DETERMINANTS OF FOOD CHOICE AND OTHER
BEHAVIOURS OF PARTICIPANTS IN A HEART HEALTH PROGRAM

by

Ann Gacheri Kiunga

A thesis
submitted to the Faculty of Graduate Studies,
University of Manitoba in partial fulfilment
of the requirements for the degree of

Master of Science
in
Foods and Nutrition

Winnipeg, Manitoba

(c) Ann Gacheri Kiunga, 1996

Canada

NUTRITION

SUBJECT TERM

| 0 | 5 | 7 | 0 | **UMI**

SUBJECT CODE

Subject Categories

THE HUMANITIES AND SOCIAL SCIENCES

COMMUNICATIONS AND THE ARTS
Architecture 0729
Art History 0377
Cinema 0900
Dance 0378
Fine Arts 0357
Information Science 0723
Journalism 0391
Library Science 0399
Mass Communications 0708
Music 0413
Speech Communication 0459
Theater 0465

EDUCATION
General 0515
Administration 0514
Adult and Continuing 0516
Agricultural 0517
Art 0273
Bilingual and Multicultural 0282
Business 0688
Community College 0275
Curriculum and Instruction 0727
Early Childhood 0518
Elementary 0524
Finance 0277
Guidance and Counseling 0519
Health 0680
Higher 0745
History of 0520
Home Economics 0278
Industrial 0521
Language and Literature 0279
Mathematics 0280
Music 0522
Philosophy of 0998
Physical 0523

Psychology 0525
Reading 0535
Religious 0527
Sciences 0714
Secondary 0533
Social Sciences 0534
Sociology of 0340
Special 0529
Teacher Training 0530
Technology 0710
Tests and Measurements 0288
Vocational 0747

LANGUAGE, LITERATURE AND LINGUISTICS
Language
  General 0679
  Ancient 0289
  Linguistics 0290
  Modern 0291
Literature
  General 0401
  Classical 0294
  Comparative 0295
  Medieval 0297
  Modern 0298
  African 0316
  American 0591
  Asian 0305
  Canadian (English) 0352
  Canadian (French) 0355
  English 0593
  Germanic 0311
  Latin American 0312
  Middle Eastern 0315
  Romance 0313
  Slavic and East European 0314

PHILOSOPHY, RELIGION AND THEOLOGY
Philosophy 0422
Religion
  General 0318
  Biblical Studies 0321
  Clergy 0319
  History of 0320
  Philosophy of 0322
Theology 0469

SOCIAL SCIENCES
American Studies 0323
Anthropology
  Archaeology 0324
  Cultural 0326
  Physical 0327
Business Administration
  General 0310
  Accounting 0272
  Banking 0770
  Management 0454
  Marketing 0338
Canadian Studies 0385
Economics
  General 0501
  Agricultural 0503
  Commerce-Business 0505
  Finance 0508
  History 0509
  Labor 0510
  Theory 0511
Folklore 0358
Geography 0366
Gerontology 0351
History
  General 0578

Ancient 0579
Medieval 0581
Modern 0582
Black 0328
African 0331
Asia, Australia and Oceania 0332
Canadian 0334
European 0335
Latin American 0336
Middle Eastern 0333
United States 0337
History of Science 0585
Law 0398
Political Science
  General 0615
  International Law and
    Relations 0616
  Public Administration 0617
Recreation 0814
Social Work 0452
Sociology
  General 0626
  Criminology and Penology ... 0627
  Demography 0938
  Ethnic and Racial Studies 0631
  Individual and Family
    Studies 0628
  Industrial and Labor
    Relations 0629
  Public and Social Welfare 0630
  Social Structure and
    Development 0700
  Theory and Methods 0344
Transportation 0709
Urban and Regional Planning 0999
Women's Studies 0453

THE SCIENCES AND ENGINEERING

BIOLOGICAL SCIENCES
Agriculture
  General 0473
  Agronomy 0285
  Animal Culture and
    Nutrition 0475
  Animal Pathology 0476
  Food Science and
    Technology 0359
  Forestry and Wildlife 0478
  Plant Culture 0479
  Plant Pathology 0480
  Plant Physiology 0817
  Range Management 0777
  Wood Technology 0746
Biology
  General 0306
  Anatomy 0287
  Biostatistics 0308
  Botany 0309
  Cell 0379
  Ecology 0329
  Entomology 0353
  Genetics 0369
  Limnology 0793
  Microbiology 0410
  Molecular 0307
  Neuroscience 0317
  Oceanography 0416
  Physiology 0433
  Radiation 0821
  Veterinary Science 0778
  Zoology 0472
Biophysics
  General 0786
  Medical 0760

EARTH SCIENCES
Biogeochemistry 0425
Geochemistry 0996

Geodesy 0370
Geology 0372
Geophysics 0373
Hydrology 0388
Mineralogy 0411
Paleobotany 0345
Paleoecology 0426
Paleontology 0418
Paleozoology 0985
Palynology 0427
Physical Geography 0368
Physical Oceanography 0415

HEALTH AND ENVIRONMENTAL SCIENCES
Environmental Sciences 0768
Health Sciences
  General 0566
  Audiology 0300
  Chemotherapy 0992
  Dentistry 0567
  Education 0350
  Hospital Management 0769
  Human Development 0758
  Immunology 0982
  Medicine and Surgery 0564
  Mental Health 0347
  Nursing 0569
  Nutrition 0570
  Obstetrics and Gynecology ... 0380
  Occupational Health and
    Therapy 0354
  Ophthalmology 0381
  Pathology 0571
  Pharmacology 0419
  Pharmacy 0572
  Physical Therapy 0382
  Public Health 0573
  Radiology 0574
  Recreation 0575

Speech Pathology 0460
Toxicology 0383
Home Economics 0386

PHYSICAL SCIENCES

Pure Sciences
Chemistry
  General 0485
  Agricultural 0749
  Analytical 0486
  Biochemistry 0487
  Inorganic 0488
  Nuclear 0738
  Organic 0490
  Pharmaceutical 0491
  Physical 0494
  Polymer 0495
  Radiation 0754
Mathematics 0405
Physics
  General 0605
  Acoustics 0986
  Astronomy and
    Astrophysics 0606
  Atmospheric Science 0608
  Atomic 0748
  Electronics and Electricity 0607
  Elementary Particles and
    High Energy 0798
  Fluid and Plasma 0759
  Molecular 0609
  Nuclear 0610
  Optics 0752
  Radiation 0756
  Solid State 0611
Statistics 0463

Applied Sciences
Applied Mechanics 0346
Computer Science 0984

Engineering
  General 0537
  Aerospace 0538
  Agricultural 0539
  Automotive 0540
  Biomedical 0541
  Chemical 0542
  Civil 0543
  Electronics and Electrical 0544
  Heat and Thermodynamics ... 0348
  Hydraulic 0545
  Industrial 0546
  Marine 0547
  Materials Science 0794
  Mechanical 0548
  Metallurgy 0743
  Mining 0551
  Nuclear 0552
  Packaging 0549
  Petroleum 0765
  Sanitary and Municipal 0554
  System Science 0790
Geotechnology 0428
Operations Research 0796
Plastics Technology 0795
Textile Technology 0994

PSYCHOLOGY
General 0621
Behavioral 0384
Clinical 0622
Developmental 0620
Experimental 0623
Industrial 0624
Personality 0625
Physiological 0989
Psychobiology 0349
Psychometrics 0632
Social 0451

THE UNIVERSITY OF MANITOBA

FACUTY OF GRADUATE STUDIES

COPYRIGHT PERMISSION

DETERMINANTS OF FOOD CHOICE AND OTHER BEHAVIOURS

OF PARTICIPANTS IN A HEART HEALTH PROGRAM

BY

ANN GACHERI KIUNGA

A Thesis/Practicum submitted to the Faculty of Graduate Studies of the University of Manitoba in partial
fulfillment of the requirements for the degree of

MASTER OF SCIENCE

Ann Gacheri Kiunga © 1996

ABSTRACT

Predicting effectiveness of interventions aimed at behaviour change appears difficult. Experience with programs aimed at lowering the risk of cardiovascular disease shows that the impact of education on attitudes and food choice is rarely as extensive as anticipated in intervention objectives. This lack of understanding may be related to the methodology used to describe individual situations, attitudes and behavioral contexts, or to the process used to analyze and interpret the descriptions.

Descriptions of food choice decisions, from any one individual will show a unique pattern of determinants, where the pattern itself provides information relevant for interpretation. The problem is to formulate changes in existing interview and analysis techniques that allow more accurate description of these unique patterns as part of the reasons for compliance with guidelines on food choice. This research was conducted with thirty adult men and women in Portage La Prairie, where the Manitoba Heart Health Project (MHHP) is active. A food frequency questionnaire was used to assess general food consumption patterns of those actively involved and those not involved in heart health intervention activities.

To provide accurate descriptions of dietary habits, food choices and general health practices, two interview techniques were used: an in-depth interview and a new method, the Food

choice Map (FCM). The FCM combined content analysis, projective analysis and propositional text analysis to capture and ascribe meaning to such detailed data. The analysis process assigned numerical values to behavioral concepts in defining and describing decision making groups. The two methods differed in terms of process and function with the FCM recording more detailed descriptions of food related behaviours. Interpretations identified attitudes and key concepts in social, economic, and service access contexts, that explain compliance or non-compliance with recommended dietary guidelines for heart health.

There was no significant difference in the fat consumption of participants and non participants of the MHHP activities (p > 0.05). Adults who exhibit a high level of heart health concern use different concepts in food behaviour decisions. People seem to be confident about their heart health knowledge and seek heart health information from within and outside the family and perceive strong control of food choices. Those with weak heart health concerns do not perceive they have direct control in choosing, preparing and changing foods. Their perception of concepts such as family, society, social norms plus other environmental pressures have a greater impact on their food behaviour decisions.

There was no significant difference between those who were actively involved in project activities and those who were not in their levels of heart health concern (p > 0.05).

The findings show that the process of decision making for food behaviour depends on the contexts for the type of behaviour, such as eating meals, preparing food or changing food choices.

ACKNOWLEDGEMENTS

iv

This work is dedicated to my parents, Peter and Salome Kiunga who have always believed in me and encouraged me to do my best. To my brothers and sisters, I am forever grateful for all the letters and words that kept me going, having hope that all would end well. I praise the Lord, who has blessed me more abundantly than I could ever imagine, and I thank him for all those who contributed to the completion of this work.

Kiri Kiende, Jose, Kanaa, Thambi, Muriithi, Nkirote na Kinya; wahenga walinena: Penye mavimbi ndipo penye mlango, tena subira huvuta kheri. Asanteni kwa vile mlinitendea mema nikiwa ng'ambo.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

1.0   **INTRODUCTION**

1.1 Problem addressed

Since diets influence physiological and biochemical outcomes such as chronic illnesses, many programs and projects on diet modification have been proposed by nutritionists and health care providers. These interventions aim to facilitate dietary change. It would seem that most recommendations for behaviour change have not been fully adopted by individuals at risk, or maintained over the long term.

