaluated.

One of the major postulates suggests that foods which cause hypoglycemia in humans may contribute in some way to the increased frequency of antisocial behavior. Early researchers have identified junk foods, including sweetened cereals and other high sugar content foods, and eliminated or reduced them from the experimental diets to see what would be the effect on antisocial behavior. A limitation to these studies was that the experimental diets selected have not been systematically assessed as to their glycemic qualities. In order to meaningfully assess this postulate, a scientifically validated indexing of the foods according to glycemic effects was needed.

The purpose of this study was to determine if foods which specifically have been identified as affecting glucose response do indeed affect antisocial behavior. In other words, this study attempted to address the recommendations of Schoenthaler (1985a) by ascertaining which aspects of diet should or should not be considered to contribute to the occurrence of antisocial behavior.

CHAPTER III

METHOD

Overview

The primary purpose of this study was to compare the effects of two diets on antisocial behavior in adolescents. Subjects included the 140 male youths between the ages of 11 and 17 who were in residence at Starr Commonwealth School in Albion, Michigan, from January 3, 1987, to February 11, 1987. All subjects were juvenile offenders, referred to the Starr residential facility for treatment of antisocial behavior.

The treatment diet was provided to half the subjects and consisted of foods which were determined to be low in their glycemic characteristics as rated on the Glycemic Index (see Appendix A). The Glycemic Index ranks a food's capacity to cause sharp and quick rises in blood glucose levels in humans. Foods low on the Glycemic Index elicit lower glucose responses.

The nontreatment diet was given to the other half of subjects and consisted of foods which were identical to the treatment diet in all respects with the exception that it contained carbohydrates which were determined to produce a higher glucose response (Jenkins et al., 1981, 1985). Both diets were nutritionally complete and were approved by a registered dietitian and a physician.

The dietary effects on the occurrence of antisocial behavior were measured in three separate ways. First, the Unusual Incident Reports provided formalized, objective measurements of behavior considered to be antisocial. Second, the subjects' mood states were surveyed on a pretest and posttest basis using the Profile of Mood States (McNair, Lorr, & Droppleman, 1981). Finally, antisocial behavior in the classroom was recorded and measured by teachers who employed a modification of the Adaptive Behavior Scale-School Edition (Nihira, Foster, Shellhaas, & Leland, 1981).

The intent of this study was to examine dietary effects on behavior and not to investigate the internal physiological processes which mediate the ingestion of food and behavior. While the results led to a discussion of these processes, no attempt was made to measure them or to identify those involved.

Subjects

The population studied consisted of the 140 male residents of Starr Commonwealth's residential treatment center. Of the original number of 165 subjects, 22 youths graduated from the program and returned to their communities, 4 refused to participate, and 1 youth was removed from the facility for disciplinary reasons. The remaining 140 residents served as subjects for this study. All subjects were residents of Michigan and citizens of the U.S.A.

The subjects were delinquent, behavior disordered youths between the ages of 11.8 and 17.4 years who were referred to the Starr Commonwealth by the Michigan Department of Social Services, Michigan

Department of Mental Health, and Michigan County Probate Courts. The average length of stay for the subjects at the time of the study was 7.08 months. Of the total population, 50% were Caucasian; 44% were black; 3% were biracial; and 3% were Spanish-American, Oriental, or American Indian.

The overall characteristics of the 140 subjects comprising the study group are provided in Appendix B. Information including subject age, ethnicity, length of stay, and total number of adjudications are presented.

Setting

Starr Commonwealth Schools is a private, not-for-profit residential treatment center serving youths who are behavior disordered. Depending upon age and the area of the state from where they are referred, youths are assigned to one of three treatment centers, called "villages."

Each village consists of groups to which youths are assigned. Each group consists of 12 youths who reside in an on-campus home referred to as a "cottage." Treatment for each group is provided by a unit of staff called a cottage team. Each team consists of two group leaders, two resident staff, one nonresident staff, and two educational teachers. It should be noted that the resident staff are responsible for preparing the meals for each group. The youths eat their meals in the cottage together as groups and not cafeteria-style.

Cedar Village, made up of five cottage groups (approximately 60 youths) serves youths who are between 14 and 18 years of age and whose residence prior to placement is the eastern side of Michigan. The five cottage groups of Lakeview Village consist of 60 youths from the west side of the state also between 14 and 18 years of age. Maple Village is made up of four cottage groups (approximately 48 youths) between 12 and 14 years of age. These younger youths are referred from the entire state.

Consent and Approval

Starr Commonwealth Approval

The research project was proposed to the program director, the director of research and evaluation, and the vice president of program of the Starr Commonwealth Schools. The proposal was approved (Appendix C), indicating that the proposed project met the criteria set forth in the Professional Standards for Implementing Research and Evaluation Activities (Appendix C) at Starr Commonwealth Schools.

Human Subjects Review

Because the proposed research involved human subjects, it was necessary to secure approval from the Western Michigan University Human Subjects Institutional Review Board. The Human Subjects Approval Form (Appendix C) was completed and reviewed by the full institutional review board. The board voted to approve the research

project and formally notified the project director of this decision (Appendix C).

Informed Consent

The purposes of the project were explained to all subjects. Each subject was provided a Description and Purpose of Study Form (Appendix C) which outlined the overall project. Secondly, the project director met with each of the 14 cottage groups to more completely review the project and to respond to questions from the subjects.

Subsequently, all subjects were asked to read and sign the Consent for Participation--Social and Behavioral Research Form (Appendix C). All 140 subjects gave their consent to participate.

Informed consents were also required from the subjects' parents/guardians. The project director met with the family service workers who routinely meet with the families. Family service workers were given an orientation of the research project.and were supplied with written information (Appendix C) to help them respond consistently to parental inquiries. They reviewed the Description and Purpose of Study Form with each parent and requested their consent. All but four parents agreed to have their children participate. The analysis of data did not include observations or measurements regarding these youths.

Experimental Design

A pretest-posttest control group design with randomization (Campbell & Stanley, 1966) was employed to carry out the purposes of the study. The 14 cottage groups were divided equally into treatment and nontreatment groups of 7 each. Both the experimental and control groups were pretested on the dependent variable; and following the experimental period, both groups were posttested on the dependent variable.

Randomization

Randomization was considered to be an important feature of the study since one of the limitations cited for all existing diet-antisocial behavior research was the lack of randomization of subjects to either treatment or nontreatment groups (Perrello, 1984; Schoenthaler, 1984). As Christensen (1977) indicated, "randomization is the basic technique for achieving control and is generally regarded to be a sufficient guard for internal validity" (p. 146).

Additionally, the research environment was regarded as facilitating a randomized experimental design since the cottage groups were spatially separated and intergroup communication occurred infrequently. Cottage groups of subjects were similar in this respect to the hospital ward units described by Campbell and Stanley (1966) as being spatially isolated and appropriate for a randomized technique.

Thus a randomized process was utilized in the assignment of the dietary variable to the cottage groups. Seven cottage groups of

subjects were randomly assigned to the treatment diet group using the Tables of Random Permutations (Moses & Oakford, 1963). Randomization was stratified in that the assignments were made within each village. Because there were two villages (Cedar and Lakeview) with five cottage groups each, Cedar Village was randomly selected to contain three treatment groups and two nontreatment groups. Lakeview Village contained two treatment groups and three nontreatment groups. Maple Village had two treatment groups and two nontreatment groups.

Internal Validity

1. History: This source of error was controlled inasmuch as overall events which produced changes regarding the dependent variable in the control group would also have produced changes in the experimental group. However, an intragroup event could have existed in this design because there were more than one group of subjects. It was possible that events took place in one group that did not take place in others. This effect needed to be controlled through statistical procedures and was discussed in the data analysis section.

2. Maturation: This error source was controlled in this design through randomization since it was expected that conditions internal to subjects changing over time were equally manifested in both experimental and nontreatment groups.

3. Instrumentation: As with maturation, these changes which occurred as a function of the measurement of the dependent variable should be equally manifested through randomization.

4. Statistical regression: This source of error was controlled by virtue of the fact that cottage groups were randomly assigned to the experimental and the control groups. Extremely high or low scores tending to regress toward the mean should do so on an equivalent basis for both study groups.

5. Selection: The procedure by which groups were assigned to the experimental and control treatments should naturally rule out extraneous selection effects since random assignment has increased the probability of equality of the experimental and control groups. This was addressed through appropriate statistical procedures which are presented later in this chapter.

6. Mortality: All experimental and control subjects who completed both pretest and posttest measurements were included in the study. The percentage of attrition was equivalent between the experimental and control groups, and there is confidence that no comparative bias existed.

7. Subject bias: Perhaps the most difficult source of error to control in dietary research is the change in performance that can be attributed to the subjects' motives or attitudes. Ideally, a double blind placebo model has been suggested for use in dietary/behavior research (Gray & Gray, 1983) as one of the best techniques for overcoming selective responses of subjects. In this model neither subjects, experimenter, nor observers are able to distinguish between the placebo or treatment condition. Systematic subject bias on the effect of the experiment is precluded because the same characteristics exist for both groups.

A placebo could not be used in this study simply because there was no way of disguising the differences of diets. Christensen (1977) indicated that a common attempt to solve this problem is to use deception in the experiment. The author defined deception as "providing all subjects with a hypothesis that is unrelated to or orthogonal to the real hypothesis" (p. 147).

The subjects were told that the investigators were interested to see if changes in their diet would have any effect on how they generally felt, especially with regard to physical health. It was indicated that the campus clinic would be involved in some way in the project. All staff, with the exception of administrators who were not directly involved in the observation or measurement of the dependent variable, were likewise informed. Providing a plausible hypothesis to the subjects and staff should have produced relatively constant subject and observer biasing across all levels of the independent variable. As Christensen stated, "since any subject source of bias is held constant it could not operate as a rival hypothesis for the differences found in the various treatment groups" (p. 148).

8. Experimenter bias: The description of procedures used to control for subject bias applied to experimenter bias as well. An exception to this condition was that teachers were aware that their Adaptive Behavior Scale-School Edition ratings would affect the outcome of the experiment.

9. Sequencing: This variable describes the change in a subject's performance which can be attributed to the subject's participation in more than one treatment condition. This source of error

was controlled naturally in as much as subjects did not participate in more than one treatment condition.

Timetable

A complete timetable for completion of the research is presented in Appendix D. The project commenced on January 3, 1987, with the administration of the first pretest of the mood survey. The subjects received the final administration of this instrument on February 11, 1987, which marked the conclusion of the research project. The actual dietary changes were initiated on January 7, 1987, with the breakfast meal and concluded with the evening snack on February 10, 1987. A total of 105 meals and 35 snacks were provided to the youths during these 35 days.

Independent Variable

Operational Definition

As indicated in Chapter I, the study of the differences in glycemic responses between carbohydrate foods provided the basis of the selection of the treatment and nontreatment diets. Since one aim of dietary therapy for glucose metabolic disorders has been to prevent large fluctuations in blood glucose, it was suggested that therapeutic diets contain carbohydrate foods which minimize the postprandial blood glucose responses (American Diabetes Association, 1984). The foods which made up the study diets were selected on the basis of their effects on postprandial blood glucose responses and

their values are expressed as a Glycemic Index (Jenkins, 1985).

Thus the independent variable of this study was the diet provided to subjects. There existed two levels of the independent variable: (a) a treatment diet which was comprised of low glycemic carbohydrate foods and (b) a nontreatment diet which contained carbohydrate foods which produce higher glucose responses in humans.

Specifically, the breads, cereal products, breakfast cereals, legumes, fruits, and vegetables served as the study foods which were experimentally varied. Meats, dairy products, sugars, and miscellaneous foods were held constant across both levels of the study diets. For example, it can be seen in Appendix E that for the first dinner, the type of meat (veal) was constant across both groups, as was the fruit, dairy product, and tossed salad. In contrast, the bread on the treatment menu was a rye bread whereas the nontreatment bread was whole wheat. Mashed potatoes, a high glycemic food, was eaten only by nontreatment subjects. In comparison, the treatment subjects ate from a recipe (Italian Skillet Dinner) which contained beans and spaghetti, both low glycemic foods. Similar changes were made for each meal throughout the study period. Treatment subjects consistently ate foods which contained low glycemic carbohydrates; high glycemic carbohydrate foods were consumed by those subjects on the nontreatment diet. Snacks were the same for both study groups with the exception that crackers for the treatment group were rye while the nontreatment subjects ate crackers of a wheat base.

Nutrient Analysis

It was essential to hold constant all nutritional qualities other than the carbohydrate factor under consideration. The failure to isolate that specific dietary component would have made it impossible to make inferences regarding the independent effects of this variable. Ideally, a nutrient analysis is conducted by having trained observers monitor the amounts of foods ingested by all subjects. Portion sizes and types of food consumed were recorded to determine nutrient levels for each subject. It was beyond the scope of this study to incorporate this level of control. After consultation with Jenkins (1985), it was decided to use averages of food portions from which estimates of nutritional levels were obtained.

Estimates of portion sizes were obtained from two resident staff who collectively have prepared food for 18 years at Starr Commonwealth Schools. These estimates served as the basis for an analysis of the nutrients of both the treatment and nontreatment menus. A complete summary of these analyses is presented in Appendix E.

The analysis provided information which dictated a modification in the nontreatment menu. It was found that the amount of dietary fiber in the treatment diet was significantly higher than the nontreatment diet. To control for this problem, Jenkins (1986) recommended that wheat bran be added to the nontreatment diet by mixing this substance in all meat, soup, and vegetable preparation. It was also suggested that subjects be instructed to sprinkle wheat bran on their breakfast cereals. The addition of the wheat bran increased

the nontreatment subjects' levels of dietary fiber to a level equal to the treatment subjects.

Training of Staff

It was recognized that all staff required training to ensure subject compliance to the dietary changes. This was accomplished through several methods:

1. The commissary director, who was responsible for all food ordering, purchasing, and distribution, ensured that the foods went to the appropriate cottages. Since there was no on-campus Px or grocery store, it was also possible to exert control over the food consumed by the subjects. The commissary director communicated on a daily basis with the project director and also served as an information resource for those staff involved in food preparation.

2. The program village directors, who administer the residential programs and who supervise the staff, emphasized with all staff that youths should not be allowed to eat off-campus meals during the project period. Staff notified families that no foods were to be brought to the center nor were families allowed to eat off-campus meals during this period. The village directors routinely ate meals at the cottage on both announced and unannounced occasions to ensure staff compliance.

3. The staff responsible for food preparation were trained prior to the project. Specific dietary changes were discussed, menus were reviewed, recipes were shared and developed, and potential problem areas were explored and worked through. Staff were

instructed to discard leftovers after each meal. A feedback system utilizing the commissary director was developed.

A manual which incorporated the guidelines and recipes was subsequently developed (Appendix E). Specifications of the trial run menus and recipes were included in this manual.

After the trial run, the project director discussed with every resident staff their impressions of the pilot diet; it was believed that staff compliance would be enhanced if an attempt were made to incorporate their suggestions wherever possible. Changes in the treatment diet were made and final treatment and nontreatment menus were distributed.

Pilot Study

A pilot study which incorporated the treatment diet was conducted during the week of December 2 through December 8, 1986. The entire campus of 14 cottage groups with a total of 168 subjects ate from the treatment menu. The objective of the pilot study was to identify any difficulties with the menu and to provide the resident staff with practice in preparing foods from the experimental diet using recipes which were supplied to them (Appendix D). Results of the pilot study indicated the following changes:

1. Due to a substantially aversive reaction to the high amounts of legumes, especially chick peas, it was decided to initiate the actual treatment diet with slightly lower levels of legumes at the beginning and to gradually increase the amounts. An increase in tossed salads resulted.

2. A positive reaction to bean soups occurred and these were increased for the treatment period.

3. Bulgur was dropped from the treatment menu.

4. Recipes in general met with favorable reactions from the staff preparing the meals and, as a result, more were utilized in the treatment menu.

5. It was decided to add "Uncle Ben's Converted Brown Rice Breakfast" to the experimental menu.

6. Milkshakes were deleted from the snacks due to the difficulty in preparation.

7. More meats were made available for both study groups on Saturday mornings.

8. Available fruits were increased for both study groups.

9. Rye crackers were made available for the treatment group for snacks and when soups were served. The nontreatment group received crackers with a wheat base.

The pilot study provided the basis for the development of the final treatment and nontreatment menus. Although the initial reduction of legumes resulted in a slightly higher treatment diet Glycemic Index rating, the overriding factor was that the foods be sufficiently palatable so subject compliance not be a problem. The post-trial nutrient analysis indicated that the difference in glycemic characteristics between the two diets was maintained. A complete recipe list (Appendix E) was developed and distributed to each staff responsible for food preparation. Also presented in Appendix E are the final treatment and nontreatment diets. The diets were approved

by Jenkins (1986) through telephone conversations. Both menus were also reviewed and approved by a Michigan registered dietitian and a Michigan licensed physician (Appendix E).

Dependent Variable

Limitations to early diet-antisocial research included both validity and reliability issues with respect to the definition and measurement of the dependent variable.

In response to this problem, Schoenthaler (1985a) suggested the use of a "triangulated" (p. 18) approach to increase reliability. In essence, the author recommended that antisocial behavior be measured by three independent instruments, including formalized incident reports, surveys of subject mood states, and observations of classroom behavior. This recommendation served as the basis for the operational definition of antisocial behavior for this study.

Operational Definition

The dependent variable, antisocial behavior, is operationally defined as:

1. The frequency of formalized, documented Unusual Incident Reports.

2. Subject mood states as measured by the subjects' scores on the Profile of Mood States (McNair et al., 1981).

3. Frequencies of observed antisocial, aggressive, or rebellious behaviors in the classroom as measured by a modification of the Adaptive Behavior Scale-School Edition (Nihira et al., 1981).

Instrumentation

Unusual Incident Report

The Unusual Incident Report (UIR) is routinely completed by staff upon an observation of one or more of the incidents presented in Appendix F. There are no validity or reliability studies of the UIR as a measure of behavior. Ford (1984) suggested that the UIR has merit when an analysis is done of each individual report rather than a simple counting of incidents. The author further pointed out that staff bias is more likely to occur in minor incidents but should not be a factor in the reporting of more serious types of events. Pertaining to this observation, Schoenthaler (1985a) added, "Used in this way the UIR seems to be an excellent index of the overall change in criminal behavior rates in institutional settings" (p. 18).

Profile of Mood States

Pursuant to a consultation with Schoenthaler (1985b), the Profile of Mood States (POMS) was selected as this study's instrument to measure subjects' change in mood states. This instrument was developed to measure six identifiable moods, or affective states: (a) tension-anxiety, (b) depression-dejection, (c) anger-hostility, (d) vigor-activity, (e) fatigue-inertia, and (f) confusion-bewilderment. The POMS is a 5-point adjective rating scale consisting of 65 factor-analyzed items designed primarily as a method of measuring mood states and assessing changes in psychiatric outpatients. The internal consistency of the instrument was reported to be high (McNair et

al., 1981) with the reliability coefficient ranging from .84 to .95. Although test-retest reliability coefficients are lower (.65 to .75) than those expected for relatively stable personality traits, they are consistent with what might be expected for an instrument measuring less stable mood swings.

Six independent factor analytic replications in the development of the POMS were conducted and support the factorial validity of the six mood factors. The POMS scales have considerable face validity and examination of the individual items defining each mood scale provides evidence of both face and content validity of the factor scores.

According to the author, evidence of the construct and predictive validity has been provided through further research. The areas of short term psychotherapy studies, controlled outpatient drug trials, studies of emotion-inducing conditions, and studies of concurrent validity and other POMS correlates have provided this information.

POMS also has been described as an instrument which is helpful in the evaluation of a mood state that is more transient than a personality trait yet more lasting than a rapidly fluctuation, momentary mood. To illustrate, instructions to subjects include asking them to indicate how they have felt "during the past week, including today." The authors explain by saying, "The purpose of the one-week rating period was to emphasize the subjects' typical and persistent mood reactions to current life situations and yet be sufficiently short to assess treatment effects" (McNair et al., 1981, p. 5).

Adaptive Behavior Scale-School Edition

The Adaptive Behavior Scale-School Edition (ABS-SE) measures personal independence and social skills in children (Nihira et al., 1981). It consists of 95 items clustered into 21 domains (e.g., responsibility, aggressiveness, and antisocial vs. social behavior). A factor analysis resulted in five factors including: (a) Personal Self-Sufficiency, (b) Community Self-Sufficiency, (c) Personal-Social Responsibility, (d) Social Adjustment, and (e) Personal Adjustment. The items are displayed in a 15-page assessment booklet and are written in behavioral or objective terms.

The ABS-SE was standardized on a sample of 6,523 individuals ranging from 3 through 17 years of age who were classified into both normal and mentally retarded groups.

Reliability data documented in the manual includes internal consistency of each factor using the coefficient alpha technique and the resultant coefficient alphas are high (.71 to .97). Of concern is that there are no test-retest and interrater reliabilities for this instrument.

Domain score (construct) validity and predictive validity information is presented in the manual. Domain score validity results include data demonstrating the correlation between adaptive behavior ratings and intelligence test performance. Most of the 21 ABS-SE domains have low to moderate correlations with IQ test performances. Predictive validity scores indicate that the ABS-SE does an excellent

job in discriminating between regular and mentally retarded children and youths.

Data Collection

Unusual Incident Report

This reporting procedure is a formalized, documented system used by the treatment facility to monitor serious incidents of behavior. All staff are trained to document incidents using this objective recording system. As is procedure, staff routinely write up a UIR by filling out a prepared form (Appendix F) in the event they observe any important incidents. A description of what took place, the time and date of the incident, and the name of the youth(s) involved are reported. It is also noted whether or not a physical restraint was necessary. The UIR is reviewed by the village administrators and then sent to the Department of Research and Evaluation. There the specific type of event is classified through a qualitative analysis of the report.

For the purpose of this study, the UIR behaviors served as the objective measurement of the occurrence of antisocial behavior. Since the staff were unaware that antisocial behavior was actually the dependent variable, they were also unaware that the UIR was used as an instrument measuring this variable.

Profile of Mood States

The POMS was administered on a pretest-posttest basis. To establish temporal stability of the instrument, the POMS was administered twice during both phases; that is, during the pretesting, the POMS was administered to all subjects on Saturday morning and again on the following Wednesday morning. In the same manner, the instrument was administered on two separate occasions during posttesting, again on the same days and at the same times for all subjects. All testing with the POMS was conducted by the project director.

All subjects were encouraged to ask the meaning of items with which they were unfamiliar. A list of definitions (Appendix F) was developed prior to the first administration to ensure consistency when responding to subjects' inquiries as to the item definition.

On all factors except Vigor-Activity, higher scores reflect more negative affective moods; high scores on this factor indicate a positive affect mood. All response sheets were hand scored using an overlay. The mean score on each factor represented an individual's score. Raw scores and T scores were then plotted on profile sheets.

Adaptive Behavior Scale-School Edition

The ABS-SE is a checklist for systematically obtaining teacher observations of behaviors. Teachers did not use the entire ABS-SE for data collection. Only items measuring antisocial vs. social behavior items were retained. Specific items from the domains of trustworthiness, aggressiveness, and rebelliousness were also

selected since they were judged to reflect occurrences of antisocial behavior in the classroom.

The academic classroom teachers (one per cottage group of subjects) rated the subjects' classroom behavior once a week on Thursdays. Each measurement included observations of each subject for the past week. A total of six measurements of the occurrence of antisocial behavior were obtained for each subject.

It was originally intended that the purpose of the ABS-SE would be disguised so that teachers would not associate the record form with the research project. The record forms were introduced as part of a pilot study with the objective of obtaining citizenship data for the research department of the facility. The forms were introduced by the village directors several weeks before the actual research study so that a temporal association would be avoided.

However, when the teachers began to suspect that the real purpose of the form was to accommodate the research project, it was necessary to disclose the true purpose of the instrument.

Teachers were advised that it still would be beneficial to the study to obtain their observations of classroom behavior using the modified ABS-SE instrument. In spite of the rater bias potential, it was believed that this scale provided a valid measurement of antisocial behavior.

Statistical Hypotheses

Both the cottage group and the individual served as the unit of analysis for the hypotheses generated in this study. Several

hypotheses were analyzed using both units of analysis because it was recommended (Schoenthaler, 1987) to statistically test both the group mean differences as well as the differences in the proportions of subjects showing change. Because the diets were randomly assigned to cottage groups and not to individual subjects, the main unit of analysis was the cottage group.

Based on the research hypothesis which was stated in Chapter II, the following hypotheses were formulated:

1. There will be a significant difference between group mean gain scores measuring the Tension-Anxiety factor on the POMS.

2. There will be a significant difference between group mean gain scores measuring the Depression-Dejection factor on the POMS.

3. There will be a significant difference between group mean gain scores measuring the Confusion-Bewilderment factor on the POMS.

4. There will be a significant difference between group mean gain scores measuring the Fatigue-Inertia factor on the POMS.

5. There will be a significant difference between group mean gain scores measuring the Vigor-Activity factor on the POMS.

6. There will be a significant difference between group mean gain scores measuring the Anger-Hostility factor on the POMS.

7. There will be a significant difference between groups in the proportion of subjects who demonstrate a positive mood change on the Tension-Anxiety factor on the POMS.

8. There will be a significant difference between groups in the proportion of subjects who demonstrate a positive mood change on the Depression-Dejection factor on the POMS.

9. There will be a significant difference between groups in the proportion of subjects who demonstrate a positive mood change on the Confusion-Bewilderment factor on the POMS.

10. There will be a significant difference between groups in the proportion of subjects who demonstrate a positive mood change on the Fatigue-Inertia factor on the POMS.

11. There will be a significant difference between groups in the proportion of subjects who demonstrate a positive mood change on the Vigor-Activity factor on the POMS.

12. There will be a significant difference between groups in the proportion of subjects who demonstrate a positive mood change on the Anger-Hostility factor on the POMS.

13. There will be a significant difference between groups in mean subject UIR rates.

14. There will be a significant difference between groups in the proportion of subjects receiving UIRs.

15. There will be a significant difference between groups in the accumulated number of teacher observations as measured by the ABS-SE.

16. There will be a significant difference between groups in the proportion of subjects who score < 1 on the ABS-SE.

17. There will be a significant difference between groups in the proportion of subjects who score < 6 on the ABS-SE.

18. There will be a significant difference between groups in the proportion of subjects who score < 11 on the ABS-SE.

19. There will be a significant difference between groups in the proportion of subjects who score < 16 on the ABS-SE.

CHAPTER IV

ANALYSIS AND RESULTS

Analysis

The main statistical treatment of data involved an analysis of variance (ANOVA), the *t* test for mean differences (*t* test), and the chi-square test for independence. These statistical models were applied to the data to test the hypotheses listed in Chapter III.

For purposes of this study, the .05 level of significance was selected for all statistical testing. The exact probability levels are reported with each *F* (ANOVA), *t* (*t* test), or χ^2 (chi-square) value.

Since randomization was employed within each village, any village differences which may have affected overall treatment effects were included in the presentation of results. Where village effects were significant, a randomized block design of ANOVA, with village as the blocking variable, was employed.

Results

After computing the means and standard deviations for each of the six POMS factors, the ANOVA was used to test the first six hypotheses. The purpose of this analysis was to ascertain if there were any differences between group mean gain scores on these factors. In addition, when village effects were significant, a randomized

block (RB) ANOVA procedure was utilized. Otherwise a t test for mean differences was employed. All statistical hypotheses are presented in the null form.

Hypothesis 1: There will be no statistically significant difference between group mean gain scores as measured by the Tension-Anxiety factor on the POMS as a result of dietary alteration.

Pretest to posttest gain score differences on the POMS for the two groups were evaluated with the t test for mean differences. As shown in Table 1, the observed reductions do not exceed the .05 level of significance and the null hypothesis was accepted.

Table 1

The t Test Between Diets on the Mean Gain Scores of the Tension-Anxiety Factor on the POMS

Variable	N	Mean gain	SD	t	Prob.
Nontreatment diet	7	0.79	2.64	.01	.98
Treatment diet	7	0.77	2.47		

Hypothesis 2: There will be no statistically significant difference between group mean gain scores measuring the Depression-Dejection factor on the POMS as a result of dietary alteration.

Pretest to posttest gain score differences on the POMS for the two groups were evaluated with the t test for mean differences. As shown in Table 2, the observed reductions do not exceed the .05 level of significance and the null hypothesis was accepted.

Table 2

The t Test Between Diets on the Mean Gain Scores of the Depression-Dejection Factor on the POMS

Variable	N	Mean gain	SD	t	Prob.
Nontreatment diet	7	1.01	1.22	.53	.59
Treatment diet	7	1.64	2.82		

Hypothesis 3: There will be no statistically significant difference between group mean gain scores measuring the Confusion-Bewilderment factor on the POMS as a result of dietary alterations.

As village effects were nearly at a significant level, pretest to posttest gain score differences on the Confusion-Bewilderment factor were evaluated using a randomized block ANOVA design with the village as the blocking factor. As shown in Table 3, the observed reductions do not exceed the .05 level of significance and the null hypothesis was accepted.

Table 3

Randomized Block Analysis of Variance Between Diets on the Mean Gain Score Differences of the Confusion-Bewilderment Factor on the POMS

Source	df	SS	F	Prob.
Village	2	13.93	3.05	.10
Diet	1	0.01	0.01	.93
Village/diet	2	22.75	4.98	.04

Hypothesis 4: There will be no statistically significant difference between group mean gain scores measuring the Fatigue-Inertia factor on the POMS as a result of dietary alterations.

Pretest to posttest gain score differences on the POMS Fatigue-Inertia factor for the two groups were evaluated with the t test for mean differences. As shown in Table 4, the observed reductions do not exceed the .05 level of significance and the null hypothesis was accepted.

Table 4

The t Test Between Diets on the Mean Gain Scores of the Fatigue-Inertia Factor on the POMS

Variable	N	Mean gain	SD	t	Prob.
Nontreatment diet	7	0.38	2.40	.59	.56
Treatment diet	7	1.01	1.38		

Hypothesis 5: There will be no statistically significant difference between group mean gain scores measuring the Vigor-Activity factor on the POMS as a result of dietary alterations.

Since there was a significant difference among the villages on this factor, pretest to posttest gain score differences between the two groups were evaluated using a randomized block ANOVA design with village as the blocking factor. As shown in Table 5, the observed reductions do not exceed the .05 level of significance and the null hypothesis was accepted.

Table 5

Randomized Block Analysis of Variance Between Diets on the Mean Gain Scores of the Vigor-Activity Factor on the POMS

Source	df	SS	F	Prob.
Village	2	72.75	8.48	.01
Diet	1	1.52	0.36	.56
Village/diet	2	1.69	0.20	.82

Hypothesis 6: There will be no statistically significant difference between group mean gain scores measuring the Anger-Hostility factor on the POMS as a result of dietary changes.

Pretest to posttest gain score differences on the POMS for the two groups were evaluated with the t test for mean differences. As shown in Table 6, the observed reductions do not exceed the .05 level of significance and the null hypothesis was accepted.

Table 6

The t Test Between Diets on the Mean Gain Scores of the Anger-Hostility Factor on the POMS

Variable	N	Mean gain	SD	t	Prob.
Nontreatment diet	7	2.58	1.79	.10	.92
Treatment diet	7	2.77	4.33		

Hypothesis 7: There will be no significant difference between

groups in the proportion of subjects who demonstrate a positive change, as indicated by a difference score of a +2 or greater, on the Tension-Anxiety factor of the POMS as a result of dietary changes.

The difference scores between pretest and posttest scores were calculated and divided into three categories: (a) positive change = > +2, (b) no change = between -2 and +2, and (c) negative change = < -2. The proportions of subjects in each category were evaluated using the chi-square test of independence. As shown in Table 7, the observed differences in proportion do not exceed the .05 level of significance and the null hypothesis was accepted.

Table 7

Chi-Square Test of Independence Between Diet and Number of Subjects Showing Improvement on the Tension-Anxiety Factor of POMS

Variable	Negative change[a]	No change[a]	Positive change[a]	Total[a]
Nontreatment diet	25	30	20	75
Treatment diet	25	22	18	65
Totals	50	52	38	140

Statistics for Table of Diet by Tension-Anxiety Factor

Statistic	df	Value	Prob.
Chi square	2	0.62	.73

[a]All figures = number of subjects.

Hypothesis 8: There will be no significant difference between groups in the proportion of subjects who demonstrate a positive change, as indicated by a difference score of +2 or greater, in the Depression-Dejection factor of the POMS as a result of dietary changes.

The difference scores between pretest and posttest scores were calculated and divided into three categories: (a) positive change = > +2, (b) no change = between -2 and +2, and (c) negative change = < -2. The proportions of subjects in each category were evaluated using the chi-square test of independence. As shown in Table 8, the observed differences in proportion do not exceed the .05 level of significance and the null hypothesis was accepted. The hypothesis that the experimental diet would result in subjects showing improvement was not supported.

Hypothesis 9: There will be no significant difference between groups in the proportion of subjects who demonstrate a positive change, as indicated by a difference score of +2 or greater, on the Confusion-Bewilderment factor on the POMS as a result of dietary alterations.

The difference scores between pretest and posttest scores were calculated and divided into three categories: (a) positive change = > +2, (b) no change = between -2 and +2, and (c) negative change = < -2. The proportions of subjects in each category were evaluated using the chi-square test of independence. As shown in Table 9, the observed differences in proportion do not exceed the .05 level of significance and the null hypothesis was accepted. The hypothesis

that the experimental diet would result in more subjects showing improvement was not supported.

Table 8

Chi-Square Test of Independence Between Diet and Number of Subjects Showing Improvement on the Depression-Dejection Factor of POMS

Variable	Negative change[a]	No change[a]	Positive change[a]	Total[a]
Nontreatment diet	28	20	27	75
Treatment diet	26	21	18	65
Totals	54	41	45	140

Statistics for Table of Diet by Depression-Dejection Factor

Statistic	df	Value	Prob.
Chi square	2	1.19	.55

[a]All figures = number of subjects.

Hypothesis 10: There will be no significant difference between groups in the proportion of subjects who demonstrate a positive change, as indicated by a difference score of +2 or greater, on the Fatigue-Inertia factor on the POMS as a result of dietary alterations.

The difference scores between pretest and posttest scores were calculated and divided into three categories: (a) positive change = > +2, (b) no change = between -2 and +2, and (c) negative change =

Table 9

Chi-Square Test of Independence Between Diet and Number of Subjects Showing Improvement on the Confusion-Bewilderment Factor of POMS

Variable	Negative change[a]	No change[a]	Positive change[a]	Total[a]
Nontreatment diet	34	16	25	75
Treatment diet	28	17	20	65
Totals	62	33	45	140

Statistics for Table of Diet by Confusion-Bewilderment Factor

Statistic	df	Value	Prob.
Chi square	2	0.45	.80

[a]All figures = number of subjects.

< -2. The proportions of subjects in each category were evaluated using the chi-square test of independence. As shown in Table 10, the observed differences in proportion do not exceed the .05 level of significance and the null hypothesis was accepted. The hypothesis that the experimental diet would result in a higher proportion of subjects showing improvement as measured on this factor was not supported.

Hypothesis 11: There will be no significant difference between groups in the proportion of subjects who demonstrate a positive change, as indicated by a difference score of -2 or less, on the

Vigor-Activity factor on the POMS as a result of dietary alterations.

Table 10

Chi-Square Test of Independence Between Diet and Number of Subjects Showing Improvement on the Fatigue-Inertia Factor of POMS

Variable	Negative change[a]	No change[a]	Positive change[a]	Total[a]
Nontreatment diet	31	19	25	75
Treatment diet	26	21	18	65
Totals	57	40	43	140

Statistics for Table of Diet by Fatigue-Inertia Factor

Statistic	df	Value	Prob.
Chi square	2	0.96	.61

[a]All figures = number of subjects.

The difference scores between pretest and posttest scores were calculated and divided into three categories: (a) positive change = < -2, (b) no change = between -2 and +2, and (c) negative change = > +2. The proportions of subjects in each category were evaluated using the chi-square test of independence. As shown in Table 11, the observed differences in proportion do not exceed the .05 level of significance.

Hypothesis 12: There will be no significant difference between groups in the proportion of subjects who demonstrate a positive

Table 11

Chi-Square Test of Independence Between Diet and Number of Subjects Showing Improvement on the Vigor-Activity Factor of POMS

Variable	Negative change[a]	No change[a]	Positive change[a]	Total[a]
Nontreatment diet	25	14	36	75
Treatment diet	27	12	26	65
Totals	52	26	62	140

Statistics for Table of Diet by Vigor-Activity Factor

Statistic	df	Value	Prob.
Chi square	2	1.14	.56

[a]All figures = number of subjects.

change, as indicated by a difference score of +2 or greater, on the Anger-Hostility factor of the POMS as a result of dietary alterations.

The difference scores between pretest and posttest scores were calculated and divided into three categories: (a) positive change = > +2, (b) no change = between -2 and +2, and (c) negative change = < -2. The proportions of subjects in each category were evaluated using the chi-square test of independence. As shown in Table 12, the observed differences in proportion do not exceed the .05 level of significance and the null hypothesis was accepted. The hypothesis

that the experimental diet would result in a higher proportion of subjects showing improvement as measured by the Anger-Hostility factor was not supported.