Research findings have described the reasons for success and failure of interventions aimed at behaviour change. Determinants of intervention effectiveness have been identified in a number of areas such as learning styles, cultural environment, social and economic barriers to action. However predicting the effectiveness appears difficult. Experience with programs aimed at lowering the risk of cardiovascular disease shows that the impact of education on attitudes and food choice is rarely as extensive as anticipated in intervention objectives.

This lack of understanding may be related to the methodology used to describe individual situations, attitudes and behavioral contexts, or it may be related to the process used to analyze and interpret these descriptions.

Recording complex patterns of behaviour, attitudes, beliefs and contexts requires lengthy interviews. Alternative methods requiring shorter times, capable of consistent

interpretation for different cultural groups would assist data collection.

Current treatment of data using linear models, such as regression models, ignore the way food choice decisions are influenced by the unique combination of circumstances that characterises the situation of each individual. Descriptions from any one individual will show a unique pattern of determinants, where the pattern itself provides information relevant for interpretation. The problem then is to formulate changes in existing interview and analysis techniques that allow more accurate description of the reasons for compliance with guidelines on food choice.

1.2 **Objectives**

This research describes perceptions of recommendations and advice communicated by staff associated with the Manitoba Heart Health Project to people living in the Central Region. It focuses on methods used to describe people's reactions to the content and communication channels used in promoting heart health to the community.

Specifically, the research describes:

- ◆ Messages and communication channels used in project activities that reach a group of active and a group of less active participants.

- ◆ Two interview techniques, one new and one traditional, to provide accurate descriptions of dietary habits, food

2

choices and general health practices.

♦ Interpretations of the descriptions and identifies attitudes and barriers in social, economic, and service access contexts, that explain compliance or non-compliance with recommended food choices.

♦ Interpretations from the traditional interview technique and compares them with those from the new technique.

♦ A comparison of behavioral choices made by the group of respondents actively involved in the project and those less actively involved.

1.3 Outcome

The work describes the extent to which individuals change or restrict their food and nutrient intake when considering diet and heart health issues.

It demonstrates the relative efficiencies of two interview techniques in describing food choices, the reasons for those choices and the associated implications for nutrition health intervention designs. Results are expected to be useful for implementing nutrition education programmes aimed at promoting heart health.

CHAPTER II

2.0   **REVIEW OF LITERATURE**

2.1   <u>**Determinants of Food Choice.**</u>

Although a great deal is known about what people eat and the demographic and lifestyle linked with food selection, systematic studies have not been carried out to investigate why people choose certain foods over others (Rappoport et al., 1992). Food intake in itself is a behaviour which can also be viewed as an outcome of underlying behaviours. Axelson and Brinberg (1993) proposed that if people increase their nutrition knowledge they may modify their beliefs and attitudes causing desirable changes in their food related behaviour. Therefore it is necessary to know what determines the eating patterns (behaviour), knowledge (how they think) and their attitudes (how they feel).

The study of nutrition is a bio-cultural issue because consequences of food intake are biological, but the very nature of food intake, what people eat, how, when, where and how much is largely influenced by social, economic, political and cultural processes (Sanjur, 1982). The fact that food is acquired, prepared and eaten within certain contexts like beliefs, opinions, interpretations, points of view or other hidden meanings, implies the importance of traditional beliefs and practices in food selection (Hertzler, 1976).

Murcot (1992), indicated that the cooked dinner in Britain is not just a matter of unthinking habit, but it is viewed as a proper meal traditionally. This suggests that the way people think about food is deeply entrenched in their normative beliefs shaped by the community they belong to.

Food defines relationships, reaffirms positions, roles and enforces common bonds of mutual dependence. Examples of imagery classification of foods within cultures, are super cultural foods seen as prestigious foods, body image foods, reward foods and magic foods said to cure all ills (Hertzler et al., 1982).

Food is seen as life giving and has often been linked with mystical powers, in oral narratives it has been displayed as playing divine and demonic roles (Hochbaum, 1981; Parraga, 1990). Indeed such beliefs and superstitions hold today, evident in the vast consumption of vitamins, supplements and other extracts in western societies. Food still affects many aspects of individual experience, beliefs and behaviour at the present time.

In considering whether this complex system of food behaviour and beliefs can be influenced, the descriptions of current determinants needs to be reviewed. Culture shapes our food likes and dislikes and certain foods are eaten during different stages of life in certain cultures. For instance pregnant women in Asia believe in balancing "hot" and "cold"

foods, whereas in China and Africa mothers believe that eating some foods would harm their baby suggesting that culture and physiological status determine food choices (Hochbaum, 1981; Corionos-Vargas et al., 1992).

An argument that has been proposed is that food habits are dynamic and can be modified (Sanjur, 1982). If we believe that culture imparts food habits and therefore learning, it follows that food habits can be 'unlearned' pointing to the possibility of modifying dietary patterns. Indeed changes reported in the American diet of minorities in the last 50 years is indicative of this.

The choice of food is a complex issue especially when preference has to be made for traditional foods in the light of accepting new foods, causing a competitive and dynamic pattern (Aebi, 1982). Social factors and income may influence food selection. People spend time earning money to purchase food, prepare and eat meals (Rozin, 1990). Food purchasing, preparation and consumption are influenced more by psychosocial, cultural and situational factors than by physiological factors (Hochbaum, 1981).

Studies have demonstrated that food pleasure is important as a food choice determinant (Westenhoefer and Pudel, 1993). When people were asked why they ate certain foods, Rappoport et al., (1993) reported that people think of foods in holistic, complete meals and not separate items. They gave

6

reasons for eating these foods as pleasure, tasting good; health, a food being good for them and convenience, inexpensive and easy to get. The study of determinants of food behaviour is apparently very complex. The descriptions of determinants are therefore also complex.

In order to simplify the process of identifying behaviourial determinants, fundamental characteristics of determinants have been described. For example, a long accepted precept that income is a major determinant of diet quality.

This precept is used in comparisons of the average income per capita within a country with a measure of diet quality. Based on Engel's law, the correlation between income and diet quality rests on the assumptions that an increase in average income of a country will increase income for the poor which in turn causes the poor to increase the amount of money spent on food, enlarging their food choices (Hoorweg and Niemeyer, 1980; Sanjur, 1982). The physical availability of foods and the association of certain foods with a socio-economic status gives a food prestige, making the cheaper readily available foods have a lowered status and preference too (Rappoport et al., 1992; Westenhoefer and Pudel, 1993).

Though economic situations determine food behaviour in a number of ways, other factors are also important, even if they do not support economically rational decisions. For example, Krondl and Lau, (1982) suggested that cognitive learning from

the media, books, magazines, and bulletins affects the selection of foods. The social determinants of price, prestige and convenience were considered less important in the decision making process of food choice compared to the determinants of health, nutrition and the taste and flavour.

There is renewed interest in the whole area of food choices as evidenced by the First International Multidisciplinary Conference on Food choice held in Brussels, Belgium in July 1992, which showed multidisciplinary emphasis. Sparks (1993) identified certain aspects of current research in food choice, namely cultural, sociological, sensory, health and age. Sparks (1993) noted that the integration of qualitative and quantitative methods are not confined to any one discipline and the area has great potential for cross disciplinary integrated research and therefore can be applied to dietary assessment research. Understanding the decisions made for one type of food behaviour, such as food intake may lead to understanding decision making for other food related behaviours and wider behaviourial determinants.

2.2   Heart Health Intervention Programs.

Attempts at changing food behaviour have been an integral part of programs that promoted common health values for communities. Intervention studies aimed at cardiovascular disease began in the 1960s focusing on identifying and

8

treating individuals at high risk at the community level (Winkleby, 1994). In the U.S.A., intervention trials were begun in the 70's and 80's: The Three Community Study in California; The Stanford Five - City project; The Minnesota Heart Health Project and the Pawtucket Heart Health Program (Contento and Balch, 1995).

In Canada, a number of provincial surveys provided data for the implementation of Heart Health projects. The Manitoba Heart Health Project was initiated within the central region of Manitoba, after pilot projects in other regions.

A prospective study conducted by Winkleby et al. (1994), in the Stanford - Five city project examined predictors of behaviour change with the purpose of providing intervention planners with information about subgroups that are the most likely or unlikely to make positive changes for heart health in response to intervention programs. It was noted that 42% had a low rate of change indicating a need for understanding the barriers to change experienced by such groups.

Contento and Balch (1995) reported that the Pawtucket Heart Health Project whose key goal was long term behavioral changes in the community had small statistically non significant changes in total blood cholesterol and blood pressure. The project showed a 12% decline in risks for cardiovascular diseases compared to the control community which had a 4% increase in risks for heart disease.

In the North Karelia project conducted in Finland, community cooperation was high and there was significant reduction in serum cholesterol levels over a ten year period.

The Stanford five city project reported increase in nutrition knowledge for all cities and dietary fat and cholesterol declined significantly. However, there was no difference between the treatment group and the control group.

In the Minnesota Heart Health Program, a ten year research demonstration project, overall results indicated that the effects of the program were modest and within chance levels. Results on dietary intakes were not reported.

The South Carolina Heart Health project had 112 ongoing nutritional services and activities. Results from a telephone survey indicated statistically significant reductions in self reported use of animal fats and an increased awareness of nutrition information. These improvements were reported for both black (26%) and white (16%) respondents.

Contento and Balch (1995) concluded from a review of these interventions that most had modest improvements in diet related risks compared to baseline when using serum cholesterol levels as the measure.

The relative success of the North Karelia and South Carolina projects was attributed to the intervention being news to the communities at that time. More successful results were found in smaller, homogenous communities which allowed

10

greater interpersonal communication.

The Manitoba Heart Health Project attempts to create similar and larger changes in Manitoba. The initial justification for the MHHP came from a survey of risk factors in the province. Sevenhuysen et al. (1993), described the prevalence of dietary risk factors in Manitoba from a province wide nutrition survey. Respondents completed a food frequency questionnaire and results showed that Manitobans eat more than the recommended 30% of energy from fat (Health and Welfare Canada, 1990). It was recommended that interventions for heart health are necessary and should be encouraged given the prevailing dietary trends.

Following recommendations from the survey, the Manitoba Heart Health Project was initiated (Gelsky et al., 1991). The primary goals and strategies of the project located in Portage La Prairie, were to encourage and enable healthy lifestyle choices focusing on the community by empowering the community through different outreach strategies to regain and maintain optimal heart health. The increased levels of community participation are expected to enhance changes in health and nutrition behaviours.

The areas emphasised by the project are nutrition, smoking cessation, fitness and promotion of a heart healthy lifestyle. The areas covered all relate to reducing and controlling risk for cardiovascular disease. To achieve their

objective, the project utilizes a diverse array of strategies including educating the community through mall displays and heart health fairs, skill development by conducting heart smart cooking classes, shopping tours and smoking cessation classes.

In addition, the Project offers environmental support through restaurant programs and lobby groups. Using social marketing to reinforce heart healthy lifestyles, the project offers awards and incentives to volunteers and participants using T-shirts, mugs and writing materials with unique logo design.

Community strategies to influence dietary practices for improved heart health should promote sustained lifestyle change associated with reduced risk for cardiovascular disease. However, the effects of these strategies, or the abilities to predict the effects are not well understood. It may be that the lack of understanding is due in part to the choice of methodologies available to the researchers. Weaknesses inherent in both quantitative and qualitative methods may hamper the ability to achieve new insights.

2.3   Current Methodology in Dietary Assessment

2.31   Quantitative methods.

Methods that include tools and measures that produce numerical and quantifiable data are labelled quantitative methods. They are deemed to yield objective results. They are universally accepted methods because results are based on the assumption that, the meaning of the numerical data is the same to all observers (Achterberg, 1988).

To record usual dietary patterns over a long period of time and quantify nutrient intakes, none of the standardized diet assessment instruments provide ideal data. Multiple day diet records are lengthy, expensive and difficult to administer in research settings.

Food frequency questionnaires have high response rates and low respondent burden, but their accuracy is lower than other dietary assessment methods. The 24-hour recall requires professionally trained interviewers, rigorous standardization and analysis procedures. This method is likely to omit foods that are not eaten frequently (Block, 1982; Gibson, 1990).

Dietary assessment methods have been instrumental in characterising the causes of cardiovascular disease hence the interventions today. To summarise the usefulness of dietary assessment methods, Pennington, (1988) reiterated that this data are essential for:

- assessing and monitoring dietary status,

13

- estimating the incidence of dietary inadequacies,

- planning nutritional interventions,

- developing nutrition education programs,

- developing dietary guidelines and public health policies

- assessment of dynamic food consumption patterns

indicating absence or presence of disease. It is clear from these uses that quantified dietary data is combined with large volumes of additional data and interpreted according to assumptions about relationships between the dietary data and these descriptions.

Traditional methods of dietary assessment record actual food intake or their frequency in the diet or a description of the foods, without a description of the individual's perception of the particular food (Lee-Han et al., 1989; Pao, 1989). Other quantitative surveys have been useful in gathering information on responses to nutritional interventions. However, there are no standardised measures or scales that assess dietary behaviour related to selecting specific diets (Kristal et al., 1990b).

To illustrate the use of additional methods of dietary assessments, Kristal et al. (1990b) demonstrated patterns of behaviour associated with selecting diets low in fat, utilizing a behavioural approach to assessment.

The purpose was to assess four dimensions of dietary behaviour. Substituting specially manufactured low fat foods,

modifying high fat foods, replacing high fat foods with low fat alternatives and excluding high fat ingredients and preparation techniques.

2.32   Limitations of quantitative studies

The first limitation is that current dietary assessment methods do not explain why or how certain dietary behaviours occur, especially the adherence to recommended heart healthy diets.

The second limitation is that analysis employs linear regression models and results are reported as means of groups or group data, hence the individual's experiences which may further explain and qualify the results presented on behaviour change are not investigated or reported.

Roering et al. (1986), suggest that peoples explanations do not fit linear models because they impose a select set of dimensions to the data and are rigid. More flexibility is needed to explain dietary behaviour and barriers to change. It has been suggested that analysis of individual responses should include both linear as well as non-linear combinations of variables so as to tap into the principles that influence food choice behaviour (Conner, 1993).

2.33   Qualitative Studies.

The naturalist viewpoint proposes that reality is shaped by the human mind. Hence there are multiple realities because people vary in their values, experiences and world views

(Achterberg, 1988).

Qualitative data collection methods include the sampling process and the data collection methods. The most common ones are participant observation, in-depth interviews, focus group interviews and free elicitation where a participant states all possible thoughts when presented with a cue (Shepherd and Achterberg, 1992).

Biggs and Fleury (1994) explored the barriers to cardiovascular risk reduction using unstructured interviews. They attempted to identify and describe the role of perceived barriers and the influence on individual motivation and sustaining healthy behaviour change. Five categories of perceived barriers; namely affective response, physical response, environmental factors, social relationships and resources were identified. They concluded, people lack motivation to initiate and sustain behaviourial change in lowering risk for heart disease because of perceived barriers to change.

Qualitative methods provided a better understanding of the role of barriers to motivation in health behaviour change than quantitative studies because the qualitative analysis is descriptive and explanatory. Inductively generated data allows for a unique focus on individual perception on environmental cues or self efficacy (Strauss and Corbin, 1990). Interventions based on such results may be designed to empower

16

individuals to reach their full health potential.

2.34   Limitation of qualitative methods.

The first limitation is that conceptual models are derived or fitted into qualitative data, hence individual patterns are summed up in one generic model that explains individual response. This does not retain different contexts of decision making which would add insight to how best to meet nutrition education needs of different groups in the community.

The second limitation is that due to the sample sizes and sampling techniques, most research findings are not generalised to the population in question, limiting the use of such results in nutrition policy development (Achterberg, 1988).

The third limitation is that most of the methods are laborious and have great respondent burden in the number of instruments used and time allocated to complete the procedures (Achterberg, 1988; Kristal et al, 1990a). Having explored qualitative and quantitative methods, their strengths and weaknesses, Steckler et al. (1992) observed that research in interventions require the integration of both approaches.

2.4 Research needs for interventions

Most community nutrition programs are shaped by three assumptions. First, that awareness of the rewarding health effects of nutrition will motivate people to regulate or follow improved dietary habits. Second, that people do not eat healthy foods because they lack nutrition education. Thirdly, it is also assumed that if food is available and affordable, then people will choose to eat it. However research has indicated that not all people share the motivation to alter their foods given the above conditions (Hochbaum, 1981). Therefore, understanding what motivates and influences decision making on food would be a benefit to nutrition programs.

Buzzard and Sievert (1994) in outlining research priorities for dietary assessment, emphasised a need for data collection methods that are powerful in communication styles so as to document the cognitive dimension of food choice by effectively documenting perceptions and food experiences. Descriptions of the social environment of food use are needed to provide the information required for intervention planning.

Educational interventions need effective communication about food in order to transpose advice on nutrients into advice on food. The challenge for health education interventions is to communicate messages of personal relevance to individuals of a target group.

Relevance depends on perceptions about food, access to this food and personal barriers to action such as preparation skills and proper household equipment. Information on individual perceptions and their subjective world of food or on barriers to action is missing from data collected with commonly used methods for describing dietary intakes (Biggs and Fleury, 1994).

Kohlmeier (1994) and Pelto (1981), noted the lack of integrating cognitive psychology in developing new tools for dietary assessment. By employing skills from cognitive psychology, analysis methods that retain the individuals' perceptions and experiences would be possible, therefore capturing a more comprehensive picture of the decision making that precedes initiating and sustaining healthier food choices. Such data would document reasons for differences in the frequencies of use of food alternatives.

Since individual food intake is influenced by the society and the desire to meet certain social images, Clendenen et al. (1994) suggested that, assessment methods that record a description of people with whom meals and snacks are eaten, as well as their associated frequencies would enhance our understanding of the role that social factors play in dietary changes of the individual.

Information on the sources of foods and the means of obtaining them would be a useful measure not only of food

security but such results would play an important role in policy development (Parraga, 1990). Such data would highlight foods with special characteristics, such as chosen to comply with health advice or recent change in consumption due to economic situations. Hendricks et al. (1988) emphasised that qualitative analysis are important tools that capture and express results in the individuals experiences. For policy makers to make informed choices for the community, it is important as far as possible to tap into results generated with such holistic and qualitative data.

This review shows that four types of data at the level of the individual, are important to enhance the planning of interventions: Influences on food choice decisions; and, economic determinants of food choice. An integration of quantitative and qualitative methods is needed to provide the comprehensive descriptions required for these types of data (Pelto, 1981; Hendricks et al., 1988; Strauss and Corbin, 1990; Steckler et al., 1992; Buzzard and Sievert, 1994).

2.5 **Theoretical and Conceptual Framework**

In order to record and interpret qualitative data consistently, researchers can choose from a variety of models to explain dietary behaviours (Contento, 1995). The theoretical and conceptual framework of this study was based on models of individual behaviourial change drawn from social psychological models of motivation.

20

These decision making theories included Social Learning Theory (Bandura, 1977) and the Theory of Reasoned Action and Planned Behaviour (Ajzen and Fishbein, 1980). The key concept of these models is that people will take action if they perceive that the action will lead to expected or anticipated outcomes that they value or want (Contento, 1995).

This study also adopts concepts presented in the Precede-Proceed model which is a framework for planning and evaluating behaviourial and environmental changes (Daniel and Green, 1995).

Lewis et al. (1989) observed that cognitive models have been applied in psychological and sociological research and form a basis for examining food and health behaviours since they allow for a wide range of variables known to influence these behaviours. By using this approach to focus on individual traits, social contexts and values, motivating factors and decision making factors can be identified in the area of food choice (Houts and Warland, 1989).

2.51 The Social Learning Theory

The Social Learning Theory was designed as a framework for identifying factors that influence the individual's behaviour emphasising expectancy and reinforcement in a given situation. This school of thought proposes that behaviour, personal factors which include cognition (how people think) and environmental influences all interact (Perry et al.,

1990). Environment includes the social aspects of family and friends and the physical environment like work situation.

The continuous interaction between the person, their behaviour and the environment that behaviour is performed in describes reciprocal determinism. Thus a change in one implies a change in the other two variables (Bandura, 1977; Perry et al., 1990).

Behavioral capabilities is a concept defined as the knowledge and skills to perform a task. This distinguishes between learning and just performing a behaviour since one may learn and not perform.

Expectations are seen as what one anticipates from acting in a certain way, while expectancies are incentives for that behaviour or the value one places on a given outcome (Perry et al., 1990; Contento, 1995).

In Social Learning Theory, self efficacy is one's ability and confidence to perform a behaviour. This may determine the effort invested in a given task, so repetition of a behaviour indicates confidence in performing that task (Boyle and Morris, 1994).

Self control is personal regulation of goal directed behaviour. The constructs of internal and external locus of control are indicative of an individual's dependence or independence on environment and important others (Bandura, 1977; Hau, 1995). Therefore, a person exhibiting an internal

22

locus of control believes they have the ability and control over a given situation or event to command the desired outcome. However, one with an external locus of control believes the outcome is controlled by an external other power such as fate, luck, the Gods etc. Houts and Warland, (1989) and Coates, (1981) explain that these terms are only descriptive and neither is better than the other.