Table 12

Chi-Square Test of Independence Between Diet and Number of Subjects Showing Improvement on the Anger-Hostility Factor of POMS

Variable	Negative change[a]	No change[a]	Positive change[a]	Total[a]
Nontreatment diet	34	24	17	75
Treatment diet	35	13	17	65
Totals	69	37	34	140

Statistics for Table of Diet by Anger-Hostility Factor

Statistic	df	Value	Prob.
Chi square	2	2.58	.27

[a]All figures = number of subjects.

Hypothesis 13: There will be no significant difference between groups in the mean subject UIR rates as a result of dietary alterations.

The number of UIRs for each cottage group was totaled and then divided by the number of subjects in that cottage, resulting in a cottage mean UIR per subject rate. These figures were used to compile the study group mean UIR per subject rate.

The difference between study groups was evaluated using a t test for mean differences. As shown in Table 13, the observed reductions do not exceed the .05 level of significance and the null hypothesis was not supported. The hypothesis that the experimental diet would result in less UIRs was not supported.

Table 13

The t Test Between Diets on the Mean UIR Rate Per Subject Over the Entire Study Period

Variable	N	Mean	SD	t	Prob.
Nontreatment diet	7	0.52	0.35	.09	.92
Treatment diet	7	0.50	0.36		

Hypothesis 14: There will be no significant difference between groups in the proportion of subjects receiving UIRs as a result of dietary alterations.

The proportions of subjects receiving at least one UIR were evaluated for differences between study groups using the chi-square test of independence. As shown in Table 14, the differences in proportions exceed the .05 level of significance and the null hypothesis was rejected. The hypothesis that the experimental diet would result in fewer subjects receiving UIRs was supported.

Hypothesis 15: There will not be a statistically significant difference between groups in the total number of teacher observations of antisocial behavior as measured by the ABS-SE resulting from dietary alterations.

Table 14

Chi-Square Test of Independence Between Diets on the Proportion of Subjects Having at Least One UIR

Variable	At least one UIR[a]	No UIRs[a]	Total[a]
Nontreatment diet	29	46	75
Treatment diet	13	52	65
Totals	42	98	140

Statistics for Table of Diet by Subjects With at Least One UIR

Statistic	df	Value	Prob.
Chi square	1	5.78	.02

[a]All figures = number of subjects.

Each subject's ABS-SE scores were totaled over the study period. All subjects' scores in the treatment and nontreatment groups were totaled and those figures were divided by the number of subjects in that particular group. The resultant mean ABS-SE score for each subject was then compared for differences between study groups using a *t* test for mean differences. As shown in Table 15, the observed reductions do not exceed the .05 level of significance and the null hypothesis was accepted. The hypothesis that the experimental diet would result in fewer teacher observations as measured by the ABS-SE was not supported.

Table 15

The t Test for Mean Differences Between Diets on Mean Number of Subject ABS-SE Scores

Variable	N	Mean	SD	t	Prob.
Nontreatment diet	75	34.70	26.93	.16	.87
Treatment diet	65	33.80	36.90		

Hypothesis 16: There will not be a statistically significant difference between groups in the proportion of subjects receiving less than an accumulated score of 1 on the ABS-SE as a result of dietary alterations.

Each subject's ABS-SE scores over the study period were totaled. The proportions of subjects who did not receive at least one ABS-SE score were evaluated for differences between study groups. A chi-square test of independence was employed. As shown in Table 16, the observed differences did not exceed the .05 level of significance and the null hypothesis was accepted.

Hypothesis 17: There will not be a significant difference between groups in the proportion of subjects receiving less than a score of 6 on the ABS-SE as a result of dietary alterations.

Each subject's ABS-SE scores over the study period were totaled. The proportions of subjects who received less than a score of 6 on the ABS-SE were evaluated for differences between study groups. A chi-square test of independence was employed. As shown in Table 17,

the observed differences did not exceed the .05 level of significance.

Table 16

Chi-Square Test of Independence Between Diet and Number of Subjects With Less Than 1 on the ABS-SE

Variable	< 1 ABS-SE[a]	1 or > ABS-SE[a]	Total[a]
Nontreatment diet	1	74	75
Treatment diet	4	61	65
Totals	5	135	140

Statistics for Table of Diet by Subjects With Less Than 1 on the ABS-SE

Statistic	df	Value	Prob.
Chi square	1	2.35	.12

[a]All figures = number of subjects.

Hypothesis 18: There will not be a significant difference between groups in the proportion of subjects receiving less than a score of 11 on the ABS-SE as a result of dietary alterations.

Each subject's ABS-SE scores over the study period were totaled. The proportions of subjects who received less than a score of 11 on the ABS-SE were evaluated for differences between study groups. A chi-square test of independence was employed. As shown in Table 18,

the observed differences did not exceed the .05 level of significance and the null hypothesis was accepted.

Table 17

Chi-Square Test of Independence Between Diet and Number of Subjects With Less Than 6 on the ABS-SE

Variable	< 6 ABS-SE[a]	6 or > ABS-SE[a]	Total[a]
Nontreatment diet	11	64	75
Treatment diet	12	53	65
Totals	23	117	140

Statistics for Table of Diet by Subjects With Less Than 6 on the ABS-SE

Statistic	df	Value	Prob.
Chi square	1	0.37	.54

[a]All figures = number of subjects.

Hypothesis 19: There will be no significant difference between groups in the proportion of subjects having less than a score of 16 on the ABS-SE as a result of dietary alterations.

Each subject's ABS-SE scores over the study period were totaled. The proportions of subjects who received less than a score of 16 on the ABS-SE were evaluated for differences between study groups. A chi-square test of independence was employed. As shown in Table 19,

the observed differences did not exceed the .05 level of significance and the null hypothesis was accepted.

Table 18

Chi-Square Test of Independence Between Diet and Number of Subjects With Less Than 11 on the ABS-SE

Variable	< 11 ABS-SE[a]	11 or > ABS-SE[a]	Total[a]
Nontreatment diet	15	60	75
Treatment diet	19	46	65
Totals	34	106	140

Statistics for Table of Diet by Subjects With Less Than 11 on the ABS-SE

Statistic	df	Value	Prob.
Chi square	1	1.61	.20

[a]All figures = number of subjects.

Table 19

Chi-Square Test of Independence Between Diet and Number of Subjects With Less Than 16 on the ABS-SE

Variable	< 16 ABS-SE[a]	16 or > ABS-SE[a]	Total[a]
Nontreatment diet	24	51	75
Treatment diet	29	36	65
Totals	53	87	140

Statistics for Table of Diet by Subjects With Less Than 16 on the ABS-SE

Statistic	df	Value	Prob.
Chi square	1	2.36	.12

[a]All figures = number of subjects.

CHAPTER V

SUMMARY, DISCUSSION, LIMITATIONS, AND RECOMMENDATIONS

Summary

Since 1975, there has been considerable interest in the relationship between diet and behavior. Many researchers have claimed that diet and behavior are related and that dietary modifications can lead to a reduction of problematic behaviors. The purpose of this study was to examine the relationship of diet and antisocial behavior in order to enhance understanding of how diet and behavior are related.

A review of the literature examined the relationship of diet and behavior, particularly the effects of diet on antisocial behavior in juvenile offenders. Results of these studies have indicated that diet contributes to the occurrence of antisocial behavior in juvenile offenders.

The literature review also examined the role of sugar and refined carbohydrate consumption on antisocial behavior. Results of studies in this domain suggest that the reduction and elimination of highly sugared and refined foods lead to a reduction in the incidence of behavior problems among institutionalized juvenile offenders. Thus, "junk" foods, such as potato chips, candy, sweetened soft drinks, chocolate, and highly sugared cereals, were eliminated from the diets of juvenile offenders in these studies.

Several researchers proposed that the consumption of sugar and other refined carbohydrates promotes glucose metabolic disorders, especially hypoglycemia, with an increase in antisocial behavior as a major symptom of this disorder. However, the specific processes which underlie improved behavior have not been identified.

The literature review revealed that the experimental foods which had been examined were not only higher in refined carbohydrates, but also were found to be less nutritious and to contain high amounts of artificial flavors and colorings. These studies could not control for factors other than sugar and refined carbohydrate level as determinants of antisocial behavior. It was obvious that research efforts have fallen short in determining which food factors are responsible for the improvements in behavior.

The review of the literature revealed further that contrary to popular assumption, foods other than refined carbohydrates, including sugar, are significantly related to the cause of and treatment for glucose metabolic disorders. Results from this area of research indicate that foods such as beans, peas, spaghetti, rice, noodles, and rye breads are effective in the dietary control of the glycemic reaction.

The present study is based on these comprehensive findings. The intent of this study was to more systematically investigate the effects of diet on antisocial behavior. Specifically, this study attempted to analyze the effects of a diet scientifically developed to effectively treat glucose metabolic disorders. In this study, only the type of starchy carbohydrate distinguished the treatment

from the nontreatment diet. All other factors, including nutritional levels, amounts of calories, and ratio of food groups, were held constant. The intent was to determine if a diet empirically tested to effectively treat glucose metabolic disorders would result in the reduction of antisocial behavior.

The subjects of this study consisted of the 140 boys, ages 11 through 17, who resided at the residential treatment center of Starr Commonwealth Schools. Half the youths ate from the treatment diet throughout the entire study period of approximately 5 weeks. The other half of subjects ate from a nontreatment menu for the same period of time.

All subjects were measured for antisocial behavior using the following instruments: (a) Profile of Mood States (POMS), (b) a modification of the Adaptive Behavior Scale-School Edition (ABS-SE), and (c) Unusual Incident Report (UIR). The POMS was administered to all subjects on a pretest and posttest basis to evaluate changes in mood. The ABS-SE measured rates of classroom antisocial behavior as observed and recorded by teachers. The UIR provided objective data regarding the frequency of serious antisocial behaviors requiring formal documentation.

It was hypothesized that the treatment diet would result in reduced occurrences of antisocial behavior as measured by these instruments. However, results of this study failed to support 18 out of the 19 research hypotheses. An analysis of the results revealed that the treatment diet failed to reduce the frequencies of antisocial behaviors in all respects. Moreover, there were no

significant differences in the proportion of subjects showing improvements on the treatment diet with the one exception that there was a lower proportion of subjects who were reported for at least one serious antisocial act as measured by the Unusual Incident Report.

Discussion

The preponderance of results of this study fail to support the research hypothesis that the treatment diet would result in a reduction of antisocial behavior. Of the 19 statistical hypotheses, 18 failed to show any significant treatment effects. It must be concluded that, overall, the treatment diet as tested is not an effective dietary intervention in reducing behavior problems in juveniles. It is important to discuss the results which lead to this conclusion so that plausible explanations for these findings can be considered.

Inaccurate Assumptions

One of the most obvious explanations for the lack of treatment effects is that researchers have mistakenly assumed that juvenile offenders suffer from glucose metabolic disorders. This is entirely possible since researchers claiming that juvenile offenders experience these disorders (e.g., Hippchen, 1976; Schauss, 1980) have not administered validated diagnostic tests such as the 5-hour Oral Glucose Tolerance Test (OGTT) to subjects in order to scientifically establish the existence of a glucose metabolic disorder. To date, only Virkkunen (1982a, 1982b) has employed this method; and although impaired blood glucose levels were noted, the investigations involved

adult male criminals and not juvenile offenders.

In this context, it is also possible that antisocial behavior is not a symptom of a glucose metabolic disorder as has been claimed. As was discussed in Chapter II, there is no agreement on this matter. Some authors (e.g., Schauss, 1980) claim that antisocial behavior is symptomatic of hypoglycemia. Others, including Gray and Gray (1983), dispute this finding. Thus, it is plausible that the treatment diet did not reduce the occurrence of antisocial behavior because there is no validity to the claims that glucose metabolic disorders elicit antisocial behavior in juveniles.

Contamination of the Experiment

It is also possible that the lack of treatment effects resulted from noncompliance to the dietary alterations on the part of either the staff or subjects participating in this study. Although the project director was able to exercise a high level of control over this problem through staff training, rigorous monitoring procedures, and food distribution methods, infractions nevertheless occurred. The dietary alterations disrupted the habitual "tried and true" eating patterns among the subjects and staff and there was a significantly strong reaction to the dietary alterations. Through a personal communication with Jenkins (1984), it was learned that adolescents are notoriously unwilling to modify, even temporarily, their eating habits. Thus, with respect to this study, even minor incidents of noncompliance could have resulted in a contamination of the experiment.

Even though steps were taken to provide the subjects with the most palatable diet and to concurrently maintain the glycemic characteristics of the experimental foods, subjects reacted adversely to many of the foods which could have resulted in an increased number of behavioral incidents. The resultant increase in these behaviors would have negated any positive treatment effects.

A social factor which may have mitigated against significant outcomes may have been peer influence. Since Starr Commonwealth uses positive peer culture as a treatment modality, it is possible that differential gains would be neutralized by the positive effects of this treatment.

Ineffectiveness of the Diet

It should also be considered that the dietary alterations in this study may have not been broad enough to effectively reduce the occurrence of antisocial behavior. Although it has been clearly established that diet is related to the occurrence of behavior problems (Schoenthaler, 1983a, 1983b, 1983d, 1983e, 1983f, 1984), it is plausible that the improvements noted in these studies occurred only when comprehensive dietary changes occurred. This would lend support to the notion that either many food factors, including nutritional value and artificial substances, or a factor other than the type of carbohydrate, may be involved in the observed behavior changes.

A final possibility is that the experimental diet did not reduce the incidence of antisocial behavior because it is not an effective dietary treatment of glucose metabolic disorders. This explanation

does not seem likely since no research studies were found in the literature review which dispute the treatment efficacy of this diet. Although no measurements of glycemic responses were taken in this study, the treatment diet may not have the desired effect on subjects' glucose metabolic levels; and as a result, behavior problems did not diminish.

Small Sample Size

As part of the experiment the cottage groups served as the units of analysis. The necessarily severly depressed sample sizes increased the likelihood of committing a Type II error in which significant differences are lost. Any future research of this genre should focus on large groups as units for analysis.

Limitations of the Study

A limitation to this study was that there were no physiological measurement of blood glucose levels in subjects. It was beyond the scope of this study to investigate this specific topic and it was not possible to know the actual dietary effect of the blood glucose levels. Thus, this study was not able to provide an understanding of the physiological processes which underlie behavior.

Another limitation to this study was not determining interrater reliability of the teachers' recording of classroom behaviors using the ABS-SE. It is possible that there was a high degree of variability among teachers in their ability to consistently rate the occurrence of classroom behaviors of subjects. Related to this

limitation was that teachers were aware of the nature of the experiment and knew that their recording of classroom behaviors was related to the study. This knowledge may have biased the recording of their observations.

Contrary to initial expectations, the concurrent provision of both the treatment and nontreatment diets to subjects was a limitation as well. It had been anticipated that by providing both diets simultaneously, sources of error, including history and maturation, would be more adequately controlled and result in a more powerful analysis. However, it was observed that the subjects on the treatment diet were resentful that the nontreatment diet subjects were not required to drastically change their eating habits. This resentment could have been acted out by subjects or staff with nonadherence to the dietary changes.

Recommendations for Further Study

Experimenters conducting diet-behavior research in the future are faced with several difficulties. As discussed earlier, dietary research which alters the foods consumed by adolescents is laden with problems. In this study the project director was an administrator of the institution and as such was able to elicit a high level of cooperation from subjects and staff. Even with this level of control, there were problems on a day-to-day basis that increased the risk of contaminating the experiment. In light of this observation, it is questionable that studies which involve major dietary alterations for extended periods of time can adequately control this source

of error. Consequently, a time-series design is advised in which all subjects basically eat from the treatment menu concurrently. The behavior of these subjects is then compared to the behavior of subjects who eat from a nontreatment diet at a different time.

It was also observed that the pilot study was an integral component of the overall research project. Having a practice run made it possible to fine-tune the actual study diets and to work through many of the problems before the actual study took place. For these reasons, future diet-behavior research of this genre should include a trial run.

As was accomplished in this study, future dietary research should also clearly specify the exact dietary changes that are made. This will provide more clarity and direction for further research rather than merely reducing or eliminating "junk" foods of unspecified composition.

It is also recommended that future research in this area record the actual amounts of food consumed by subjects. In this way, it may be possible to determine if quantities of foods consumed are related to behavior problems. This is an obviously more costly and obtrusive procedure, yet it provides more precision in the investigation of the diet-behavior relationship.

Finally, if the relationship of diet and behavior is to be more thoroughly understood, future research should investigate mediating physiological processes. Valid and reliable measurements of these processes, including blood glucose levels, would provide a more

comprehensive understanding of the specific dietary effects on human behavior.

APPENDICES

Appendix A

Glycemic Index Table

Food glycemic indices used in study calculations

Food	Source	GI	Food	Source	GI	Food	Source	GI
BREADS			**VEGETABLES**			**FRUIT**		
White bread	A-E*	100	Green Frozen Peas			Apples	A,C	53
Whole wheat			(Fresh Peas)†	A	74	Banana	A C	79
bread	A-C.F	100	Carrots	A	133	Cherries	C	32
Rye bread§	F	83	Yam	A	74	Grapefruit	C	36
Pumpernickel	F	80	Potatoes -			Grapes	C	62
			New Boiled	A C	81	Orange (Fruit		
			Instant	A	116	Cocktail/Melon/		
CEREAL PRODUCTS			Baked	D,E	135	Mango)	A,C	66
Bulgur	F	65	Beets	A	93	Orange Juice	A	67
Barley	F	31	Parsnips	A	141	Peach (Nectarines)	C	40
Spaghetti	A C	66	Turnip/Swede	A	104	Pear	C	47
Rice (white)	A-E	83		A,D		Plum	C	34
			Corn	E	87	Raisins	A	93
BREAKFAST CEREALS						**SUGARS**		
Cornflakes	A,B	119				Sucrose	A,C	86
Oatmeal-cooked	A-C	85	**LEGUMES**					
Shredded wheat	A	97	Red Lentils	A,B	43	**DAIRY PRODUCTS**		
Weetabix	A	109	Kidney (Romano/			Ice Cream	A	52
Oat bran -			Haricot/White			Milk (All Types)	A	49
uncooked	F	84	Pea)	A,B	51	Yogurt	A	52
			Chick Peas	A,B	49			
BISCUITS			Baked Beans	A	60	**MISCELLANEOUS**		
Rich tea			Dried Green peas	A,C	56	Peanuts	A	19
(Arrowroot)	A	80	Broad Beans			Tomato Soup	A	55
Digestives	A,B	82	(Lima)	A	115	Baked Goods	A	75

* A, normal volunteers; B, diabetic volunteers; C, diabetic volunteers; D, normal volunteers; E, normal volunteers; F, diabetic volunteers (unpublished data).

† All foods in brackets are assumed to have the same GI as the food precedibg the bracket.

§ Sourdough.

Appendix B

Study Group Characteristics

Case number
102034-4

Intake Data Sheet

☐ CORRECTION
PAGE 2

TYPE(S) AND NUMBER OF PREVIOUS PLACEMENTS

1 = Foster care ..... _____
2 = Group home..... _____
3 = Mental health facility.... _____
4 = Youth home ..... _____
5 = Private residential care facility..... _____
6 = Boarding school..... _____
7 = State facility ..... _____
8 = Receiving center ..... _____
9 = Halfway house ..... _____
10 = Placement with relatives.. _____
11 = Other..... _____
12 = Adoptive Placement..... _____

TYPE AND NUMBER OF SPECIAL TREATMENT SERVICES:

[ ] Community Mental Health [Outpatient]
[ ] Alternative Education
[ ] Day treatment
[ ] Intensive Probation
[ ] Residential treatment
[ ] Treatment in group home
[ ] Hospital [psychiatric]
[ ] Other _____

ADJUDICATIONS: ⌊__⌋ Number of times the student has been adjudicated.
⌊→ Of these, how many were for status offenses? ⌊__⌋

OFFENSE & REASON FOR PLACEMENT

Indicate the number of charges and adjudications in each category:

CHARGES	ADJUDICATIONS		CHARGES	ADJUDICATIONS	
[ ]	[ ]	1 = Homocide	[ ]	[ ]	17 = Narcotic Drug Laws
[ ]	[ ]	2 = Forcible Rape	[ ]	[ ]	18 = Gambling
[ ]	[ ]	3 = Robbery	[ ]	[ ]	19 = Driving Under the Influenc
[ ]	[ ]	4 = Assaults	[ ]	[ ]	20 = Liquor Laws
[ ]	[ ]	5 = Burglary	[ ]	[ ]	21 = Drunkenness
[ ]	[ ]	6 = Larceny Theft	[ ]	[ ]	22 = Disorderly Conduct
[ ]	[ ]	7 = Motor Vehicle Theft	[ ]	[ ]	23 = Vagrancy
[ ]	[ ]	8 = Arson	[ ]	[ ]	24 = All other offenses
[ ]	[ ]	9 = Forgery & Conterfeiting	[ ]	[ ]	25 = Curfew and Loitering
[ ]	[ ]	10 = Fraud	[ ]	[ ]	26 = Runaway
[ ]	[ ]	11 = Embezzlement	[ ]	[ ]	27 = Dependency (Neglect)
[ ]	[ ]	12 = Stolen Property:Possessing	[ ]	[ ]	28 = Truancy
[ ]	[ ]	13 = Vandalism	[ ]	[ ]	29 = Ungovernable Behavior
[ ]	[ ]	14 = Weapons: Carrying, Possessing	[ ]	[ ]	30 = Traffic Violations
[ ]	[ ]	15 = Prostitution & Com. Vice	[ ]	[ ]	31 = Violation of Probation
[ ]	[ ]	16 = Sex Offenses	[ ]	[ ]	32 = Other _____

Completed by _____

These are the characteristics of the study group as a whole:

	Age	Length of stay	Total adj.
Total	2,129.2	991.5	398.0
Minimum	11.8	1.2	0.0
Maximum	17.4	18.2	14.0
Average	15.2	7.1	2.8

Record count = 140

Ethnic:

	Count
American Indian	1
Biracial	4
Black	61
Other	1
Spanish American	2
White	71
Total	140

These are the characteristics of the control group:

	Age	Length of stay	Total adj.
Total	1,143.7	495.0	245.0
Minimum	12.8	1.2	0.0
Maximum	17.4	14.3	14.0
Average	15.3	6.6	3.3
Record count = 75			

These are the characteristics of the experimental group:

	Age	Length of stay	Total adj.
Total	985.5	496.5	153.0
Minimum	11.8	2.1	0.0
Maximum	17.3	18.2	14.0
Average	15.2	7.6	2.3
Record count = 65			

This is the ethnic distribution of the control group:

	Count
Biracial	1
Black	31
White	43
Total	75

This is the ethnic distribution of the experimental group:

	Count
American Indian	1
Biracial	3
Black	30
Other	1
Spanish American	2
White	28
Total	65

Appendix C

Consent and Approval Forms

Description and Purpose of Study

The purpose of this study is to see if diet can improve performance and overall health in youth. From January 3, 1987, through February 11, 1987, some of the students in the residential program of Starr Commonwealth Schools will be provided a diet which will be modified slightly only in the types of starchy food choices. For example, rice and spaghetti will be substituted for potatoes. Instead of white bread, whole rye or pumpernickel bread will be provided. Students not assigned to this menu will eat from one which is nearly identical but does contain potatoes and whole wheat bread. The menus have been developed by a registered dietitian and approved by a licensed physician to be safe, balanced, and nutritious. There are no risks to health whatsoever.

We are interested to see if these types of food can help our students to feel healthier and perform better. We will be monitoring students' overall health and school performances to see if there are improvements in this area.

It is hoped that we can use this information to improve our ability to help young people. Results from this study will help us develop the best possible diets for our students.

_____

(Investigator/Project Director or Authorized Representative)

Consent for Participation
Social and Behavioral Research

I consent to participating in (or my child's participation in) a study which intends to investigate the positive effects diet may have on health and performance. I have read the Description and Purpose of the Study and the procedures to be followed. I have read about the possible benefits of this study as well.

I acknowledge that I have had the opportunity to obtain additional information regarding the study and that any questions I have raised have been answered to my full satisfaction. Further, I understand that I am (my child is) free to withdraw consent at any time and to discontinue participation in the study without prejudice to me (or my child). The information obtained from me (my child) will remain confidential unless I specifically agree otherwise.

Finally, I acknowledge that I have read and fully understand the consent form. I have signed it freely and voluntarily and understand a copy is available upon request.

Date:_____ Signed: _____
(Participant/Parent)

_____ _____
(Investigator/Project Director or Authorized Representative) (Person Authorized to Consent for Participant)

Procedure to Assure Privacy and Confidentiality

Upon collection of the data from the instruments, all subject's names will be replaced with an alphabetic/numerical code for measurement and analysis. Under no circumstances will the names of the subjects be used at any stage of this project or after.

Questions You May Be Asked

Why are you changing the menu?

We are always looking for ways to improve our treatment program. In this case we hope to see if a slight change in diet can in any way improve our students' overall health and performance.

What are the changes?

All groups will eat from the same basic menu with only slight differences in the types of carbohydrates offered to half the groups. For example, pastas including spaghetti and rice will be served more often in one group than another. That group also will eat more oat cereals, rye and pumpernickel breads, and beans. All groups will eat typical meats, vegetables, and desserts. Only the carbohydrate food group will be modified.

Will it make my son sick at all?

No, these menus have been developed by a registered dietitian who has worked with Starr Commonwealth for several years. It was reviewed and approved by a physician as well. There is nothing in the menus which have harmful effects.

What if I don't want my son to participate?

We are seeking permission from both your son and you. The dietary changes will all be started at the beginning of the year and your son and his group will eat from one of the two menus. If permission is not obtained from either you or your son, then we will not include him in the study. However, he would still have to eat from the menu provided for his group and him.

How long will it last?

Approximately 6 weeks beginning at the first of the 1987 year.

Why do you think that these changes will improve health?

Prior research indicates that this may be the case. We do know that these diets will not hurt health--but we want to see how much diet can improve it.

Will this go against my son if he does not participate?

No.

What happens if I visit my son during this period of time and we want to go out to eat?

We ask that you and your son stay on campus to eat during this period of time. We understand that this may be temporarily inconvenient, but the results of the study depend on sticking to the menu.

What about snacks? Can't my son have them?

Snacks are included for all students throughout the study.

What if my son comes home for a pass during this time?

We see that this possibility exists. Your son, of course, can participate in a home pass. While at home you do not have to follow any particular dietary plan at all. This occurrence will be taken into consideration when we review the results of the study.

Can I see the results?

Yes. We will share with you the results of the project after they have been compiled and analyzed. We will also share them with your son.

Reviewer:

Western Michigan University
Human Subjects Institutional Review Board
Human Subjects Approval Form

Protocol #:

Received:

RESEARCH SHOULD NOT BEGIN UNTIL THE PROTOCOL HAS BEEN REVIEWED AND APPROVED BY THE HUMAN SUBJECTS INSTITUTIONAL REVIEW BOARD, WHICH MEETS ON A REGULAR MONTHLY BASIS. PROTOCOLS MUST BE RECEIVED BY THE HSIRB CHAIR AT LEAST SEVEN DAYS PRIOR TO A REGULARLY SCHEDULED MEETING IN ORDER TO BE ACTED ON AT THAT MEETING. PLEASE TYPE EACH RESPONSE - EXCEPT SIGNATURES. REFER TO THE WESTERN MICHIGAN UNIVERSITY POLICY FOR THE PROTECTION OF HUMAN SUBJECTS TO DETERMINE THE APPROPRIATE LEVEL OF REVIEW.

PRINCIPAL INVESTIGATOR J.E. Longhurst DEPARTMENT COUNSELOR EDUCATION AND COUNSELING PSYCHOLOGY

Home Phone (517) 629-4228 Office Phone (517) 629-5593

Home Address 608 Irwin Office Address Starr Commonwealth Schools

Albion, MI 49224 Albion, MI 49224

PROJECT TITLE: DIETARY EFFECTS ON ANTISOCIAL BEHAVIOR

SUBMISSION DATE: _____ PROPOSED PROJECT DATES Jan.3,1987 TO Feb.11,1987

APPLICATION IS: X New ____Renewal ____Continuation ____Supplement

SOURCE OF FUNDING: (if applicable) Non Applicable

James E. Longhurst
Signature of Investigator

STUDENT RESEARCH (Fill out if applicable)

Name of Student James E. Longhurst Phone 629-4228 (H) 629-5593 (W)

Address 608 Irwin Avenue, Albion, MI 49224

The Research is: ____Undergraduate Level X Graduate Level

Faculty Advisor Dr. Gil Mazer Department CECP

_____ Phone 383-1975
Signature of Faculty Advisor

HSIRB

VULNERABLE SUBJECT INVOLVEMENT (Fill out if applicable)

Research involves subjects who are: (check as many as apply)

1. _x_ children
   approximate age 12-17
2. ___ mentally retarded persons
   _x_ check if institutionalized
3. ___ mental health patients
   ___ check if institutionalized
4. ___ prisoners
5. ___ pregnant women
6. ___ Other subjects whose life circumstances may interfere with their ability to make free choices in consenting to take part in research

   Subjects are residents of Starr Commonwealth Schools-Juvenile Offenders
   (Describe please)

LEVEL OF REVIEW: Please indicate here if you think that the research project is exempt from review, subject to expedited review, or subject to full review.

___ Exempt (Forward 1 application to IRB Chair)

Which category of exemption applies? #_____

___ Expedited (Forward 4 applications to IRB Chair)

_x_ Subject to Full IRB review (Forward 9 applications to IRB Chair)

Comments:

HSIRB ACTION

1. ___ Exempt _____ _____
   Signature HSIRB Chair Date

---

2. ___ Expedited ___ Full

Your application was reviewed and the Human Subject Institutional Review Board (HSIRB) has determined that:

___1. The proposed activities, subject to any conditions and/or restrictions indicated in Remarks below, have (a) provided adequate safeguards to protect the rights and welfare of human subjects involved, (b) established appropriate procedures and/or documents to obtain informed consent, and (c) demonstrated that the potential benefits of the research substantially out-weigh the risks.

___2. The proposed activities, for reasons indicated in Remarks below do not provide adequate protection for the rights and welfare of the human subjects.

At its meeting on _____, the HSIRB (approved) (provisionally approved - see remarks) this application with regard to the treatment of human subjects. The HSIRB categorized this application as:

___1. Involving subjects at no more than minimal risk.

___2. Involving subjects at more than minimal risk.

REMARKS:

_____ _____
Signature HSIRB Chair Date

Protocol #:

DIRECTIONS: Please type or print the requested information - except signatures. You may attach additional sheets as necessary and reference the appropriate page.

PRINCIPAL INVESTIGATOR: James E. Longhurst DATE August 25, 1986

TITLE OF PROJECT: DIETARY EFFECTS ON ANTISOCIAL BEHAVIOR

ABSTRACT: Briefly describe the purpose, research design, and site of the proposed research activity.

The purpose of the study is to investigate the effects of diet on behavior. More specifically, we will try to determine if a low glycemic diet can reduce the severity and frequency of antisocial behavior in male juvenile offenders between the ages of 12-17 at a residential treatment center. Foods which have been demonstrated to produce less sharp and slower glucose responses in humans will be compared to a typical Western diet as to their effects on antisocial behavior. Both menues have been developed by a registered dietician and approved by a licensed physician.

It has been demonstrated in several studies (e.g. Schoenthaler, 1985, 1983a, 1983b, 1983c, 1983d) that providing reduced levels of high sugar content foods to juvenile offenders results in decreased antisocial behavior. This study attempts to follow up this research by modifying only the starchy carbohydrate food group to see if this has any effect on antisocial behavior. For example, potatoes, a traditional staple carbohydrate in Western diet, will be replaced by spaghetti and rice. White or whole wheat breads will be replaced with 100% rye and pumpernickel. The menue will also contain higher amounts of beans. All these foods have been demonstrated (Jenkins, 1980) to result in lower and flatter blood sugar responses. Thus it will be possible to see if consumption of these foods result in a decrease in the severity and frequency of antisocial behavior.

The study will take place from January 3, 1987 to February 11, 1987 and will incorporate the 168 students residing at the Albion campus of the Starr Commonwealth Schools Residential Program.

There are 14 cottages in which groups of 12 youth per cottage reside. Meals are eaten in the cottages and are prepared by resident treatment staff. For the study, seven cottage groups will be randomly selected to eat from the treatment menu and the remaining seven will eat from the standard of control menu. For a period of six weeks, both test groups will be measured as to their level of antisocial behavior, using already existing Unusual Incident Reports, a self-measured mood survey, the Profile of Mood States, POMS to be completed by the students on a pre and post test basis. Teachers will also record their observations of student antisocial behavior in their classrooms.

Results between the treatment and control groups will be compared to determine if foods which are lower in their glucose characteristics reduce the level of antisocial behavior. Review of existing literature suggests that there may be a diet behavior connection. It is hoped that this information will shed light on this relationship.

CHARACTERISTICS OF SUBJECTS: Briefly describe the subject population (e.g., age, sex, prisoners, people in mental institutions, etc.). Also indicate the source of subjects.

AGE: 12-17 years SEX: male

These youth have been referred to the residential program of the Albion campus of Starr Commonwealth Schools for delinquent and behavioral problems. These youth are referred from the Michigan Department of Social Services, the Michigan Department of Mental Health, and Michigan County Probate Courts. The average length of stay for these youth is one year.

Protocol #:

SUBJECT SELECTION: How will the subjects be selected? Approximately how many subjects will be involved in the research?

The total resident population of the Albion campus will be included in the study. Those students who give their informed consent and whose parents or guardians give their informed consent will be included in the study.

Of the fourteen cottage groups, seven will be randomly selected to eat from the treatment menu. A total of 168 subjects will be involved in the research.

CONFIDENTIALITY OF DATA: Briefly describe the precautions that will be taken to ensure the privacy of subjects and confidentiality of information. Be explicit if data is sensitive.

There will be three instruments used to measure the frequency and severity of anti-social behavior:

1. *The Unusual Incident Report*
   This report is routinely completed by staff in the event an unusual or serious incident with youth occur. The report is then processed by the Dept. of Research and Evaluation. It is the policy of The Starr Commonwealth Schools that all information is to be held in confidence. No student names will be used in the study whatsoever. This research will comply with the Professional Standards for implementing Research and Evaluation Activities of The Starr Commonwealth Schools. (See attached)
2. *The Profile of Mood States (POMS) (McNair, Lorr, & Droppleman, 1981)*
   Given on a pre- and post-test basis, only this researcher will have access to the completed forms. As in the Unusual Incident Report, no student names will be used.
3. *Teacher completion of the Adaptive Behavioral Series - School Edition (ABS-SE) (Nihira, Foster, Shellhaas, & Leland, 1974)*
   On a weekly basis, teachers will rate their particular group of students in regard to antisocial behavior. This information will be given directly to the researcher so as to ensure confidential handling of the data.

BENEFITS OF RESEARCH: Briefly describe the expected benefits of the research.

Information is needed regarding the effects which diet may have on human behavior. It has been determined (e.g. Schoenthaler, 1983, 1983a, 1983b, 1983c, 1983d, 1983e) that the reduction and elimination of high carbohydrate foods can reduce antisocial behavior in similar populations. This specific study will be one of the first to comprehensively analyze the menus used and to isolate one particular food group for alteration-the starchy carbohydrate. This research is needed to focus in on what particular aspect of food substances, if any, may be linked to antisocial behavior. This will assist Starr Commonwealth and other treatment centers in the development of the best possible diets for children.

RISKS TO SUBJECTS: Briefly describe the nature and likelihood of possible risks (e.g., physical, psychological, social) as a result of participation in the research.

The specific treatment menu was developed by a Michigan registered dietician. The dietician and this researcher have consulted extensively with Dr. David Jenkins, on the Medical faculty at the University of Toronto and an internationally known researcher in the field of diabetes. Janet Kalmusky, research nutritionist at the University of Toronto, has reviewed both menus involved as well.

Dr. Jim Dobbins, a licensed physician, has reviewed the proposed menus and has determined them to be safe, balanced, and nutritious in every respect.

To sum, it is concluded that there are no known physiological or psychological risks to subjects in either the treatment or control menus. Enclosed are copies of letters from Marla Moss, registered dietician and Dr. James Dobbins, a licensed physician.

Protocol #:

PROTECTION FOR SUBJECTS: Briefly describe measures taken to protect subjects from possible risks, if any.

By providing all subjects with safe, balanced, and nutritious diets, protection for subjects is ensured.

INFORMED CONSENT: Please attach a copy of the informed consent form. If oral consent will be obtained, describe procedures for obtaining and documenting such consent. (Subject should be given a copy of the consent form).

The attached forms, the Purpose and Description of the Study and the Consent for Participation in Social and Behavioral Research, will serve to describe the procedure of obtaining Informed Consent.

QUESTIONNAIRES OR INTERVIEW SCHEDULES: If questionnaires, interview schedules or data collection instruments are used, please identify them and attach a copy of what will be used in the project.

1. *All youth will complete the Profile of Mood States (POMS) in its entirety on the first and last days of the study (Pre and post test basis). Attached is a copy of this instrument.*
2. *Teachers will complete the Adaptive Behavioral Scale-School Edition (ABS-SE) once a week. Attached is a sample copy of this instrument.*

These instruments will measure the dependent variable of antisocial behavior. As was previously mentioned, these two instruments will be used in conjunction with the Unusual Incident Report.

WMU

Western Michigan University
Kalamazoo, Michigan 49008-3899

Human Subjects
Institutional Review Board

TO: J.E. Longhurst
Gil Mazer

FROM: Ellen Page-Robin, Chair EPR

RE: REsearch Protocol

DATE: October 2, 1986

This letter will serve as confirmation that your research protocol, "Dietary Effects on Antisocial Behavior," has been approved by the HSIRB with the understanding that the following changes be made:

1) Remove "anonymous" from consent form to state that individuals will not be identified.

2) Remove "if required" from consent form.

3) Include information about control group in description of study.

Please send a copy of the revised consent form and description of study to file with your protocol.

If you have any questions, please contact me at 383-4917.

THE STARR COMMONWEALTH SCHOOLS
Albion, Michigan • Van Wert, Ohio • Columbus, Ohio

Arlin E. Ness, ACSW
President

Martin L. Mitchell, Ed.D
Vice President

October 6, 1986

Dr. Ellen Page-Robin
Department of Gerontology
Henry Hall
Western Michigan University
Kalamazoo, MI 49008

Dear Dr. Page-Robin:

I have made the changes in the Description and Consent forms which were suggested by the committee. Enclosed you will find the corrected forms with the changes underlined. As you will see, "anonymous" has been deleted from the Consent form and reference to the existence of a control group has been included in the Description.

Maybe it was my relief to have this project approved but I forgot to extend to you and the Board members an open invitation to visit Starr Commonwealth's program in Albion. If you ever would like to visit, please give me a call and I will arrange a tour for you.

Again, I hope the changes meet with your approval. Thank you for your time, consideration, and input.

Sincerely,

Jim Longhurst

JL:jw

THE STARR COMMONWEALTH SCHOOLS

RESEARCH APPROVAL REPORT

Title of Research Proposal: Dietary Effects on Intellectual Behavior

Investigator: Jim Longhurst

The above mentioned proposal has been reviewed according to the Research Approval Procedure and meets the following criteria:

1. The research is consistent with the program of The Starr Commonwealth Schools and is potentially useful to the organization and beneficial to the children involved.

2. The research presents no risks to the subjects.

3. The research is not disruptive of the ongoing program and will not place unreasonable demands on staff.

4. Participation in the research will be voluntary on the part of the children.

5. The research will obtain approval from responsible parents, guardians or agency representatives.

6. The researcher has agreed to maintain confidentiality of records and other information.

7. The researcher has agreed to share the procedures and results of the research with staff members, parents, or agency representatives.

8. The researcher has agreed to follow the Professional Standards for implementing Research and Evaluation Activities at The Starr Commonwealth Schools.

Program Director — Date: 6/5/86

Director of Research and Evaluation — Date: 6/6/86

Vice President of Program — Date: 6/9/86

PROFESSIONAL STANDARDS FOR IMPLEMENTING RESEARCH AND EVALUATION ACTIVITIES[1]

[1]Adopted from Standards for Evaluation of Educational Programs, Projects, and Materials by Joint Committee on Standards for Educational Evaluation, 1981. New York: McGraw-Hill.

Utility Standards: To insure that the activity will provide useful and practical information.

1. Audience Identification

Persons involved or affected by the activity will be identified and their needs will be addressed.

2. Researcher/Evaluator Credibility

Persons conducting the activity will be trustworthy and competent, to facilitate maximum credibility and acceptance of their results.

3. Information Scope and Selection

Information collected will address pertinent questions and be responsive to the needs of the identified audiences.

4. Valuational Interpretation

The perspectives, procedures, and rationale used to draw conclusions will be carefully described, so that the bases for value judgments are clear.

5. Report Clarity

The final report of the activity will answer these questions:

What was done?
Why was it done?
What information was obtained?
What conclusions were drawn and why?
What recommendations, if any, are made?

6. Report Dissemination

Any reports of the activity will be made available to all persons who are in the identified audiences.

7. Report Timeliness

The reports generated during the activity will be made available in a timeframe which allows for the information to be useful.

8. Research/Evaluation Impact

The activity will be planned and conducted to facilitate the use of the findings by the identified audiences.

Feasibility Standards: To insure that the activity will be realistic, prudent, diplomatic, and frugal.

1. Practical Procedures

The procedures will be practical and disruption will be kept to a minimum so that the needed information can be obtained.

2. Political Viability

The activity will be planned and conducted in anticipation of the different positions of various audiences to gain their cooperation and curtail any attempts to bias or misuse the findings.

3. Cost Effectiveness

The activity will produce findings of such value as to justify the resources expended.

Propriety Standards: To insure the activity will be conducted legally, ethically, and with regard for the welfare of those involved and those affected by the activity and its results.

1. Formal Obligation

Obligations of the persons involved will be agreed upon in writing to specify what is to be done, how, by whom, and when.

2. Conflict of Interest

Any conflict of interest which may arise during the activity will be dealt with openly and honestly to protect the integrity of the activity and its results.

3. Full and Frank Disclosure

Oral and written reports will be open, direct, and honest with regard to the results of the activity and its limitations.

4. Public's Right to Know

Those persons who will be affected by the results will be informed about how and why the study was done and what the results were, except where to do so would endanger public safety or violate the right to privacy.

5. Rights of Human Subjects[1]

The activity will be designed and conducted with the respect and protection of the rights and welfare of the human subjects.

6. Human Interactions

Persons conducting the activity will display a respect for human dignity and worth in their interactions with the youth and staff involved.

7. Balanced Reporting

The reports generated in the activity will be complete and fair in the presentation of the strengths and weaknesses of the program being studied, so that the strengths can be built upon and the weaknesses can be addressed.

8. Fiscal Responsibility

Expenditure of funds will be prudent and responsible.

Accuracy Standards: To insure the activity will provide technically adequate information and sound results.

1. Object Identification

The program being studied will be examined thoroughly to arrive at a clear description of the object of the study.

2. Context Analysis

The context within which the program exists will be examined to identify the influences that the context has on the program and how it will be studied.

3. Described Purposes and Procedures

The purpose of the activity will be identified and the procedures fully described to allow the assessment of them by persons who may use the results.

4. Defensible Information Source

The sources of information obtained in the activity will be described to allow for the assessment of the adequacy of such information.

5. Valid Measurement

The instruments and procedures used will be chosen (or developed) and used in ways that assure the interpretation of the results are valid.

6. Reliable Measurement

The instruments and procedures used will be chosen (or developed) and used in ways that assure the results are reliable.

7. Systematic Data Control

The data collected and used in the study will be reviewed and verified to assure an error-free database.

8. Analysis of Quantitative Information

Quantitative data will be analyzed in appropriate ways to support the interpretation of the findings.

9. Analysis of Qualitative Information

Qualitative data will be analyzed in appropriate ways to support the interpretation of the findings.

10. Justified Conclusions

The conclusions reached in the study will be reported with clear justification as to how they were reached.

11. Objective Reporting

Study procedures will provide ways to protect the findings from distortion by personal feelings, biases, or loyalties of any person involved in the study.

---

[1]Rights of human subjects require the following procedures be adhered to:

A. Use of informed consent forms, either signed by the subject or a legally responsible person.

B. Verbal and written communication to the subject of his/her choice to withdraw from the study at any time.

C. Verbal and written communication to the subject of the nature and purpose of the study.

D. Right of the Research and Evaluation Office to terminate the study if human subjects become endangered or at risk in any way.

E. Verbal and written communication to the subject of his/her right to raise concerns about the conduct of the study with the Director of Research and Evaluation or with any Program Director.

F. Ongoing monitoring of the conduct of the study by the Program Director and Director of Research and Evaluation to assure that unanticipated problems are addressed as they occur.

Appendix D

Timetable for Project

Timetable

October 7, 1986: Human Subjects Review Committee meeting.

October 13, 1986: Presentation of proposal to Directors, Director of Research, and Vice President of Program.

October 16, 1986: Assistant Directors informed of project details.

October 16, 1986: Family Service workers trained in how to obtain parental consents.

October 22, 1986: Assistant Directors present project to all village teams.

October 23, 1986: Family Service workers begin to obtain consents from parents.

October 29, 1986: All students informed of project and consent forms signed.

November 5, 1986: All resident staff trained in the preparation of foods; project explained, questions answered.

November 10, 1986: Village Directors trained to present teachers the ABS-SE forms.

December 2-8, 1986: Trial run for experimental diet.

December 11, 1986: Random assignment of cottages to study groups.

December 17, 1986: Manuals for resident staff and timetables distributed.

December 17, 1986: All parental consent forms obtained.

January 3, 1987: Project start date.

January 3, 1987: First pretest of POMS administered.

January 7, 1987: Dietary changes implemented and second pretest of POMS administered.

January 8, 1987: Teacher ABS-SE forms completed.

January 15, 1987: Teacher ABS-SE forms completed.

January 22, 1987: Teacher ABS-SE forms completed.

January 29, 1987: Teacher ABS-SE forms completed.

February 5, 1987: Teacher ABS-SE forms completed.

February 7, 1987: First posttest of POMS administered.

February 10, 1987: Dietary changes conclude with evening snack.

February 11, 1987: Teacher ABS-SE forms completed and second posttest of POMS administered. Project end date.

Appendix E

Independent Variable

Trial Run
(December 2-8, 1986)

Week 1 + 4 SUNDAY

BREAKFAST

Control	*Experimental*
Grape Juice (6 oz.)	*Grape Juice (6 oz.)*
Pancake (4 med.)	*All-Bran Cereal (1 Cup)*
Syrup (2 oz.)	*Banana (1)*
2% Milk (8 oz.)	*Dimp. Rye Bread (2)*
Butter (2 tsp.)	*Butter (2 tsp.)*

LUNCH

Roast Beef (8 oz.)	*Roast Beef (8 oz.)*
Potatoes (2 Med.)	*Conv. Rice (1 Cup)*
Beets (½ Cup)	*Beets (½ Cup)*
Coleslaw (½ Cup)	**Kidney Bean Salad (3/4 Cup)*
Dinner Rolls (3)	*Dimp. Rye Bread (2)*
2% Milk (8 oz.)	*2% Milk (8 oz.)*
Butter (2 tsp.)	*Butter (2 tsp.)*
Pie (1/6")	*Pie (1/6")*

DINNER

Hot Dog (2)	*Hot Dog (2)*
Bun (2)	*Dimp. Rye Bread (2)*
Chips (Potato) (2 oz. - 30)	**Chick Peas/Tomatoes (1 Cup)*
Carrot Strips (½ Med.)	*Carrot Strips (½ Med.)*
Celery (1 Stalk)	*Celery (1 Stalk)*
Peach Slices (½ Cup)	*Peach Slices (½ Cup)*
2% Milk (8 oz.)	*2% Milk (8 oz.)*

PM SNACK

Milkshakes (12 oz.)

Week 1 + 4 MONDAY

BREAKFAST

Control	*Experimental*
Pineapple Juice (6 oz.)	*Pineapple Juice (6 oz.)*
Cherrios (2 Cups)	*Bulgar (1 Cup)*
English Muffin (2)	*Dimp. Rye Bread (2)*
Butter (2 tsp.)	*Butter (2 tsp.)*
Jelly (2 tsp.)	*Jelly (2 tsp.)*
Milk (8 oz.)	*Milk (8 oz.)*

LUNCH

Grilled Ham Sandwich	*Grilled Ham Sandwich*
Ham (5 oz.)	*Ham (5 oz.)*
W.W. Bread (4)	*Dimp. Rye Bread (4)*
Butter (4 tsp.)	*Butter (4 tsp.)*
Toss Salad (½ Cup)	**Bean Salad (1 Cup)*
Salad Dressing (2 T.)	
Pear Halves (3)	*Pear Halves (3)*
2% Milk (8 oz.)	*2% Milk (8 oz.)*
Yogurt (5 oz.)	*Yogurt (5 oz.)*

DINNER

Pork Chow Mein (10 oz.)	*Pork Chow Mein (10 oz.)*
Chow Mein Noodles (1 oz.	*Spiral Macaroni (1 Cup)*
Sunshine Salad (6 oz.)	**Springtime Salad (3/4 Cup)*
Fresh Fruit Cup (1 Cup)	*Fresh Fruit Cup (1 Cup)*
W.W. Bread (2)	*Dimp. Rye Bread (2)*
Butter (2 tsp.)	*Butter (2 tsp.)*
2% Milk (8 oz.)	*2% Milk (8 oz.)*

PM SNACK

Popcorn (3 Cups)/Apple Juice (6 oz.)

Week 1 + 4 TUESDAY

BREAKFAST

Control	*Experimental*
Orange Juice (10 oz.)	*Orange Juice (10 oz.)*
Shredded Wheat (1½ Cup)	*Oat Bran Cereal (2 Cups)*
W.W. Toast (2)	*Dimp. Rye Bread (2)*
Butter (2 tsp.)	*Butter (2 tsp.)*
Jelly (2 tsp.)	*Jelly (2 tsp.)*
2% Milk (8 oz.)	*2% Milk (8 oz.)*

LUNCH

Egg Salad Sandwich	*Egg Salad Sandwich*
Egg (2)	*Egg (2)*
Mayonnaise (2 T.)	*Mayonnaise (2 T.)*
W.W. Bread (4)	*Dimp. Rye Bread (4)*
Soda Crackers (8)	
Cream of Mushroom Soup (6 oz.)	**Bean/Barley Soup*
Pineapple Slices (3)	*Pineapple Slices (3)*
2% Milk (8 oz.)	*2% Milk (8 oz.)*

DINNER

Baked Chicken (6 oz.)	*Baked Chicken (6 oz.)*
Baked Potato (2 Med.)	*Conv. Rice Pilaf (1 Cup)*
Stewed Tomatoes (½ Cup)	**Chick Peas/Tomatoes (½ Cup)*
Orange Sections (4 oz. - ½ Cup)	*Orange Sections (4 oz.-½ Cup)*
W. W. Bread (2)	*Dimp. Rye Bread (2)*
Butter (2 tsp.)	*Butter (2 tsp.)*
2% Milk (8 oz.)	*2% Milk (8 oz.)*

PM SNACK

Ice Cream Bar (2)

Week 1 + 4 WEDNESDAY

BREAKFAST

Control	*Experimental*
Grapefruit Juice (6 oz.)	*Grapefruit Juice (6 oz.)*
Rice Krispies Cereal (2 Cups)	*All Bran Cereal (1 Cup)*
W.W. Toast (2)	*Dimp. Rye Bread (2)*
Butter (2 tsp.)	*Butter (2 tsp.)*
Jelly (2 tsp.)	*Jelly (2 tsp.)*
2% Milk (8 oz.)	*2% Milk (8 oz.)*

LUNCH

Bratwurst (2)	*Bratsurst (2)*
Bun (2)	*Dimp. Rye Bread (4)*
Veg. Soup (6 oz.)	**Lentil Veg. Soup (1 Cup)*
Crackers (soda) (8)	
Jello/Fruit (4 oz.)	*Jello/Fruit (4 oz.)*
2% Milk (8 oz.)	*2% Milk (8 oz.)*
Catsup (1 T.)	*Catsup (1 T.)*
Mustard (2 tsp.)	*Mustard (2 tsp.)*

DINNER

Veal Parmigiano (6 oz.)	**Italian Skillet Dinner (8 oz.)*
Mashed Potatoes (1 Med.)	
Toss Salad (1 Cup)	*Toss Salad (1 Cup)*
Salad Dressing (2 oz.)	*Salad Dressing (2 oz.)*
Fresh Fruit Cup (1 Cup)	*Fresh Fruit Cup (1 Cup)*
W.W. Bread (2)	*Dimp. Rye Bread (2)*
Butter (2 tsp.)	*Butter (2 tsp.)*
2% Milk (8 oz.)	*2% Milk (8 oz.)*

PM SNACK

Mixed Nuts (2 oz.)/ Fruit Juice (6 oz.)

Week 1 + 4 THURSDAY

BREAKFAST

Control	*Experimental*
Grape Juice (6 oz.)	*Grape Juice (6 oz.)*
Rice Krispies (2 Cups)	*Oat Bran Cereal (2 Cups)*
W.W. Toast (1 Slice)	*Dimp Rye Bread (2 slice)*
Butter (2 tsp.)	*Butter (2 tsp.)*
2% Milk (8 oz.)	*2% Milk (8 oz.)*

LUNCH

Hamburger (6 oz.)	*Hamburger (6 oz.)*
Bun (2)	*Dimp. Rye Bread (4)*
Soda Crackers (8)	
Vegetable Soup (6 oz.)	**Hearty Lentil Veg. Soup (1 Cup)*
Sliced Tomatoes (2 Slices)	*Sliced Tomatoes (2 Slices)*
Apricot Halves (3)	*Apricot Halves (3)*
2% Milk (8 oz.)	*2% Milk (8 oz.)*
Catsup (2 T.)	*Catsup (2 T.)*

DINNER

Pork Chops (8 oz.)	*Pork Chops (8 oz.)*
Unc. Rick Pilaf (1 Cup)	*Converted Rice Pilaf (1 Cup)*
Broccoli (½ Cup)	**Broccoli/Chick Peas (½ Cup)*
Pineapple Rings (3)	*Pineapple Rings (3)*
W.W. Bread (2)	*Dimp. Rye Bread (2)*
2% Milk (8 oz.)	*2% Milk (8 oz.)*
Butter (2 tsp.)	*Butter (2 tsp.)*

PM SNACK

Popcorn (3 Cups)/Hot Chocolate (8 oz.)

Week 1 + 4 FRIDAY

BREAKFAST

Control	*Experimental*
Orange/Grapefruit Sections (6 oz.)	*Orange/Grapefruit Sec. (6 oz.)*
Sausage Links (3 Links)	*Sausage Links (3 Links)*
W.W. Toast (2)	*Dimp. Rye Bread (2)*
Butter (2 tsp.)	*Butter (2 tsp.)*
Corn Bran Cereal (2 Cups)	*All Bran (2 Cups)*
2% Milk (8 oz.)	*2% Milk (8 oz.)*

LUNCH

Sloppy Joes (6 oz.)	*Sloppy Joes (6 oz.)*
Bun (2)	*Dimp. Rye Bread (4)*
Soda Crackers (8)	
Beef Veg. Soup (6 oz.)	**Lentil Soup (1 Cup)*
Peach Halves (4)	*Peach Halves (4)*
2% Milk (8 oz.)	*2% Milk (8 oz.)*

DINNER

Baked Fish (8 oz.)	*Baked Fish (8 oz.)*
Potatoes (2 Med.)	**Pasta Salad (1 Cup)*
Green Beans (½ Cup)	*Green Beans (½ Cup)*
Applesauce (3/4 Cup)	*Applesauce (3/4 Cup)*
2% Milk (8 oz.)	*2% Milk (8 oz.)*
W.W. Bread (2)	*Dimp. Rye Bread (2)*
Butter (2 tsp.)	*Butter (2 tsp.)*

PM SNACK

Fresh Grapes (1 Cup)

Week 1 + 4 SATURDAY

BREAKFAST

Control	*Experimental*
Orange Juice (10 oz.)	*Orange Juice (10 oz.)*
Cornflakes (2 Cups)	*Oat Bran Cereal (2 Cups)*
W.W. Toast (2)	*Dimp. Rye Bread (2)*
Jelly (2 tsp.)	*Jelly (2 tsp.)*
Butter (2 tsp.)	*Butter (2 tsp.)*
2% Milk (8 oz.)	*2% Milk (8 oz.)*

LUNCH

Tuna Salad Sandwich	*Tuna Salad Sandwich*
Tuna (½ Cup)	*Tuna (½ Cup)*
Mayo (2 T.)	*Mayo (2 T.)*
W.W. Bread (4)	*Dimp. Rye Bread (4)*
Soda Crackers (8)	
Tomato Soup (6 oz.)	**Chick Pea Soup (6 oz.)*
Fresh Banana (1)	*Fresh Banana (1)*
2% Milk (8 oz.)	*2% Milk (8 oz.)*

DINNER

Swiss Steak (6 oz.)	*Swiss Steak (6 oz.)*
Rice (1 Cup)	*Conv. Rice (1 Cup)*
Peas (canned) (½ Cup)	*Peas (canned) (½ Cup)*
Mixed Fruit Cup (3/4 Cup)	*Mixed Fruit Cup (3/4 Cup)*
W.W. Bread (2)	*Dimp. Rye Bread (2)*
Butter (2 tsp.)	*Butter (2 tsp.)*
2% Milk (8 oz.)	*2% Milk (8 oz.)*

PM SNACK

yogurt (5 oz.)/Apple Juice (6 oz.)

Manual for Residents
Research Project
January 3--February 12, 1987

December 2 through December 8--Practice Run:

All cottage groups will participate in a practice run for the dietary changes during this week. It is hoped that any kinks can be worked out so that everything will be ready to go at the start of the year.

It was brought up at one of our meetings together that the Sunday meal for this practice period included pancakes. If this still is on the menu for that day, feel free to switch that day's breakfast with Saturday's. Typically, pancakes are not served on Sundays but fit better on a Saturday morning menu.

I will be contacting your Directors for feedback. Please let them know how the practice run goes so that we can make the necessary changes for the actual project. We anticipate that there will be problems and want to hear about them. While we hope to make adjustments as needed, please understand that there will be some things that we cannot change.

There will be no measurements of any kind in regard to student health during the practice run. This is purely an opportunity to try to anticipate any problems in food acquisition, distribution, preparation, ordering, etc.

General Guidelines

Sometime after the practice run in December, I will randomly assign 7 cottages to the Experimental Group Diet, and the remaining 7 will be assigned to the Control Group Diet. Remember, the Experimental Group Diet will be the one which has the changes.

It is anticipated that the dietary changes during the project will begin on Wednesday, January 8, at 12:00 noon and will terminate on Wednesday, February 11, after snacks that evening. In other words, everyone will return to the standard menus on Thursday, February 12.

I will be meeting with your students on four separate occasions during this period. I will administer to all of them a survey which is needed to determine the equality between the Experimental and Control Group subjects. The dates of these surveys are as follows:

Saturday, January 3
Wednesday, January 7
Saturday, February 7
Wednesday, February 11

On all these days, I will meet with each cottage group individually sometime in the morning. Specific times will be developed with you later.

Regardless of whether or not your cottage is on the Experimental Diet, there are some necessary guidelines for all.

1. Stick to the menu! This is an absolute must.
2. Do not go off campus to eat! This too is a no-no.
3. Do not use leftovers!
4. Birthday and release meals will have to be delayed until after the end of the project.
5. Special home adjustment passes should be discouraged. There may be an occasion when one is necessary. Please inform your Director of this if it occurs.
6. Stick to the snacks provided for. As you can see, they will occur every night.
7. Do not worry about portion sizes. But do strongly encourage your students to eat their food. Your enthusiasm and modeling will be very important.

Experimental Group Diet Guidelines

I am attaching recipes which you will use for some of the meals prepared. You will need to adapt the recipes to fit the size of your group. Again, please stick to the recipes.

As you will see, this diet includes spaghetti, macaroni, rice, rye and pumpernickel breads, and more beans and peas. Potatoes, whole wheat and white breads, and certain cereals have been eliminated from this diet. It is essential that students avoid the eliminated foods and eat the ones which have been emphasized in their place.

Bulgur, an Eastern grain, can be used to make oatmeal. Actually, it would not be <u>oatmeal</u>, but you get the idea.

Do not worry about whether or not you are supposed to use sugars or other spices. Butter and salt on popcorn is okay too. Pies have been cut down because of the flour in them. Milkshakes can be made how you like them. Condiments such as mustard, catsup, and butter, margarine, etc. can be used at your pleasure.

We still are working out some kinks for the oat bran cereals. We have not found a way to have this easily prepared. We will try to inform you as soon as we can come up with something. We do know that the Bulgur cereals may have to be prepared somewhat on the night before and then microwaved that morning.

That's about it. We will try to let you all know of any changes, adjustments, and ideas as they come along.

Control Group Diet

Make sure that wheat bran is sprinkled on the students' cereals in the mornings. This is very important. Wheat bran should also be mixed in with meats, soups, vegetables, and whenever else you can. This is absolutely necessary to equalize the fiber contents for the two groups. This is really the only major change for the Control Diet, other than making sure to stick strictly to the menu.

Memo to: All Residents preparing Experimental Diets
From: Jim Longhurst
Date: December 22, 1986
In re: Final menus

I have tried to get feedback from all of you as to suggestions which could be incorporated into the menus. I appreciate your input and have tried to adapt the menu changes wherever possible. Some of the changes include:

1. Include more soups for lunches.
2. Include more of a variety of salads.
3. Reduce chick peas (garbanzos) to 1 or 2 times a week.
4. Add more fresh fruit to breakfasts.
5. Change bulgur to Uncle Ben's Brown Rice Breakfast.
6. Make sure to have meat in breakfasts on Saturday.
7. Provide more flexibility for snacks (more on this later).
8. Provide rye crackers for soups and for snacks.
9. Include pop two times a week.
10. Make sure we have enough rye breads and don't run out.

In regard to the snacks. I understand that there may be times where you cannot have snacks at night. Please feel free to incorporate them into the evening meal when this is the case.

Please spice and season the foods to your taste. The most important thing is to make sure the students (and staff) find the foods as palatable and tasty as possible.

Menu changes will start: Wednesday, January 7 (Breakfast)

Menu changes will end: Wednesday, February 11 (Lunch)

Most importantly, call Marty Doolittle or other residents if you come across any problems (shortages, recipes, etc.).

I will enclose recipes for the project. There may be a couple which have not been typed up yet but we will get them to you prior to your needing to use them.

Memo to: All Residents preparing foods for Control Groups
From: Jim Longhurst
Date: December 22, 1986
In re: Final menus

As you are aware, the only major change for your group dietarily is to make sure that wheat bran is sprinkled on the guys' cereals, and that it is mixed into the meats, soups, etc., wherever possible. This is very important as it balances out the fiber difference between the two groups.

It is just as important for your groups to stick to the menu which is provided and to not substitute foods or eat off campus. I am aware, too, that it may be impractical to have snacks on a particular night because of programming or whatever. If it can be planned, please try to incorporate the snacks into the dinner if possible.

The diet change dates are:

First day: Wednesday (Breakfast) January 7, 1987

Last day: Wednesday (Lunch) February 11, 1987

Please call Marty Doolittle if you should have any questions.

Thank you.

ITALIAN SKILLET DINNER

2 cups cooked beans, drained (these can be canned or pressure cooked)
1 cup spaghetti, broken into thirds
1/2 cup chopped onion
2 cloves garlic, minced (optional)
1 tablespoon oil
1 large tomato, peeled chopped
1 (8 oz.) can tomato sauce
1 tablespoon chopped fresh parsley
pinch of dried basil
1/2 teaspoon dried oregano
pepper to taste
2 oz. grated skim milk cheese or 2 slices processed skim cheese slices

Bring approximately 4 cups of water to a boil.
Add spaghettiand cook 3 minutes only. Drain.
In a large skillet, saute onion and garlic in the oil until tender.
Stir in tomato, tomato sauce, parsley, basil, oregano, beans and pepper
Cover and simmer for 5 minutes.
Arrange cheese slices or grated cheese over mixture.
Cover and simmer only until cheese is melted.

1 cup = 2 starchy choice and 2 protein choices

BROCCOLI AND CHICK PEAS

2 cups cooked chick peas, drained (canned or pressure cooked)
3/4 lb. fresh broccoli (or 1 large stalk)
1/2 cup water
2 tablespoons red pepper
1 teaspoon lemon juice
1/2 teaspoon dried basil
pepper to taste

Wash and trim broccoli.
In a medium saucepan, bring water to boil, add broccoli.
Cover and simmer just until broccoli is tender. Drain.
Add chick peas, red pepper, lemon juice, basil and pepper.
Toss gently.
Cook just until heated through.

1 cup = 1 starchy choice

BETTER-THAN-POTATO SALAD

Rice, uncooked	1 3/4 cups
Water	2 qts
Salt	2 tsp
Mayonnaise	1 qt
Onion, finely chopped	1 1/2 cups
Prepared mustard	2 Tbsp
Salt	1 tsp
Cucumber, pared	1 cup
Radishes, sliced	1 cup

Cook rice in water with 2 tsp salt according to package directions. Cool. Combine mayonnaise, onion, mustard and salt. Stir into rice. Cover and Chill. Stir in cucumbers and radishes before serving.

SKILLET BEEF WITH LENTILS

Bring 1 qt. water to boil in saucepan. Add:
1 1/2 c. lentils, rinsed
Cook 20 minutes. Drian, reserving liquid. In deep skillet, saute:
2 T. Margarine or butter
2 medium onions, chopped
1 clove garlic, minced
Stir in:
1 lb. ground beef
Brown well. Dissolve in 2c. reserved liquid:
2 beef bouillon cubes
Add liquid to meat mixture; cover and simmer 10 minutes. Stir in:
reserved lentils
2 T. rice
1 t. sugar
1 t. salt
1 t. ground cumin
1/2 t. pepper
Bring to boil, reduce heat, cover, and simmer 30 minutes, or until lentils and rice are tender and liquid is absorbed (add more liquid if necessary). Check seasonings and stir in:
1 T. cider vinegar.
Top with parsley sprinkle.
Serves: 6-8

BULGUR PILAF

2 T. minced onion
2 T. chopped green pepper
2 T. butter or margarine
2 c. chicken broth
1 c. bulgur wheat
1 can (3 oz.) sliced mushrooms, drained
1/2 t. salt
dash pepper

In medium skillet, cook and stir onion and green pepper in butter until onion is tender. Stir in remaining ingredients. Cover; heat to boiling. Reduce heat; simmer 15 minutes.
Serves: 4

LENTIL-BARLEY SOUP

Saute in large pan:
1/4 c. margarine
3/4 c. chopped celery
3/4 c. chopped onion
Add:
6 c. water
3/4 c. lentils
Cook 20 minutes. Add:
1 qt. Tomatoes
3/4 c. barley
2 t. salt
1/4 t. pepper
1/2 t. rosemary
1/2 t. garlic salt
Simmer 45-60 minutes. Add:
1/2 c. shredded carrots
Cook 5 minutes and serve.
Serves: 6

BAKED LENTILS AND CHEESE

Preheat oven to 375 degrees.
Combine in shallow 9 x 13 inch baking dish:
1 3/4 c. lentils, rinsed
2 c. water
1 whole bay leaf
2 t. salt
1/4 t. pepper
1/8 t. each marjoram, sage, thyme
2 large onions, chopped
2 cloves garlic, minced
2 c. canned tomatoes
Cover tightly and bake 30 minutes. Uncover and stir in:
2 large carrots, sliced 1/8 inch thick
1/2 c. thinly sliced celery
Bake covered 40 minutes until vegetables are tender. Stir in:
1 green pepper, chopped
2 T. finely chopped parsley
Sprinkle on top:
3 c. Shredded cheddar cheese
Bake uncovered, 5 minutes until cheese melts.
Serves: 6

FAVORITE KIDNEY-BEAN SALAD

1 16 ounce can kidney beans, drained
1/2 cup diced celery
1/3 cup pickle relish
1/4-1/3 cup mayonnaise
3 tablespoons chili sauce
2 green onions, diced
1/2 teaspoon salt

About 1 hour ahead or early in day, in medium bowl, combine beans with remaining ingredients. Mix well. Cover and refrigerate. Makes about 6 servings.

BASIC LENTIL SOUP

Combine in kettle:
1/2 lb. lentils
6 c water
Cook 30 minutes or until lentils are tender. Add:
2 carrots, chopped or sliced
4 sliced green onions
1 clove garlic, minced
1 1/2 c. tomato juice
1/2 c. minced parsley
1 T. margarine
1 1/2 t. salt
dash pepper
1/2 t. dried oregano
Bring to boil, reduce heat, and simmer just until carrots are tender.
Serves: 6

CHICK PEAS IN TOMATOES
****

2 cups chick peas
½ cup green pepper, diced
½ cup onions, chopped
1 ½ cups canned tomatoes
½ cup condensed paste
4 teaspoons oil
½ teaspoon garlic, minced

Saute onions and green peppers together in oil. Add remaining ingredients and seasonings. Place in a casserole dish and bake about 30 minutes or until done.

1 cup = 1 starchy choice + 2 fruit and vegetable choices + 1 protein ch
choice

BEANS AND SPAGHETTI - HOT OR COLD
****

1 cup beans, drained
½ cup cooked, drained spaghetti (al dente)
¼ teaspoon salt
½ clove garlic, crushed
2 teaspoons oil

To serve hot - Put beans and spaghetti into saucepan. Add oil, salt, and garlic. Heat until thoroughly warmed.

To serve cold - Mix beans and spaghetti in a large bowl. Add oil, salt and garlic, and mix thoroughly. Refrigerate until chilled.

1/2 recipe = 2 starchy choices + 1 protein choices

HEARTY LENTIL VEGETABLE SOUP

1 cup raw red lentils
2 carrots, diced
½ green pepper, diced
½ onion, chopped
2 stalks celery, diced
3 cups water
1 tsp salt
¼ tsp pepper

Combine all ingredients in a large pot. Bring to a boil and simmer 20-25 minutes.

Yield: 5 cups

1 cup = 1 starchy choice + 1 fruit and vegetable choice + 1 protein

ITALIAN LENTIL SOUP WITH SPINACH

1 cup raw red lentils
3½ cups water or broth
¼ cup sliced onions
1 tablespoon oil
¼ pound fresh or 1-5 ounce package frozen spinach, chopped
1 tablespoon lemon juice

Saute onions in oil until golden. Add to lentils and water or broth. Bring to a boil and simmer 15 minutes. Add spinach and simmer for an additional 10 minutes. Add lemon juice. Soup may be diluted with hot water if a thinner consistency is desired.

Yield: 5 cups

1 cup (undiluted) = 2 starchy choices + 1 protein choice

BROCCOLI RICE CASSEROLE

Cook 1/2 c. rice or have ready 1 1/2 c-2 cups leftover rice. Saute in small skillet:
1/4 c. margarine
1 onion, chopped
Add:
2 c. chopped broccoli, cooked and drained
3/4 c. grated cheese
1/2 c. milk
cooked rice
Bake in covered casserole at 350 degrees for 45 minutes.
Serves: 4

BEAN AND BARLEY SOUP

1/2 cup dry white pea beans
4 cups water
1 carrot, diced
1 celery stalk, diced
1 onion, chopped
1 clove garlic
1/4 cup dry barley
1 cup canned tomatoes
1 tsp basil
1 tsp pepper
2 tsp parsley

Bring water to a boil. Add beans and simmer, covered for 30 minutes Add remaining ingredients, except tomatoes, and simmer, covered, 30 minutes. Add tomatoes and continue simmering 20 minutes or until beans and barley are tender.
Yield: 6 cups

1 cup = 1 starchy choice

QUICK LENTIL AND BARLEY STEW

1/2 cup raw red lentils
1/2 cup raw pearled barley
2 cups tomato juice
1 cup water
1/2 cup diced onion
1/2 cup diced green pepper

Basil, oregano, salt and pepper to taste.

Combine all ingredients into pot.
Bring to boil, cover, and simmer for 40 minutes.

1/2 cup cooked = 2 starchy choices

BEAN-STUFFED CABBAGE ROLLS

Diet
these recipes are for smaller volumes than you would use. perhaps we can adapt the...

1 head of cabbage
2/3 cup canned kidney beans
2/3 cup canned chick peas
2/3 cup canned romano beans
1 cup cooked barley or Uncle Ben's rice
1 onion, chopped
1 celery stalk, chopped
1 tsp salt
1 tsp basil
2 cups tomato juice
1 pinch thyme, oregano, dill weed

Boil cabbage until leaves are tender. Remove from water and drain. Separate leaves and pare down heavy middle vein. Lightly mash beans. Mix beans, barley (or rice), celery, onion, and spices together to form the filling. Place four level tablespoons of filling on a cabbage leaf. Fold sides and top of leaf over filling and carefully roll up. Secure with a toothpick.

Place in a shallow baking dish. Pour tomato juice over cabbage rolls and cover dish. Bake at 350° (F) for one hour.

Makes 3 cups of filling or 12 cabbage rolls.
Each serving: 2 cabbage rolls = 2 starchy choices + 1 protein choice

BEAN SALAD

1 cup kidney beans
1 cup chick peas
½ cup dill pickle, chopped
¼ cup celery, chopped
¼ cup onion, raw, chopped
1 tablespoon mayonnaise or oil
½ tsp garlic powder
salt and pepper to taste

Drain and rinse beans. Add other ingredients to beans. Add spices and mayonnaise. Mix lightly. Chill and serve

Makes 3 cups.

3/4 cup = 1 starchy choice + 1 protein choice

CHICK PEA SOUP

1 (19oz) can chick peas, drained (or 2 cups pressure cooked)
1 (28oz) can tomatoes
1 tsp salt
1 tsp pepper
3 cups chicken broth
½ cup chopped onion

In a saucepan, bring to boil tomatoes and chicken broth.
Add chick peas, salt, pepper and chopped onions.
Simmer 25 to 30 minutes and serve. Yield 9 cups.