Lewis et al. (1989), illustrates the concept of reinforcement and situation by documenting the association of food behaviour and how it is influenced by family, friends, media and health experts. Thus environment can be seen as influencing behaviour. There was interaction and identification with social groups providing different environments. This causes a social reinforcement and the opportunity to model behaviour is evident in ones norms, attitudes and orientations.

Therefore the concept of observational learning indicates that the environment provides models of behaviour so a person may learn from others not only by receiving reinforcement from them but also from observing them (Perry et al., 1990; Boyle and Morris, 1994).

2.52   The Theory of Reasoned Action

The model presented by Ajzen and Fishbein (1980), incorporates the constructs of belief, attitude, normative beliefs, subjective norms, intention and behaviour in the

Theory of Reasoned Action and Planned Behaviour (Fishbein and Ajzen, 1975; Shepherd, 1989). It has been applied extensively in food related and health related behaviour research (Shepherd and Stockley, 1987; Rappoport et al., 1992; Towler and Shepherd, 1992; Conner, 1993; Sparks et al., 1995).

This theory proposes that human beings are rational and make systematic use of available information when making decisions on engaging in or not engaging in a given behaviour. Ajzen and Fishbein (1980) stated that the objective of the theory was to predict and understand an individuals behaviour by first measuring the behaviour and determining the causes for that behaviour. For the purposes of understanding determinants of food choices and adherence or failure to adhere to heart health dietary guidelines, applying constructs from this theory may help to explain and predict individual food choices.

Beliefs are the fundamental building blocks in this conceptual framework. They represent a person's information about an object. Beliefs link objects to certain attributes. For instance, linking the belief that "using iron supplements" (the object) "will prevent anaemia" (the attribute). Thus the object of belief may be a person, event, a group of people, organization, a behaviour or policy. The associated attribute may be any object, trait, property, quality, characteristic or outcome.

24

Normative beliefs refer to the pressure an individual experiences from others who think that the person should or should not perform a particular behaviour (Fishbein and Ajzen, 1975). These are modified by how much the individual wants to comply with the wishes of others because normally an individual will have a small set of salient beliefs but will be influenced by ' important others ' opinions, views and expectations. Normative pressure forms the subjective norm which is seen as pressure from the society and the environment. Therefore the totality of one's beliefs, normative or otherwise, serve as the informational base that ultimately determines one's attitudes, intentions and behaviours.

Although there is a plethora of definitions for attitude, Fishbein and Ajzen (1975) differentiated attitude from other concepts by its evaluative and affective nature. They described attitude as a learned favourable or unfavourable response to a given object based on one's salient beliefs about that object, leading to a set of intentions that are indicative of a certain amount of affect towards the object in question. Thus attitude is defined by how the individual views the object, from good or bad, harmful or beneficial.

Behavioral intention refers to a person's intentions to perform various behaviours. This may also be classified as beliefs where the object is always the person and the

25

attribute is always a behaviour. The best predictor of a person's behaviour is assumed to be one's conscious intention to perform a behaviour (Ajzen and Fishbein, 1980).

Behaviours are the observable acts of the subject. Overt behaviours are either studied in their own right or used to learn more about beliefs attitudes or intentions. In the case of food choice, such behaviours would be buying, preparing, serving and eating particular foods or food types.

2.53 Application of Theory

The theoretical frameworks impose models on observed behaviours and decisions. Many individual behaviours deviate from the models, calling into question whether the models' assumptions are correct. Though constructs represent the fundamental explanations of behaviour, models of interactions between these constructs may not. For this research, only selected constructs of the three theories formed the basis for analyzing transcripts with the assumption that these would explain aspects of individual decision making on food choice.

These constructs are designed to understand contexts, motivation and decision making in following dietary guidelines and skills for improving heart health among subjects who had been exposed to information and activities geared towards improved heart health (Appendix E). The use of constructs is important in creating a start list for coding transcripts (Miles and Huberman, 1994).

CHAPTER III

3.0 **RESEARCH DESIGN**

3.1 Research questions

The following were the central questions addressed in this research, through integration of data collection techniques and multiple analysis strategies.

1. Do traditional interview and analysis procedures provide the same descriptions and interpretations as the Food Choice Map interview ?

2. Do adults with a high level of heart health concern use different concepts in food behaviour decisions from those with lower levels of concern ?

3. Do adults who have participated in educational activities of the heart health project at any time differ from those who have not participated in terms of:

   Patterns of food choice,

   Reasons for specific food choices,

   Barriers to action and behaviour change ?

3.2 Respondent Selection

The sampling frame was the list of respondents from Portage la Prairie who returned a Heart Health Baseline Survey questionnaire in 1991. The original baseline survey sample of

2792 participants was a stratified random sample, based on location, age, gender and selected demographic variables such as marital status and education (Gelskey et al., 1991). The list of survey respondents was complemented with the list of participants in project activities and details listed in the Manitoba Telephone System phone book.

A random sample of 60 men and women was selected, stratified by respondents who had participated in Heart Health Project activities, and respondents who had contact, but had not actively participated in the activities.

Following approval of the research procedures by the Faculty of Human Ecology Ethics committee, a letter was mailed to the Chief Coordinator of The Manitoba Heart Health Project, outlining the objectives of the study and requesting authorization to conduct the study and assistance in making initial contact with participants in Portage La Prairie was requested, before the scheduled interviews.

An introductory letter was sent to the potential participants explaining the nature of the study and describing what was required of subjects (Appendix B). A week later the Manitoba Heart Health facilitator in Portage La Prairie placed telephone calls to the participants to establish interest in participating and to schedule the first interview. At the first interview, subjects signed a consent form to participate in the study (Appendix C).

3.21   Planned Data Collection

i) The traditional technique to collect data was the in-depth interview. A semi-structured format was used, where the interviewer ensured that certain topics were dealt with in the conversation without imposing fixed questions, answers or sequence of topics.

ii) The Manitoba Heart Health food frequency questionnaire, was completed by each subject to record and obtain information about usual food intake patterns.

iii) Anthropometric measurements were recorded for height and weight.

iv) The new technique to collect data was the Food Choice Map, a semi-structured interview, but one where the respondent was actively involved in making a visual record of the conversation. In addition, the Food Choice Map used food behaviours as a core set of behaviours to describe individual differences in other areas of experience.

During in-depth and Food Choice Map interviews, additional questions were asked to document views about specific health and heart health issues, as well as

perceptions about food that are important in the design of educational activities.

3.22   **Planned Analysis**

The food frequency data provided percentage of fat and carbohydrate in the diet which were seen as key factors in determining implications for heart health. Analysis employed the Demeter nutrient analysis program (Northern Technical Data Inc., 1995).

Body mass index (BMI) was calculated using weight and height measurements in order to describe the numbers of overweight and obese people in the community (Gibson, 1990).

Food choice maps were to be analyzed for food variety using a Food Variety Index (FVI) to describe the effect of food variety on heart health by associating food variety with BMI (Wahlqvist et al., 1989).

In-depth and food choice interview transcripts were to be analyzed for content (Holsti, 1969; Miles and Huberman, 1994). Codes were assigned using propositional text analysis and projective analysis to describe individual constructs in decision making. Construct links were defined from pile sorting of generated concept maps. K-means clustering using statistical software; NCSS 6.0 for windows (Hintze, 1995) was planned to identify groups of respondents with similar types of decision making patterns for food related behaviours.

CHAPTER IV

4.0   MATERIALS AND METHODS

The first stage in data collection was an in-depth interview at the respondent's home, which was approximately 30 minutes in length. Before the interview, the respondent was measured for weight and height.

On completing the interview, the respondent was left with a food frequency questionnaire to complete within a two week period. At the second visit, the completed questionnaire was collected, after which the Food Choice interview proceeded for a further 45 minutes.

4.1   Anthropometric assessment

4.11 Rationale:

Each respondent had their weight and height measured using a calibrated Harpender anthropometer and Seca scales for weight and height. The respondent was weighed with indoor clothes on and no shoes. The Body Mass Index (BMI), was used as a criterion in the description of different groups when results from the food frequency questionnaire and the Food choice map were compiled, clarifying the association of diet to obese and non obese subjects.

4.12 Process of Analysis

The BMI defined as weight in kilograms divided by height in meters squared was calculated.

Quetlet's index (Gibson, 1990)

BMI =$\dfrac{\text{Weight in Kg}}{\text{height in m}^2}$

4.2   <u>In-Depth interview</u>

4.21 Rationale:

A non structured question guide steered the conversation and covered topics on high fat foods and utilisation of nutrition education materials emphasising heart healthy information (Appendix G).

The data collected was used to meet one of the study objectives for recording perceptions, attitudes and other decision making processes related to food consumption (Taylor and Biglow, 1989; Touliatos and Compton, 1992). The in-depth interview was audio taped and the interviewer made notes as the interview progressed.

4.22   Process of Analysis

The taped interview was transcribed verbatim and completed using the field notes where necessary. Identification of constructs in the transcript was carried out by a nutrition professional other than the researcher. This was a quality control measure for reducing researcher subjectivity and bias since the researcher analyzed food choice interviews using similar criteria for identifying concepts and constructs. It was also possible to make valid

32

comparisons of both methods without the added worry that the researcher placed an emphasis on one interview more than the other.

The entire transcript was read through once. In the second reading, the transcript was reviewed line by line and outcome behaviours were identified and noted in the transcript margins (Miles and Huberman, 1994). These outcome behaviours (OB), defined as a statement of action by the respondent were:

1. Food intake, where every food event was noted.
2. Food preparation methods, such as "frying fish".
3. Food changes were noted, such as mention of the respondent changing from regular ground beef to lean ground beef.
4. Health behaviours such as use of supplements, dieting, exercise and making use of a health service.

Information sources, which were important or available to the respondent, such as magazines, television, heart smart cooking classes and professional advice were noted. This was indicative of respondent's awareness of nutrition education channels and information targeted at educating the public on heart health.

An Excel spread sheet (Microsoft corporation, 1994) was created with five columns and the above behaviours were listed with reasons and actions recorded under each behaviour.

Codes were assigned to identified behaviours in sentence units. These descriptive codes were assigned to constructs

33

derived from psychological decision making theories. These constructs and concepts were the same ones used in analyzing Food Choice interviews. Hence a better comparison was made on quality and type of data from both interviews (Appendix E).

Respondents awareness and utilisation of nutrition information from heart health activities and other sources was summarised. Internal and external motivation in making certain food decisions was also included in the summary.