1 cup = 1/2 starchy choice

SPRINGTIME SALAD

1 (19oz) can chick peas, drained (or 2 cups pressure cooked)
1 tablespoon oil
1/4 cup wine vinegar
1/4 cup pimentos, finely chopped
3 fresh spring onions, finely chopped
salt and pepper
crisp lettuce leaves

Place chick peas in a medium sized bowl.
Add oil, vinegar, pimentos, onions and season to taste with salt and pepper
Toss gently but thoroughly.
Cover and place in refrigerator for 3 hours.
When chilled serve over crisp lettuce leaves
Yield: 2 cups

1/2 cup = 1 starchy choice + 1 protein choice

LENTIL BURGERS

1/3 cup raw red lentils
3/4 cup water
1/3 cup bread crumbs (or 1 slice bread, dried and crumbled)
2 tablespoons finely chopped onion
1/4 teaspoon celery seed or 2 tablespoons minced celery
1/4 teaspoon salt
1 tablespoon oil

Cook lentils in water for 20 minutes. Add more water if necessary. Remove from heat. Add onions, salt, celery, and half of the bread crumbs. When cool enough to handle form into 2 patties and coat with remaining crumbs. Heat oil. Cook patties until brown on both sides. Serve with tomato slices.

Recipe = 3 starchy choices + 2 protein choices + 1 fat choice

CHILI BEANS

1 can romano beans (540 ml = 19 oz.)
1 can kidney beans (540 ml = 19 oz.)
1 small can tomato paste (156 ml = 5.5 oz.)
1 clove garlic, mashed
1 onion, chopped
2 stalks celery, chopped
1 cup sliced mushrooms (preferably fresh)
2 to 3 teaspoons chili powder
1 to 2 teaspoons cumin

Combine all ingredients in large pot. Cook to boiling over medium heat.

Note: Chili may be divided into 1 cup portions and frozen individually. Reheat as required.

Yield: 6 cups

1 cup = 2 starchy choices + 1 protein choice

Week 1 [redacted] C

WEDNESDAY		
Grapefruit Juice Rice Krispies Cereal W.W. Toast Milk/Fresh Fruit	Bratwurst WW Bun Vegetable Soup/Crackers Jello/Fruit Milk	Veal Parmigiano Mashed Potatoes Toss Salad Fresh Fruit Cup W.W. Bread/Milk
THURSDAY		
Grape Juice Rice Krispies W.W. Toast Milk	Hamburger WW Bun Vegetable Soup/Crax. Sliced Tomatoes Apricot Halves/Milk	Pork Chops *Rice Pilaf Broccoli Pineapple Rings W.W. Bread/Milk
FRIDAY		
Orange Juice Fresh Fruit W.W. Toast Sausage Links Corn Bran Cereal/Milk	Sloppy Joe WW Bun Beef Vegetable Soup Crackers/Peaches Milk	Baked Fish Potatoes Green Beans Applesauce WW Bread/Milk
SATURDAY		
Orange Juice Eggs/Bacon W.W. Toast Milk	Tuna Salad Sand. W.W. Bread Tomato Soup/Crackers Fresh Banana Milk	Swiss Steak Rice Peas/Coleslaw Mixed Fruit Cup W.W. Bread/Milk
SUNDAY		
Grape Juice Pancake/Syrup Milk	Roast Beef Potatoes Green Beans Cukes/Onion/Sr.Cream Dinner Rolls/Milk/Pie	Hot Dog/Bun Potato Chips Carrot/Celery Strips Peach Slices Milk
MONDAY		
Pineapple Juice Cheerios English Muffin Milk	Grilled Ham/Cheese Sand. W.W. Bread Toss Salad Pear Halves Milk/Yogurt	Pork Chow Mein Chow Mein Noodles Sunshine Salad Fresh Fruit Cup W.W. Bread/Milk
TUESDAY		
Orange Juice Shredded Wheat W.W. Toast Milk	Egg Salad Sandwich W.W. Bread Cream of Mushroom Soup Crackers Pineapple Slices/Milk	Baked Chicken Baked Potato/Toss Salad Stewed Tomatoes Orange Sections W.W. Bread/Milk

Week 1 & 4 E

WEDNESDAY		
Grapefruit Juice	Bratwurst	*Italian Skillet Dinner
All Bran Cereal	Rye Bun	Toss Salad
Rye Toast	*Lentil Soup	Fresh Fruit Cup
Milk/Fresh Fruit	Jello/Fruit	Rye Bread
	Milk	Milk
THURSDAY		
Grape Juice	Hamburger	Pork Chops
Oat Bran Cereal	Rye Bun	Conv. Rice Pilaf
Rye Toast	*Hearty Lentil Veg. Soup	Broccoli
Milk	Sliced Tomatoes	Pineapple Rings
	Apricot Halves/Milk	Rye Bread/Milk
FRIDAY		
Orange Juice	Sloppy Joes	Baked Fish
Fresh Fruit	Rye Bread	*Baked Lentils and Cheese
Sausage Links	*Lentil Soup	Green Beans
All Bran Cereal	Peach Halves	Applesauce
Rye Toast/Milk	Milk	Rye Bread/Milk
SATURDAY		
Orange Juice	Tuna Salad Sandwich	Swiss Steak
Eggs/Bacon	Rye Bread	Conv. Rice
Rye Toast	Tomato Rice Soup	Peas/Coleslaw
Milk	Banana	Mixed Fruit Cup
	Milk	Rye Bread/Milk
SUNDAY		
Grape Juice	Roast Beef	Hot Dog/Rye Bun
All Bran Cereal	Conv. Rice	*Bean Barley Soup
Banana	Green Beans	*Chick Peas/Tomatoes
Rye Toast	Cukes/Onion/Sr. Cream	Carrot/Celery Sticks
Milk	Rye Bread	Peach Slices/Milk
	Pie/Milk	
MONDAY		
Pineapple Juice	Grilled Ham/Cheese Sand.	Pork Chow Mein
U.B. Brown Rice Brfk.	Rye Bread	Spiral Macaroni
Rye Toast	Toss Salad	*Kidney Bean Salad
Milk	Pear Halves	Fresh Fruit Cup
	Milk/Yogurt	Rye Bread/Milk
TUESDAY		
Orange Juice	Egg Salad Sandwich	Baked Chicken
Oat Bran Cereal	Rye Bread	Conv. Rice Pilaf
Rye Toast	*Bean/Barley Soup	Stewed Tomatoes/Toss Sal.
Milk	Pineapple Slices	Orange Sections
	Milk	Rye Bread/Milk

WEDNESDAY

Orange Juice	Sub.Sand./Rye Bread	Beef Stroganoff
All Bran Cereal	Lettuce/Tomato	Spaghetti
Banana	*Lentil Soup	Peas
Rye Toast/Milk	Fresh Orange	Applesauce
	Milk	Rye Bread/Milk

THURSDAY

Orange Juice	Chicken Salad Sandwich	*Skillet Beef - Lentils
U.B. Brown Rice Brfk.	Rye Bread	Toss Salad
Rye Toast	*Better-Than-Potato Sld.	Mixed Vegetables
Milk	Carrot Sticks	Pineapple Tidbits
	Apple/Milk	Rye Bread/Milk

FRIDAY

V-8 Juice	Sizzle Steak	BBQ Ribs
Oat Bran Cereal	Rye Bun	Conv. Rice
Rye Toast	*Veg. Lentil Soup	Corn
Sausage Link	Toss Salad	*Bean Salad
Milk	Fresh Grapes/Milk	Rye Bread/Milk

SATURDAY

Orange Juice	Shaved Ham	Cheeseburger
Fresh Fruit	Rye Bun	Rye Bun
Eggs/Bacon	*Bean/Barley Soup	*Chili Beans
Milk/Rye Toast	Carrot/Celery Sticks	Sliced Tomato
	Peaches/Milk	Yogurt/Milk

SUNDAY

Org./Grapf. Sections	Pork Roast	Grilled Tuna Sandwich
U.B. Brown Rice Brft.	Conv. Rice	*Lentil/Barley Soup
Rye Toast	Broccoli/Cheese Sc.	Applesauce
Milk	Apricot Halves	Milk/Cookie
	Rye Bread/Milk	

MONDAY

Apple Juice	Grilled Cheese Sand.	Baked Chicken
Scrambled Eggs	Rye Bread/Dill Pickles	Rice Florentine
Sausage Patty	Tomato Rice Soup	Toss Salad
Rye Toast/Milk	Banana	Three Bean Salad
	Milk/Brownies	Pears
		Rye Bread/Milk

TUESDAY

Grapefruit Juice	Polish Sausage	Pork Chops
Oat Bran Cereal	Rye Bun	Conv. Rice Pilaf
Rye Toast	*Lentil Soup	*Kidney Salad
Milk	Fresh Apple	Fruit Cocktail
	Milk	Rye Bread/Milk

Week 2 & 4 C

WEDNESDAY

Orange Juice	Submarine Sandwich/Bun	Beef Stroganoff
Cheerios	Cold Cuts/Cheese	Mashed Potatoes
Banana	Lettuce/Tomato	Green Peas
Milk/W.W. Toast	Potato Chips/Milk	Applesauce
	Fresh Orange Sections	W.W. Bread/Milk

THURSDAY

Orange Juice	Chicken Salad Sand.	Swedish Meatballs
Cornflakes	WW Bread	Baked Potato/Toss Salad
WW Toast	Potato Salad	Mixed Vegetables
Milk	Carrot Sticks	Pineapple Tidbits
	Apple/Milk	W.W. Bread/Milk

FRIDAY

V-8 Juice	Sizzle Steak	BBQ Ribs
WW Toast	Hamburger Bun	French Fries
Shredded Wheat	Vegetable Soup/Crackers	Corn
Sausage Links	Toss Salad	Coleslaw
Milk	Milk/Fresh Grapes	Milk/WW Bread

SATURDAY

Orange Juice	Shaved Ham Sandwich	Cheeseburger
Fresh Fruit	W.W. Bread	Bun
Eggs/Bacon	Tomato Soup/Crackers	Hash Browns
W.W. Toast	Carrot/Celery Sticks	Sliced Tomatoes
Milk	Peach Slices	Yogurt
	Milk	Milk

SUNDAY

Org./Grapf. Sections	Pork Roast	Grilled Tuna Sandwich
Cornflakes	Baked Potato	Corn Chips
W.W. Toast	Broccoli/Cheese Sc.	Applesauce
Milk	Apricot Halves	Milk/Cookie
	Dinner Rolls/Milk	

MONDAY

Apple Juice	Grilled Cheese Sandwich	Baked Chicken
Scrambled Eggs	Cr. Pea Soup	Mashed Potato
Sausage Patty	Crackers/Dill Pickles	Toss Salad
W.W. Toast	Fresh Banana	Green Beans
Milk	Milk	Pear Halves
		W.W. Bread/Milk

TUESDAY

Grapefruit Juice	Polish Sausage/Bun	Pork Chops
Rice Krispies	Beef Vegetable Soup	Rice Pilaf
W.W. Toast	Crackers	Cooked Cabbage
Milk	Fresh Apple	Fruit Cocktail
	Milk	W.W. Bread/Milk

Week 3 & 5 E

WEDNESDAY

Grape Juice Poached Egg Rye Toast Milk	BBQ Beef Rye Bun Tomato Rice Soup Jello with Pears Milk/Brownie	Ham Loaf *Kidney Bean Salad Toss Salad Mixed Vegetables Rye Bread/Milk Banana

THURSDAY

French Toast/Syrup (Rye Bread) Orange Juice Milk/Bacon	Smoked Turkey Sandwich *Lentil Soup Peach Cobbler Relish Plate Milk	Steak Rice Florentine Corn Toss Salad Fruit Cocktail/Milk Rye Bread

FRIDAY

Orange/Grapefruit Sections Oat Bran Cereal Rye Toast Milk	Grilled Ham/Cheese Sand. Rye Bread *Lentil/Veg. Soup Orange Milk	Beef Stew Cukes/Onions/Sr.Cream *Broccoli Rice Casserole Applesauce Rye Bread/Milk

SATURDAY

Orange Juice Scrambled Eggs Sausage Links Rye Toast Milk	Hot Dog/Rye Bun *Bean/Barley Soup Broccoli/Dip Apple Milk	Seafood Pasta Spaghetti/Toss Salad Garlic (Rye) Bread Pineapple Chunks Milk/Cookie

SUNDAY

Grapefruit Juice W.B. Brown Rice Brft. Rye Toast Milk	Pork Roast/Gravy Rice Pilaf Three Bean Salad Fruit Cocktail Rye Bread/Milk Ice Cream	Grilled Tuna Sandwich *Baked Lentils and Cheese Pears/Coleslaw Milk

MONDAY

Orange Juice All Bran Cereal Rye Toast/Fresh Fruit Peanut Butter/Milk	Cheeseburger Rye Bun Sliced Tomatoes Pineapple Chunks *Lentil/Barley Soup Milk	Pork Chops Fried Rice/Toss Salad *Broccoli/Chick Peas Orange Sections Rye Bread/Milk/Cookie

TUESDAY

Pineapple Juice Oat Bran Cereal Rye Toast Milk	Polish Sausage/Rye Bun *Bean Barley Soup Relish Plate Peaches Milk	Chicken *Baked Lentils/Cheese *Kidney Bean Salad Applesauce Rye Bread/Milk

Week 3 & 4 C

WEDNESDAY

Grape Juice Poached Egg WW Toast Milk	BBQ Beef WW Bun/Crackers Cream of Tomato Soup Jello with Pears Milk/Brownie	Ham Loaf Mashed Potatoes Toss Salad/Banana Mixed Vegetables WW Bread/Milk

THURSDAY

French Toast/Syrup Orange Juice Bacon Milk	Smoked Turkey Sandwich Chicken Noodle Soup Crackers/Peach Cobbler Relish Plate Milk	Steak Baked Potato Corn Toss Salad Fruit Cocktail WW Bread/Milk

FRIDAY

Orange/Grapefruit Sections Cheerios WW Toast/Milk	Grilled Ham/Cheese Sand. Vegetable Soup Orange Crackers/Milk	Beef Stew/Biscuits Cukes/Onions/Sr. Cream Broccoli Applesauce Milk

SATURDAY

Orange Juice Scrambled Eggs Sausage Links W.W. Toast Milk	Hot Dog/Bun Dorritos Broccoli/Dip Milk Apple	Pizza Toss Salad Pineapple Chunks Milk/Cookie

SUNDAY

Grapefruit Juice Shredded Wheat WW Toast Milk	Pork Roast/Gravy Mashed Potatoes Cauliflower Fruit Cocktail Dinner Rolls/Milk Ice Cream	Grilled Tuna Sand. Chips/Coleslaw Pears Milk

MONDAY

Orange Juice Cheerios WW Toast Peanut Butter/Milk Fresh Fruit	Cheeseburger/WW Bun Beef Veg. Soup Sliced Tomatoes Pineapple Chunks Milk/Crackers	Pork Chops Hash Browns/Broccoli Toss Salad Orange Sections WW Bread Milk/Cookie

TUESDAY

Pineapple Juice Corn Bran Cereal English Muffin Milk	Polish Suasage/WW Bun Relish Plate Cream of Mushroom Soup Peaches Milk/Crackers	Chicken Peas/Mashed Potatoes Coleslaw Applesauce Bread/Milk

Week 1 — Control and Experimental

BEDTIME SNACKS

Wednesday: Mixed Nuts/Fruit Juice
Thursday: Fresh Grapes
Friday: Popcorn/Pop
Saturday: Popcorn/Pop
Sunday: Cheese/Crackers/Apple Juice
Monday: Mixed Nuts/Grape Juice
Tuesday: Graham Crackers/Milk

Week 2 & 5 Control and Experimental

BEDTIME SNACKS

Wednesday: Sherbet
Thursday: Banana
Friday: Popcorn/Pop
Saturday: Mixed Nuts/Pop
Sunday: Cheese/Crackers/Fruit Juice
Monday: Yogurt
Tuesday: Fresh Orange

Week 3 & 6 Control and Experimental

BEDTIME SNACKS

Wednesday: Peanut Butter/Crackers/Milk
Thursday: Peanuts/Apple Juice
Friday: Popcorn/Pop
Saturday: Mixed Nuts/Pop
Sunday: Graham Crackers/Milk
Monday: Banana
Tuesday: Yogurt

2/5 C WED

Item	Food Name	Serving	Portion	Amount
278	ORANGE JUICE-FROZ-DILUTED	10	FL OUNCES	311.3 GMS
1206	CEREAL-CHEERIOS	2	CUPS	45.4 GMS
235	BANANAS-RAW-PEELED	1	ITEM	119.0 GMS
358	BREAD-WHOLE WHEAT-SOFT	2	SLICES	56.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
198	BOLOGNA-PORK	6	OUNCES	170.1 GMS
22	CHEESE-AMERICAN-PROCESSED	2	OUNCES	56.7 GMS
671	TOMATO-RAW-RED-RIPE	.25	ITEM	33.8 GMS
491	ROLL-SUBMARINE/HOAGIE-ENR	2	ITEMS	270.0 GMS
654	POTATO CHIPS-SALT ADDED	2	OUNCES	56.7 GMS
274	ORANGES-RAW-SECTIONS	1	CUP	180.0 GMS
1709	MIRACLE WHIP-LIGHT-LOW CAL	2	TABLESPOONS	28.0 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
81	BEEF STROGANOFF-FROZ DIN	2	ITEMS	340.0 GMS
652	POTATO-MASHED-MILK/BUTTER	1	CUP	210.0 GMS
639	PEAS-GREEN-CAN-DRAINED	.5	CUP	85.0 GMS
226	APPLESAUCE-CAN-SWEETENED	.5	CUP	127.5 GMS
358	BREAD-WHOLE WHEAT-SOFT	2	SLICES	56.0 GMS
104	BUTTER-REGULAR-TABLESPOON	4	TEASPOONS	18.7 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
85	SHERBET-ORANGE-2% FAT	1	CUP	193.0 GMS

NUTRIENT VALUES (%RDA)

KCALORIES	4192	Kc (149%)	PROTEIN	164.0	Gm (292%)
CARBOHYDRATE	532.9	Gm (-%)	FAT	162.7	Gm (-%)
FIBER-CRUDE	8.229	Gm (-%)	CHOLESTEROL	301.6	Mg (-%)
SATURATED FA	58.68	Gm (-%)	OLEIC FA	45.23	Gm (-%)
LINOLEIC FA	19.58	Gm (-%)	SODIUM	9088	Mg (504%)
POTASSIUM	6174	Mg (202%)	MAGNESIUM	491.2	Mg (122%)
IRON	28.62	Mg (158%)	ZINC	14.87	Mg (99%)
VITAMIN A	8030	IU (160%)	VITAMIN D	314.4	IU (78%)
VIT. E/TOTAL	21.44	Mg (-%)	VITAMIN C	378.5	Mg (630%)
THIAMIN	4.244	Mg (303%)	RIBOFLAVIN	4.424	Mg (260%)
NIACIN	42.02	Mg (233%)	VITAMIN B6	3.734	Mg (186%)
FOLACIN	431.2	Ug (107%)	VITAMIN B12	7.174	Ug (239%)
PANTO- ACID	8.966	Mg (163%)	CALCIUM	1894	Mg (157%)
PHOSPHORUS	2533	Mg (211%)	TRYPTOPHAN	1489	Mg (755%)
THREONINE	4579	Mg (870%)	ISOLEUCINE	5863	Mg (743%)
LEUCINE	9737	Mg (925%)	LYSINE	7640	Mg (968%)
METHIONINE	2557	Mg (777%)	CYSTINE	915.9	Mg (278%)
PHENYL-ANINE	5686	Mg (1081%)	TYROSINE	3372	Mg (641%)
VALINE	6599	Mg (716%)	HISTIDINE	2532	Mg (-%)
ALCOHOL	0.000	Gm (-%)	ASH	36.88	Gm (-%)
COPPER	1.677	Mg (67%)	MANGANESE	2.464	Mg (65%)
IODINE	32.40	Ug (21%)	MONO FAT	40.85	Gm (-%)
POLY FAT	19.91	Gm (-%)	CAFFEINE	0.000	Mg (-%)
FLUORIDE	1006	Ug (50%)	MOLYBDENUM	93.27	Ug (28%)
VITAMIN K	265.2	Ug (353%)	SELENIUM	0.147	Mg (117%)
BIOTIN	45.67	Ug (30%)	CHLORIDE	0.000	Mg (0%)
CHROMIUM	0.405	Mg (324%)	SUGAR	43.24	Gm (-%)
FIBER-DIET	8.566	Gm (-%)	VIT. E/AT	5.185	Mg (51%)

PROTEIN: 15% CARBOHYDRATE: 50% FAT: 34% ALCOHOL: 0%

2/5 E WED

Item	Food Name	Serving	Portion	Amount
278	ORANGE JUICE-FROZ-DILUTED	10	FL OUNCES	311.3 GMS
1197	CEREAL-ALL BRAN	1	CUP	85.2 GMS
235	BANANAS-RAW-PEELED	1	ITEM	119.0 GMS
338	BREAD-PUMPERNICKEL	2	SLICES	64.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
198	BOLOGNA-PORK	6	OUNCES	170.1 GMS
22	CHEESE-AMERICAN-PROCESSED	2	OUNCES	56.7 GMS
671	TOMATO-RAW-RED-RIPE	.25	ITEM	33.8 GMS
338	BREAD-PUMPERNICKEL	4	SLICES	128.0 GMS
1807	6	1	SERVING	131.0 GMS
274	ORANGES-RAW-SECTIONS	1	CUP	180.0 GMS
1709	MIRACLE WHIP-LIGHT-LOW CAL	2	TABLESPOONS	28.0 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
1419	CRACKERS-RY KRISP-NATURAL	8	ITEMS	16.8 GMS
81	BEEF STROGANOFF-FROZ DIN	2	ITEMS	340.0 GMS
494	SPAGHETTI-COOK-TENDER-HOT	1	CUP	140.0 GMS
639	PEAS-GREEN-CAN-DRAINED	.5	CUP	85.0 GMS
226	APPLESAUCE-CAN-SWEETENED	.5	CUP	127.5 GMS
338	BREAD-PUMPERNICKEL	2	SLICES	64.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
85	SHERBET-ORANGE-2% FAT	1	CUP	193.0 GMS

NUTRIENT VALUES (%RDA)

KCALORIES	3536	Kc (176%)	PROTEIN	161.9	Gm (367%)
CARBOHYDRATE	482.5	Gm (-%)	FAT	124.2	Gm (-%)
FIBER-CRUDE	16.71	Gm (-%)	CHOLESTEROL	277.1	Mg (-%)
SATURATED FA	45.10	Gm (-%)	OLEIC FA	34.13	Gm (-%)
LINOLEIC FA	6.587	Gm (-%)	SODIUM	8642	Mg (392%)
POTASSIUM	6945	Mg (185%)	MAGNESIUM	819.0	Mg (273%)
IRON	35.86	Mg (199%)	ZINC	26.59	Mg (177%)
VITAMIN A	16781	IU (419%)	VITAMIN D	319.1	IU (159%)
VIT. E/TOTAL	28.69	Mg (-%)	VITAMIN C	386.0	Mg (643%)
THIAMIN	4.290	Mg (429%)	RIBOFLAVIN	5.637	Mg (469%)
NIACIN	42.49	Mg (326%)	VITAMIN B6	4.109	Mg (205%)
FOLACIN	695.2	Ug (173%)	VITAMIN B12	4.774	Ug (159%)
PANTO- ACID	8.647	Mg (157%)	CALCIUM	1864	Mg (233%)
PHOSPHORUS	3182	Mg (397%)	TRYPTOPHAN	1356	Mg (831%)
THREONINE	4656	Mg (1070%)	ISOLEUCINE	5629	Mg (862%)
LEUCINE	9153	Mg (1050%)	LYSINE	7673	Mg (1175%)
METHIONINE	2504	Mg (920%)	CYSTINE	1167	Mg (429%)
PHENYL-ANINE	5425	Mg (1247%)	TYROSINE	3663	Mg (842%)
VALINE	6552	Mg (859%)	HISTIDINE	2816	Mg (-%)
ALCOHOL	0.000	Gm (-%)	ASH	40.24	Gm (-%)
COPPER	1.914	Mg (76%)	MANGANESE	1.010	Mg (26%)
IODINE	84.90	Ug (56%)	MONO FAT	31.16	Gm (-%)
POLY FAT	6.558	Gm (-%)	CAFFEINE	0.000	Mg (-%)
FLUORIDE	415.9	Ug (15%)	MOLYBDENUM	262.2	Ug (80%)
VITAMIN K	265.2	Ug (252%)	SELENIUM	0.251	Mg (200%)
BIOTIN	41.34	Ug (27%)	CHLORIDE	0.000	Mg (0%)
CHROMIUM	0.313	Mg (250%)	SUGAR	51.56	Gm (-%)
FIBER-DIET	34.94	Gm (-%)	VIT. E/AT	4.231	Mg (52%)

PROTEIN: 18% CARBOHYDRATE: 52% FAT: 30% ALCOHOL: 0%

2/5 C THUR

Item	Food Name	Serving	Portion	Amount
278	ORANGE JUICE-FROZ-DILUTED	10	FL OUNCES	311.3 GMS
1211	CEREAL-CORN FLAKES-KELLOGG	2	CUPS	45.4 GMS
358	BREAD-WHOLE WHEAT-SOFT	2	SLICES	56.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
1778	SALAD-CHICKEN	1	CUP	205.0 GMS
358	BREAD-WHOLE WHEAT-SOFT	4	SLICES	112.0 GMS
655	SALAD-POTATO	1	CUP	250.0 GMS
600	CARROT-RAW-WHOLE-SCRAPED	.5	ITEM	36.0 GMS
223	APPLES-RAW-UNPEELED	1	ITEM	138.0 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
164	HAMB PATTY-BEEF-10% FAT	6	OUNCES	170.1 GMS
1144	POTATO-FLESH & SKIN-BAKE	1	ITEM	202.0 GMS
1132	VEGETABLES-MIXED-CAN-DRAIN	.5	CUP	81.5 GMS
296	PINEAPPLE-CAN/SIRUP-BITS	.5	CUP	127.5 GMS
358	BREAD-WHOLE WHEAT-SOFT	2	SLICES	56.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
255	GRAPES-RAW-AMERICAN TYPE	1	CUP	92.0 GMS
629	LETTUCE-LOOSELEAF-RAW	1	CUP	55.0 GMS
134	SAL DRESS-FRENCH	2	TABLESPOONS	31.2 GMS

NUTRIENT VALUES (%RDA)

KCALORIES	3214 Kc	(160%)	PROTEIN	139.9 Gm	(317%)
CARBOHYDRATE	377.9 Gm	(-%)	FAT	130.4 Gm	(-%)
FIBER-CRUDE	11.97 Gm	(-%)	CHOLESTEROL	423.9 Mg	(-%)
SATURATED FA	33.83 Gm	(-%)	OLEIC FA	22.11 Gm	(-%)
LINOLEIC FA	10.44 Gm	(-%)	SODIUM	5917 Mg	(268%)
POTASSIUM	5678 Mg	(151%)	MAGNESIUM	534.4 Mg	(178%)
IRON	23.21 Mg	(128%)	ZINC	16.74 Mg	(111%)
VITAMIN A	25728 IU	(643%)	VITAMIN D	392.6 IU	(196%)
VIT. E/TOTAL	21.24 Mg	(-%)	VITAMIN C	241.4 Mg	(402%)
THIAMIN	2.799 Mg	(279%)	RIBOFLAVIN	3.250 Mg	(270%)
NIACIN	35.36 Mg	(271%)	VITAMIN B6	3.150 Mg	(157%)
FOLACIN	615.8 Ug	(153%)	VITAMIN B12	3.049 Ug	(101%)
PANTO- ACID	7.553 Mg	(137%)	CALCIUM	1287 Mg	(160%)
PHOSPHORUS	2094 Mg	(261%)	TRYPTOPHAN	1181 Mg	(724%)
THREONINE	3659 Mg	(841%)	ISOLEUCINE	4701 Mg	(719%)
LEUCINE	7318 Mg	(840%)	LYSINE	5988 Mg	(916%)
METHIONINE	1968 Mg	(723%)	CYSTINE	818.5 Mg	(300%)
PHENYL-ANINE	4176 Mg	(959%)	TYROSINE	2660 Mg	(611%)
VALINE	5192 Mg	(681%)	HISTIDINE	1982 Mg	(-%)
ALCOHOL	0.000 Gm	(-%)	ASH	24.66 Gm	(-%)
COPPER	2.147 Mg	(85%)	MANGANESE	2.955 Mg	(78%)
IODINE	0.000 Ug	(0%)	MONO FAT	30.14 Gm	(-%)
POLY FAT	18.80 Gm	(-%)	CAFFEINE	0.000 Mg	(-%)
FLUORIDE	934.9 Ug	(33%)	MOLYBDENUM	4.110 Ug	(1%)
VITAMIN K	287.1 Ug	(273%)	SELENIUM	0.188 Mg	(150%)
BIOTIN	34.29 Ug	(22%)	CHLORIDE	0.000 Mg	(0%)
CHROMIUM	0.248 Mg	(198%)	SUGAR	44.00 Gm	(-%)
FIBER-DIET	8.265 Gm	(-%)	VIT. E/AT	3.783 Mg	(47%)

PROTEIN: 17% CARBOHYDRATE: 47% FAT: 36% ALCOHOL: 0%

2-5-E-THU

Item	Food Name	Serving	Portion	Amount
278	ORANGE JUICE-FROZ-DILUTED	10	FL OUNCES	311.3 GMS
338	BREAD-PUMPERNICKEL	2	SLICES	64.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
1778	SALAD-CHICKEN	1	CUP	205.0 GMS
338	BREAD-PUMPERNICKEL	4	SLICES	128.0 GMS
600	CARROT-RAW-WHOLE-SCRAPED	.5	ITEM	36.0 GMS
223	APPLES-RAW-UNPEELED	1	ITEM	138.0 GMS
1811	BETTER-THAN-POT-SALAD	1	SERVING	69.9 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
1806	SKILLET BEEF AND LENTILS	1	SERVING	162.0 GMS
629	LETTUCE-LOOSELEAF-RAW	1	CUP	55.0 GMS
134	SAL DRESS-FRENCH	2	TABLESPOONS	31.2 GMS
1132	VEGETABLES-MIXED-CAN-DRAIN	.5	CUP	81.5 GMS
296	PINEAPPLE-CAN/SIRUP-BITS	.5	CUP	127.5 GMS
338	BREAD-PUMPERNICKEL	2	SLICES	64.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
255	GRAPES-RAW-AMERICAN TYPE	1	CUP	92.0 GMS
1815	U.B. Brown Rice Bkft	2	ITEMS	228.0 GMS

NUTRIENT VALUES (%RDA)

KCALORIES	2765 Kc	(138%)	PROTEIN	103.6 Gm	(235%)
CARBOHYDRATE	370.0 Gm	(-%)	FAT	102.0 Gm	(-%)
FIBER-CRUDE	9.710 Gm	(-%)	CHOLESTEROL	152.0 Mg	(-%)
SATURATED FA	25.70 Gm	(-%)	OLEIC FA	14.50 Gm	(-%)
LINOLEIC FA	12.10 Gm	(-%)	SODIUM	4973 Mg	(226%)
POTASSIUM	4747 Mg	(126%)	MAGNESIUM	388.0 Mg	(129%)
IRON	13.90 Mg	(77%)	ZINC	9.550 Mg	(63%)
VITAMIN A	23302 IU	(582%)	VITAMIN D	322.0 IU	(161%)
VIT. E/TOTAL	39.80 Mg	(-%)	VITAMIN C	171.0 Mg	(285%)
THIAMIN	1.890 Mg	(189%)	RIBOFLAVIN	2.960 Mg	(246%)
NIACIN	16.10 Mg	(123%)	VITAMIN B6	1.350 Mg	(67%)
FOLACIN	312.0 Ug	(78%)	VITAMIN B12	2.660 Ug	(88%)
PANTO- ACID	4.810 Mg	(87%)	CALCIUM	1257 Mg	(157%)
PHOSPHORUS	1609 Mg	(201%)	TRYPTOPHAN	778.0 Mg	(477%)
THREONINE	2664 Mg	(612%)	ISOLEUCINE	3291 Mg	(503%)
LEUCINE	5193 Mg	(596%)	LYSINE	4125 Mg	(631%)
METHIONINE	1329 Mg	(488%)	CYSTINE	473.0 Mg	(173%)
PHENYL-ANINE	2966 Mg	(681%)	TYROSINE	1714 Mg	(394%)
VALINE	3749 Mg	(491%)	HISTIDINE	1159 Mg	(-%)
ALCOHOL	0.000 Gm	(-%)	ASH	18.70 Gm	(-%)
COPPER	0.510 Mg	(20%)	MANGANESE	2.480 Mg	(66%)
IODINE	53.50 Ug	(35%)	MONO FAT	16.80 Gm	(-%)
POLY FAT	10.80 Gm	(-%)	CAFFEINE	0.000 Mg	(-%)
FLUORIDE	390.0 Ug	(14%)	MOLYBDENUM	14.10 Ug	(4%)
VITAMIN K	117.0 Ug	(111%)	SELENIUM	0.160 Mg	(128%)
BIOTIN	36.90 Ug	(24%)	CHLORIDE	0.000 Mg	(0%)
CHROMIUM	0.230 Mg	(184%)	SUGAR	35.00 Gm	(-%)
FIBER-DIET	8.050 Gm	(-%)	VIT. E/AT	3.540 Mg	(44%)

PROTEIN: 15% CARBOHYDRATE: 53% FAT: 33% ALCOHOL: 0%

2-5-C-FRI

Item	Food Name	Serving	Portion	Amount
1434	V-8 VEGETABLE JUICE	6	FL OUNCES	182.3 GMS
381	CEREAL-WHEAT-SHRED-BISCUIT	4	ITEMS	94.4 GMS
358	BREAD-WHOLE WHEAT-SOFT	2	SLICES	56.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
204	SAUSAGE-LINK-PORK-COOKED	3	OUNCES	85.1 GMS
164	HAMB PATTY-BEEF-10% FAT	6	OUNCES	170.1 GMS
489	ROLL-HAMBURGER/HOTDOG	2	ITEMS	80.0 GMS
721	SOUP-VEGETARIAN-CAN-WATER	6	FL OUNCES	180.8 GMS
432	CRACKERS-SALTINES	8	ITEMS	22.0 GMS
629	LETTUCE-LOOSELEAF-RAW	1	CUP	55.0 GMS
134	SAL DRESS-FRENCH	2	TABLESPOONS	31.2 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
255	GRAPES-RAW-AMERICAN TYPE	1	CUP	92.0 GMS
166	ROAST BEEF-RIB-LEAN/FAT	8	OUNCES	226.8 GMS
649	POTATO-FRENCH FRIED-FROZ	2	ITEMS	10.0 GMS
617	CORN-SWEET-CAN-DRAINED	.75	CUP	123.8 GMS
1062	SALAD-COLESLAW	.5	CUP	64.0 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
358	BREAD-WHOLE WHEAT-SOFT	2	SLICES	56.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
476	POPCORN-POPPED-PLAIN	4	CUPS	24.0 GMS
693	COLA-TYPE-SODA	12	FL OUNCES	369.6 GMS

NUTRIENT VALUES (%RDA)

KCALORIES	3837 Kc	(191%)	PROTEIN	174.0 Gm	(395%)
CARBOHYDRATE	352.5 Gm	(-%)	FAT	194.6 Gm	(-%)
FIBER-CRUDE	6.609 Gm	(-%)	CHOLESTEROL	549.4 Mg	(-%)
SATURATED FA	79.03 Gm	(-%)	OLEIC FA	73.76 Gm	(-%)
LINOLEIC FA	16.97 Gm	(-%)	SODIUM	5406 Mg	(245%)
POTASSIUM	4247 Mg	(113%)	MAGNESIUM	536.7 Mg	(178%)
IRON	27.79 Mg	(154%)	ZINC	30.22 Mg	(201%)
VITAMIN A	8854 IU	(221%)	VITAMIN D	313.2 IU	(156%)
VIT. E/TOTAL	22.16 Mg	(-%)	VITAMIN C	85.58 Mg	(142%)
THIAMIN	3.551 Mg	(355%)	RIBOFLAVIN	3.334 Mg	(277%)
NIACIN	39.90 Mg	(306%)	VITAMIN B6	1.632 Mg	(81%)
FOLACIN	346.1 Ug	(86%)	VITAMIN B12	6.814 Ug	(227%)
PANTOTHENIC ACID	5.554 Mg	(100%)	CALCIUM	1340 Mg	(167%)
PHOSPHORUS	2671 Mg	(333%)	TRYPTOPHAN	1780 Mg	(1092%)
THREONINE	6115 Mg	(1405%)	ISOLEUCINE	7406 Mg	(1134%)
LEUCINE	12229 Mg	(1403%)	LYSINE	10404 Mg	(1593%)
METHIONINE	3360 Mg	(1235%)	CYSTINE	1504 Mg	(553%)
PHENYL-ANINE	6494 Mg	(1492%)	TYROSINE	4448 Mg	(1022%)
VALINE	8048 Mg	(1056%)	HISTIDINE	3883 Mg	(-%)
ALCOHOL	0.000 Gm	(-%)	ASH	26.28 Gm	(-%)
COPPER	1.585 Mg	(63%)	MANGANESE	4.280 Mg	(114%)
IODINE	0.000 Ug	(0%)	MONO FAT	74.57 Gm	(-%)
POLY FAT	17.45 Gm	(-%)	CAFFEINE	39.00 Mg	(-%)
FLUORIDE	309.3 Ug	(11%)	MOLYBDENUM	16.88 Ug	(5%)
VITAMIN K	125.1 Ug	(119%)	SELENIUM	0.245 Mg	(196%)
BIOTIN	39.93 Ug	(26%)	CHLORIDE	0.000 Mg	(0%)
CHROMIUM	0.232 Mg	(185%)	SUGAR	58.32 Gm	(-%)
FIBER-DIET	12.22 Gm	(-%)	VIT. E/AT	3.315 Mg	(41%)

PROTEIN: 18% CARBOHYDRATE: 37% FAT: 45% ALCOHOL: 0%

2-5-E-FRI

Item	Food Name	Serving	Portion	Amount
1434	V-8 VEGETABLE JUICE	6	FL OUNCES	182.3 GMS
1814	Oat Bran Cereal	3	ITEMS	85.2 GMS
338	BREAD-PUMPERNICKEL	2	SLICES	64.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
204	SAUSAGE-LINK-PORK-COOKED	3	OUNCES	85.1 GMS
164	HAMB PATTY-BEEF-10% FAT	6	OUNCES	170.1 GMS
338	BREAD-PUMPERNICKEL	4	SLICES	128.0 GMS
2	LENTIL VEGETABLE SOUP	1	SERVING	69.7 GMS
1419	CRACKERS-RY KRISP-NATURAL	8	ITEMS	16.8 GMS
629	LETTUCE-LOOSELEAF-RAW	1	CUP	55.0 GMS
134	SAL DRESS-FRENCH	2	TABLESPOONS	31.2 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
255	GRAPES-RAW-AMERICAN TYPE	1	CUP	92.0 GMS
166	ROAST BEEF-RIB-LEAN/FAT	8	OUNCES	226.8 GMS
486	RICE-WHITE-PARBOIL-COOKED	1	CUP	175.0 GMS
617	CORN-SWEET-CAN-DRAINED	.75	CUP	123.8 GMS
1801	BEAN SALAD	1	SERVING	174.0 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
338	BREAD-PUMPERNICKEL	2	SLICES	64.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
476	POPCORN-POPPED-PLAIN	4	CUPS	24.0 GMS
693	COLA-TYPE-SODA	12	FL OUNCES	369.6 GMS

NUTRIENT VALUES (%RDA)

KCALORIES	4174 Kc	(208%)	PROTEIN	197.0 Gm	(447%)
CARBOHYDRATE	406.0 Gm	(-%)	FAT	195.0 Gm	(-%)
FIBER-CRUDE	10.00 Gm	(-%)	CHOLESTEROL	536.0 Mg	(-%)
SATURATED FA	76.90 Gm	(-%)	OLEIC FA	70.30 Gm	(-%)
LINOLEIC FA	15.40 Gm	(-%)	SODIUM	6188 Mg	(281%)
POTASSIUM	5588 Mg	(149%)	MAGNESIUM	472.0 Mg	(157%)
IRON	29.30 Mg	(162%)	ZINC	30.30 Mg	(202%)
VITAMIN A	14390 IU	(359%)	VITAMIN D	311.0 IU	(155%)
VIT. E/TOTAL	25.20 Mg	(-%)	VITAMIN C	86.60 Mg	(144%)
THIAMIN	2.620 Mg	(262%)	RIBOFLAVIN	3.880 Mg	(323%)
NIACIN	38.20 Mg	(293%)	VITAMIN B6	2.600 Mg	(130%)
FOLACIN	239.0 Ug	(59%)	VITAMIN B12	6.790 Ug	(226%)
PANTO- ACID	6.760 Mg	(122%)	CALCIUM	1359 Mg	(169%)
PHOSPHORUS	2800 Mg	(350%)	TRYPTOPHAN	1807 Mg	(1108%)
THREONINE	6883 Mg	(1582%)	ISOLEUCINE	8215 Mg	(1258%)
LEUCINE	13470 Mg	(1546%)	LYSINE	11680 Mg	(1788%)
METHIONINE	3588 Mg	(1319%)	CYSTINE	1558 Mg	(572%)
PHENYL-ANINE	7205 Mg	(1656%)	TYROSINE	4883 Mg	(1122%)
VALINE	9214 Mg	(1209%)	HISTIDINE	3965 Mg	(-%)
ALCOHOL	0.000 Gm	(-%)	ASH	23.80 Gm	(-%)
COPPER	1.050 Mg	(41%)	MANGANESE	3.000 Mg	(80%)
IODINE	68.20 Ug	(45%)	MONO FAT	72.40 Gm	(-%)
POLY FAT	15.60 Gm	(-%)	CAFFEINE	39.00 Mg	(-%)
FLUORIDE	339.0 Ug	(12%)	MOLYBDENUM	30.20 Ug	(9%)
VITAMIN K	125.0 Ug	(119%)	SELENIUM	0.310 Mg	(248%)
BIOTIN	44.20 Ug	(29%)	CHLORIDE	0.000 Mg	(0%)
CHROMIUM	0.230 Mg	(184%)	SUGAR	62.00 Gm	(-%)
FIBER-DIET	6.210 Gm	(-%)	VIT. E/AT	3.280 Mg	(41%)

PROTEIN: 19% CARBOHYDRATE: 38% FAT: 42% ALCOHOL: 0%

2-5-C-SAT

Item	Food Name	Serving	Portion	Amount
278	ORANGE JUICE-FROZ-DILUTED	10	FL OUNCES	311.3 GMS
235	BANANAS-RAW-PEELED	1	ITEM	119.0 GMS
102	EGG-SCRAMBLED-MILK/BUTTER	2	ITEMS	128.0 GMS
161	BACON-PORK-BROILED/FRIED	3	SLICES	18.9 GMS
358	BREAD-WHOLE WHEAT-SOFT	2	SLICES	56.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
358	BREAD-WHOLE WHEAT-SOFT	2	SLICES	56.0 GMS
1640	MAYONNAISE-LIGHT-LOW CAL	1	TABLESPOON	14.0 GMS
719	SOUP-TOMATO-CAN-WATER	1	CUP	244.0 GMS
432	CRACKERS-SALTINES	8	ITEMS	22.0 GMS
600	CARROT-RAW-WHOLE-SCRAPED	.5	ITEM	36.0 GMS
608	CELERY-PASCAL-RAW-STALK	.5	ITEM	20.0 GMS
285	PEACHES-CAN/HEAVY SIRUP	.5	CUP	128.0 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
22	CHEESE-AMERICAN-PROCESSED	2	PIECES	56.0 GMS
489	ROLL-HAMBURGER/HOTDOG	2	ITEMS	80.0 GMS
650	POTATO-HASHED BROWN-FROZ	2	CUPS	310.0 GMS
671	TOMATO-RAW-RED-RIPE	.25	ITEM	33.8 GMS
92	YOGURT-FRUIT FLAVOR-LOWFAT	5	FL OUNCES	141.9 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
1159	NUTS-MIXED-DRY ROASTED	2	OUNCES	56.7 GMS
693	COLA-TYPE-SODA	12	FL OUNCES	369.6 GMS
164	HAMB PATTY-BEEF-10% FAT	6	OUNCES	170.1 GMS
190	HAM-REG-LUNCH MEAT-11% FAT	6	OUNCES	170.1 GMS

NUTRIENT VALUES (%RDA)

KCALORIES	4039 Kc (201%)	PROTEIN	180.8 Gm (410%)
CARBOHYDRATE	429.3 Gm (-%)	FAT	184.0 Gm (-%)
FIBER-CRUDE	6.600 Gm (-%)	CHOLESTEROL	905.8 Mg (-%)
SATURATED FA	67.75 Gm (-%)	OLEIC FA	49.08 Gm (-%)
LINOLEIC FA	27.80 Gm (-%)	SODIUM	6826 Mg (310%)
POTASSIUM	6537 Mg (174%)	MAGNESIUM	621.9 Mg (207%)
IRON	26.38 Mg (146%)	ZINC	25.45 Mg (169%)
VITAMIN A	15191 IU (379%)	VITAMIN D	393.0 IU (196%)
VIT. E/TOTAL	21.57 Mg (-%)	VITAMIN C	293.9 Mg (489%)
THIAMIN	4.831 Mg (483%)	RIBOFLAVIN	3.925 Mg (327%)
NIACIN	43.32 Mg (333%)	VITAMIN B6	2.909 Mg (145%)
FOLACIN	499.0 Ug (124%)	VITAMIN B12	6.637 Ug (221%)
PANTO- ACID	10.22 Mg (185%)	CALCIUM	1945 Mg (243%)
PHOSPHORUS	3418 Mg (427%)	TRYPTOPHAN	2070 Mg (1270%)
THREONINE	6675 Mg (1534%)	ISOLEUCINE	8100 Mg (1240%)
LEUCINE	13428 Mg (1541%)	LYSINE	11757 Mg (1800%)
METHIONINE	3696 Mg (1358%)	CYSTINE	1725 Mg (634%)
PHENYL-ANINE	7548 Mg (1735%)	TYROSINE	5447 Mg (1252%)
VALINE	9151 Mg (1200%)	HISTIDINE	4544 Mg (-%)
ALCOHOL	0.000 Gm (-%)	ASH	38.81 Gm (-%)
COPPER	2.980 Mg (119%)	MANGANESE	2.574 Mg (68%)
IODINE	123.0 Ug (82%)	MONO FAT	77.19 Gm (-%)
POLY FAT	18.74 Gm (-%)	CAFFEINE	39.00 Mg (-%)
FLUORIDE	376.0 Ug (13%)	MOLYBDENUM	3.440 Ug (1%)
VITAMIN K	56.00 Ug (53%)	SELENIUM	0.238 Mg (190%)
BIOTIN	61.80 Ug (41%)	CHLORIDE	0.000 Mg (0%)
CHROMIUM	0.300 Mg (240%)	SUGAR	73.30 Gm (-%)
FIBER-DIET	3.540 Gm (-%)	VIT. E/AT	6.170 Mg (77%)

PROTEIN: 18% CARBOHYDRATE: 42% FAT: 40% ALCOHOL: 0%

2-5-E-SAT

Item	Food Name	Serving	Portion	Amount
278	ORANGE JUICE-FROZ-DILUTED	10	FL OUNCES	311.3 GMS
235	BANANAS-RAW-PEELED	1	ITEM	119.0 GMS
102	EGG-SCRAMBLED-MILK/BUTTER	2	ITEMS	128.0 GMS
161	BACON-PORK-BROILED/FRIED	3	SLICES	18.9 GMS
338	BREAD-PUMPERNICKEL	2	SLICES	64.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
190	HAM-REG-LUNCH MEAT-11% FAT	6	OUNCES	170.1 GMS
338	BREAD-PUMPERNICKEL	4	SLICES	128.0 GMS
4	BEAN AND BARLEY SOUP	1	SERVING	112.0 GMS
1419	CRACKERS-RY KRISP-NATURAL	8	ITEMS	16.8 GMS
600	CARROT-RAW-WHOLE-SCRAPED	.5	ITEM	36.0 GMS
608	CELERY-PASCAL-RAW-STALK	.5	ITEM	20.0 GMS
285	PEACHES-CAN/HEAVY SIRUP	.5	CUP	128.0 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
164	HAMB PATTY-BEEF-10% FAT	6	OUNCES	170.1 GMS
22	CHEESE-AMERICAN-PROCESSED	2	PIECES	56.0 GMS
338	BREAD-PUMPERNICKEL	4	SLICES	128.0 GMS
1805	CHILI	1	SERVING	276.0 GMS
671	TOMATO-RAW-RED-RIPE	.25	ITEM	33.8 GMS
92	YOGURT-FRUIT FLAVOR-LOWFAT	5	FL OUNCES	141.9 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
693	COLA-TYPE-SODA	12	FL OUNCES	369.6 GMS
1640	MAYONNAISE-LIGHT-LOW CAL	1	TABLESPOON	14.0 GMS
1159	NUTS-MIXED-DRY ROASTED	2	OUNCES	56.7 GMS

NUTRIENT VALUES (%RDA)

KCALORIES	3846 Kc	(192%)	PROTEIN	197.6 Gm	(449%)
CARBOHYDRATE	444.1 Gm	(-%)	FAT	151.0 Gm	(-%)
FIBER-CRUDE	10.67 Gm	(-%)	CHOLESTEROL	901.6 Mg	(-%)
SATURATED FA	53.62 Gm	(-%)	OLEIC FA	40.04 Gm	(-%)
LINOLEIC FA	8.239 Gm	(-%)	SODIUM	7264 Mg	(330%)
POTASSIUM	7255 Mg	(193%)	MAGNESIUM	750.7 Mg	(250%)
IRON	29.41 Mg	(163%)	ZINC	28.23 Mg	(188%)
VITAMIN A	19412 IU	(485%)	VITAMIN D	387.4 IU	(193%)
VIT. E/TOTAL	26.65 Mg	(-%)	VITAMIN C	243.8 Mg	(406%)
THIAMIN	4.033 Mg	(403%)	RIBOFLAVIN	5.159 Mg	(429%)
NIACIN	40.94 Mg	(314%)	VITAMIN B6	3.627 Mg	(181%)
FOLACIN	359.2 Ug	(89%)	VITAMIN B12	6.764 Ug	(225%)
PANTO- ACID	10.63 Mg	(193%)	CALCIUM	2063 Mg	(257%)
PHOSPHORUS	3860 Mg	(482%)	TRYPTOPHAN	2191 Mg	(1344%)
THREONINE	7454 Mg	(1713%)	ISOLEUCINE	9097 Mg	(1393%)
LEUCINE	14827 Mg	(1702%)	LYSINE	13229 Mg	(2025%)
METHIONINE	3970 Mg	(1459%)	CYSTINE	1775 Mg	(652%)
PHENYL-ANINE	8458 Mg	(1944%)	TYROSINE	5600 Mg	(1287%)
VALINE	10265 Mg	(1347%)	HISTIDINE	4670 Mg	(-%)
ALCOHOL	0.000 Gm	(-%)	ASH	38.71 Gm	(-%)
COPPER	2.465 Mg	(98%)	MANGANESE	1.757 Mg	(46%)
IODINE	123.0 Ug	(82%)	MONO FAT	60.83 Gm	(-%)
POLY FAT	13.61 Gm	(-%)	CAFFEINE	39.00 Mg	(-%)
FLUORIDE	417.8 Ug	(15%)	MOLYBDENUM	16.66 Ug	(5%)
VITAMIN K	56.10 Ug	(53%)	SELENIUM	0.317 Mg	(253%)
BIOTIN	76.47 Ug	(50%)	CHLORIDE	0.000 Mg	(0%)
CHROMIUM	0.372 Mg	(297%)	SUGAR	65.88 Gm	(-%)
FIBER-DIET	6.550 Gm	(-%)	VIT. E/AT	5.868 Mg	(73%)

PROTEIN: 20% CARBOHYDRATE: 45% FAT: 35% ALCOHOL: 0%

2-5-C-SUN

Item	Food Name	Serving	Portion	Amount
274	ORANGES-RAW-SECTIONS	.5	CUP	90.0 GMS
984	GRAPEFRUIT-CAN/JUICE	.5	CUP	124.5 GMS
1211	CEREAL-CORN FLAKES-KELLOGG	2	CUPS	45.4 GMS
358	BREAD-WHOLE WHEAT-SOFT	2	SLICES	56.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
195	PORK-LOIN-LEAN-ROASTED	8	OUNCES	226.8 GMS
1144	POTATO-FLESH & SKIN-BAKE	2	ITEMS	404.0 GMS
590	BROCCOLI-FROZ-BOIL-DRAIN	.5	CUP	92.5 GMS
229	APRICOTS-CAN/HEAVY SIRUP	.5	CUP	129.0 GMS
487	ROLL-BROWN & SERVE-ENR	2	ITEMS	52.0 GMS
104	BUTTER-REGULAR-TABLESPOON	4	TEASPOONS	18.7 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
160	SALAD-TUNA	.5	CUP	102.5 GMS
358	BREAD-WHOLE WHEAT-SOFT	4	SLICES	112.0 GMS
1389	CORN CHIPS	2	SERVINGS	56.8 GMS
226	APPLESAUCE-CAN-SWEETENED	.5	CUP	127.5 GMS
416	COOKIE-CHOC CHIP-HOME REC	2	ITEMS	20.0 GMS
22	CHEESE-AMERICAN-PROCESSED	1	PIECE	28.0 GMS
432	CRACKERS-SALTINES	8	ITEMS	22.0 GMS
257	GRAPE JUICE-CAN & BOTTLE	1	CUP	253.0 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS

NUTRIENT VALUES (%RDA)

KCALORIES	3561 Kc	(178%)	PROTEIN	156.1 Gm	(354%)
CARBOHYDRATE	464.7 Gm	(-%)	FAT	123.7 Gm	(-%)
FIBER-CRUDE	8.470 Gm	(-%)	CHOLESTEROL	400.0 Mg	(-%)
SATURATED FA	45.02 Gm	(-%)	OLEIC FA	34.00 Gm	(-%)
LINOLEIC FA	11.50 Gm	(-%)	SODIUM	3711 Mg	(168%)
POTASSIUM	5272 Mg	(140%)	MAGNESIUM	569.0 Mg	(189%)
IRON	23.82 Mg	(132%)	ZINC	15.35 Mg	(102%)
VITAMIN A	8567 IU	(214%)	VITAMIN D	395.0 IU	(197%)
VIT. E/TOTAL	11.72 Mg	(-%)	VITAMIN C	217.3 Mg	(362%)
THIAMIN	5.595 Mg	(559%)	RIBOFLAVIN	3.783 Mg	(315%)
NIACIN	45.31 Mg	(348%)	VITAMIN B6	4.365 Mg	(218%)
FOLACIN	452.0 Ug	(113%)	VITAMIN B12	4.238 Ug	(141%)
PANTO- ACID	8.671 Mg	(157%)	CALCIUM	1458 Mg	(182%)
PHOSPHORUS	2461 Mg	(307%)	TRYPTOPHAN	1803 Mg	(1106%)
THREONINE	5593 Mg	(1285%)	ISOLEUCINE	6536 Mg	(1000%)
LEUCINE	10699 Mg	(1228%)	LYSINE	10492 Mg	(1606%)
METHIONINE	2937 Mg	(1079%)	CYSTINE	1257 Mg	(462%)
PHENYL-ANINE	5871 Mg	(1349%)	TYROSINE	4282 Mg	(984%)
VALINE	7351 Mg	(964%)	HISTIDINE	4490 Mg	(-%)
ALCOHOL	0.000 Gm	(-%)	ASH	27.71 Gm	(-%)
COPPER	2.620 Mg	(104%)	MANGANESE	2.420 Mg	(64%)
IODINE	16.00 Ug	(10%)	MONO FAT	29.65 Gm	(-%)
POLY FAT	7.640 Gm	(-%)	CAFFEINE	0.000 Mg	(-%)
FLUORIDE	1447 Ug	(52%)	MOLYBDENUM	964.0 Ug	(296%)
VITAMIN K	551.2 Ug	(524%)	SELENIUM	0.592 Mg	(473%)
BIOTIN	31.80 Ug	(21%)	CHLORIDE	0.000 Mg	(0%)
CHROMIUM	0.340 Mg	(272%)	SUGAR	27.80 Gm	(-%)
FIBER-DIET	4.530 Gm	(-%)	VIT. E/AT	4.676 Mg	(58%)

PROTEIN: 17% CARBOHYDRATE: 52% FAT: 31% ALCOHOL: 0%

2-5-E-SUN

Item	Food Name	Serving	Portion	Amount
274	ORANGES-RAW-SECTIONS	.5	CUP	90.0 GMS
984	GRAPEFRUIT-CAN/JUICE	.5	CUP	124.5 GMS
1815	U.B. Brown Rice Bkft	1	CUP	228.0 GMS
338	BREAD-PUMPERNICKEL	2	SLICES	64.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
195	PORK-LOIN-LEAN-ROASTED	8	OUNCES	226.8 GMS
486	RICE-WHITE-PARBOIL-COOKED	1	CUP	175.0 GMS
590	BROCCOLI-FROZ-BOIL-DRAIN	.5	CUP	92.5 GMS
229	APRICOTS-CAN/HEAVY SIRUP	.5	CUP	129.0 GMS
338	BREAD-PUMPERNICKEL	2	SLICES	64.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
160	SALAD-TUNA	.5	CUP	102.5 GMS
338	BREAD-PUMPERNICKEL	4	SLICES	128.0 GMS
1809	LENTIL-BARLEY SOUP	1	SERVING	252.0 GMS
226	APPLESAUCE-CAN-SWEETENED	.5	CUP	127.5 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
416	COOKIE-CHOC CHIP-HOME REC	2	ITEMS	20.0 GMS
22	CHEESE-AMERICAN-PROCESSED	1	PIECE	28.0 GMS
1419	CRACKERS-RY KRISP-NATURAL	8	ITEMS	16.8 GMS
1419	CRACKERS-RY KRISP-NATURAL	8	ITEMS	16.8 GMS
257	GRAPE JUICE-CAN & BOTTLE	1	CUP	253.0 GMS

NUTRIENT VALUES (%RDA)

KCALORIES	3334	Kc (166%)	PROTEIN	158.4	Gm (359%)
CARBOHYDRATE	451.7	Gm (-%)	FAT	104.6	Gm (-%)
FIBER-CRUDE	11.45	Gm (-%)	CHOLESTEROL	374.0	Mg (-%)
SATURATED FA	40.44	Gm (-%)	OLEIC FA	31.46	Gm (-%)
LINOLEIC FA	13.13	Gm (-%)	SODIUM	4276	Mg (194%)
POTASSIUM	5052	Mg (134%)	MAGNESIUM	488.5	Mg (162%)
IRON	19.07	Mg (105%)	ZINC	14.72	Mg (98%)
VITAMIN A	10157	IU (253%)	VITAMIN D	340.8	IU (170%)
VIT. E/TOTAL	14.13	Mg (-%)	VITAMIN C	171.3	Mg (285%)
THIAMIN	3.993	Mg (399%)	RIBOFLAVIN	3.858	Mg (321%)
NIACIN	33.77	Mg (259%)	VITAMIN B6	3.299	Mg (164%)
FOLACIN	189.9	Ug (47%)	VITAMIN B12	4.233	Ug (141%)
PANTO- ACID	8.304	Mg (150%)	CALCIUM	1546	Mg (193%)
PHOSPHORUS	2576	Mg (322%)	TRYPTOPHAN	1823	Mg (1118%)
THREONINE	6097	Mg (1401%)	ISOLEUCINE	6916	Mg (1059%)
LEUCINE	11498	Mg (1320%)	LYSINE	10951	Mg (1677%)
METHIONINE	3113	Mg (1144%)	CYSTINE	1439	Mg (529%)
PHENYL-ANINE	6281	Mg (1443%)	TYROSINE	4720	Mg (1085%)
VALINE	8095	Mg (1062%)	HISTIDINE	4626	Mg (-%)
ALCOHOL	0.000	Gm (-%)	ASH	22.19	Gm (-%)
COPPER	1.180	Mg (47%)	MANGANESE	3.434	Mg (91%)
IODINE	86.00	Ug (57%)	MONO FAT	29.72	Gm (-%)
POLY FAT	9.996	Gm (-%)	CAFFEINE	0.000	Mg (-%)
FLUORIDE	321.9	Ug (11%)	MOLYBDENUM	681.4	Ug (271%)
VITAMIN K	227.4	Ug (216%)	SELENIUM	0.289	Mg (231%)
BIOTIN	44.69	Ug (29%)	CHLORIDE	0.000	Mg (0%)
CHROMIUM	0.265	Mg (212%)	SUGAR	11.14	Gm (-%)
FIBER-DIET	9.755	Gm (-%)	VIT. E/AT	5.535	Mg (69%)

PROTEIN: 19% CARBOHYDRATE: 53% FAT: 28% ALCOHOL: 0%

2-5-C-MON

Item	Food Name	Serving	Portion	Amount
102	EGG-SCRAMBLED-MILK/BUTTER	2	ITEMS	128.0 GMS
200	SAUSAGE-PATTY-PORK-COOKED	2	ITEMS	54.0 GMS
358	BREAD-WHOLE WHEAT-SOFT	2	SLICES	56.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
358	BREAD-WHOLE WHEAT-SOFT	4	SLICES	112.0 GMS
104	BUTTER-REGULAR-TABLESPOON	4	TEASPOONS	18.7 GMS
22	CHEESE-AMERICAN-PROCESSED	4	PIECES	112.0 GMS
1350	SOUP-PEA-GREEN-CAN-MILK	1	CUP	254.0 GMS
432	CRACKERS-SALTINES	8	ITEMS	22.0 GMS
704	PICKLE-FRESH PACK-CUCUMBER	1	ITEM	7.5 GMS
235	BANANAS-RAW-PEELED	1	ITEM	119.0 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
1273	CHICKEN-BREAST-ROASTED	2	ITEMS	392.0 GMS
652	POTATO-MASHED-MILK/BUTTER	1	CUP	210.0 GMS
629	LETTUCE-LOOSELEAF-RAW	1	CUP	55.0 GMS
134	SAL DRESS-FRENCH	2	TABLESPOONS	31.2 GMS
574	BEANS-SNAP-GREEN-CAN-CUTS	.5	CUP	67.5 GMS
294	PEARS-CAN/HEAVY SIRUP	.5	CUP	127.5 GMS
358	BREAD-WHOLE WHEAT-SOFT	2	SLICES	56.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
92	YOGURT-FRUIT FLAVOR-LOWFAT	5	FL OUNCES	141.9 GMS
225	APPLE JUICE-CANNED/BOTTLED	6	FL OUNCES	186.0 GMS

NUTRIENT VALUES (%RDA)

KCALORIES	3922	Kc (140%)	PROTEIN	238.1	Gm (425%)
CARBOHYDRATE	337.8	Gm (-%)	FAT	184.2	Gm (-%)
FIBER-CRUDE	7.310	Gm (-%)	CHOLESTEROL	1154	Mg (-%)
SATURATED FA	82.04	Gm (-%)	OLEIC FA	50.30	Gm (-%)
LINOLEIC FA	18.70	Gm (-%)	SODIUM	7716	Mg (428%)
POTASSIUM	5347	Mg (175%)	MAGNESIUM	645.0	Mg (161%)
IRON	21.89	Mg (121%)	ZINC	20.95	Mg (139%)
VITAMIN A	7164	IU (143%)	VITAMIN D	427.0	IU (106%)
VIT. E/TOTAL	22.80	Mg (-%)	VITAMIN C	51.52	Mg (85%)
THIAMIN	3.369	Mg (240%)	RIBOFLAVIN	3.972	Mg (233%)
NIACIN	67.59	Mg (375%)	VITAMIN B6	4.715	Mg (235%)
FOLACIN	387.1	Ug (96%)	VITAMIN B12	8.050	Ug (268%)
PANTO- ACID	12.60	Mg (229%)	CALCIUM	2458	Mg (204%)
PHOSPHORUS	3872	Mg (322%)	TRYPTOPHAN	2887	Mg (1465%)
THREONINE	9571	Mg (1819%)	ISOLEUCINE	12085	Mg (1531%)
LEUCINE	18972	Mg (1803%)	LYSINE	18301	Mg (2319%)
METHIONINE	5946	Mg (1807%)	CYSTINE	2491	Mg (757%)
PHENYL-ANINE	10527	Mg (2001%)	TYROSINE	8205	Mg (1559%)
VALINE	12956	Mg (1406%)	HISTIDINE	6456	Mg (-%)
ALCOHOL	0.000	Gm (-%)	ASH	40.11	Gm (-%)
COPPER	2.351	Mg (94%)	MANGANESE	1.680	Mg (44%)
IODINE	155.0	Ug (103%)	MONO FAT	57.11	Gm (-%)
POLY FAT	23.36	Gm (-%)	CAFFEINE	0.000	Mg (-%)
FLUORIDE	1107	Ug (55%)	MOLYBDENUM	45.50	Ug (14%)
VITAMIN K	309.0	Ug (412%)	SELENIUM	0.290	Mg (232%)
BIOTIN	67.54	Ug (45%)	CHLORIDE	0.000	Mg (0%)
CHROMIUM	0.500	Mg (400%)	SUGAR	34.00	Gm (-%)
FIBER-DIET	4.030	Gm (-%)	VIT. E/AT	4.289	Mg (42%)

PROTEIN: 24% CARBOHYDRATE: 34% FAT: 42% ALCOHOL: 0%

2-5-E-MON

Item	Food Name	Serving	Portion	Amount
225	APPLE JUICE-CANNED/BOTTLED	6	FL OUNCES	186.0 GMS
102	EGG-SCRAMBLED-MILK/BUTTER	2	ITEMS	128.0 GMS
200	SAUSAGE-PATTY-PORK-COOKED	2	ITEMS	54.0 GMS
338	BREAD-PUMPERNICKEL	2	SLICES	64.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
338	BREAD-PUMPERNICKEL	4	SLICES	128.0 GMS
104	BUTTER-REGULAR-TABLESPOON	4	TEASPOONS	18.7 GMS
22	CHEESE-AMERICAN-PROCESSED	4	PIECES	112.0 GMS
710	SOUP-TOMATO-CAN-MILK	1	CUP	248.0 GMS
486	RICE-WHITE-PARBOIL-COOKED	.25	CUP	43.8 GMS
1419	CRACKERS-RY KRISP-NATURAL	8	ITEMS	16.8 GMS
704	PICKLE-FRESH PACK-CUCUMBER	1	ITEM	7.5 GMS
235	BANANAS-RAW-PEELED	1	ITEM	119.0 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
413	BROWNIES/NUTS-MIX/PREP	2	ITEMS	40.0 GMS
1273	CHICKEN-BREAST-ROASTED	2	ITEMS	392.0 GMS
629	LETTUCE-LOOSELEAF-RAW	1	CUP	55.0 GMS
134	SAL DRESS-FRENCH	2	TABLESPOONS	31.2 GMS
486	RICE-WHITE-PARBOIL-COOKED	1	CUP	175.0 GMS
121	SALAD-THREE BEAN-DEL MONTE	1	SERVING	28.4 GMS
294	PEARS-CAN/HEAVY SIRUP	.5	CUP	127.5 GMS
338	BREAD-PUMPERNICKEL	2	SLICES	64.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
92	YOGURT-FRUIT FLAVOR-LOWFAT	5	FL OUNCES	141.9 GMS

NUTRIENT VALUES (%RDA)

KCALORIES	4095 Kc	(146%)	PROTEIN	236.2 Gm	(421%)
CARBOHYDRATE	391.0 Gm	(-%)	FAT	179.2 Gm	(-%)
FIBER-CRUDE	8.341 Gm	(-%)	CHOLESTEROL	1143 Mg	(-%)
SATURATED FA	79.83 Gm	(-%)	OLEIC FA	50.01 Gm	(-%)
LINOLEIC FA	21.46 Gm	(-%)	SODIUM	6832 Mg	(379%)
POTASSIUM	5713 Mg	(187%)	MAGNESIUM	553.2 Mg	(138%)
IRON	22.45 Mg	(124%)	ZINC	19.13 Mg	(127%)
VITAMIN A	7145 IU	(142%)	VITAMIN D	426.8 IU	(106%)
VIT. E/TOTAL	25.93 Mg	(-%)	VITAMIN C	101.1 Mg	(168%)
THIAMIN	2.603 Mg	(185%)	RIBOFLAVIN	4.703 Mg	(276%)
NIACIN	67.86 Mg	(377%)	VITAMIN B6	5.242 Mg	(262%)
FOLACIN	266.2 Ug	(66%)	VITAMIN B12	8.050 Ug	(268%)
PANTO- ACID	13.03 Mg	(236%)	CALCIUM	2464 Mg	(205%)
PHOSPHORUS	3874 Mg	(322%)	TRYPTOPHAN	2889 Mg	(1466%)
THREONINE	9880 Mg	(1878%)	ISOLEUCINE	12278 Mg	(1556%)
LEUCINE	19346 Mg	(1838%)	LYSINE	18416 Mg	(2334%)
METHIONINE	6065 Mg	(1843%)	CYSTINE	2608 Mg	(792%)
PHENYL-ANINE	10679 Mg	(2030%)	TYROSINE	8577 Mg	(1630%)
VALINE	13484 Mg	(1464%)	HISTIDINE	6496 Mg	(-%)
ALCOHOL	0.000 Gm	(-%)	ASH	35.21 Gm	(-%)
COPPER	1.447 Mg	(57%)	MANGANESE	3.245 Mg	(86%)
IODINE	155.0 Ug	(103%)	MONO FAT	55.39 Gm	(-%)
POLY FAT	29.03 Gm	(-%)	CAFFEINE	9.140 Mg	(-%)
FLUORIDE	482.2 Ug	(24%)	MOLYBDENUM	1.000 Ug	(0%)
VITAMIN K	113.2 Ug	(150%)	SELENIUM	0.315 Mg	(252%)
BIOTIN	75.63 Ug	(50%)	CHLORIDE	0.000 Mg	(0%)
CHROMIUM	0.480 Mg	(384%)	SUGAR	21.96 Gm	(-%)
FIBER-DIET	5.085 Gm	(-%)	VIT. E/AT	5.214 Mg	(52%)

PROTEIN: 23% CARBOHYDRATE: 38% FAT: 39% ALCOHOL: 0%

2-5-C-TUE

Item	Food Name	Serving	Portion	Amount
250	GRAPEFRUIT JUICE-CAN-UNSW	6	FL OUNCES	185.3 GMS
1245	CEREAL-RICE KRISPIES	2	CUPS	56.8 GMS
358	BREAD-WHOLE WHEAT-SOFT	2	SLICES	56.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
1325	POLISH SAUSAGE-PORK	2	ITEMS	454.0 GMS
489	ROLL-HAMBURGER/HOTDOG	2	ITEMS	80.0 GMS
720	SOUP-VEGETABLE BEEF-CAN	6	FL OUNCES	183.8 GMS
432	CRACKERS-SALTINES	8	ITEMS	22.0 GMS
223	APPLES-RAW-UNPEELED	1	ITEM	138.0 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
192	PORK-CHOP-LEAN/FAT-BROILED	2	ITEMS	164.0 GMS
484	RICE-WHITE-LONG GRAIN-COOK	1	CUP	205.0 GMS
595	CABBAGE-COMMON-BOIL-DRAIN	.5	CUP	72.5 GMS
978	FRUIT COCKTAIL-CAN/JUICE	.5	CUP	124.0 GMS
358	BREAD-WHOLE WHEAT-SOFT	2	SLICES	56.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
273	ORANGES-RAW-ALL VARIETIES	1	ITEM	131.0 GMS

NUTRIENT VALUES (%RDA)

KCALORIES	2607	Kc (93%)	PROTEIN	104.8	Gm (187%)
CARBOHYDRATE	320.7	Gm (-%)	FAT	100.8	Gm (-%)
FIBER-CRUDE	5.087	Gm (-%)	CHOLESTEROL	290.5	Mg (-%)
SATURATED FA	41.98	Gm (-%)	OLEIC FA	31.73	Gm (-%)
LINOLEIC FA	8.000	Gm (-%)	SODIUM	3940	Mg (218%)
POTASSIUM	3306	Mg (108%)	MAGNESIUM	368.0	Mg (91%)
IRON	17.03	Mg (94%)	ZINC	13.61	Mg (90%)
VITAMIN A	6800	IU (136%)	VITAMIN D	410.8	IU (102%)
VIT. E/TOTAL	8.945	Mg (-%)	VITAMIN C	192.0	Mg (320%)
THIAMIN	5.002	Mg (357%)	RIBOFLAVIN	3.496	Mg (205%)
NIACIN	33.49	Mg (186%)	VITAMIN B6	3.406	Mg (170%)
FOLACIN	447.1	Ug (111%)	VITAMIN B12	4.948	Ug (164%)
PANTO- ACID	8.026	Mg (145%)	CALCIUM	1255	Mg (104%)
PHOSPHORUS	1763	Mg (146%)	TRYPTOPHAN	1383	Mg (701%)
THREONINE	4588	Mg (872%)	ISOLEUCINE	5496	Mg (696%)
LEUCINE	9192	Mg (873%)	LYSINE	7819	Mg (990%)
METHIONINE	2415	Mg (733%)	CYSTINE	1053	Mg (319%)
PHENYL-ANINE	5019	Mg (954%)	TYROSINE	3581	Mg (680%)
VALINE	6340	Mg (688%)	HISTIDINE	3137	Mg (-%)
ALCOHOL	0.000	Gm (-%)	ASH	21.20	Gm (-%)
COPPER	1.511	Mg (60%)	MANGANESE	3.270	Mg (87%)
IODINE	0.000	Ug (0%)	MONO FAT	36.38	Gm (-%)
POLY FAT	8.328	Gm (-%)	CAFFEINE	0.000	Mg (-%)
FLUORIDE	355.9	Ug (17%)	MOLYBDENUM	0.725	Ug (0%)
VITAMIN K	133.1	Ug (177%)	SELENIUM	0.322	Mg (258%)
BIOTIN	31.72	Ug (21%)	CHLORIDE	0.000	Mg (0%)
CHROMIUM	0.168	Mg (134%)	SUGAR	36.32	Gm (-%)
FIBER-DIET	4.065	Gm (-%)	VIT. E/AT	4.599	Mg (45%)