4.3   Food frequency questionnaire

4.31 Rationale:

Respondents completed the Manitoba Heart Health food frequency questionnaire. The food frequency questionnaire was aimed at assessing the consumption of certain food items over a thirty day period, providing data on usual food intake (Appendix H).

The information gathered would group respondents into categories of those consuming heart healthy diets, those on borderline and those at risk for cardiovascular disease based on their food intake. Hence the proportion of energy from fat and carbohydrate were of interest since these have implications for heart health (Health and Welfare Canada, 1990; Sevenhuysen et al., 1991). Examples of these included hard cheeses such as cheddar cheese, the addition of butter or other spreads and sauces or dressings.

The survey was also aimed at identifying dietary factors

34

that need to be modified in order to reduce cardiovascular disease risk in Portage La Prairie area, and provided a standard for comparing results obtained from the Food Choice Map.

4.32 Analysis process

All incomplete surveys and outliers that could bias the results were omitted from the analysis. These included surveys that recorded unusually low amounts of food for the age and gender of the individual, such that total calorie amounts did not meet physiological needs for an individual.

Surveys that showed consistently and unusually large portions, indicating a misunderstanding of portion size, were also omitted. Nutrient amounts were calculated using Demeter version 2.05, a nutrient analysis program (Northern Technical Data Inc., 1995). Differences in fat intake for men and women and for participants and non participants of MHHP activities were established using t-test statistics.

4.4   The Food Choice Interview (FCM).

4.41 Rationale:

The interview was designed to record differences in food choice between people, together with their perceptions of the importance of the food items they report in daily life. During the interview, respondents saw their answers recorded and were able to change the record themselves in response to

35

later questions adding internal validity checks as the interview progressed (Sevenhuysen et al., 1996).

The record described perceptions of quality associated with food and the extent to which that food contributes to friendships, working relationships with superiors or emotional relationships within the family.

The interview did not quantify food intake, describe all foods eaten by an individual, or record precise frequencies of consumption. It described those elements of an individual's environment which the individual chooses to associate with the food-related behaviours. Areas included in the interview were:

1. Food consumption as to what foods, when and why they were consumed.

2. Economic context, income, where and who purchases or provides food.

3. Social context, who a respondent shares a food event with

4. Physical context, where they have the different meals, and how they prepare these foods.

5. Information context, on healthy eating.

In-depth questions were then targeted at these areas. The interview emphasised information use in its widest sense, including access, choices, control, and skills in interpretation of information (Sevenhuysen, 1996).

4.42   Preparation of Materials

Food pictures were prepared. These were simple, generic line drawings of foods, easily recognised and identified by any respondent. The picture size was approximately 1" by 2" so as to fit well on the map. In addition, 1" by 2" white labels were needed to write in any new or additional food items not available on a food sticker.

Stickers were organized into a quick retrieval file by placing them on clear plastic sheets of paper with temporary adhesive. The use of temporary adhesive enabled one to move the stickers as needed. Coloured felt pens or pencils, were needed to highlight meals that a respondent shared with others. Different colours indicated different groups that form part of the social network of the respondent.

Photocopies of a 11" by 14" sheet of paper with grid lines were prepared as the base for the map. The horizontal scale numbered one to seven and the vertical scale showed 10 divisions without a number.

A micro cassette recorder (or other audio tape recording equipment) with charged batteries and a blank tape was needed for each interview. This minimised incomplete records, and enabled the interviewer to organise the data.

4.43   Creating a food choice map

The first part of the interview provided a record of food choices, associated frequencies of consumption and related comments. The visual record was the basis for all of the remainder of the conversation. The subsequent parts of the interview dealt with the information required for interpretation of behaviours and the reasons for them.

To create a food map, foods are recorded on a 11" by 14" sheet of paper with a grid of lines. The horizontal scale numbered 1 to 7, reflects the approximate weekly consumption of food items. The vertical scale allows the respondent to show time periods during the day that food is normally eaten. Initial stages consisted of questions and answers, while later stages reflected more of a conversation.

First questions consider the foods that are eaten most often and for each food mentioned, a food picture is placed in the margin of the grid. Relative frequencies of the food consumed are discussed for each food item. As the food is mentioned, the food sticker is moved horizontally into the grid to a position that shows how often in the week that food is eaten (Appendix I). In the event that a respondent remembered or changed their mind about any food item already on the map, the sticker could be removed easily.

The next stages in the interview are a conversation to record the social situations in which the foods in the map are

eaten. Recording of the information is interactive and captures the interest of the respondent keeping conversation flowing. It is checked by the respondent for internal validity because the participant sees what is happening and controls the information (Sevenhuysen et al., 1996; Sevenhuysen, 1996).

4.5   Analysis of Food Choice Maps

4.51   Food Variety Index (FVI)

Food variety using a variety scores were based on the concept of food biological variety. This index was developed from classifying foods according to their biological origin because foods from similar natural sources have common nutritional value.

For this score, foods are divided into three general categories of animal, microbiological and plant sources. These groups were further subdivided to yield a larger group depending on their natural, biological description.

If any food within a group is eaten, then a score of one (1) is given (Wahlqvist, 1989). If many foods within the same sub group are eaten the score does not increase meaning that the scores reflect biologically different foods (Appendix D).

These scores can be used for food consumption data that are recorded for a week, a month or a year. The scores make no assumption of food quantity except that a serving is the minimum for a food to score. Frequency of consumption is not considered apart from defining the period of time the food

39

scores are to be assigned. No value judgements are assigned to food as being either a "bad" or "good" food, healthy or unhealthy food.

In addition to this, food variety scores can be assigned to data recorded using various instruments and tools and therefore fit into various study designs (Wahlqvist, 1989; Hodgson et al., 1991).

Food maps generated during the interview, had no numerical data and a FVI was calculated for each participant.

4.52   Transcript analysis

The primary objective of the analysis was to find links that the respondent made between these behaviours and ideas, facts or circumstances that explained the behaviours. The researcher defined Outcome Behaviour (OB), which were statements of action made by the respondent. These were assumed to have a direct effect on the health status of the individual.

The facts and comments provided by the respondent were the sole information needed in the analysis process. The researcher did not assume that the respondent was using any knowledge or psychological reaction during the interview, other than what the respondent mentioned with actions and situations described (Sevenhuysen, 1996).

For an individual respondent, the analysis process was intended to result in a list of several reasons which explain

a specific outcome behaviour. The reasons included both those explicitly mentioned by the respondent, as well as reasons that related to the behavioral theory.

For a group of respondents, the analysis process produced a list of categories based on reasons for behaviour. By assigning respondents to these categories, subgroups of respondents who will differ in their response to attempts at changing behaviour can be identified (Sevenhuysen et al., 1996)

4.53   Identification of Concepts and Constructs

Content analysis of transcripts was utilised in coding and identifying outcome behaviours. Holsti (1969) defined content analysis as a phase of information processing in which communication content (the transcript in this case) is transformed through objective and systematic application of categorization rules, into data that can be summarized and compared.

According to Chenitz and Swanson (1986), Content analysis organises raw data into concepts that are designed to stand for categories.It's a process of identifying conceptual frameworks within which analysis can be organised.

First the tape was transcribed verbatim. Where necessary the transcripts were completed from field notes. The entire transcript was read once to have an overview of it's content. Memos or notes were made in the margins, underscoring or

41

circling words or sentences that were indicative of an outcome behaviour, such as food intake or food preparation.

Outcome Behaviours were identified for all respondents creating the first set of categories identified. Only direct influences on the health or nutritional status of the individual or the population were considered, not those that have an effect through mediating factors.

Chenitz and Swanson (1986) emphasise that indeed, categories and properties are concepts indicated by the data. Outcome behaviours identified were similar to those identified for the in-depth interview.

If an individual reported that " I go for power walks every evening", this was then classified as an outcome behaviour within the health behaviour category.

The next step was to identify reasons or constructs for each OB. These reasons, concepts and constructs given by the respondent were associated with each outcome behaviour. Perceptions of positive and negative effects on the behaviour were noted to determine enhancing factors and barriers to heart healthy food choice.

A spreadsheet was created with five or six columns for displaying the outcome behaviours and their related reasons it in an organised form.

Line/Pg	Primary Behaviour	Secondary Behaviour	FCM Outcome Behaviour	Reason or action	Assoc. Code

The above columns displayed the categorised data into a format for coding. To illustrate this, a primary behaviour can be "breakfast" with the secondary behaviour noted as " I always have 1% milk with my cereal in the morning" This would be categorised as "Food intake" in the outcome behaviour category. The reason for the consumption of this food may be " I know milk is good for my bones, and I like the taste of milk".

Using projective analysis, the constructs defined from literature on behavioral theory and the applications became the rules and guidelines for identifying constructs thus minimising subjectivity on the part of the analyst.

Other constructs or categories were generated from the transcripts mainly those that were reflective of the research interests such as information sources and heart health knowledge.

The links between separate comments from the respondent as well as the wording used to describe these links were connected to concepts and constructs of behavioral theories. Any one comment, and the way it was expressed, represented

parts of the same behavioral constructs that were used to formulate questions and wording for structured questionnaires on behaviour. This was an aspect of discourse analysis that uses prepositions to assign meaning to text (Kintche, 1988).

A preposition is an abstract theoretical construct which is used to identify the meaning or what is expressed by a sentence in a given context (Van Dijk and Kintche, 1983). A knowledge base drawn from behavioral theories and context were used to assign codes to transcript text.

The pattern of circumstances, reasons for behaviour, behavioral constructs and motivation was by itself important. Not only were each of the reasons important in explaining behaviour, but the respondent used the pattern of reasons itself to select a final behaviour. The selection involved judgements of risk and benefit that require the combinations of reasons. Hence the pattern of reasons was maintained as an entity during the analysis process (Sevenhuysen, 1996).

A mnemonic coding system was used where a set of letters represented a concept or construct (Gittelson, 1992). For instance the behavioral belief construct was coded as BEH-BEL. These were descriptive codes that needed little interpretation and using these types of codes made more sense to the coder and were easier to use and to remember (Miles and Huberman, 1994).

Codes were associated with any of the reasons and

44

concepts contained in word or sentence units for each outcome behaviour and later formed pattern codes useful in data display and variable definitions.

4.54   **Data Display**

A display summarises extended text and allows for conclusion drawing or further steps of analysis to become clear. Since the human mind cannot process large numbers of discrete information well, it is better to reduce complex information into selective and simpler gestalts which are more easily understood (Miles and Huberman, 1994). This was achieved by mapping out identified concepts and constructs into a pattern. Concept maps were created for each respondent and for each outcome behaviour separately.

A box was drawn for each reason, concept, construct or behaviour. A line between each box indicated a link that the respondent had made between the reason, concept, construct or behaviour. The resulting sheet of boxes and arrows was a concept map of the behavioral determinants of the individual for that outcome behaviour (Appendix J).