PROTEIN: 16% CARBOHYDRATE: 49% FAT: 35% ALCOHOL: 0%

2-5-E-TUE

Item	Food Name	Serving	Portion	Amount
250	GRAPEFRUIT JUICE-CAN-UNSW	6	FL OUNCES	185.3 GMS
1814	Oat Bran Cereal	3	ITEMS	85.2 GMS
338	BREAD-PUMPERNICKEL	2	SLICES	64.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
1325	POLISH SAUSAGE-PORK	2	ITEMS	454.0 GMS
338	BREAD-PUMPERNICKEL	4	SLICES	128.0 GMS
1807	6	1	SERVING	131.0 GMS
1419	CRACKERS-RY KRISP-NATURAL	8	ITEMS	16.8 GMS
223	APPLES-RAW-UNPEELED	1	ITEM	138.0 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
192	PORK-CHOP-LEAN/FAT-BROILED	2	ITEMS	164.0 GMS
486	RICE-WHITE-PARBOIL-COOKED	1	CUP	175.0 GMS
1812	KIDNEY BEAN SALAD	1	SERVING	116.0 GMS
978	FRUIT COCKTAIL-CAN/JUICE	.5	CUP	124.0 GMS
338	BREAD-PUMPERNICKEL	2	SLICES	64.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
273	ORANGES-RAW-ALL VARIETIES	1	ITEM	131.0 GMS

NUTRIENT VALUES (%RDA)

KCALORIES	2896	Kc (103%)	PROTEIN	129.4	Gm (231%)
CARBOHYDRATE	363.4	Gm (-%)	FAT	105.9	Gm (-%)
FIBER-CRUDE	11.22	Gm (-%)	CHOLESTEROL	284.9	Mg (-%)
SATURATED FA	40.66	Gm (-%)	OLEIC FA	29.07	Gm (-%)
LINOLEIC FA	7.550	Gm (-%)	SODIUM	3987	Mg (221%)
POTASSIUM	4952	Mg (162%)	MAGNESIUM	419.0	Mg (104%)
IRON	17.08	Mg (94%)	ZINC	13.59	Mg (90%)
VITAMIN A	10619	IU (212%)	VITAMIN D	319.1	IU (79%)
VIT. E/TOTAL	13.39	Mg (-%)	VITAMIN C	169.6	Mg (282%)
THIAMIN	3.414	Mg (243%)	RIBOFLAVIN	3.517	Mg (206%)
NIACIN	24.82	Mg (137%)	VITAMIN B6	2.899	Mg (144%)
FOLACIN	198.5	Ug (49%)	VITAMIN B12	4.724	Ug (157%)
PANTO- ACID	8.182	Mg (148%)	CALCIUM	1296	Mg (107%)
PHOSPHORUS	2112	Mg (176%)	TRYPTOPHAN	1369	Mg (694%)
THREONINE	4908	Mg (933%)	ISOLEUCINE	5643	Mg (715%)
LEUCINE	9400	Mg (893%)	LYSINE	8408	Mg (1065%)
METHIONINE	2446	Mg (743%)	CYSTINE	1161	Mg (352%)
PHENYL-ANINE	5203	Mg (989%)	TYROSINE	3631	Mg (690%)
VALINE	6651	Mg (722%)	HISTIDINE	3227	Mg (-%)
ALCOHOL	0.000	Gm (-%)	ASH	19.92	Gm (-%)
COPPER	1.071	Mg (42%)	MANGANESE	2.331	Mg (62%)
IODINE	70.00	Ug (46%)	MONO FAT	36.03	Gm (-%)
POLY FAT	8.700	Gm (-%)	CAFFEINE	0.000	Mg (-%)
FLUORIDE	370.0	Ug (18%)	MOLYBDENUM	28.36	Ug (8%)
VITAMIN K	42.60	Ug (56%)	SELENIUM	0.354	Mg (283%)
BIOTIN	40.80	Ug (27%)	CHLORIDE	0.000	Mg (0%)
CHROMIUM	0.211	Mg (168%)	SUGAR	26.27	Gm (-%)
FIBER-DIET	6.245	Gm (-%)	VIT. E/AT	3.700	Mg (36%)

PROTEIN: 18% CARBOHYDRATE: 50% FAT: 33% ALCOHOL: 0%

3-6-C-WED

Item	Food Name	Serving	Portion	Amount
257	GRAPE JUICE-CAN & BOTTLE	6	FL OUNCES	189.8 GMS
101	EGG-POACHED-WHOLE-LARGE	2	ITEMS	100.0 GMS
358	BREAD-WHOLE WHEAT-SOFT	2	SLICES	56.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
1326	BARBECUE LOAF-PORK/BEEF	6	OUNCES	170.1 GMS
489	ROLL-HAMBURGER/HOTDOG	2	ITEMS	80.0 GMS
710	SOUP-TOMATO-CAN-MILK	6	FL OUNCES	186.0 GMS
432	CRACKERS-SALTINES	8	ITEMS	22.0 GMS
699	GELATIN DESSERT-PREP	1	CUP	240.0 GMS
1012	PEARS-CAN/JUICE	.25	CUP	62.0 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
413	BROWNIES/NUTS-MIX/PREP	2	ITEMS	40.0 GMS
189	HAM-REG-ROASTED-PORK	6	OUNCES	170.1 GMS
652	POTATO-MASHED-MILK/BUTTER	1	CUP	210.0 GMS
629	LETTUCE-LOOSELEAF-RAW	1	CUP	55.0 GMS
134	SAL DRESS-FRENCH	2	TABLESPOONS	31.2 GMS
1132	VEGETABLES-MIXED-CAN-DRAIN	.5	CUP	81.5 GMS
358	BREAD-WHOLE WHEAT-SOFT	2	SLICES	56.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
524	PEANUT BUTTER-SMOOTH TYPE	2	TABLESPOONS	32.0 GMS
432	CRACKERS-SALTINES	8	ITEMS	22.0 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS

NUTRIENT VALUES (%RDA)

KCALORIES	3247	Kc (115%)	PROTEIN	159.7	Gm (285%)
CARBOHYDRATE	350.1	Gm (-%)	FAT	139.6	Gm (-%)
FIBER-CRUDE	7.248	Gm (-%)	CHOLESTEROL	859.0	Mg (-%)
SATURATED FA	50.13	Gm (-%)	OLEIC FA	33.38	Gm (-%)
LINOLEIC FA	19.99	Gm (-%)	SODIUM	9670	Mg (537%)
POTASSIUM	5173	Mg (169%)	MAGNESIUM	493.5	Mg (123%)
IRON	20.83	Mg (115%)	ZINC	18.69	Mg (124%)
VITAMIN A	14679	IU (293%)	VITAMIN D	543.6	IU (135%)
VIT. E/TOTAL	28.23	Mg (-%)	VITAMIN C	156.2	Mg (260%)
THIAMIN	5.595	Mg (399%)	RIBOFLAVIN	4.068	Mg (239%)
NIACIN	33.68	Mg (187%)	VITAMIN B6	2.675	Mg (133%)
FOLACIN	354.4	Ug (88%)	VITAMIN B12	9.189	Ug (306%)
PANTO- ACID	11.89	Mg (216%)	CALCIUM	1841	Mg (153%)
PHOSPHORUS	2670	Mg (222%)	TRYPTOPHAN	1819	Mg (923%)
THREONINE	5939	Mg (1129%)	ISOLEUCINE	7290	Mg (923%)
LEUCINE	11926	Mg (1133%)	LYSINE	10052	Mg (1273%)
METHIONINE	3228	Mg (981%)	CYSTINE	1730	Mg (525%)
PHENYL-ANINE	6796	Mg (1291%)	TYROSINE	4900	Mg (931%)
VALINE	7871	Mg (854%)	HISTIDINE	3630	Mg (-%)
ALCOHOL	0.000	Gm (-%)	ASH	41.35	Gm (-%)
COPPER	2.015	Mg (80%)	MANGANESE	1.828	Mg (48%)
IODINE	26.00	Ug (17%)	MONO FAT	45.65	Gm (-%)
POLY FAT	22.62	Gm (-%)	CAFFEINE	9.140	Mg (-%)
FLUORIDE	908.8	Ug (45%)	MOLYBDENUM	1.000	Ug (0%)
VITAMIN K	127.4	Ug (169%)	SELENIUM	0.257	Mg (205%)
BIOTIN	72.13	Ug (48%)	CHLORIDE	0.000	Mg (0%)
CHROMIUM	0.252	Mg (201%)	SUGAR	45.01	Gm (-%)
FIBER-DIET	3.149	Gm (-%)	VIT. E/AT	6.001	Mg (60%)

PROTEIN: 19% CARBOHYDRATE: 42% FAT: 38% ALCOHOL: 0%

3-6-E-WED

Item	Food Name	Serving	Portion	Amount
257	GRAPE JUICE-CAN & BOTTLE	6	FL OUNCES	189.8 GMS
101	EGG-POACHED-WHOLE-LARGE	2	ITEMS	100.0 GMS
338	BREAD-PUMPERNICKEL	2	SLICES	64.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
1326	BARBECUE LOAF-PORK/BEEF	6	OUNCES	170.1 GMS
338	BREAD-PUMPERNICKEL	4	SLICES	128.0 GMS
710	SOUP-TOMATO-CAN-MILK	6	FL OUNCES	186.0 GMS
486	RICE-WHITE-PARBOIL-COOKED	.25	CUP	43.8 GMS
1419	CRACKERS-RY KRISP-NATURAL	8	ITEMS	16.8 GMS
699	GELATIN DESSERT-PREP	1	CUP	240.0 GMS
1012	PEARS-CAN/JUICE	.25	CUP	62.0 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
413	BROWNIES/NUTS-MIX/PREP	2	ITEMS	40.0 GMS
189	HAM-REG-ROASTED-PORK	6	OUNCES	170.1 GMS
1812	KIDNEY BEAN SALAD	1	SERVING	116.0 GMS
629	LETTUCE-LOOSELEAF-RAW	1	CUP	55.0 GMS
134	SAL DRESS-FRENCH	2	TABLESPOONS	31.2 GMS
1132	VEGETABLES-MIXED-CAN-DRAIN	.5	CUP	81.5 GMS
338	BREAD-PUMPERNICKEL	2	SLICES	64.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
235	BANANAS-RAW-PEELED	1	ITEM	119.0 GMS
524	PEANUT BUTTER-SMOOTH TYPE	2	TABLESPOONS	32.0 GMS
1419	CRACKERS-RY KRISP-NATURAL	8	ITEMS	16.8 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS

NUTRIENT VALUES (%RDA)

KCALORIES	3354	Kc (119%)	PROTEIN	168.7	Gm (301%)
CARBOHYDRATE	399.9	Gm (-%)	FAT	128.4	Gm (-%)
FIBER-CRUDE	13.01	Gm (-%)	CHOLESTEROL	847.0	Mg (-%)
SATURATED FA	46.27	Gm (-%)	OLEIC FA	26.71	Gm (-%)
LINOLEIC FA	17.82	Gm (-%)	SODIUM	9618	Mg (534%)
POTASSIUM	6268	Mg (205%)	MAGNESIUM	578.1	Mg (144%)
IRON	22.82	Mg (126%)	ZINC	20.25	Mg (135%)
VITAMIN A	14582	IU (291%)	VITAMIN D	543.6	IU (135%)
VIT. E/TOTAL	32.45	Mg (-%)	VITAMIN C	158.4	Mg (263%)
THIAMIN	3.744	Mg (267%)	RIBOFLAVIN	4.838	Mg (284%)
NIACIN	33.11	Mg (183%)	VITAMIN B6	3.661	Mg (183%)
FOLACIN	291.0	Ug (72%)	VITAMIN B12	9.189	Ug (306%)
PANTO- ACID	11.87	Mg (215%)	CALCIUM	1832	Mg (152%)
PHOSPHORUS	2984	Mg (248%)	TRYPTOPHAN	1831	Mg (929%)
THREONINE	6308	Mg (1199%)	ISOLEUCINE	7506	Mg (951%)
LEUCINE	12312	Mg (1170%)	LYSINE	10599	Mg (1343%)
METHIONINE	3308	Mg (1005%)	CYSTINE	1791	Mg (544%)
PHENYL-ANINE	7001	Mg (1331%)	TYROSINE	5087	Mg (967%)
VALINE	8346	Mg (906%)	HISTIDINE	3813	Mg (-%)
ALCOHOL	0.000	Gm (-%)	ASH	38.84	Gm (-%)
COPPER	1.619	Mg (64%)	MANGANESE	2.250	Mg (59%)
IODINE	43.50	Ug (29%)	MONO FAT	40.58	Gm (-%)
POLY FAT	19.46	Gm (-%)	CAFFEINE	9.140	Mg (-%)
FLUORIDE	350.1	Ug (17%)	MOLYBDENUM	1.160	Ug (0%)
VITAMIN K	127.4	Ug (169%)	SELENIUM	0.276	Mg (222%)
BIOTIN	87.74	Ug (58%)	CHLORIDE	0.000	Mg (0%)
CHROMIUM	0.272	Mg (217%)	SUGAR	54.08	Gm (-%)
FIBER-DIET	8.765	Gm (-%)	VIT. E/AT	6.140	Mg (61%)

PROTEIN: 20% CARBOHYDRATE: 47% FAT: 34% ALCOHOL: 0%

3-6-C-THU

Item	Food Name	Serving	Portion	Amount
358	BREAD-WHOLE WHEAT-SOFT	3	SLICES	84.0 GMS
96	EGG-WHOLE-RAW-LARGE	1	ITEM	50.0 GMS
104	BUTTER-REGULAR-TABLESPOON	3	TEASPOONS	14.0 GMS
1634	SIRUP-PANCAKE-LIGH-LOW CAL	4	TABLESPOONS	78.0 GMS
278	ORANGE JUICE-FROZ-DILUTED	10	FL OUNCES	311.3 GMS
161	BACON-PORK-BROILED/FRIED	3	SLICES	18.9 GMS
1299	TURK HAM-CURED THIGH MEAT	6	OUNCES	170.1 GMS
358	BREAD-WHOLE WHEAT-SOFT	4	SLICES	112.0 GMS
1640	MAYONNAISE-LIGHT-LOW CAL	2	TABLESPOONS	28.0 GMS
827	SOUP-CHICKEN NOODLE-CAN	6	FL OUNCES	180.8 GMS
432	CRACKERS-SALTINES	8	ITEMS	22.0 GMS
468	PIE-PEACH-HOME REC	1	SLICE	135.0 GMS
600	CARROT-RAW-WHOLE-SCRAPED	.25	ITEM	18.0 GMS
608	CELERY-PASCAL-RAW-STALK	.25	ITEM	10.0 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
170	STEAK-SIRLOIN-LEAN/FAT	6	OUNCES	170.1 GMS
1144	POTATO-FLESH & SKIN-BAKE	1	ITEM	202.0 GMS
617	CORN-SWEET-CAN-DRAINED	.5	CUP	82.5 GMS
629	LETTUCE-LOOSELEAF-RAW	1	CUP	55.0 GMS
134	SAL DRESS-FRENCH	2	TABLESPOONS	31.2 GMS
978	FRUIT COCKTAIL-CAN/JUICE	.5	CUP	124.0 GMS
338	BREAD-PUMPERNICKEL	2	SLICES	64.0 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
1161	NUTS-PEANUTS-SPANISH-DRIED	.25	CUP	36.5 GMS
225	APPLE JUICE-CANNED/BOTTLED	6	FL OUNCES	186.0 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1.5	CUPS	366.0 GMS
104	BUTTER-REGULAR-TABLESPOON	4	TEASPOONS	18.7 GMS

NUTRIENT VALUES (%RDA)

KCALORIES	3995	Kc (142%)	PROTEIN	162.3	Gm (289%)
CARBOHYDRATE	417.6	Gm (-%)	FAT	187.2	Gm (-%)
FIBER-CRUDE	9.390	Gm (-%)	CHOLESTEROL	605.9	Mg (-%)
SATURATED FA	68.31	Gm (-%)	OLEIC FA	59.27	Gm (-%)
LINOLEIC FA	21.45	Gm (-%)	SODIUM	6659	Mg (369%)
POTASSIUM	5558	Mg (182%)	MAGNESIUM	592.9	Mg (148%)
IRON	29.41	Mg (163%)	ZINC	18.53	Mg (123%)
VITAMIN A	11501	IU (230%)	VITAMIN D	413.6	IU (103%)
VIT. E/TOTAL	52.32	Mg (-%)	VITAMIN C	184.5	Mg (307%)
THIAMIN	3.594	Mg (256%)	RIBOFLAVIN	3.661	Mg (215%)
NIACIN	40.12	Mg (222%)	VITAMIN B6	2.178	Mg (108%)
FOLACIN	498.6	Ug (124%)	VITAMIN B12	6.212	Ug (207%)
PANTO- ACID	8.712	Mg (158%)	CALCIUM	1467	Mg (122%)
PHOSPHORUS	2757	Mg (229%)	TRYPTOPHAN	1850	Mg (939%)
THREONINE	6119	Mg (1163%)	ISOLEUCINE	7649	Mg (969%)
LEUCINE	12174	Mg (1157%)	LYSINE	10577	Mg (1340%)
METHIONINE	3431	Mg (1042%)	CYSTINE	1432	Mg (435%)
PHENYL-ANINE	6846	Mg (1301%)	TYROSINE	4893	Mg (930%)
VALINE	8358	Mg (907%)	HISTIDINE	3648	Mg (-%)
ALCOHOL	0.000	Gm (-%)	ASH	33.91	Gm (-%)
COPPER	2.325	Mg (93%)	MANGANESE	1.548	Mg (41%)
IODINE	13.00	Ug (8%)	MONO FAT	34.10	Gm (-%)
POLY FAT	19.82	Gm (-%)	CAFFEINE	0.000	Mg (-%)
FLUORIDE	908.8	Ug (45%)	MOLYBDENUM	14.60	Ug (4%)
VITAMIN K	281.3	Ug (375%)	SELENIUM	0.248	Mg (198%)
BIOTIN	66.95	Ug (44%)	CHLORIDE	0.000	Mg (0%)
CHROMIUM	0.303	Mg (242%)	SUGAR	15.80	Gm (-%)
FIBER-DIET	2.500	Gm (-%)	VIT. E/AT	13.11	Mg (131%)

PROTEIN: 16% CARBOHYDRATE: 42% FAT: 42% ALCOHOL: 0%

3-6-E-THU

Item	Food Name	Serving	Portion	Amount
338	BREAD-PUMPERNICKEL	3	SLICES	96.0 GMS
96	EGG-WHOLE-RAW-LARGE	1	ITEM	50.0 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1.5	CUPS	366.0 GMS
104	BUTTER-REGULAR-TABLESPOON	3	TEASPOONS	14.0 GMS
1634	SIRUP-PANCAKE-LIGH-LOW CAL	4	TABLESPOONS	78.0 GMS
278	ORANGE JUICE-FROZ-DILUTED	10	FL OUNCES	311.3 GMS
161	BACON-PORK-BROILED/FRIED	3	SLICES	18.9 GMS
1299	TURK HAM-CURED THIGH MEAT	6	OUNCES	170.1 GMS
338	BREAD-PUMPERNICKEL	4	SLICES	128.0 GMS
1640	MAYONNAISE-LIGHT-LOW CAL	2	TABLESPOONS	28.0 GMS
1807	6	1	SERVING	131.0 GMS
1419	CRACKERS-RY KRISP-NATURAL	8	ITEMS	16.8 GMS
468	PIE-PEACH-HOME REC	1	SLICE	135.0 GMS
600	CARROT-RAW-WHOLE-SCRAPED	.25	ITEM	18.0 GMS
608	CELERY-PASCAL-RAW-STALK	.25	ITEM	10.0 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
170	STEAK-SIRLOIN-LEAN/FAT	6	OUNCES	170.1 GMS
486	RICE-WHITE-PARBOIL-COOKED	1	CUP	175.0 GMS
617	CORN-SWEET-CAN-DRAINED	.5	CUP	82.5 GMS
629	LETTUCE-LOOSELEAF-RAW	1	CUP	55.0 GMS
134	SAL DRESS-FRENCH	2	TABLESPOONS	31.2 GMS
978	FRUIT COCKTAIL-CAN/JUICE	.5	CUP	124.0 GMS
338	BREAD-PUMPERNICKEL	2	SLICES	64.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
1161	NUTS-PEANUTS-SPANISH-DRIED	.25	CUP	36.5 GMS
225	APPLE JUICE-CANNED/BOTTLED	6	FL OUNCES	186.0 GMS

NUTRIENT VALUES (%RDA)

KCALORIES	3974	Kc (141%)	PROTEIN	168.0	Gm (299%)
CARBOHYDRATE	434.3	Gm (-%)	FAT	179.6	Gm (-%)
FIBER-CRUDE	11.31	Gm (-%)	CHOLESTEROL	576.1	Mg (-%)
SATURATED FA	63.08	Gm (-%)	OLEIC FA	56.04	Gm (-%)
LINOLEIC FA	21.39	Gm (-%)	SODIUM	6309	Mg (350%)
POTASSIUM	5824	Mg (190%)	MAGNESIUM	551.9	Mg (137%)
IRON	29.97	Mg (166%)	ZINC	18.91	Mg (126%)
VITAMIN A	18321	IU (366%)	VITAMIN D	419.7	IU (104%)
VIT. E/TOTAL	55.27	Mg (-%)	VITAMIN C	183.2	Mg (305%)
THIAMIN	2.825	Mg (201%)	RIBOFLAVIN	4.389	Mg (258%)
NIACIN	38.88	Mg (216%)	VITAMIN B6	2.425	Mg (121%)
FOLACIN	444.4	Ug (111%)	VITAMIN B12	6.232	Ug (207%)
PANTO- ACID	9.307	Mg (169%)	CALCIUM	1536	Mg (128%)
PHOSPHORUS	2825	Mg (235%)	TRYPTOPHAN	1848	Mg (938%)
THREONINE	6598	Mg (1254%)	ISOLEUCINE	7978	Mg (1011%)
LEUCINE	12899	Mg (1226%)	LYSINE	11136	Mg (1411%)
METHIONINE	3569	Mg (1084%)	CYSTINE	1650	Mg (501%)
PHENYL-ANINE	7211	Mg (1370%)	TYROSINE	5353	Mg (1017%)
VALINE	9067	Mg (984%)	HISTIDINE	3810	Mg (-%)
ALCOHOL	0.000	Gm (-%)	ASH	29.49	Gm (-%)
COPPER	1.347	Mg (53%)	MANGANESE	3.040	Mg (81%)
IODINE	65.50	Ug (43%)	MONO FAT	31.25	Gm (-%)
POLY FAT	19.64	Gm (-%)	CAFFEINE	0.000	Mg (-%)
FLUORIDE	342.8	Ug (17%)	MOLYBDENUM	42.83	Ug (13%)
VITAMIN K	120.3	Ug (160%)	SELENIUM	0.289	Mg (231%)
BIOTIN	75.21	Ug (50%)	CHLORIDE	0.000	Mg (0%)
CHROMIUM	0.329	Mg (263%)	SUGAR	7.728	Gm (-%)
FIBER-DIET	4.790	Gm (-%)	VIT. E/AT	13.61	Mg (136%)

PROTEIN: 17% CARBOHYDRATE: 43% FAT: 40% ALCOHOL: 0%

3-6-C-FRI

Item	Food Name	Serving	Portion	Amount
274	ORANGES-RAW-SECTIONS	.5	CUP	90.0 GMS
984	GRAPEFRUIT-CAN/JUICE	.5	CUP	124.5 GMS
1206	CEREAL-CHEERIOS	2	CUPS	45.4 GMS
358	BREAD-WHOLE WHEAT-SOFT	2	SLICES	56.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
190	HAM-REG-LUNCH MEAT-11% FAT	5	OUNCES	141.8 GMS
22	CHEESE-AMERICAN-PROCESSED	2	OUNCES	56.7 GMS
358	BREAD-WHOLE WHEAT-SOFT	4	SLICES	112.0 GMS
104	BUTTER-REGULAR-TABLESPOON	4	TEASPOONS	18.7 GMS
721	SOUP-VEGETARIAN-CAN-WATER	6	FL OUNCES	180.8 GMS
273	ORANGES-RAW-ALL VARIETIES	1	ITEM	131.0 GMS
432	CRACKERS-SALTINES	8	ITEMS	22.0 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
177	BEEF & VEGETABLE STEW	2	CUPS	490.0 GMS
323	BISCUITS-PREPARED/MIX	3	ITEMS	84.0 GMS
104	BUTTER-REGULAR-TABLESPOON	3	TEASPOONS	14.0 GMS
619	CUCUMBER-RAW-SLICED	.25	CUP	26.0 GMS
48	CREAM-SOUR-IMIT-NONFAT	2	TABLESPOONS	29.4 GMS
633	ONIONS-MATURE-RAW-CHOPPED	2	TABLESPOONS	21.3 GMS
590	BROCCOLI-FROZ-BOIL-DRAIN	.5	CUP	92.5 GMS
226	APPLESAUCE-CAN-SWEETENED	.5	CUP	127.5 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
477	POPCORN-POPPED-OIL & SALT	3	CUPS	27.0 GMS
693	COLA-TYPE-SODA	12	FL OUNCES	369.6 GMS

NUTRIENT VALUES (%RDA)

KCALORIES	3215	Kc (114%)	PROTEIN	137.5	Gm (245%)
CARBOHYDRATE	370.3	Gm (-%)	FAT	138.1	Gm (-%)
FIBER-CRUDE	8.807	Gm (-%)	CHOLESTEROL	430.0	Mg (-%)
SATURATED FA	68.28	Gm (-%)	OLEIC FA	42.10	Gm (-%)
LINOLEIC FA	8.830	Gm (-%)	SODIUM	9275	Mg (515%)
POTASSIUM	4719	Mg (154%)	MAGNESIUM	501.7	Mg (125%)
IRON	26.69	Mg (148%)	ZINC	14.67	Mg (97%)
VITAMIN A	14803	IU (296%)	VITAMIN D	323.0	IU (80%)
VIT. E/TOTAL	10.58	Mg (-%)	VITAMIN C	307.2	Mg (511%)
THIAMIN	4.725	Mg (337%)	RIBOFLAVIN	3.916	Mg (230%)
NIACIN	37.89	Mg (210%)	VITAMIN B6	2.401	Mg (120%)
FOLACIN	293.0	Ug (73%)	VITAMIN B12	6.798	Ug (226%)
PANTO- ACID	6.278	Mg (114%)	CALCIUM	1929	Mg (160%)
PHOSPHORUS	3190	Mg (265%)	TRYPTOPHAN	1730	Mg (877%)
THREONINE	5444	Mg (1034%)	ISOLEUCINE	7399	Mg (937%)
LEUCINE	11554	Mg (1098%)	LYSINE	9202	Mg (1166%)
METHIONINE	3000	Mg (911%)	CYSTINE	921.0	Mg (279%)
PHENYL-ANINE	6632	Mg (1260%)	TYROSINE	3057	Mg (581%)
VALINE	7505	Mg (814%)	HISTIDINE	2488	Mg (-%)
ALCOHOL	0.000	Gm (-%)	ASH	31.37	Gm (-%)
COPPER	2.011	Mg (80%)	MANGANESE	2.773	Mg (73%)
IODINE	40.60	Ug (27%)	MONO FAT	37.47	Gm (-%)
POLY FAT	7.411	Gm (-%)	CAFFEINE	39.00	Mg (-%)
FLUORIDE	418.0	Ug (20%)	MOLYBDENUM	0.250	Ug (0%)
VITAMIN K	227.6	Ug (303%)	SELENIUM	0.239	Mg (191%)
BIOTIN	31.15	Ug (20%)	CHLORIDE	0.000	Mg (0%)
CHROMIUM	0.241	Mg (193%)	SUGAR	63.37	Gm (-%)
FIBER-DIET	6.060	Gm (-%)	VIT. E/AT	3.912	Mg (39%)

PROTEIN: 17% CARBOHYDRATE: 45% FAT: 38% ALCOHOL: 0%

3-6-E-FR1

Item	Food Name	Serving	Portion	Amount
274	ORANGES-RAW-SECTIONS	.5	CUP	90.0 GMS
984	GRAPEFRUIT-CAN/JUICE	.5	CUP	124.5 GMS
1814	Oat Bran Cereal	3	ITEMS	85.2 GMS
338	BREAD-PUMPERNICKEL	2	SLICES	64.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
190	HAM-REG-LUNCH MEAT-11% FAT	5	OUNCES	141.8 GMS
22	CHEESE-AMERICAN-PROCESSED	2	OUNCES	56.7 GMS
338	BREAD-PUMPERNICKEL	4	SLICES	128.0 GMS
2	LENTIL VEGETABLE SOUP	1	SERVING	69.7 GMS
1419	CRACKERS-RY KRISP-NATURAL	8	ITEMS	16.8 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
104	BUTTER-REGULAR-TABLESPOON	4	TEASPOONS	18.7 GMS
177	BEEF & VEGETABLE STEW	2	CUPS	490.0 GMS
338	BREAD-PUMPERNICKEL	2	SLICES	64.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
619	CUCUMBER-RAW-SLICED	.25	CUP	26.0 GMS
48	CREAM-SOUR-IMIT-NONFAT	2	TABLESPOONS	29.4 GMS
633	ONIONS-MATURE-RAW-CHOPPED	2	TABLESPOONS	21.3 GMS
1810	BROCCOLI RICE	1	SERVING	268.0 GMS
226	APPLESAUCE-CAN-SWEETENED	.5	CUP	127.5 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
477	POPCORN-POPPED-OIL & SALT	3	CUPS	27.0 GMS
693	COLA-TYPE-SODA	12	FL OUNCES	369.6 GMS
273	ORANGES-RAW-ALL VARIETIES	1	ITEM	131.0 GMS

NUTRIENT VALUES (%RDA)

KCALORIES	3460	Kc (123%)	PROTEIN	158.2	Gm (282%)
CARBOHYDRATE	418.4	Gm (-%)	FAT	134.2	Gm (-%)
FIBER-CRUDE	12.46	Gm (-%)	CHOLESTEROL	438.0	Mg (-%)
SATURATED FA	67.72	Gm (-%)	OLEIC FA	37.50	Gm (-%)
LINOLEIC FA	6.510	Gm (-%)	SODIUM	8067	Mg (448%)
POTASSIUM	5836	Mg (191%)	MAGNESIUM	479.0	Mg (119%)
IRON	19.93	Mg (110%)	ZINC	14.49	Mg (96%)
VITAMIN A	18600	IU (376%)	VITAMIN D	335.0	IU (83%)
VIT. E/TOTAL	10.11	Mg (-%)	VITAMIN C	300.7	Mg (501%)
THIAMIN	3.274	Mg (233%)	RIBOFLAVIN	3.962	Mg (233%)
NIACIN	29.87	Mg (165%)	VITAMIN B6	2.229	Mg (111%)
FOLACIN	224.7	Ug (56%)	VITAMIN B12	4.540	Ug (151%)
PANTO- ACID	6.868	Mg (124%)	CALCIUM	1947	Mg (162%)
PHOSPHORUS	2940	Mg (245%)	TRYPTOPHAN	1745	Mg (865%)
THREONINE	5858	Mg (1113%)	ISOLEUCINE	7691	Mg (974%)
LEUCINE	12049	Mg (1145%)	LYSINE	10067	Mg (1275%)
METHIONINE	3189	Mg (969%)	CYSTINE	936.0	Mg (284%)
PHENYL-ANINE	6782	Mg (1289%)	TYROSINE	3489	Mg (663%)
VALINE	8115	Mg (881%)	HISTIDINE	2691	Mg (-%)
ALCOHOL	0.000	Gm (-%)	ASH	26.18	Gm (-%)
COPPER	1.269	Mg (50%)	MANGANESE	2.473	Mg (65%)
IODINE	92.90	Ug (61%)	MONO FAT	36.23	Gm (-%)
POLY FAT	5.543	Gm (-%)	CAFFEINE	39.00	Mg (-%)
FLUORIDE	472.7	Ug (23%)	MOLYBDENUM	13.30	Ug (4%)
VITAMIN K	228.0	Ug (304%)	SELENIUM	0.252	Mg (201%)
BIOTIN	42.51	Ug (28%)	CHLORIDE	0.000	Mg (0%)
CHROMIUM	0.300	Mg (240%)	SUGAR	66.00	Gm (-%)
FIBER-DIET	7.060	Gm (-%)	VIT. E/AT	4.224	Mg (42%)

PROTEIN: 18% CARBOHYDRATE: 48% FAT: 34% ALCOHOL: 0%

3-6-C-SAT

Item	Food Name	Serving	Portion	Amount
278	ORANGE JUICE-FROZ-DILUTED	10	FL OUNCES	311.3 GMS
102	EGG-SCRAMBLED-MILK/BUTTER	2	ITEMS	128.0 GMS
204	SAUSAGE-LINK-PORK-COOKED	3	OUNCES	85.1 GMS
358	BREAD-WHOLE WHEAT-SOFT	2	SLICES	56.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
1411	HOT DOG/BUN	2	ITEMS	164.0 GMS
1389	CORN CHIPS	2	SERVINGS	56.8 GMS
587	BROCCOLI-RAW	.5	CUP	44.0 GMS
333	DIP-FRENCH ONION-KRAFT	2	TABLESPOONS	30.0 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
223	APPLES-RAW-UNPEELED	1	ITEM	138.0 GMS
1668	PIZZA-PEPPERONI-BAKED	4	SLICES	480.0 GMS
629	LETTUCE-LOOSELEAF-RAW	1	CUP	55.0 GMS
134	SAL DRESS-FRENCH	2	TABLESPOONS	31.2 GMS
1019	PINEAPPLE-CAN/JUICE	.5	CUP	125.0 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
422	COOKIE-SANDWICH-CHOC/VAN	4	ITEMS	40.0 GMS
1159	NUTS-MIXED-DRY ROASTED	2	OUNCES	56.7 GMS
693	COLA-TYPE-SODA	12	FL OUNCES	369.6 GMS

NUTRIENT VALUES (%RDA)

KCALORIES	4241	Kc (151%)	PROTEIN	149.9	Gm (267%)
CARBOHYDRATE	441.8	Gm (-%)	FAT	212.1	Gm (-%)
FIBER-CRUDE	4.134	Gm (-%)	CHOLESTEROL	720.1	Mg (-%)
SATURATED FA	37.74	Gm (-%)	OLEIC FA	32.67	Gm (-%)
LINOLEIC FA	13.81	Gm (-%)	SODIUM	7718	Mg (428%)
POTASSIUM	4430	Mg (145%)	MAGNESIUM	472.7	Mg (118%)
IRON	23.58	Mg (130%)	ZINC	15.63	Mg (104%)
VITAMIN A	6631	IU (132%)	VITAMIN D	411.0	IU (102%)
VIT. E/TOTAL	27.96	Mg (-%)	VITAMIN C	208.8	Mg (347%)
THIAMIN	3.592	Mg (256%)	RIBOFLAVIN	3.931	Mg (231%)
NIACIN	39.46	Mg (219%)	VITAMIN B6	1.668	Mg (83%)
FOLACIN	700.2	Ug (175%)	VITAMIN B12	6.819	Ug (227%)
PANTO- ACID	8.265	Mg (150%)	CALCIUM	2069	Mg (172%)
PHOSPHORUS	1884	Mg (156%)	TRYPTOPHAN	920.7	Mg (467%)
THREONINE	2977	Mg (565%)	ISOLEUCINE	3654	Mg (463%)
LEUCINE	6006	Mg (570%)	LYSINE	4779	Mg (605%)
METHIONINE	1665	Mg (505%)	CYSTINE	862.9	Mg (262%)
PHENYL-ANINE	3338	Mg (634%)	TYROSINE	2628	Mg (499%)
VALINE	4126	Mg (448%)	HISTIDINE	1769	Mg (-%)
ALCOHOL	0.000	Gm (-%)	ASH	34.12	Gm (-%)
COPPER	2.185	Mg (87%)	MANGANESE	1.435	Mg (38%)
IODINE	26.00	Ug (17%)	MONO FAT	43.54	Gm (-%)
POLY FAT	18.81	Gm (-%)	CAFFEINE	39.00	Mg (-%)
FLUORIDE	331.6	Ug (16%)	MOLYBDENUM	127.0	Ug (39%)
VITAMIN K	201.2	Ug (268%)	SELENIUM	0.492	Mg (393%)
BIOTIN	53.99	Ug (35%)	CHLORIDE	0.000	Mg (0%)
CHROMIUM	0.174	Mg (139%)	SUGAR	60.31	Gm (-%)
FIBER-DIET	4.355	Gm (-%)	VIT. E/AT	3.523	Mg (35%)

PROTEIN: 14% CARBOHYDRATE: 41% FAT: 45% ALCOHOL: 0%

3-6-E-SAT

Item	Food Name	Serving	Portion	Amount
278	ORANGE JUICE-FROZ-DILUTED	10	FL OUNCES	311.3 GMS
102	EGG-SCRAMBLED-MILK/BUTTER	2	ITEMS	128.0 GMS
204	SAUSAGE-LINK-PORK-COOKED	3	OUNCES	85.1 GMS
338	BREAD-PUMPERNICKEL	2	SLICES	64.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
1816	hot dog	2	ITEMS	120.0 GMS
338	BREAD-PUMPERNICKEL	4	SLICES	128.0 GMS
4	BEAN AND BARLEY SOUP	1	SERVING	112.0 GMS
1419	CRACKERS-RY KRISP-NATURAL	8	ITEMS	16.8 GMS
587	BROCCOLI-RAW	.5	CUP	44.0 GMS
333	DIP-FRENCH ONION-KRAFT	2	TABLESPOONS	30.0 GMS
223	APPLES-RAW-UNPEELED	1	ITEM	138.0 GMS
497	SPAGHETTI/TOM/MEAT-HOME	2	CUPS	496.0 GMS
629	LETTUCE-LOOSELEAF-RAW	1	CUP	55.0 GMS
134	SAL DRESS-FRENCH	2	TABLESPOONS	31.2 GMS
338	BREAD-PUMPERNICKEL	2	SLICES	64.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
1019	PINEAPPLE-CAN/JUICE	.5	CUP	125.0 GMS
422	COOKIE-SANDWICH-CHOC/VAN	4	ITEMS	40.0 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
1159	NUTS-MIXED-DRY ROASTED	2	OUNCES	56.7 GMS
693	COLA-TYPE-SODA	12	FL OUNCES	369.6 GMS

NUTRIENT VALUES (%RDA)

KCALORIES	3755 Kc	(134%)	PROTEIN	141.3 Gm	(252%)
CARBOHYDRATE	429.1 Gm	(-%)	FAT	172.7 Gm	(-%)
FIBER-CRUDE	10.45 Gm	(-%)	CHOLESTEROL	798.8 Mg	(-%)
SATURATED FA	46.78 Gm	(-%)	OLEIC FA	45.61 Gm	(-%)
LINOLEIC FA	16.94 Gm	(-%)	SODIUM	6404 Mg	(355%)
POTASSIUM	5623 Mg	(184%)	MAGNESIUM	527.8 Mg	(131%)
IRON	24.91 Mg	(138%)	ZINC	12.47 Mg	(83%)
VITAMIN A	11139 IU	(222%)	VITAMIN D	283.6 IU	(70%)
VIT. E/TOTAL	30.37 Mg	(-%)	VITAMIN C	251.2 Mg	(418%)
THIAMIN	3.016 Mg	(215%)	RIBOFLAVIN	3.757 Mg	(221%)
NIACIN	26.90 Mg	(149%)	VITAMIN B6	1.723 Mg	(86%)
FOLACIN	368.6 Ug	(92%)	VITAMIN B12	4.491 Ug	(149%)
PANTO- ACID	7.010 Mg	(127%)	CALCIUM	1373 Mg	(114%)
PHOSPHORUS	2489 Mg	(207%)	TRYPTOPHAN	1046 Mg	(531%)
THREONINE	3503 Mg	(666%)	ISOLEUCINE	4173 Mg	(528%)
LEUCINE	6765 Mg	(643%)	LYSINE	5247 Mg	(665%)
METHIONINE	1798 Mg	(546%)	CYSTINE	856.4 Mg	(260%)
PHENYL-ANINE	4019 Mg	(764%)	TYROSINE	2428 Mg	(461%)
VALINE	4807 Mg	(521%)	HISTIDINE	1682 Mg	(-%)
ALCOHOL	0.000 Gm	(-%)	ASH	22.67 Gm	(-%)
COPPER	1.841 Mg	(73%)	MANGANESE	1.499 Mg	(39%)
IODINE	26.00 Ug	(17%)	MONO FAT	44.40 Gm	(-%)
POLY FAT	19.00 Gm	(-%)	CAFFEINE	39.00 Mg	(-%)
FLUORIDE	295.1 Ug	(14%)	MOLYBDENUM	14.00 Ug	(4%)
VITAMIN K	187.0 Ug	(249%)	SELENIUM	0.172 Mg	(137%)
BIOTIN	58.45 Ug	(38%)	CHLORIDE	0.000 Mg	(0%)
CHROMIUM	0.246 Mg	(196%)	SUGAR	62.89 Gm	(-%)
FIBER-DIET	7.335 Gm	(-%)	VIT. E/AT	3.603 Mg	(36%)

PROTEIN: 15% CARBOHYDRATE: 45% FAT: 41% ALCOHOL: 0%

3-6-C-SUN

Item	Food Name	Serving	Portion	Amount
250	GRAPEFRUIT JUICE-CAN-UNSW	6	FL OUNCES	185.3 GMS
381	CEREAL-WHEAT-SHRED-BISCUIT	2	ITEMS	47.2 GMS
358	BREAD-WHOLE WHEAT-SOFT	2	SLICES	56.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
194	PORK-LOIN-LEAN/FAT-ROAST	8	OUNCES	226.8 GMS
847	GRAVY-PORK-MIX-PREP/WATER	3	TABLESPOONS	48.4 GMS
652	POTATO-MASHED-MILK/BUTTER	1	CUP	210.0 GMS
606	CAULIFLOWER-RAW-BOIL-DRAIN	.5	CUP	62.0 GMS
978	FRUIT COCKTAIL-CAN/JUICE	.5	CUP	124.0 GMS
487	ROLL-BROWN & SERVE-ENR	3	ITEMS	78.0 GMS
104	BUTTER-REGULAR-TABLESPOON	4	TEASPOONS	18.7 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
82	ICE MILK-VAN-HARD-4.3% FAT	1	CUP	131.0 GMS
160	SALAD-TUNA	1	CUP	205.0 GMS
358	BREAD-WHOLE WHEAT-SOFT	4	SLICES	112.0 GMS
104	BUTTER-REGULAR-TABLESPOON	4	TEASPOONS	18.7 GMS
654	POTATO CHIPS-SALT ADDED	20	ITEMS	40.0 GMS
1062	SALAD-COLESLAW	.5	CUP	64.0 GMS
1012	PEARS-CAN/JUICE	.5	CUP	124.0 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
1387	CRACKERS-GRAHAM-SUG/HONEY	4	ITEMS	28.0 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS

NUTRIENT VALUES (%RDA)

KCALORIES	3691 Kc	(131%)	PROTEIN	165.7 Gm	(295%)
CARBOHYDRATE	376.8 Gm	(-%)	FAT	175.8 Gm	(-%)
FIBER-CRUDE	7.007 Gm	(-%)	CHOLESTEROL	480.5 Mg	(-%)
SATURATED FA	70.10 Gm	(-%)	OLEIC FA	60.12 Gm	(-%)
LINOLEIC FA	26.15 Gm	(-%)	SODIUM	4260 Mg	(236%)
POTASSIUM	5045 Mg	(165%)	MAGNESIUM	567.1 Mg	(141%)
IRON	18.71 Mg	(103%)	ZINC	15.45 Mg	(102%)
VITAMIN A	5420 IU	(108%)	VITAMIN D	423.6 IU	(105%)
VIT. E/TOTAL	18.15 Mg	(-%)	VITAMIN C	156.8 Mg	(261%)
THIAMIN	3.954 Mg	(282%)	RIBOFLAVIN	3.716 Mg	(218%)
NIACIN	40.49 Mg	(224%)	VITAMIN B6	2.823 Mg	(141%)
FOLACIN	307.1 Ug	(76%)	VITAMIN B12	5.801 Ug	(193%)
PANTO- ACID	9.478 Mg	(172%)	CALCIUM	1794 Mg	(149%)
PHOSPHORUS	2771 Mg	(230%)	TRYPTOPHAN	1815 Mg	(921%)
THREONINE	5696 Mg	(1082%)	ISOLEUCINE	6812 Mg	(863%)
LEUCINE	11172 Mg	(1061%)	LYSINE	10091 Mg	(1278%)
METHIONINE	2968 Mg	(901%)	CYSTINE	1258 Mg	(382%)
PHENYL-ANINE	6013 Mg	(1143%)	TYROSINE	4212 Mg	(800%)
VALINE	7563 Mg	(821%)	HISTIDINE	4122 Mg	(-%)
ALCOHOL	0.000 Gm	(-%)	ASH	26.70 Gm	(-%)
COPPER	1.749 Mg	(69%)	MANGANESE	2.132 Mg	(56%)
IODINE	61.60 Ug	(41%)	MONO FAT	45.75 Gm	(-%)
POLY FAT	18.48 Gm	(-%)	CAFFEINE	0.000 Mg	(-%)
FLUORIDE	950.8 Ug	(47%)	MOLYBDENUM	904.3 Ug	(278%)
VITAMIN K	56.80 Ug	(75%)	SELENIUM	0.224 Mg	(179%)
BIOTIN	58.53 Ug	(39%)	CHLORIDE	0.000 Mg	(0%)
CHROMIUM	0.230 Mg	(184%)	SUGAR	9.690 Gm	(-%)
FIBER-DIET	8.085 Gm	(-%)	VIT. E/AT	4.687 Mg	(46%)

PROTEIN: 18% CARBOHYDRATE: 40% FAT: 42% ALCOHOL: 0%

3-6-E-SUN

Item	Food Name	Serving	Portion	Amount
250	GRAPEFRUIT JUICE-CAN-UNSW	6	FL OUNCES	185.3 GMS
1815	U.B. Brown Rice Bkft	1	CUP	228.0 GMS
338	BREAD-PUMPERNICKEL	2	SLICES	64.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
194	PORK-LOIN-LEAN/FAT-ROAST	8	OUNCES	226.8 GMS
847	GRAVY-PORK-MIX-PREP/WATER	3	TABLESPOONS	48.4 GMS
486	RICE-WHITE-PARBOIL-COOKED	1	CUP	175.0 GMS
121	SALAD-THREE BEAN-DEL MONTE	.5	SERVING	14.2 GMS
978	FRUIT COCKTAIL-CAN/JUICE	.5	CUP	124.0 GMS
338	BREAD-PUMPERNICKEL	2	SLICES	64.0 GMS
104	BUTTER-REGULAR-TABLESPOON	3	TEASPOONS	14.0 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
82	ICE MILK-VAN-HARD-4.3% FAT	1	CUP	131.0 GMS
160	SALAD-TUNA	1	CUP	205.0 GMS
338	BREAD-PUMPERNICKEL	4	SLICES	128.0 GMS
104	BUTTER-REGULAR-TABLESPOON	4	TEASPOONS	18.7 GMS
1808	BAKED LENTILS WITH CHEESE	1	SERVING	237.0 GMS
1012	PEARS-CAN/JUICE	.5	CUP	124.0 GMS
1062	SALAD-COLESLAW	.5	CUP	64.0 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
1387	CRACKERS-GRAHAM-SUG/HONEY	4	ITEMS	28.0 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS

NUTRIENT VALUES (%RDA)

KCALORIES	3800 Kc	(135%)	PROTEIN	180.2 Gm	(321%)
CARBOHYDRATE	404.1 Gm	(-%)	FAT	165.0 Gm	(-%)
FIBER-CRUDE	6.138 Gm	(-%)	CHOLESTEROL	525.8 Mg	(-%)
SATURATED FA	72.93 Gm	(-%)	OLEIC FA	55.10 Gm	(-%)
LINOLEIC FA	17.20 Gm	(-%)	SODIUM	4501 Mg	(250%)
POTASSIUM	4892 Mg	(160%)	MAGNESIUM	468.3 Mg	(117%)
IRON	18.70 Mg	(103%)	ZINC	15.75 Mg	(104%)
VITAMIN A	12924 IU	(258%)	VITAMIN D	422.2 IU	(105%)
VIT. E/TOTAL	10.80 Mg	(-%)	VITAMIN C	131.0 Mg	(218%)
THIAMIN	3.869 Mg	(276%)	RIBOFLAVIN	4.589 Mg	(269%)
NIACIN	36.80 Mg	(204%)	VITAMIN B6	2.944 Mg	(147%)
FOLACIN	161.1 Ug	(40%)	VITAMIN B12	6.261 Ug	(208%)
PANTO- ACID	9.404 Mg	(170%)	CALCIUM	2192 Mg	(182%)
PHOSPHORUS	2949 Mg	(245%)	TRYPTOPHAN	1923 Mg	(975%)
THREONINE	6493 Mg	(1234%)	ISOLEUCINE	7805 Mg	(989%)
LEUCINE	12878 Mg	(1224%)	LYSINE	11635 Mg	(1474%)
METHIONINE	3414 Mg	(1037%)	CYSTINE	1443 Mg	(438%)
PHENYL-ANINE	6885 Mg	(1308%)	TYROSINE	5246 Mg	(997%)
VALINE	8976 Mg	(974%)	HISTIDINE	4685 Mg	(-%)
ALCOHOL	0.000 Gm	(-%)	ASH	25.05 Gm	(-%)
COPPER	0.919 Mg	(36%)	MANGANESE	2.251 Mg	(60%)
IODINE	159.3 Ug	(106%)	MONO FAT	45.49 Gm	(-%)
POLY FAT	13.32 Gm	(-%)	CAFFEINE	0.000 Mg	(-%)
FLUORIDE	433.5 Ug	(21%)	MOLYBDENUM	856.3 Ug	(263%)
VITAMIN K	56.80 Ug	(75%)	SELENIUM	0.271 Mg	(217%)
BIOTIN	46.76 Ug	(31%)	CHLORIDE	0.000 Mg	(0%)
CHROMIUM	0.185 Mg	(148%)	SUGAR	3.566 Gm	(-%)
FIBER-DIET	4.065 Gm	(-%)	VIT. E/AT	2.907 Mg	(29%)

PROTEIN: 19% CARBOHYDRATE: 42% FAT: 39% ALCOHOL: 0%

3-6-C-MON

Item	Food Name	Serving	Portion	Amount
278	ORANGE JUICE-FROZ-DILUTED	10	FL OUNCES	311.3 GMS
1206	CEREAL-CHEERIOS	2	CUPS	45.4 GMS
358	BREAD-WHOLE WHEAT-SOFT	2	SLICES	56.0 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
235	BANANAS-RAW-PEELED	1	ITEM	119.0 GMS
524	PEANUT BUTTER-SMOOTH TYPE	2	TABLESPOONS	32.0 GMS
164	HAMB PATTY-BEEF-10% FAT	6	OUNCES	170.1 GMS
22	CHEESE-AMERICAN-PROCESSED	2	OUNCES	56.7 GMS
489	ROLL-HAMBURGER/HOTDOG	2	ITEMS	80.0 GMS
720	SOUP-VEGETABLE BEEF-CAN	6	FL OUNCES	183.8 GMS
432	CRACKERS-SALTINES	8	ITEMS	22.0 GMS
671	TOMATO-RAW-RED-RIPE	.25	ITEM	33.8 GMS
1019	PINEAPPLE-CAN/JUICE	.5	CUP	125.0 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
192	PORK-CHOP-LEAN/FAT-BROILED	2	ITEMS	164.0 GMS
650	POTATO-HASHED BROWN-FROZ	5	OUNCES	141.8 GMS
629	LETTUCE-LOOSELEAF-RAW	1	CUP	55.0 GMS
134	SAL DRESS-FRENCH	2	TABLESPOONS	31.2 GMS
274	ORANGES-RAW-SECTIONS	.5	CUP	90.0 GMS
358	BREAD-WHOLE WHEAT-SOFT	2	SLICES	56.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
415	COOKIE-CHOCOLATE CHIP-MIX	4	ITEMS	42.0 GMS
235	BANANAS-RAW-PEELED	1	ITEM	119.0 GMS

NUTRIENT VALUES (%RDA)

KCALORIES	3748 Kc	(133%)	PROTEIN	175.1 Gm	(312%)
CARBOHYDRATE	382.4 Gm	(-%)	FAT	176.5 Gm	(-%)
FIBER-CRUDE	7.565 Gm	(-%)	CHOLESTEROL	473.0 Mg	(-%)
SATURATED FA	67.72 Gm	(-%)	OLEIC FA	57.56 Gm	(-%)
LINOLEIC FA	29.98 Gm	(-%)	SODIUM	4966 Mg	(275%)
POTASSIUM	5896 Mg	(193%)	MAGNESIUM	610.9 Mg	(152%)
IRON	28.02 Mg	(155%)	ZINC	23.65 Mg	(157%)
VITAMIN A	8072 IU	(161%)	VITAMIN D	311.4 IU	(77%)
VIT. E/TOTAL	31.07 Mg	(-%)	VITAMIN C	260.3 Mg	(433%)
THIAMIN	5.098 Mg	(364%)	RIBOFLAVIN	4.290 Mg	(252%)
NIACIN	47.99 Mg	(266%)	VITAMIN B6	4.013 Mg	(200%)
FOLACIN	520.8 Ug	(130%)	VITAMIN B12	7.307 Ug	(243%)
PANTO- ACID	8.133 Mg	(147%)	CALCIUM	1739 Mg	(144%)
PHOSPHORUS	2920 Mg	(243%)	TRYPTOPHAN	1954 Mg	(991%)
THREONINE	6145 Mg	(1168%)	ISOLEUCINE	7463 Mg	(945%)
LEUCINE	12400 Mg	(1178%)	LYSINE	11361 Mg	(1439%)
METHIONINE	3261 Mg	(991%)	CYSTINE	1566 Mg	(475%)
PHENYL-ANINE	6962 Mg	(1323%)	TYROSINE	5162 Mg	(981%)
VALINE	8405 Mg	(912%)	HISTIDINE	4835 Mg	(-%)
ALCOHOL	0.000 Gm	(-%)	ASH	30.39 Gm	(-%)
COPPER	2.118 Mg	(84%)	MANGANESE	2.785 Mg	(74%)
IODINE	32.40 Ug	(21%)	MONO FAT	69.80 Gm	(-%)
POLY FAT	26.49 Gm	(-%)	CAFFEINE	0.000 Mg	(-%)
FLUORIDE	397.8 Ug	(19%)	MOLYBDENUM	1.000 Ug	(0%)
VITAMIN K	126.7 Ug	(168%)	SELENIUM	0.219 Mg	(175%)
BIOTIN	47.64 Ug	(31%)	CHLORIDE	0.000 Mg	(0%)
CHROMIUM	0.385 Mg	(307%)	SUGAR	58.47 Gm	(-%)
FIBER-DIET	6.582 Gm	(-%)	VIT. E/AT	7.129 Mg	(71%)

PROTEIN: 18% CARBOHYDRATE: 40% FAT: 42% ALCOHOL: 0%

3-6-E-MON

Item	Food Name	Serving	Portion	Amount
278	ORANGE JUICE-FROZ-DILUTED	10	FL OUNCES	311.3 GMS
1197	CEREAL-ALL BRAN	1	CUP	85.2 GMS
338	BREAD-PUMPERNICKEL	2	SLICES	64.0 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
235	BANANAS-RAW-PEELED	1	ITEM	119.0 GMS
524	PEANUT BUTTER-SMOOTH TYPE	2	TABLESPOONS	32.0 GMS
164	HAMB PATTY-BEEF-10% FAT	6	OUNCES	170.1 GMS
22	CHEESE-AMERICAN-PROCESSED	2	OUNCES	56.7 GMS
338	BREAD-PUMPERNICKEL	4	SLICES	128.0 GMS
671	TOMATO-RAW-RED-RIPE	.25	ITEM	33.8 GMS
1019	PINEAPPLE-CAN/JUICE	.5	CUP	125.0 GMS
1809	LENTIL-BARLEY SOUP	1	SERVING	252.0 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
1419	CRACKERS-RY KRISP-NATURAL	8	ITEMS	16.8 GMS
192	PORK-CHOP-LEAN/FAT-BROILED	2	ITEMS	164.0 GMS
486	RICE-WHITE-PARBOIL-COOKED	1	CUP	175.0 GMS
629	LETTUCE-LOOSELEAF-RAW	1	CUP	55.0 GMS
134	SAL DRESS-FRENCH	2	TABLESPOONS	31.2 GMS
1803	BROCCOLI AND CHICK PEAS	1	SERVING	150.0 GMS
274	ORANGES-RAW-SECTIONS	.5	CUP	90.0 GMS
338	BREAD-PUMPERNICKEL	2	SLICES	64.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
415	COOKIE-CHOCOLATE CHIP-MIX	4	ITEMS	42.0 GMS
235	BANANAS-RAW-PEELED	1	ITEM	119.0 GMS

NUTRIENT VALUES (%RDA)

KCALORIES	4125 Kc	(147%)	PROTEIN	199.4 Gm	(356%)
CARBOHYDRATE	506.0 Gm	(-%)	FAT	166.5 Gm	(-%)
FIBER-CRUDE	17.39 Gm	(-%)	CHOLESTEROL	463.2 Mg	(-%)
SATURATED FA	60.38 Gm	(-%)	OLEIC FA	54.15 Gm	(-%)
LINOLEIC FA	23.75 Gm	(-%)	SODIUM	5955 Mg	(330%)
POTASSIUM	8220 Mg	(269%)	MAGNESIUM	966.8 Mg	(241%)
IRON	39.78 Mg	(221%)	ZINC	34.36 Mg	(229%)
VITAMIN A	13964 IU	(279%)	VITAMIN D	338.8 IU	(84%)
VIT. E/TOTAL	46.94 Mg	(-%)	VITAMIN C	393.2 Mg	(655%)
THIAMIN	5.126 Mg	(366%)	RIBOFLAVIN	5.878 Mg	(345%)
NIACIN	57.22 Mg	(317%)	VITAMIN B6	5.833 Mg	(291%)
FOLACIN	786.8 Ug	(196%)	VITAMIN B12	4.683 Ug	(156%)
PANTO- ACID	11.08 Mg	(201%)	CALCIUM	1915 Mg	(159%)
PHOSPHORUS	4040 Mg	(336%)	TRYPTOPHAN	1998 Mg	(1013%)
THREONINE	6593 Mg	(1253%)	ISOLEUCINE	7791 Mg	(987%)
LEUCINE	13022 Mg	(1237%)	LYSINE	11827 Mg	(1499%)
METHIONINE	3433 Mg	(1043%)	CYSTINE	1656 Mg	(503%)
PHENYL-ANINE	7292 Mg	(1386%)	TYROSINE	5536 Mg	(1052%)
VALINE	9129 Mg	(991%)	HISTIDINE	4897 Mg	(-%)
ALCOHOL	0.000 Gm	(-%)	ASH	32.73 Gm	(-%)
COPPER	2.463 Mg	(98%)	MANGANESE	3.190 Mg	(85%)
IODINE	102.4 Ug	(68%)	MONO FAT	63.21 Gm	(-%)
POLY FAT	26.28 Gm	(-%)	CAFFEINE	0.000 Mg	(-%)
FLUORIDE	426.3 Ug	(21%)	MOLYBDENUM	278.4 Ug	(85%)
VITAMIN K	296.7 Ug	(395%)	SELENIUM	0.283 Mg	(226%)
BIOTIN	65.39 Ug	(43%)	CHLORIDE	0.000 Mg	(0%)
CHROMIUM	0.453 Mg	(362%)	SUGAR	67.51 Gm	(-%)
FIBER-DIET	35.03 Gm	(-%)	VIT. E/AT	10.07 Mg	(100%)

PROTEIN: 18% CARBOHYDRATE: 47% FAT: 35% ALCOHOL: 0%

3-6-C-TUE

Item	Food Name	Serving	Portion	Amount
1209	CEREAL-CORN BRAN	2	CUPS	72.0 GMS
1382	MUFFIN-ENGLISH-PLAIN-TOAST	2	ITEMS	106.0 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
1325	POLISH SAUSAGE-PORK	2	ITEMS	454.0 GMS
489	ROLL-HAMBURGER/HOTDOG	2	ITEMS	80.0 GMS
600	CARROT-RAW-WHOLE-SCRAPED	.5	ITEM	36.0 GMS
608	CELERY-PASCAL-RAW-STALK	.5	ITEM	20.0 GMS
432	CRACKERS-SALTINES	8	ITEMS	22.0 GMS
286	PEACHES-CAN/WATER PACK	.5	CUP	122.0 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
639	PEAS-GREEN-CAN-DRAINED	.5	CUP	85.0 GMS
226	APPLESAUCE-CAN-SWEETENED	.5	CUP	127.5 GMS
1062	SALAD-COLESLAW	.5	CUP	64.0 GMS
358	BREAD-WHOLE WHEAT-SOFT	2	SLICES	56.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
92	YOGURT-FRUIT FLAVOR-LOWFAT	5	FL OUNCES	141.9 GMS
1273	CHICKEN-BREAST-ROASTED	1	ITEM	196.0 GMS
104	BUTTER-REGULAR-TABLESPOON	4	TEASPOONS	18.7 GMS
299	PINEAPPLE JUICE-CAN	1	CUP	250.0 GMS
709	SOUP-CREAM/MUSHROOM-MILK	6	FL OUNCES	186.0 GMS

NUTRIENT VALUES (%RDA)

KCALORIES	2804	Kc (100%)	PROTEIN	135.5	Gm (242%)
CARBOHYDRATE	365.3	Gm (-%)	FAT	93.00	Gm (-%)
FIBER-CRUDE	8.797	Gm (-%)	CHOLESTEROL	347.0	Mg (-%)
SATURATED FA	38.94	Gm (-%)	OLEIC FA	19.38	Gm (-%)
LINOLEIC FA	9.080	Gm (-%)	SODIUM	4845	Mg (269%)
POTASSIUM	4236	Mg (138%)	MAGNESIUM	402.0	Mg (100%)
IRON	39.84	Mg (221%)	ZINC	18.88	Mg (125%)
VITAMIN A	14604	IU (292%)	VITAMIN D	315.0	IU (78%)
VIT. E/TOTAL	7.520	Mg (-%)	VITAMIN C	75.72	Mg (126%)
THIAMIN	3.918	Mg (279%)	RIBOFLAVIN	4.510	Mg (265%)
NIACIN	63.18	Mg (351%)	VITAMIN B6	3.968	Mg (198%)
FOLACIN	748.0	Ug (187%)	VITAMIN B12	7.200	Ug (240%)
PANTO- ACID	15.80	Mg (287%)	CALCIUM	1838	Mg (153%)
PHOSPHORUS	2093	Mg (174%)	TRYPTOPHAN	1509	Mg (765%)
THREONINE	5312	Mg (1009%)	ISOLEUCINE	6719	Mg (851%)
LEUCINE	10415	Mg (989%)	LYSINE	9301	Mg (1178%)
METHIONINE	3129	Mg (950%)	CYSTINE	1150	Mg (349%)
PHENYL-ANINE	5713	Mg (1086%)	TYROSINE	3955	Mg (751%)
VALINE	7034	Mg (763%)	HISTIDINE	3008	Mg (-%)
ALCOHOL	0.000	Gm (-%)	ASH	27.23	Gm (-%)
COPPER	1.464	Mg (58%)	MANGANESE	3.280	Mg (87%)
IODINE	65.00	Ug (43%)	MONO FAT	26.53	Gm (-%)
POLY FAT	11.06	Gm (-%)	CAFFEINE	0.000	Mg (-%)
FLUORIDE	287.0	Ug (14%)	MOLYBDENUM	3.440	Ug (1%)
VITAMIN K	263.0	Ug (350%)	SELENIUM	0.280	Mg (224%)
BIOTIN	23.90	Ug (15%)	CHLORIDE	0.000	Mg (0%)
CHROMIUM	0.140	Mg (112%)	SUGAR	2.800	Gm (-%)
FIBER-DIET	20.00	Gm (-%)	VIT. E/AT	2.810	Mg (28%)

PROTEIN: 19% CARBOHYDRATE: 51% FAT: 29% ALCOHOL: 0%

3-6-E-TUE

Item	Food Name	Serving	Portion	Amount
299	PINEAPPLE JUICE-CAN	1	CUP	250.0 GMS
1814	Oat Bran Cereal	3	ITEMS	85.2 GMS
338	BREAD-PUMPERNICKEL	2	SLICES	64.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
1325	POLISH SAUSAGE-PORK	2	ITEMS	454.0 GMS
338	BREAD-PUMPERNICKEL	4	SLICES	128.0 GMS
4	BEAN AND BARLEY SOUP	1	SERVING	112.0 GMS
600	CARROT-RAW-WHOLE-SCRAPED	.5	ITEM	36.0 GMS
608	CELERY-PASCAL-RAW-STALK	.5	ITEM	20.0 GMS
286	PEACHES-CAN/WATER PACK	.5	CUP	122.0 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
1273	CHICKEN-BREAST-ROASTED	1	ITEM	196.0 GMS
1808	BAKED LENTILS WITH CHEESE	1	SERVING	237.0 GMS
1812	KIDNEY BEAN SALAD	1	SERVING	116.0 GMS
226	APPLESAUCE-CAN-SWEETENED	.5	CUP	127.5 GMS
338	BREAD-PUMPERNICKEL	2	SLICES	64.0 GMS
104	BUTTER-REGULAR-TABLESPOON	2	TEASPOONS	9.3 GMS
51	MILK-2% FAT-LOWFAT-FLUID	1	CUP	244.0 GMS
92	YOGURT-FRUIT FLAVOR-LOWFAT	5	FL OUNCES	141.9 GMS
1419	CRACKERS-RY KRISP-NATURAL	8	ITEMS	16.8 GMS

NUTRIENT VALUES (%RDA)

KCALORIES	2971	Kc (106%)	PROTEIN	166.6	Gm (297%)
CARBOHYDRATE	369.7	Gm (-%)	FAT	95.21	Gm (-%)
FIBER-CRUDE	11.62	Gm (-%)	CHOLESTEROL	362.7	Mg (-%)
SATURATED FA	41.25	Gm (-%)	OLEIC FA	16.69	Gm (-%)
LINOLEIC FA	5.022	Gm (-%)	SODIUM	4610	Mg (256%)
POTASSIUM	5359	Mg (175%)	MAGNESIUM	489.8	Mg (122%)
IRON	17.98	Mg (99%)	ZINC	13.99	Mg (93%)
VITAMIN A	24966	IU (499%)	VITAMIN D	311.6	IU (77%)
VIT. E/TOTAL	10.70	Mg (-%)	VITAMIN C	97.37	Mg (162%)
THIAMIN	2.092	Mg (149%)	RIBOFLAVIN	3.639	Mg (214%)
NIACIN	40.57	Mg (225%)	VITAMIN B6	3.125	Mg (156%)
FOLACIN	206.8	Ug (51%)	VITAMIN B12	4.867	Ug (162%)
PANTO- ACID	8.171	Mg (148%)	CALCIUM	1933	Mg (161%)
PHOSPHORUS	2554	Mg (212%)	TRYPTOPHAN	1669	Mg (847%)
THREONINE	5985	Mg (1137%)	ISOLEUCINE	7642	Mg (968%)
LEUCINE	11767	Mg (1118%)	LYSINE	10898	Mg (1381%)
METHIONINE	3446	Mg (1047%)	CYSTINE	1351	Mg (410%)
PHENYL-ANINE	6574	Mg (1249%)	TYROSINE	4765	Mg (905%)
VALINE	8223	Mg (892%)	HISTIDINE	3630	Mg (-%)
ALCOHOL	0.000	Gm (-%)	ASH	24.27	Gm (-%)
COPPER	1.085	Mg (43%)	MANGANESE	3.068	Mg (81%)
IODINE	180.2	Ug (120%)	MONO FAT	26.59	Gm (-%)
POLY FAT	6.878	Gm (-%)	CAFFEINE	0.000	Mg (-%)
FLUORIDE	367.1	Ug (18%)	MOLYBDENUM	34.40	Ug (10%)
VITAMIN K	42.60	Ug (56%)	SELENIUM	0.343	Mg (274%)
BIOTIN	38.69	Ug (25%)	CHLORIDE	0.000	Mg (0%)
CHROMIUM	0.243	Mg (194%)	SUGAR	8.396	Gm (-%)
FIBER-DIET	7.115	Gm (-%)	VIT. E/AT	3.734	Mg (37%)

PROTEIN: 22% CARBOHYDRATE: 49% FAT: 29% ALCOHOL: 0%

Appendix F

Dependent Variable Forms

Unusual Incident Report

Student's Name: _____ Cottage: _____

Date and Time of Incident: _____

Person Reporting: _____

Explanation of Incident:

Actions to be taken:

This form is to be used for all unusual, harmful behavior. If there were a medical injury then a medical report also needs to be completed. This report should be forwarded to administration as soon as possible.

Unusual Incident Report

The Unusual Incident Report (UIR) is routinely completed by staff when any of the following incidents occur:

Hitting a staff	Hitting a student
Threatening a staff	Threatening a student
Threatening self	Stealing from staff
Stealing from student	Damaging property
Running away	Attempting to run away
Temper outburst	Drug usage
Self-abuse	Other acting out

Profile of Mood States[1]

Name _____ Date _____

Sex: Male _____ Female _____

Below is a list of words that describe feelings people have. Please read each one carefully. Then fill in one circle under the answer to the right which best describes how you have been feeling during the past week including today.

The numbers refer to these phrases:

0 = Not at all
1 = A little
2 = Moderately
3 = Quite a bit
4 = Extremely

		Not at all	A little	Moderately	Quite a bit	Extremely
1.	Friendly	0	1	2	3	4
2.	Tense	0	1	2	3	4
3.	Angry	0	1	2	3	4
4.	Worn out	0	1	2	3	4
5.	Unhappy	0	1	2	3	4
6.	Clear-headed	0	1	2	3	4
7.	Lively	0	1	2	3	4
8.	Confused	0	1	2	3	4
9.	Sorry for things done	0	1	2	3	4
10.	Shaky	0	1	2	3	4
11.	Listless	0	1	2	3	4
12.	Peeved	0	1	2	3	4
13.	Considerate	0	1	2	3	4
14.	Sad	0	1	2	3	4
15.	Active	0	1	2	3	4
16.	On edge	0	1	2	3	4
17.	Grouchy	0	1	2	3	4
18.	Blue	0	1	2	3	4
19.	Energetic	0	1	2	3	4
20.	Panicky	0	1	2	3	4
21.	Hopeless	0	1	2	3	4
22.	Relaxed	0	1	2	3	4
23.	Unworthy	0	1	2	3	4
24.	Spiteful	0	1	2	3	4
25.	Sympathetic	0	1	2	3	4
26.	Uneasy	0	1	2	3	4
27.	Restless	0	1	2	3	4
28.	Unable to concentrate	0	1	2	3	4
29.	Fatigued	0	1	2	3	4
30.	Helpful	0	1	2	3	4

		Not at all	A little	Moderately	Quite a bit	Extremely
31.	Annoyed	0	1	2	3	4
32.	Discouraged	0	1	2	3	4
33.	Resentful	0	1	2	3	4
34.	Nervous	0	1	2	3	4
35.	Lonely	0	1	2	3	4
36.	Miserable	0	1	2	3	4
37.	Muddled	0	1	2	3	4
38.	Cheerful	0	1	2	3	4
39.	Bitter	0	1	2	3	4
40.	Exhausted	0	1	2	3	4
41.	Anxious	0	1	2	3	4
42.	Ready to fight	0	1	2	3	4
43.	Good natured	0	1	2	3	4
44.	Gloomy	0	1	2	3	4
45.	Desperate	0	1	2	3	4
46.	Sluggish	0	1	2	3	4
47.	Rebellious	0	1	2	3	4
48.	Helpless	0	1	2	3	4
49.	Weary	0	1	2	3	4
50.	Bewildered	0	1	2	3	4
51.	Alert	0	1	2	3	4
52.	Deceived	0	1	2	3	4
53.	Furious	0	1	2	3	4
54.	Efficient	0	1	2	3	4
55.	Trusting	0	1	2	3	4
56.	Full of pep	0	1	2	3	4
57.	Bad-tempered	0	1	2	3	4
58.	Worthless	0	1	2	3	4
59.	Forgetful	0	1	2	3	4
60.	Carefree	0	1	2	3	4
61.	Terrified	0	1	2	3	4
62.	Guilty	0	1	2	3	4
63.	Vigorous	0	1	2	3	4
64.	Uncertain about things	0	1	2	3	4
65.	Bushed	0	1	2	3	4

Make sure you have answered every item.

---

[1]POMS COPYRIGHT © 1971 EdITS/Educational and Industrial Testing, San Diego, CA 92107.