This differed from the usual content analysis where one conceptual model reflects concepts for all the individuals in a study. This visual display created a more detailed picture of one's decision making concepts and permitted one to draw conclusions and facilitated comparison between respondents (Shepherd and Achterberg, 1992; Miles and Huberman, 1994).

45

4.55   Identifying Variables

For the purpose of defining variables for each outcome behaviour, a pile sort was completed for all concept maps for each outcome behaviour. For instance, all construct maps for the food preparation category were sorted into piles so that items in one pile were more similar than those in separate piles (Weller and Romney, 1988).

Maps were shuffled randomly and within a research team, each member had the opportunity to sort them into piles according to their similarity. Free sorting was not limited to a specific number of piles. One could create as many piles for a specific outcome behaviour depending on similarities and differences.

The pile sort grouped concept maps into piles that were the basis for identifying variables by the following criteria:

1.   Check for presence of similar constructs.

2.   Identify construct links focusing on constructs that target the research question.

3.   Identify the most common construct links across maps in a pile.

For example, if in one pile the following constructs; Info-osf, hhk, beh-bel, att-beh, con-ext were present, linked and appeared in all or more than half the concept maps in a pile, they became a variable. Each variable therefore represented a combination of constructs identified from reports and

perceptions of the respondent.

Once variables were identified for each outcome
behaviour, each individual's concept map was used to assign a
value for each variable. First all the links between all
constructs displayed on the map were counted and gave the
denominator value.

Each map was assessed for the presence of variables by
checking if all the constructs for a variable were present on
that map. If not, a zero value was indicated for that variable
on that map. If the constructs of a variable were present,
then all links between those boxes that defined the variable
were counted irrespective of direction and this was the
numerator value, Sevenhuysen et al. (1996) in the following
formula.

        total # of links within a variable = Variable value
        total # of links on map

Therefore one concept map could have 4 out of 6
variables, giving two zero values and ratios for the other
four. These numerical values were used in cluster analysis.

4.56   **Identifying Decision making groups**

by Cluster Analysis

Clustering is the grouping of objects or items into subsets based on their similarities across certain variables or attributes. K-means clustering is a partitioning technique that was developed by J.A Hartigan and M.A. Wong of Yale University (Hintze, 1995). Clusters are generated on the basis of the mean and each object is assigned to a cluster by the smallest distance to the mean which is the centroid of that cluster minimising within cluster sum of squares (Lorr, 1983).

Clusters were necessary for identifying decision making groups based on the variables that best described them. The number of clusters associated with the lowest unexplained variation in variable values, was taken as the endpoint in the cluster routine (Appendix K).

In order to characterise the clusters or decision making groups, high variable means were taken to indicate greater representation of the particular variable in the cluster. In addition to this, ranking of the means was done so as to identify the variables that best described a cluster.

In order to identify the role of heart health concerns, individual distances from cluster centres were used. The smaller the distance from the cluster centre, the greater the concern about heart health. Heart health knowledge was an indicator of the presence or absence of a heart health concern

for people within the four outcome behaviours.

4.57   **Variable definitions**

Since a variable was a string of constructs, it was defined using the separate definition of its constructs. All variables represented different contexts and situations used in decision making.

4.58   **Cluster definitions**

To identify variables that best described these clusters, means were ranked twice, once within and once across clusters. These two ranks were summed to find the sum of ranks. The variables with the highest sum of ranks in a cluster were used to define the cluster/ decision making group. The highest were those variable means that showed consecutive sums of ranks starting at the top rank. Variable means with low summed ranks were not used as descriptions of the cluster.

4.59   **Description of Decision Making Groups**

Each cluster represented a decision making group. Definitions were assigned from the variable definition list. Application of the variable and cluster definitions were derived from transcripts by noting the content of reasons that members of that cluster gave during the interview.

4.60   **Defining levels of heart health concern**

Heart health concern was denoted by any variable that had the heart health construct (hhk). Levels of heart health concern were high, medium or low. All clusters were assessed

49

for these levels based on the number of heart health variables reported and the mean values for these variables. A cluster with all or most of the heart health variables and high mean values was classified as being associated with a high level of heart health concern. The levels of concern were therefore based on the comments of respondents that reffered to the heart health construct.

Those clusters that had no heart health variables were indicative of the use of other concepts and concerns in decision making. These clusters were the basis for discussing other concerns, limitations or barriers to heart healthy food choices. To compare levels of heart health concern for those aware of and those not aware of MHHP activities, the chi-square test of homogeneity was used.

4.61   **Quality control**

Constant and consistent identification of constructs is possible through discussions for cross checking coding and generating additional theoretical ideas (Chenitz and Swanson, 1986). The researcher worked as a member of a research team that used this approach.

Subjective judgements of any one analyst were reduced, and inter rater agreement was determined by dividing the number of agreements by the total number of judgements (agreements plus disagreements) (Achterberg and Shepherd, 1992). Each member of the team checked that all the code

50

entries in each spreadsheet, given to them, met the definition for the construct or behaviour concerned. A 90% inter rater agreement was a good indicator of objective coding. Where entries did not meet the definition, a new reason, concept, construct or behaviour, had to be defined and added to the construct definition list.

To check for construct validity, all comments depicting a certain code within a outcome behaviour were grouped. Odd comments that did not belong to a particular code were identified ensuring consistency in assigning comments and reasons to a particular code.

CHAPTER V

RESULTS

5.0   <u>Introduction</u>

5.11   <u>Population description</u>

Respondents lived in Portage La Prairie, a town within the south central region of Manitoba, Canada (Appendix A). The regional office of the Manitoba Heart Health Project is located in Portage La prairie which has the largest population (13,740) among communities in the central region. Heart health promotion activities were first initiated in this community and later in other neighbouring towns.

Data collection was completed for 60 people. However, time available to the researcher allowed complete analysis for 30 participants. Table 1 is a summary of demographic data for thirty participants interviewed in this research. Participants were 15 men and 15 women whose ages ranged from 18 to 77 yrs, of whom 43% had been involved in heart health promotion activities, while 10% were aware of certain activities such as heart smart cooking classes, but never participated prior to the interview. The remaining 47% were neither actively involved or informed about the various project activities.

Although all participants were literate, 46% had university or college levels of education and 30% had completed high school. The remaining 13% had not completed

high school. Two thirds of the participants were either employed or running personal businesses, while one third were either unemployed or retired.

5.12 Body Mass Index (BMI)

As shown in table 1 and figure 1, respondents included both underweight and obese individuals. Figure 1 shows their distribution according to the four body weight categories defined by Health and Welfare Canada (1990). Approximately half were either overweight or obese with 10 respondents reporting BMI equal to or greater than 27. Of these, nine were men.

5.13 Percentage of Fat and Carbohydrate in the diet

Results from the food frequency questionnaire, indicate that the average proportion of energy intake from fat was 35.9% and that from carbohydrates was 48.8% (Figure 2). Differences between men and women were not significant. Figure 3 shows men consuming more fat per day than women. However this difference was not significant ($p > 0.05$). Figure 4 shows that those who consumed high amounts of fat had high BMI, correlation coefficient was 0.38.

5.14   Food Variety Index (FVI)

53 % of the respondents had a FVI equal to or greater than 27 while 40 % of the respondents had a FVI between 21 and 26. 6% had a FVI less than 20. From this result, it would be expected that those with a higher food variety would be healthier than those with lower food variety. A physiological measure that showed association of FVI to health was BMI.

Figure 5, indicates a trend is evident that people with a large BMI, have a smaller variety of food in their diet. Pearson correlation coefficient was -0.25.

Table 1. Demographic data and description of respondents

Subject	Gender	Age	Weight in (Kg.)	Height in (m)	BMI	Food Variety Index	Aware/participate in Heart health activities	Education level	Employment type
1	F	33	57	1.611	21.96	29	yes, displays	university	home maker
2	M	41	85.1	1.715	28.94	23	-	diploma	employed
3	M	32	82	1.768	26.23	21	-	university	teacher
4	F	40	55.5	1.694	19.34	17	-	bacc. edu.	part. teacher
5	M	66	96	1.82	28.98	28	-	grade 4	retired
6	F	77	47.5	1.624	18.01	22	after surgery	university	retired
7	F	53	51	1.528	21.84	27	-	grade 12	child care center
8	M	35	89	1.725	29.66	27	yes	university	manager
9	F	42	64.2	1.567	26.15	24	-	grade 11	unemployed
10	F	47	72	1.648	26.51	29	-	Reg. nursing	homemaker
11	F	45	59.9	1.609	23.14	32	yes	nurse training	own business
12	F	52	62	1.697	21.53	29	-	grade 13 (Ontario)	own business
13	F	30	57	1.675	20.32	28	heart health day	college	clerk
14	M	41	67	1.709	22.9	25	-	university	casual
15	M	21	116	1.757	37.66	21	-	grade 12	unemployed
16	F	36	63	1.654	23.03	35	mall walk	grade 12	secretary
17	M	18	65.5	1.686	23.04	27	obstacle race	grade 12	cashier
18	M	56	98	1.72	33.13	26	aware cooking class	university	manager
19	F	37	60	1.616	22.98	30	dance for heart	grade 12	unemployed
20	M	49	82	1.765	26.32	31	heart fair	university	vice principal
21	M	35	91	1.761	29.34	25	-	grade 12	parts manager
22	M	34	85.5	1.759	27.63	21	-	grade 11	manuf. plant
23	F	64	81.5	1.505	35.98	21	from dietitian	grade 10	part time, retired
24	M	71	86	1.755	27.92	28	aware, not active	grade 8	retired
25	M	47	70	1.715	23.8	26	-	university	technician
26	M	51	106	1.859	30.68	24	walkathon	college	Government officer
27	F	35	54	1.529	23.1	14	-	grade 12	cook
28	M	68	74.5	1.71	25.48	32	fundraisers	grade 12	retired
29	F	33	58	1.664	20.95	30	various events	college	baby sitting
30	F	34	66	1.679	23.41	27	heart health fair	university	teacher

Figure 1.

BMI for all respondents

Figure 2.

Percentage of Total Energy from Fat and Carbohydrate

Figure 3.