POMS PROFILE SHEET

MALE (OP)

Name: _____ Date: _____

T Score	FACTOR						T Score
	Ten	Dep	Ang	Vig	Fat	Con	
80+			44-8	31-2			80+
79			43				79
78			42	30			78
77			41	29			77
76			40				76
75		59-0	39	28			75
74		58	38	27	28		74
73		56-7	37			28	73
72		55	36	26	27	27	72
71		53-4	35	25	26		71
70	36	52	34		25	26	70
69	35	50-1	33	24		25	69
68	34	49	32	23	24		68
67	33	47-8	31		23	24	67
66		46	30	22	22	23	66
65	32	44-5	29	21			65
64	31	43	28		21	22	64
63	30	41-2	27	20	20	21	63
62	29	40	26	19	19		62
61	28	38-9	25		18	20	61
60	27	37	24	18		19	60
59	26	35-6	23	17	17		59
58	25	34	22		16	18	58
57		32-3	21	16	15	17	57
56	24	31	20	15			56
55	23	30	19		14	16	55
54	22	28-9	18	14	13	15	54
53	21	27	17	13	12		53
52	20	25-6	16			14	52
51	19	24	15	12	11	13	51
50	18	22-3	14	11	10		50
49		21	12-3		9	12	49
48	17	19-0	11	10		11	48
47	16	18	10	9	8		47
46	15	16-7	9		7	10	46
45	14	15	8	8	6	9	45
44	13	13-4	7	7			44
43	12	12	6		5	8	43
42	11	10-1	5	6	4	7	42
41		9	4	5	3		41
40	10	7-8	3			6	40
39	9	6	2	4	2	5	39
38	8	4-5	1	3	1		38
37	7	3	0		0	4	37
36	6	1-2		2		3	36
35	5	0		1		2	35
34	4						34
33				0		1	33
32	3					0	32
31	2						31
30	0-1						30
T Score							T Score
Raw Score							Raw Score
	Ten	Dep	Ang	Vig	Fat	Con	

Definitions

Tense: strained, nervous tension.

Clear-headed: having a clear, orderly mind.

Listless: lacking energy or enthusiasm, lacking effort.

Peeved: annoyed, vexed.

Panicky: feeling terror, frightened.

Spiteful: filled by maliciousness, hateful.

Sympathetic: mutual understanding of others' feelings.

Restless: incapable of relaxing or resting.

Fatigued: tired out, physical or mental weariness, feel weakened.

Annoyed: bothered, disturbed, irritated.

Resentful: to feel indignation (angry) at somebody--for what you thought they did--whether they did or not.

Muddled: mixed up, confused; to feel mentally confused.

Bitter: a strong resentment.

Exhausted: to feel worn out completely; totally tired.

Desperate: nearly hopeless, feeling despair; feeling like you're in an unbearable situation.

Sluggish: no energy, feeling slow, not vigorous.

Rebellious: feeling unruly; feeling like not doing what you're told.

Weary: tired.

Bewildered: feeling confused.

Deceived: to feel tricked.

Furious: raging, full of anger (extreme anger).

Efficient: acting effectively without unnecessary effort.

Full of pep: full of energy, in high spirits; lively.

Carefree: no worries.

Vigorous: energetic; lively, active.

Bushed: Extremely tired; exhausted.

NAME_____ COTTAGE_____ DATE_____

	frequently	occasionally
ITEM 1 THREATENS OR DOES PHYSICAL VIOLENCE		
Uses threatening gestures	1	2
Causes injury to others indirectly	1	2
Spits on others	1	2
Pushes, scratches, or pinches others	1	2
Kicks, strikes, bites or slaps others	1	2
Uses objects as weapons against others	1	2
☐ Does none of the above	0	
ITEM 2 TEASES OTHERS		
Teases, picks on, or makes fun of others	1	2
☐ Does none of the above	0	
ITEM 3 BOSSES AND MANIPULATES OTHERS		
Tries to tell others what to do	1	2
Demands services from others	1	2
Instigates fights among others	1	2
Manipulates others to get them in trouble	1	2
☐ Does none of the above	0	
ITEM 4 DISRUPTS OTHERS ACTIVITIES		
Upsets others work or interferes with others activities (talking or reading loudly, making noises)	1	2
☐ Does none of the above	0	
ITEM 5 SHOWS DISRESPECT FOR OTHERS' PROPERTY		
Does not return borrowed items	1	2
Uses property w/o permission	1	2
Loses others belongings	1	2
Damages others' property in anyway	1	2
Steals others property	1	2
☐ Does none of the above	0	

	frequently	occasionally
ITEM 6 USES ANGRY LANGUAGE		
Uses hostile language or swears, curses	1	2
Verbally threatens others, suggesting physical violence	1	2
☐ Does none of the above	0	
ITEM 7 RESISTS FOLLOWING RULES INSTRUCTIONS, OR REQUESTS		
Has negative attitude toward rules but usually conforms	1	2
Gets upset if given a direct request or instruction	1	2
Plays deaf and does not follow directions	1	2
Refuses to work on assigned subject	1	2
☐ Does none of the above	0	
ITEM 8 HAS REBELLIOUS ATTITUDE TOWARD AUTHORITY		
Resents people in authority	1	2
Is hostile towards people in authority	1	2
Mocks people in autohrity	1	2
☐ Does none of the above	0	
ITEM 9 MISBEHAVES IN GROUP SETTINGS		
Does not stay in seat during class	1	2
Cheats in tests, assignments	1	2
Lies about self, situations or others	1	2
Twists the truth to own advantage	1	2
☐ Does none of the above	0	

BIBLIOGRAPHY

Adamow, C. L. (1982). The nutrition/behavior link: A review. Learning Disabilities: An Interdisciplinary Journal, 1(7), 79-92.

Adams, W. (1981). Lack of behavioral effects from Feingold Diet violations. Perceptual and Motor Skills, 52(1), 307-313.

American Diabetes Association. (1984). Policy statement: Glycemic effects of carbohydrates. Diabetes Care, 7, 607-608.

American Diabetes Association, Committee on Food and Nutrition. (1985). Principles of nutrition and dietary recommendations for individuals with diabetes mellitus. Journal of the American Dietetic Association, 75, 527-530.

American Dietetic Association. (1985). Position paper Number 84-13. Position paper of the American Dietetic Association on diet and criminal behavior. Journal of the American Dietetic Association, 85(3), 361-362.

Anderson, J. W., & Herman, R. H. (1969). Classification of reactive hypoglycemia. American Journal of Clinical Nutrition, 22, 646-649.

Anderson, J. W., Herman, R. H., & Zakim, D. (1968). Glucose tolerance and insulin response to prolonged high carbohydrate feeding in normal men. American Journal of Clinical Nutrition, 21(5), 529. Abstract.

Anderson, J. W., Midgley, W. R., & Wedman, B. (1979). Fiber and diabetes. Diabetes Care, 2, 369-379.

Anthony, D., Dippe, S., Hofeldt, F. D., Davis, J. W., & Forsham, P. H. (1973). Personality disorder and reactive hypoglycemia. Diabetes, 22, 664-675.

Bachara, G. H., & Lamb, W. R. (1978). Intervention with juvenile delinquents. In L. J. Hippchen (Ed.), Ecologic-biochemical approaches to treatment of delinquents and criminals (pp. 352-370). New York: Van Nostrand Reinhold.

Bantle, J. P., Laine, D. C., Castle, G. W., Thomas, J. W., Hoogwerf, B. J., & Goetz, F. C. (1983). Postprandial glucose and insulin responses to meals containing different carbohydrates in normal and diabetic patients. New England Journal of Medicine, 309(1), 7-12.

Behar, D., Rapoport, J., Adams, A., Berg, C., & Cornblath, M. (1984). Sugar challenge testing with children considered behaviorally "sugar reactive." Journal of Nutrition and Behavior, 1, 277-288.

Bolsen, B. (1982). No agreement on diets for hyperactive kids. Journal of the American Medical Association, 247, 948-956.

Brenner, A. (1977). A study of the efficacy of the Feingold Diet on hyperkinetic children. Clinical Pediatrics, 16, 652-656.

Buckley, R. E. (1969). Hypoglycemic symptoms and the hypoglycemic experience. Psychosomatics, 10(1), 7-13.

Buckley, R. E. (1977). Nutrition, metabolism, brain functions and learning. Academic Therapy, 12, 321-326.

Buckley, R. E. (1978). Hypoglycemic kindling of limbic system disorder. Journal of Orthomolecular Psychiatry, 7(2), 118-121.

Buckley, R. E. (1979). Hypoglycemia, temporal lobe disturbance, and aggressive behavior. Journal of Orthomolecular Psychiatry, 8(3), 188-192.

Buckley, R. E., & Gellhorn, E. (1969). Neurophysiological mechanisms underlying the action of hypo- and hyperglycemia in some clinical conditions. Confin. Neurologicia, 31, 247-257.

Budd, M. (1983). Low blood sugar (hypoglycemia). New York: Sterling.

Burkitt, D. P., & Trowell, H. C. (Eds.). (1975). Refined carbohydrate foods and disease. London: Academic Press.

Butterfield, W. J. H., Sells, R. A., Abrams, M. E., Sterky, G., & Whichelow, M. S. (1966). Insulin sensitivity of the human brain. Lancet, 1, 557-560.

California Council Against Health Fraud, Inc. (1985). Position paper of the American Dietetic Association on diet and criminal behavior. Journal of the American Dietetic Association, 85, 361-362.

Campbell, D. T., & Stanley, J. S. (1966). Experimental and quasi-experimental designs for research. Chicago: Rand McNally.

Carlson, N. R. (1981). Physiology of behavior. Boston: Allyn and Bacon.

Check, W. (1983). Eat, drink, and be merry--or argue about food allergy. Journal of the American Medical Association, 250, 701-711.

Christensen, L. B. (1977). Experimental methodology. Boston: Allyn and Bacon.

Cleave, T. L. (1974). The saccharine disease. New Canaan, CT: Keats.

Cohen, M., Leong, V. W., Salmon, E., Martin, F. I. R. (1980). The role of guar and dietary fibre in the management of diabetes mellitus. Medical Journal of Australia, 1, 59-61.

Conn, J. W. (1947). The diagnosis and management of spontaneous hypoglycemia. Journal of the American Medical Association, 134, 130-137.

Conn, J. W., & Newburgh, L. H. (1936). The glycemic response to isoglycogenic quantities of protein and carbohydrate. Journal of Clinical Investigation, 15, 665-671.

Conn, J. W., & Seltzer, H. S. (1955). Spontaneous hypoglycemia. American Journal of Medicine, 19, 460.

Conners, C. K. (1984, November). Experimental studies of nutrient effects on brain, cognition, and behavior in children. Paper presented at the American Medical Association Conference on Diet and Behavior, Arlington, VA.

Conners, C. K., Goyette, C. H., Southwick, D. A., Lees, J. M., & Andrulonis, P. A. (1976). Food additives and hyperkinesis: A controlled double-blind experiment. Pediatrics, 58(2), 154-166.

Cook, T. D., & Campbell, D. T. (1979). Quasi-experimentation: Design and analysis issues for field settings. Boston: Houghton Mifflin.

Cott, A. (1978). The etiology of learning disabilities, drug abuse, and juvenile delinquency. In L. J. Hippchen (Ed.), Ecologic-biochemical approaches to treatment of delinquents and criminals (pp. 61-74). New York: Van Nostrand Reinhold.

Crapo, P. A., Kolterman, O. G., & Olefsky, J. M. (1980). Effects of oral fructose in normal, diabetic, and impaired glucose tolerance subjects. Diabetes Care, 3, 575-581.

Crapo, P. A., Kolterman, O. G., Waldeck, N., Reaven, G. M., & Olefsky, J. M. (1980). Postprandial hormonal responses to different types of complex carbohydrate in individuals with impaired

glucose tolerance. American Journal of Clinical Nutrition, 33, 1723-1728.

Crapo, P. A., Reaven, G. M., & Olefsky, J. M. (1976). Plasma glucose and insulin responses to orally administered simple and complex carbohydrates. Diabetes, 25, 741-747.

Crapo, P. A., Reaven, G. M., & Olefsky, J. M. (1977). Postprandial plasma-glucose and insulin responses to different complex carbohydrates. Diabetes, 26, 1178-1183.

Dahlqvist, A., & Borgstrom, B. (1961). Digestion and absorption of dissacharides in man. Biochemistry Journal, 81, 411-418.

Ensinck, J. W., & Williams, R. H. (1974). Hypoglycemia. In R. H. Williams (Ed.), Textbook of endocrinology (5th ed., pp. 627-659). Philadelphia: Saunders.

Fabrykant, M. (1955a). The problem of functional hyperinsulinism or functional hypoglycemia attributed to nervous causes. Metabolism, 4, 469-479.

Fabrykant, M. (1955b). The problem of functional hyperinsulinism or functional hypoglycemia attributed to nervous causes. Metabolism, 4, 480-490.

Feingold, B. F. (1975). Why your child is hyperactive. New York: Random House.

Feingold, B. F. (1976). Hyperkinesis and learning disabilities linked to the ingestion of artificial food colors and flavors. Journal of Learning Disabilities, 9, 551-559.

Ferguson, H. B. (1984, November). The effects of sugar and aspartame on children's cognition and behavior: A challenge study. Paper presented at the American Medical Association Conference on Diet and Behavior, Arlington, VA.

Fernstrom, J. D. (1977). Effects of the diet on brain neurotransmitters. Metabolism, 26, 207-223.

Fernstrom, J. D., & Wurtman, R. J. (1971). Brain serotonin content: Increase following ingestion of carbohydrate diet. Science, 174, 1023-1025.

Fishbein, D. (1981). Refined carbohydrate consumption and maladaptive behaviors: An experiment. International Journal for Biosocial Research, 2(1-9), 21-24.

Ford, R. E. (1984, November). Nutrition and behavior: The unique problems of conducting research with incarcerated populations.

Paper presented at the meetings of the American Society of Criminology, Cincinnati, OH.

Grande, F., Anderson, J. T., & Keys, A. (1965). Effect of carbohydrates of leguminous seeds, wheat, and potatoes on serum cholesterol in man. Journal of Nutrition, 86, 313-317.

Gray, G. E., & Gray, L. K. (1983, May-June). Diet and juvenile delinquency. Nutrition Today, pp. 14-21.

Groesbeck, C., D'Asaro, B., & Nigro, C. (1975). Polyamine levels in jail inmates. Journal of Orthomolecular Psychiatry, 4(2), 149-152.

Gross, M. (1984). Effect of sucrose on hyperkinetic children. Pediatrics, 74, 876-878.

Haber, G. B., Heaton, K. W., Murphy, D., & Burroughs, L. F. (1977). Depletion and disruption of dietary fibre: Effects on satiety, plasma-glucose, and insulin. Lancet, 2, 679-682.

Harley, J. P., Ray, R. S., & Tomasi, L. (1983). Hyperkinesis and food additives: Testing the Feingold Hypothesis. Pediatrics, 61, 818-828.

Harris, S. (1924). Hyperinsulinism and dysinsulinism. Journal of the American Medical Association, 83, 729-733.

Harris, S. (1936). The diagnosis and treatment of hyperinsulinism. Annals of Internal Medicine, 10, 514-533.

Hartmann, D. P. (1977). Considerations in the choice of interobserver reliability estimates. Journal of Applied Behavior Analysis, 10, 103-116.

Hawley, C. P., & Buckley, R. E. (1974). Food, dyes, and hyperkinetic children. Academy Therapy, 10(1), 27-32.

Heaton, K. (1975). The effects of carbohydrate refining on food ingestion, digestion and absorption. In D. P. Burkitt & H. C. Trowell (Eds.), Refined carbohydrate foods and disease (pp. 59-67). London: Academic Press.

Himsworth, H. P. (1937). The dietetic factor determining the glucose tolerance and sensitivity to insulin of healthy men. Clinical Science, 2, 67-94.

Hippchen, L. J. (1976). Biomedical approaches to offender rehabilitation. Offender Rehabilitation, 1, 115-123.

Hippchen, L. J. (Ed.). (1978). Ecologic-biochemical approaches to treatment of delinquents and criminals. New York: Van Nostrand Reinhold.

Hippchen, L. J. (1981). Some possible biochemical aspects of criminal behavior. International Journal for Biosocial Research, 2(1-9), 37-42.

Hofeldt, F. D. (1975). Reactive hypoglycemia. Metabolism, 24, 1193-1208.

Hoffer, A. (1979). Crime, punishment, and treatment. Journal of Orthomolecular Psychiatry, 8(3), 193-199.

Hoffer, A., & Osmond, D. (1960). The chemical basis of clinical psychiatry. Springfield, IL: Thomas.

Huitema, B. E. (1980). Analysis of covariance and alternatives. New York: Wiley & Sons.

Jenkins, D. J. A. (1984). Personal communication.

Jenkins, D. J. A. (1985). Personal communication.

Jenkins, D. J. A. (1986). Personal communication.

Jenkins, D. J. A., Ghafari, H., Wolever, T. M. S., Taylor, R. H., Barker, H. M., Fielden, H., Jenkins, A. L., & Bowling, A. C. (1982). Relationship between the rate of digestion of foods and postprandial glycaemia. Diabetologia, 22, 6.

Jenkins, D. J. A., Leeds, A. R., Houston, H., Hinks, L., Albert, K. G. M. M., & Cummings, J. H. (1977). Carbohydrate tolerance in man after six weeks of pectin administration (Abstract). Proceedings of Nutrition Society, 36, 60A.

Jenkins, D. J. A., Leeds, A. R., Slavin, B., Mann, J., & Jepson, E. M. (1979). Dietary fiber and blood lipids: Reduction of serum cholesterol in type II hyperlipidemia by guar gum. American Journal of Clinical Nutrition, 32, 16-18.

Jenkins, D. J. A., Taylor, R. H., & Wolever, T. M. S. (1982). The diabetic diet, dietary carbohydrate, and differences in digestibility. Diabetologia, 23, 477-484.

Jenkins, D. J. A., Wolever, T. M. S., Bacon, S., Nineham, R., Lees, R., Rowden, R., Love, M., & Hockaday, R. D. R. (1980). Diabetic diets: High carbohydrate combined with high fiber. American Journal of Clinical Nutrition, 33, 1729-1733.

Jenkins, D. J. A., Wolever, T. M. S., Jenkins, A., Josse, R. G., & Wong, G. S. (1985). The glycaemic response to carbohydrate foods. Diabetes 1985, 1, 795-803.

Jenkins, D. J. A., Wolever, T. M. S., Leeds, A. R., Gassull, M. A., Dilawari, J. B., Goff, D. V., Metz, G. L., & Alberti, K. G. M. M. (1978). Dietary fibres, fibre analogues and glucose tolerance: Importance of viscosity. British Medical Journal, 1, 1392-1394.

Jenkins, D. J. A., Wolever, T. M. S., Taylor, R. H., Barker, H., & Fielden, H. (1980). Exceptionally low blood glucose response to dried beans: Comparison with other carbohydrate foods. British Medical Journal, 2, 578-580.

Jenkins, D. J. A., Wolever, T. M. S., Taylor, R. H., Barker, H. M., Fielden, H., Baldwin, J. M., Bowling, A. C., Newman, H. C., Jenkins, A. L., & Goff, D. V. (1981). Glycemic index of foods: A physiological basis for carbohydrate exchange. American Journal of Clinical Nutrition, 34, 352-366.

Jenkins, D. J. A., Wolever, T. M. S., Taylor, R. H., Ghafari, H., Jenkins, A. L., Barker, H., & Jenkins, M. J. A. (1980). Rate of digestion of foods and postprandial glycaemia in normal and diabetic patients. British Medical Journal, 2, 14-17.

Jenkins, D. J. A., Wolever, T. M. S., & Wong, G. S. (1984). Glycemic responses to foods: Possible difference between insulin-dependent and non-insulin-dependent diabetics. American Journal of Clinical Nutrition, 40, 978-981.

Johnston, C., & Pelham, W. E. (1986). Teacher ratings predict peer ratings of aggression at 3-year follow-up in boys with attention deficit disorder with hyperactivity. Journal of Consulting and Clinical Psychology, 54, 571-572.

Joint Committee on Standards for Educational Evaluation. (1981). Standards for evaluation of educational programs. New York: McGraw-Hill.

Kauver, A. J., & Goldner, M. G. (1954). Hypoglycemia and the hypoglycemic syndrome. Springfield, IL: Thomas.

Kavale, K. A., & Forness, S. R. (1983). Hyperactivity and diet treatment: A meta analysis of the Feingold Hypothesis. Journal of Learning Disabilities, 16(6), 324-330.

Kepler, E. J., & Moersch, F. P. (1937). Psychiatric manifestations of reactive of hypoglycemia. American Journal of Psychiatry, 94, 89-110.

Knapczyk, D. R. (1979). Diet control in the management of behavior disorders. Behavioral Disorders, 5(1), 2-9.

Levitt, N. S., Vinik, A. I., Sive, A. A., Child, P. T., & Jackson, W. P. V. (1980). The effect of dietary fibre on glucose and hormone responses to a mixed meal in normal subjects and in diabetic subjects with and without antonomic neuropathy. Diabetes Care, 3, 515-519.

Lewis, L. D., Ljunggren, B., Ratcheson, R. A., & Siesjo, B. K. (1974). Journal of Neurochemistry, 23, 673-679.

Lipton, M. A., Nemeroff, C. B., & Mailman, R. B. (1979). Hyperkinesis and food additives. In R. J. Wurtman & J. J. Wurtman (Eds.), Nutrition and the brain (Vol. 4, pp. 1-28). New York: Raven Press.

Mark, V. H., & Ervin, F. H. (1970). Violence and the brain. New York: Harper and Row.

Marks, V., & Rose, F. C. (1965). Hypoglycemia. Oxford, England: Blackwell.

Mattes, J. A. (1983). The Feingold Diet: A current reappraisal. Journal of Learning Disabilities, 16(6), 319-323.

Mattes, J. A., & Gittelman-Klein, R. (1978). A crossover study of artificial food colorings in a hyperkinetic child. American Journal of Psychiatry, 135, 987-988.

McNair, D. M., Lorr, M., Droppleman, L. F. (1971). Profile of mood states [Instrument]. San Diego, CA: Educational and Industrial Testing Services.

McNair, D. M., Lorr, M., Droppleman, L. F. (1981). Profile of mood states [Manual]. San Diego, CA: Educational and Industrial Testing Services.

Milich, R., & Pelham, W. E. (1986). Effects of sugar ingestion on the classroom and playgroup behavior of Attention Deficit Disordered boys. Journal of Consulting and Clinical Psychology, 54(5), 714-718.

Miller, J. J. (1974). Hypoglycemia. Journal of Applied Nutrition, 26, 9-10.

Moses, L. E., & Oakford, R. V. (1963). Tables of random permutations. Stanford, CA: Stanford University Press.

Neideffer, J. (1977). Sweet and sour rats: The effect of insulin dosage on shock-elicited aggression. Bulletin of the Psychonomic Society, 10(4), 311-312.

Nihira, K. A., Foster, R., Shellhaas, M., & Leland, H. (1981). AAMD adaptive behavior scale-school edition. Monterey, CA: McGraw-Hill.

Niklas, L., & Otto, H. (1978). Exchange of carbohydrates according to their effect on blood glucose (Abstract). Diabetes, 26, 415.

O'Banion, D. R., & Greenburg, M. R. (1982). Behavioral effects of food sensitivities. International Journal for Biosocial Research, 3(2), 49-54.

O'Dea, K., & Nestel, P. (1981). Physical factors influencing post-prandial glucose and insulin responses to starch. American Journal of Clinical Nutrition, 33, 760-765.

O'Shea, J., & Porter, S. (1981). Double-blind study of allergens and hyperkinetics. Journal of Learning Disabilities, 14(4), 189-191.

Osmond, D., Hoffer, A., & Kelm, J. (1975). The Hoffer-Osmond diagnostic test. New York: Kreiger.

Page, L., & Friend, B. (1974). Level of use of sugars in the United States. In H. L. Sipple & K. W. McNutt (Eds.), Sugars in nutrition (pp. 93-107). New York: Academic Press.

Pauling, L. (1968). Orthomolecular psychiatry. Science, 160, 265-271.

Pease, S. E., & Love, C. T. (1983, November). The connection between diet and antisocial behavior: A critical review of the literature and a research model for studies in an institutional setting. Paper presented at the American Society of Criminology meetings in Denver.

Perrello, S. J. (1984). An analysis of the empirical studies linking refined carbohydrate consumption and behavior. International Journal for Biosocial Research, 6(2), 154-174.

Philpott, W. H. (1978). Ecological aspects of antisocial behavior. In L. J. Hippchen (Ed.), Ecologic-biochemical approaches to treatment of delinquents and criminals (pp. 116-137). New York: Van Nostrand Reinhold.

Podolsky, E. (1955). The chemical brew of criminal behavior. Journal of Criminal Law, Criminology, and Police Science, 45, 675-678.

Powers, H. (1974). Dietary measures to improve behavior and achievement. Academic Therapy, 9(3), 203-214.

Powers, H. (1978). Food power: Nutrition and your child's behavior. New York: St. Martin's.

Prinz, R. J., Roberts, W. A., & Hantman, E. (1980). Dietary correlates of hyperactive behavior in children. Journal of Consulting and Clinical Psychology, 48, 760-769.

Pyke, D. A. (Ed.). (1962). Disorders of carbohydrate metabolism. Philadelphia: Lippincott.

Rapoport, J. L., Berg, C. J., Ismond, D. R., Zahn, T. P., & Neims, A. (1984). Behavioral effects of caffeine in children. Archives of General Psychiatry, 41, 1073-1079.

Rapp, D. J. (1978). Does diet affect hyperactivity? Journal of Learning Disabilities, 11, 56-62.

Reaven, G. M. (1980). How much carbohydrate? Diabetologia, 19, 409-413.

Reed, B. (1977). U.S. Senate Select Committee on Nutrition and Human Needs, 95th Congress: Diet related to killer diseases: V. Nutrition and mental health. Washington, DC: U.S. Government Printing Office.

Rennie, T. A. C., & Howard, J. E. (1942). Hypoglycemia and tension-depression. Psychosomatic Medicine, 4, 273-282.

Rimland, B. (1981). Innovative approaches to criminality, delinquency, and violence. International Journal for Biosocial Research, 2(1-9), 43-48.

Rimland, B. (1983). The Feingold Diet: An assessment of the reviews by Mattes, by Kavale and Forness and others. Journal of Learning Disabilities, 16, 331-333.

Rimland, B., & Larson, G. E. (1981). Nutritional and ecological approaches to the reduction of criminality, delinquency, and violence. Journal of Applied Nutrition, 33(2), 116.

Rippere, V. (1983). Food additives and hyperactive children: A critique of Conners. British Journal of Child Psychology, 22, 19-32.

Rose, T. L. (1978). The functional relationship between artificial food colors and hyperactivity. Journal of Applied Behavior Analysis, 11, 439-446.

Rynearson, E. H., & Moersch, F. P. (1934). Neurologic manifestations of hyperinsulinism and other hypoglycemic states. Journal of the American Medical Association, 103, 1196-1198.

Salzer, H. M. (1966). Relative hypoglycemia as a cause of neuropsychiatric illness. Journal of the National Medical Association, 58(1), 12-17.

Salzman, L. K. (1976). Allergy testing, psychological assessment, and dietary treatment of the hyperactive child syndrome. Medical Journal of Australia, 2(7), 247-250.

Schauberger, G., Brinck, U. C., Suldner, G., Spaethe, R., Niklas, L., & Otto, H. (1978). Exchange of carbohydrates according to their effect on blood glucose (Abstract). Diabetes, 26, 415.

Schauss, A. G. (1978). Orthomolecular treatment of criminal offenders. Berkeley, CA: Parker House.

Schauss, A. G. (1979). Differential outcomes among probationers comparing orthomolecular approaches to conventional casework/counseling. Journal of Orthomolecular Psychiatry, 8(3), 158-168.

Schauss, A. G. (1980). Diet, crime, and delinquency. Berkley, CA: Parker House.

Schauss, A. G. (1982). Nutrition and violence. In Proceedings of the fifth national conference on child abuse and neglect (pp. 244-250. Washington, DC: DHSS.

Schauss, A. G. (1983a). Nutrition and behavior: Implications for criminology. In J. N. Tucker & A. J. Dargis (Eds.), Proceedings of the 112th Congress of Corrections of the American Correctional Association (pp. 55-64). College Park, MD: American Correctional Association.

Schauss, A. G. (1983b). Nutrition and behavior: Proceedings of the national conference and behavior, University of Texas-Austin. Journal of Applied Nutrition, 35(1), 30-43.

Schauss, A. G. (1984a). Nutrition and antisocial behavior (special article). International Clinical Nutrition Review, 4(4), 172-177.

Schauss, A. G. (1984b). Nutrition and behavior: Complex interdisciplinary research. Nutrition and Health, 3, 9-37.

Schauss, A. G. (1985a). Research links nutrition to behavior disorders. School Safety (Publication of the U.S. Department of Education and the U.S. Department of Justice), 3, 20-28.

Schauss, A. G. (1985b). Selected papers. Tacoma, WA: American Institute for Biosocial Research.

Schauss, A. G., Bland, J., & Simonsen, C. E. (1979). A critical analysis of the diets of chronic juvenile offenders: Part II. Journal of Orthomolecular Psychiatry, 8(4), 222-226.

Schauss, A. G., & Simonsen, C. E. (1979). A critical analysis of the diets of chronic juvenile offenders: Part I. Journal of Orthomolecular Psychiatry, 8(3), 149-157.

Schmidt, K., Brajkovich, W. R., & Asch, M. (1981). Clinical ecology treatment approach for juvenile offenders. International Journal for Biosocial Research, 2(1-9), 15-20.

Schoenthaler, S. J. (1982). The effect of sugar on the treatment and control of antisocial behavior: A double-blind study of an incarcerated juvenile population. International Journal for Biosocial Research, 3(1), 1-9.

Schoenthaler, S. J. (1983a). The Alabama diet-behavior program: An empirical evaluation at the Coosa Valley Regional Detention Center. International Journal for Biosocial Research, 5(2), 79-87.

Schoenthaler, S. J. (1983b). Diet and crime: An empirical examination of the value of nutrition in the control and treatment of incarcerated juvenile offenders. International Journal for Biosocial Research, 4(1), 25-39.

Schoenthaler, S. J. (1983c). Diet and delinquency: A multi-state replication. International Journal for Biosocial Research, 5(2), 70-78.

Schoenthaler, S. J. (1983d). The effects of citrus on the treatment and control of antisocial behavior: A double blind study of an incarcerated juvenile population. International Journal for Biosocial Research, 5(2), 107-117.

Schoenthaler, S. J. (1983e). The Los Angeles probation department diet-behavior program: An empirical analysis of six institutional settings. International Journal for Biosocial Research, 5(2), 88-98.

Schoenthaler, S. J. (1983f). The Northern California diet-behavior program: An empirical examination of 3,000 incarcerated juveniles in Stanislaus County Juvenile Hall. International Journal for Biosocial Research, 5(2), 99-106.

Schoenthaler, S. J. (1984). Diet, crime, and delinquency: A review of the 1983 and 1984 studies. International Journal for Biosocial Research, 6(2), 141-153.

Schoenthaler, S. J. (1985a, May-June). Institutional nutritional policies and criminal behavior. Nutrition Today, pp. 16-24.

Schoenthaler, S. J. (1985b). Personal communication.

Schoenthaler, S. J. (1987). Personal communication.

Schoenthaler, S. J., & Doraz, W. E. (1983). Types of offenses which can be reduced in an institutional setting using nutritional intervention: A preliminary empirical evaluation. International Journal for Biosocial Research, 4(2), 74-84.

Schoenthaler, S. J., Doraz, W. E., & Wakefield, J. A., Jr. (1986). The testing of various hypotheses as explanations for the gains in national standardized academic test scores in the 1978-1983 New York City Nutrition Policy Modification Project. International Journal of Biosocial Research, 8, 196-203.

Simpson, R. W., Mann, J. I., Eaton, J., Moore, R. A., Carter, R., & Hockaday, T. D. R. (1979). Improved glucose control in maturity-onset diabetes treated with high-carbohydrate-modified fat diet. British Medical Journal, 1, 1753-1756.

Sokolof, L., Fitzgerald, G., & Kaufman, E. (1977). Cerebral nutrition and energy metabolism. In R. J. Wurtman & J. J. Wurtman (Eds.), Nutrition and the brain (Vol. 6, pp. 103-139). New York: Raven Press.

Stine, J. J. (1976). Symptom alleviation in the hyperactive child by dietary modification: A report of two cases. American Journal of Orthopsychiatry, 46, 637-645.

Swan, D. C., Davidson, P., & Albrink, M. J. (1966). Effect of simple and complex carbohydrates on plasma nonesterified fatty acids, plasma-sugar, and plasma-insulin during oral carbohydrate tolerance test. Lancet, 1, 60-63.

Swanson, J. M., & Kinsbourne, M. (1980). Food dyes impair performance of hyperactive children on a laboratory learning test. Science, 207, 1485-1487.

Taylor, R. H. (1979). Gastric emptying, fibre, and absorption (Letter). Lancet, 1, 872.

Thomas, J. E. (1967). Mechanics and regulation of gastric emptying. Physiological Review, 37, 453-474.

Trowell, H. (1975a). Dietary change in modern times. In D. P. Burkitt & H. C. Trowell (Eds.), Refined carbohydrate foods and disease (pp. 47-56). London: Academic Press.

Trowell, H. (1975b). Refined carbohydrate foods and fibre. In D. P. Burkitt & H. C. Trowell (Eds.), Refined carbohydrate foods and disease (pp. 23-41). London: Academic Press.

Trowell, H. (1975c). Some historical aspects of milling cereals and refining sugar. In D. P. Burkitt & H. C. Trowell (Eds.), Refined carbohydrate foods and disease (pp. 43-46). London: Academic Press.

Trowell, H., & Burkitt, D. (1975). Concluding considerations. In D. P. Burkitt & H. C. Trowell (Eds.), Refined carbohydrate foods and disease (pp. 333-345). London: Academic Press.

Trowell, H. (1978). Diabetes mellitus and dietary fiber of starchy foods. American Journal of Clinical Nutrition, 31, 53-57.

Tver, D. F., & Russell, P. (1981). The nutrition and health encyclopedia. New York: Van Nostrand Reinhold.

Varley, C. K. (1984). Diet and the behavior of children with attention deficit disorder. Journal of the American Academy of Child Psychiatry, 23, 182-185.

Vass, M. (1983). Nutrition, environment and behavior: The missing link in counseling approaches. International Journal for Biosocial Research, 5(1), 18-24.

Virkkunen, M. (1982a). Evidence for abnormal glucose tolerance test among violent offenders. Neuropsychobiology, 8, 30-34.

Virkkunen, M. (1982b). Reactive hypoglycemia tendency among habitually violent offenders. Neuropsychobiology, 8, 34-40.

Virkkunen, M. (1983). Insulin secretion during the glucose tolerance test in antisocial personality. British Journal of Psychiatry, 142, 598-604.

Vonderhae, A. R. (1936). Personality change in hypoglycemia. Cincinnati Journal of Medicine, 17, 189-190.

Warden, N., Duncan, M., & Summars, E. (1982). Nutritional studies heighten children's achievement. International Journal for Biosocial Research, 3, 72-74.

Weckowitz, T. E. (1978). Profile of mood states. In O. K. Buros (Ed.), Eighth mental measurements yearbook (pp. 1018-1019). Highland Park, NJ: Gryphon.

Weiss, B. (1982). Food additives and environmental chemicals as sources of childhood behavior disorders. Journal of the American Academy of Child Psychiatry, 21(2), 144-152.

Weiss, B., Williams, J. H., Margen, S., Abrams, B., Caan, B., Citron, L. J., Cox, C., McKibben, J., Ogar, D., & Schultz, S. (1980). Behavioral responses to artificial food colors. Science, 207, 1487-1489.

Wilder, J. (1940). Problems of criminal psychology related to hypoglycemia states. Journal of Criminal Psychiatry, 1, 219-233.

Wilder, J. (1943). Psychological problems in hypoglycemia. American Journal of Digestive Diseases, 10(11), 428-435.

Wolever, T. M. S., & Jenkins, D. J. A. (1986). The use of the glycemic index in predicting the blood glucose response to mixed meals. American Journal of Clinical Nutrition, 43, 167-172.

Wolever, T. M. S., Nuttall, F. Q., Lee, R., Wong, G. S., Josse, R. G., Czima, A., & Jenkins, D. J. A. (1985). Prediction of the relative blood glucose response of mixed meals using the white bread glycemic index. Diabetes Care, 8(5), 418-428.

Wolraich, M. L., Milich, R., Stumbo, P., & Schultz. F. (1985). Effects of sucrose ingestion on the behavior of hyperactive boys. Journal of Pediatrics, 106, 675-681.

Wolraich, M. L., Stumbo, P., Milich, R., Chenard, C., & Schultz, F. (1986). Dietary characteristics of hyperactive and control boys and their behavioral correlates. Journal of the American Dietetic Association, 86, 500-504.

Wurtman, R. J. (1983). Behavioral effects of nutrients. Lancet, 1, 1145-1147.

Wurtman, R. J., & Fernstrom, J. D. (1974). Effects of the diet on brain neurotransmitters. Nutrition Reviews, 32(7), 193-200.

Yaryura-Tobias, J. A. (1978). Biological research on violent behavior. In L. J. Hippchen (Ed.), Ecologic-biochemical approaches to treatment of delinquents and criminals (pp. 138-152): New York: Van Nostrand Reinhold.

Yaryura-Tobias, J. A., & Neziroglu, F. A. (1975). Violent behavior, brain dysrhythmia, and glucose dysfunction: A new syndrome. Journal of Orthomolecular Psychiatry, 4(3), 182-188.

Yaryura-Tobias, J. A., & Neziroglu, F. A. (1978). Compulsion, aggression, and self-mutilation: A hypothalamic disorder? Journal of Orthomolecular Psychiatry, 7(2), 14-17.