Fat intake for Men and Women
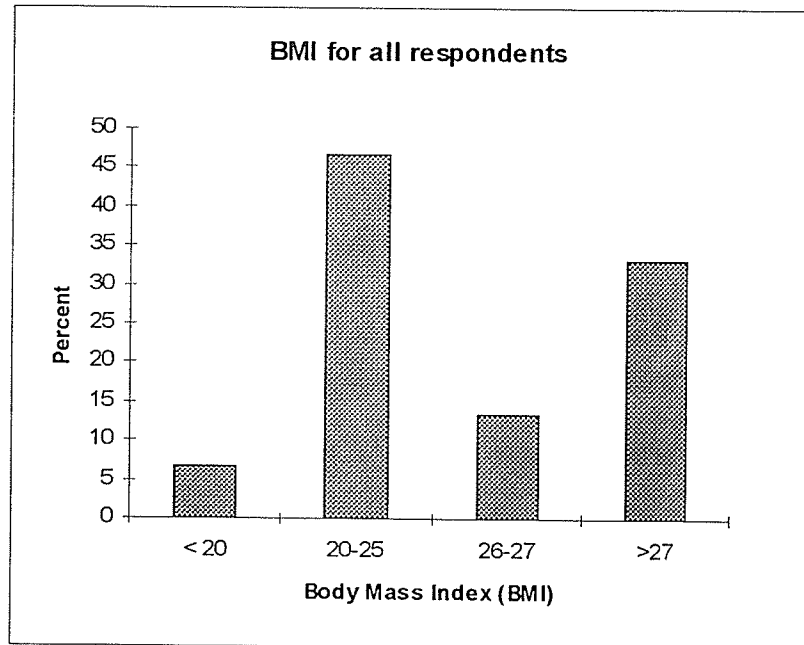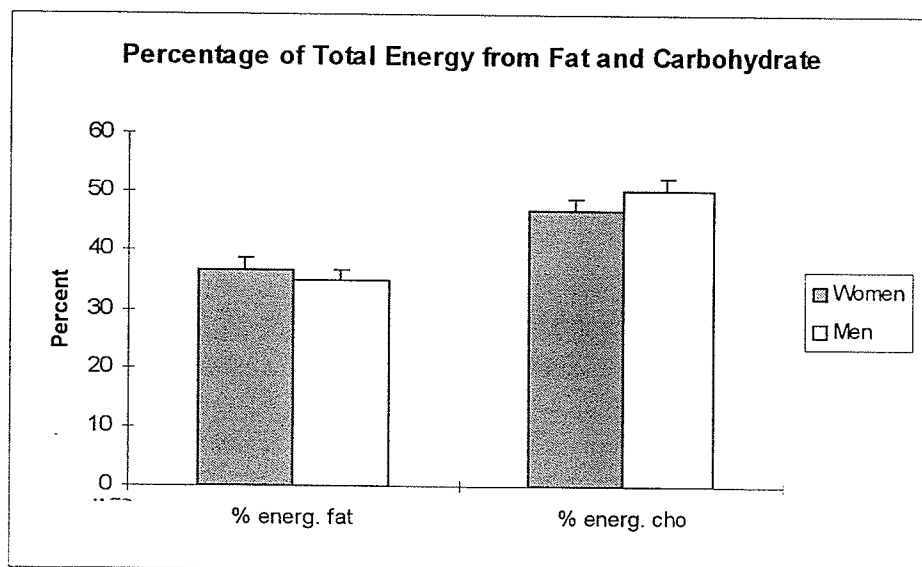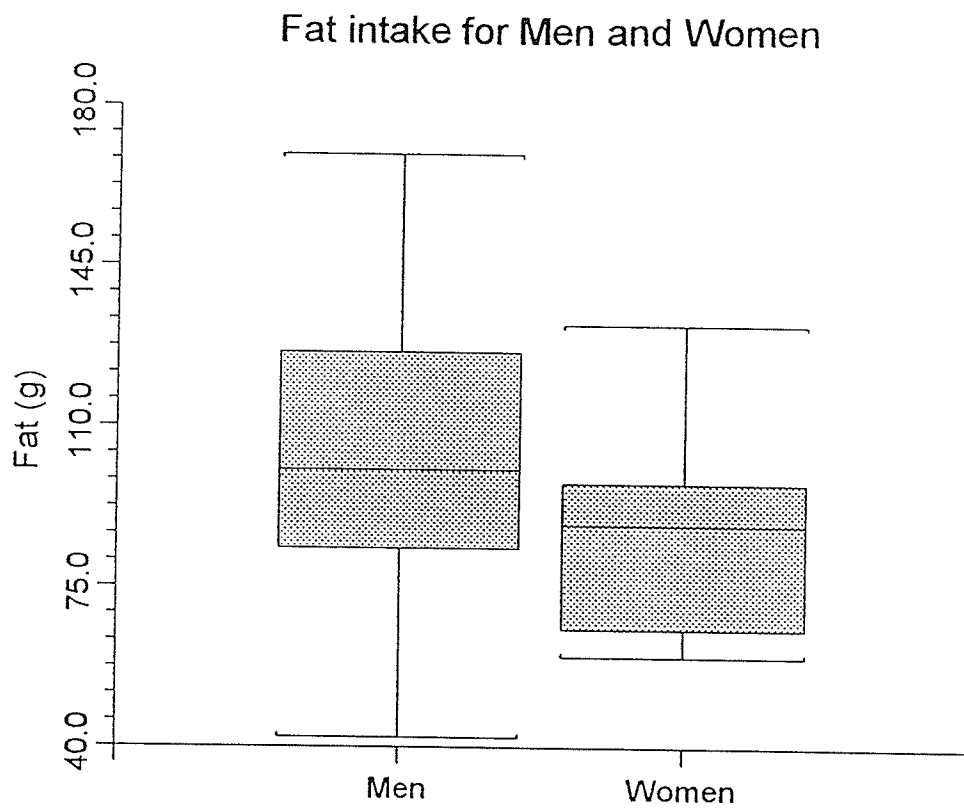
Figure 4. Association of Fat intake and BMI

FAT (G) vs BMI
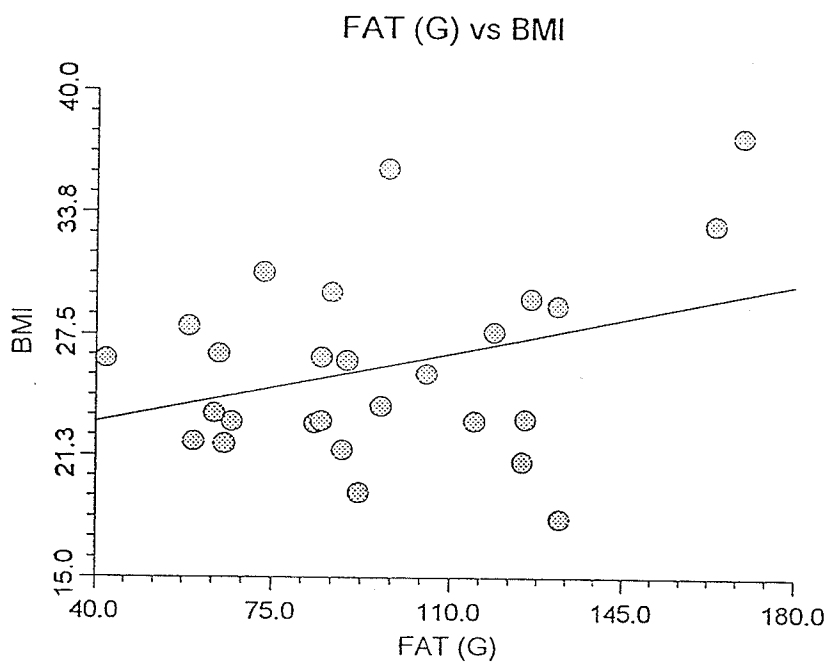
Figure 5.   Association of BMI and FVI

BMI vs FVI
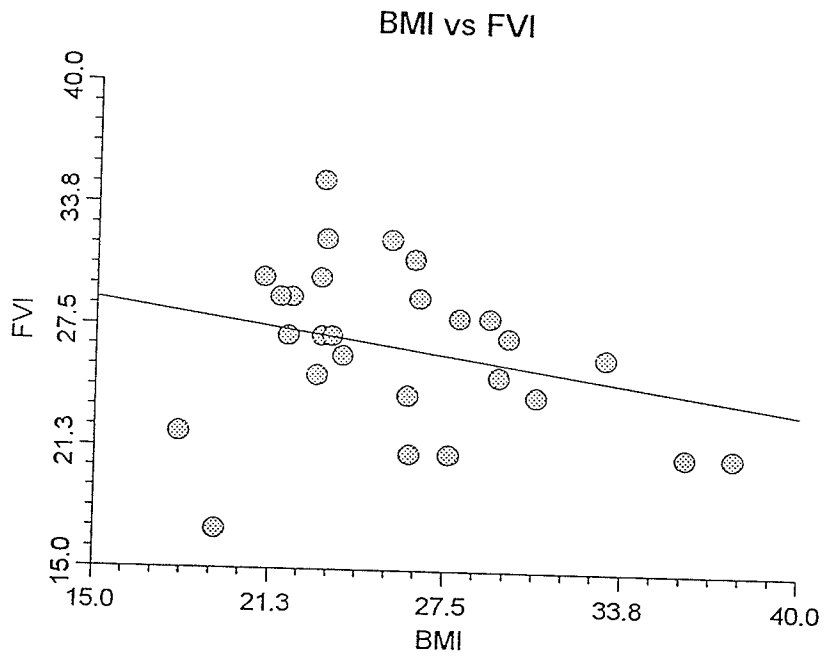
5.2 Comparison of the In-depth interview and the Food Choice Interview

Question I

5.21 Comparisons of Reasons for Behaviours

Three comparisons were made:

1) The frequency of comments linked to a certain outcome behaviour.

2) Frequency of similar comments and contexts, respondents gave.

3) Construct maps and patterns of decision making.

The in-depth interview and the FCM are both qualitative interviews that explored the same range of topics. Both interviews gave the respondent freedom to share any experiences related to the same questions and topics discussed.

The FCM was different because it provided a central reference point, which was the actual map of foods. Though this focus to the discussion can change a number of responses, it was assumed that the focus did not affect the interpretation of constructs used to explain reported behaviour.

Table 2 is a summary of the frequency of reasons given for food intake in both interviews, the frequency of identical reasons and the ratio of FCM links over in-depth interview links.

Table 2. Frequency of Reasons for Food Intake

Respondent	In-depth reasons (frequency)	Food Choice Map reasons (frequency)	Identical reasons (frequency)	Ratio of F.C.M. reasons over In-depth reasons
1	6	20	6	3.3
2	10	25	5	2.5
3	12	32	5	2.6
4	8	16	8	2
5	5	17	5	3.4
6	7	31	3	4.4
7	10	35	5	3.5
8	6	16	2	2.6
9	10	36	7	3.6
10	11	38	3	3.5
11	10	32	3	3.2
12	8	41	7	5.1
13	7	18	3	2.6
14	10	28	4	2.8
15	8	16	3	2
16	11	23	0	2.1
17	7	20	6	2.9
18	9	19	2	2.1
19	10	34	4	3.4
20	13	37	5	2.8
21	10	34	6	3.4
22	5	20	2	4
23	6	19	0	3.2
24	10	25	3	2.5
25	9	25	6	2.8
26	10	34	4	3.4
27	12	35	5	2.9
28	8	37	3	4.6
29	10	38	4	3.8
30	13	19	6	1.46
Mean	9.03	27.3	4.17	3.08
Std. Deviation	2.22	8.27	1.95	0.813

The total number of comments made by respondents were 3 times fewer in the in-depth interview compared to the FCM interview, implying that the interview processes differed. About half the comments were similar in both interviews. It is assumed that the content of comments made during the in-depth interview, but not reported during the FCM was accounted for by additional reasons and contexts expressed in the rest of the FCM transcript.

The frequency of comments was higher in the FCM because respondents reported many more contexts, reasons and situations surrounding food choice because of the nature of the interview.

5.22 Comparison of construct links

In-depth interviews were coded and assigned constructs for the outcome behaviour with the greatest volume of information (Food Intake) with the aim of generating individual patterns of food choice. Only 11 of the 30 in-depth interview transcripts could be coded and assigned constructs in a similar fashion to the FCM interviews.

The majority (19) of transcripts contained too few links between food choice and its content to describe patterns of links. Even the 11 that could be coded had lower frequencies of links and fewer constructs.

The 11 construct maps derived from the in-depth interviews, were pile sorted in the same fashion as the FCM

concept maps. Only half of the maps were sorted into piles similar to the Food Choice construct maps due to missing constructs, lower frequencies of links and fewer links between constructs. This shows that interviews functioned to give different kinds of transcripts.

Further analysis of the other outcome behaviours was not deemed possible because those outcome behaviours were associated with even less content in the transcripts. In-depth interviews did not produce patterns that had enough detail to meet all analysis procedures done for FCM transcripts. The in-depth interview is not used in subsequent analysis.

5.3   EXPLANATIONS OF HEALTH BEHAVIOURS

The construct Health Behaviours was one of four Outcome Behaviours identified by respondents (see Methods, p.41), and the following analysis65Xalsanswers Research Question II (see p.27).

5.31   Defining construct links

Pile sorting of the concept maps of the 24 respondents who referred to this outcome behaviour, led to the definition of construct links.

Variable	Variable definition
1. Beh-bel, con-int, att-beh	Control personal health
2. know-bel, hhk, beh-bel	Confident about heart health
3. inf-osf, know-bel, hhk	Information seeking on heart health
4. beh-bel, phys	Physiological factors influence health behaviour
5. res-time, beh-bel	Perceive time as important for general health
6. hhk, res-acc, beh-bel	Perceive access to resources as necessary for heart health
7. hhk, res-acc, beh-bel, con-int	Control resources for improved heart health
8. con-in, att-beh, sub-norm	Chooses to adapt to others

9. beh-bel, con-ext   Experiences   external

                                        influence   or   control   in

                                        health behaviour

10. beh-bel, phys, con-int, cop   Manipulates environment for

                                        improved health

Variables 2,3,6,and 7 had direct implication for heart health concerns. Variables 8,9,and 10 were indicative of other concerns, limitations or barriers to health behaviours because they were variables that had a coping, subjective norm or external control construct.

Four variables used to define the clusters included the heart health construct:

- Variable 2 describes a context where people have internalised heart health knowledge and they feel confident about it's importance in general health.
- Variable 3 describes a group who seek information on heart health
- Variable 6 describes a situation where resources are seen as important for improved heart health and health in general.
- Variable 7 denotes a context where people control resources to meet a heart health need.

5.32 Defining Decision Making Groups
in the Context of Health behaviours

The K-means clustering procedure yielded nine clusters or decision making groups. The clusters explained 77.01% of variation in variable values (Appendix K). Table 3 summarises the means for nine clusters. Table 4 shows the different decision making groups, by high, medium or low levels of heart health concern.

Table 3. Selected Variable means characterizing decision making groups
Health behaviors

	Variables	Group1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	Group 9
1	beh-bel, con-int, att-beh							0.1605	0.11875	0.490333
2	know-bel, hhk, beh-bel	0.4			0.1984	0.229333				0.127667
3	inf-osf, kno-bel, hhk	0.267			0.0838					
4	beh-bel, phys	0.133	0.178333		0.1558				0.0965	
5	res-tim, beh-bel									
6	hhk, res-acc, beh bel		0.200667				0.224			
7	hhk, res-acc, beh bel, con-int		0.310333				0.352	0.216		0.066667
8	con-int, att-beh, sub-norm					0.204333				
9	beh-bel, con-ext			0.143						
10	beh-bel, phys, con-int, cop					0.212667	0.3445	0.1665	0.40225	

Table 4. Levels of Heart health concern in the context of Health Behaviors

Level	Decision making clusters	Means of Heart health variables	Heart Health variable definitions
High	1	0.4 0.267	- Confident about heart health - Seeks information on heart health
	4	0.198 0.083	- Same as cluster 1
	2	0.2 0.31	- Perceive access to resources as necessary for heart health - Control resources for improved heart health
	6	0.224 0.352	- Same as cluster 2
Medium	9	0.128 0.067	- Confident about heart health - Control resources for improved heart health
Low	5	0.229	- Confident about heart health
	7	0.216	- Control resources for improved heart health
	8	0.093	- Confident about heart health
	3	---	----

5.33   Description of groups 1 and 4. (High concern)

Definition

Based on variables 2,3 and 4, people are confident about heart health knowledge and seek information on health issues. In addition to having strong heart health concern, they also reported that physiological factors affect health behaviour.

Although both clusters were characterised by the same variables, people in these decision making groups showed values of a number of other variables. This difference is evident from the actions people report in the two groups.

Application

Group 1

Comments from the transcript confirm that they are barely active in terms of exercise or activities geared toward heart health. They seek information through media like television and also have knowledge on the impact of fat in the diet from experiences of others in their social circles, such as family members.

Group 4

Application

Comments show people were involved in a form of physical activity and described the need to do something about their weight or food intake by increasing fibre and lowering fat intakes. They reported various activities, ranging from walking, riding, and aquacising to maintain physical fitness.

This group valued the opinions of others especially advice from a doctor. They used coping strategies to deal with their immediate environment or situations exerting control over their own health, for example by watching diet to deal with a spouses illness or their own illness.

5.34 Group 2 and 6 (High concern)

Definition

Variables 6 and 7, described people who are confident about heart health knowledge. They also perceive the need for certain resources and control these for improved heart health.

Application

From their comments, access to resources such as a gym, horse riding, a mall to walk in, cycling in good weather are important in improving health. They are limited in time and finances and manipulate these around family commitments. They exercise and watch their diets to control weight gain.

5.35 Group 9 (Medium concern)

Definition

Variables 1,2 and 7 describe people as confident about heart health and having control over personal health and resources to improve heart health.

Application

This group reported a need to improve present health. They have knowledge about the importance of diet and exercise. However, they have not translated this into any particular

activity but are open to do so in the future.

5.36 Group 5 (Low concern)

Definition

Variables 2,8 and 10 characterise people as knowledgable and confident about heart health. However, they perceive external influence on their health behaviour.

Application

They report knowing about heart health because they reduce fat, watch sugar content and follow Canada's food guide. Caring for the needs of other household members was an external influence.

5.37 Group 7 (Low concern)

Definition

Variables 1,7 and 10 describe people as having control over personal health, their resources and coping to meet physiological demands.

Application

From comments observed, they control resources by creating time to attend to body exercise or going to weight watchers. They make time for family commitments. Physiological needs are met by reducing or omitting certain food items from their diet.

5.38 Group 8 (Low concern)

Definition

Based on variables 1, 4 and 10 people control their personal health, dealing with physiological needs and having to cope with situations for improved health.

Application

They reported physiological factors such as food related allergies, edema, colds or headaches. Coping strategies included using health services for medication, preventive measures through diet and use of supplements. They were concerned with general health issues.

5.39 Group 3 (Low concern)

Definition

Variable 9 described this group as perceiving strong external influence on health. This group has no heart health concerns.

Application

Personal health was not reported as a priority, unless during specific physiological conditions like pregnancy where information would be sought from the public health nurse. Heart health was not a priority for them at the time. Other more pressing issues included social problems like single parenthood, divorce and financial constraints.

5.4   EXPLANATIONS OF FOOD INTAKE

The construct Food Intake, was one of four Outcome Behaviours identified by respondents (see Methods p.41), and the following analysis also answers Research Question II (see p.27).

5.41   Defining construct links

Pile sorting of concept maps for all respondents resulted in the following 14 variables.

5.42   Variables and variable definitions

1. res-acc, beh-bel, con-in, cop

   Defined: Manages available resources when choosing food.

2. Phys, beh-bel, att-beh

   Defined: Preference and sustenance is important in food choice.

3. con-ext, con-bar, att-beh

   Defined: Has limited control over food choice.

4. hhk, res-acc, beh-bel

   Defined: Perceives certain resources as necessary for a heart healthy diet.

5. norm-bel, beh-bel, con-ext, sub-norm

   Defined: Lives up to others expectations when choosing food.

6. beh-bel, in-con, cop, att-beh

   Defined: Self motivated and confident about personal food choices.

73

7. kno-bel, hhk, beh-bel, att-beh

   Defined: Makes informed choices about heart healthy foods.

8. Frb, res-tim, beh-bel

   Defined: Work situation and time limit affect food choices.

9. res-fin, beh-bel, soc-sup

   Defined: Others buy or contribute to food budget.

10. soc-sup, beh-bel, con-ext, sub-norm

   Defined: Depends on others opinion and provision in choosing food.

11. res-tim, beh-bel, con-in, att-beh

   Defined: Manages time to accommodate meals.

12. inf-hs, inf-osf, kno-bel

   Defined: Knowledge about food is acquired through health services or other sources.

13. con-bar, con-ext, sub-norm

   Defined: Limited in food choices, others opinion is very important when choosing food.

14. res-acc, soc-sup, norm-bel

   Defined: Has resources available, however, depends on others to choose foods.

   Variables 4 and 7 have implication for heart health.

These variables used in defining clusters had a heart health construct:

- Variable 4 describes a context where management of resources was important to achieve a heart healthy diet.

- Variable 7 describes a context where people make informed choices regarding heart healthy foods.

With the exception of cluster 8, all the other clusters exhibited heart health concern within the two contexts.

5.43   Defining Decision Making Groups
in the context of Food Intake

K-means clustering yielded 10 clusters. Clusters explained 68.66% variation in variable values (Appendix K). Table 5, summarises the selected variable means for 10 decision making groups.

Table 6 shows the different decision making groups by high, medium or low levels of heart health concern.

Table 5. Selected Variable means characterizing decision making groups
Food intake

	Variables	Group1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	Group 9	Group 10
1	res-acc, beh-bel, con-in, cop	0.222333	0.231								
2	phys, beh-bel, att beh			0.1996		0.219		0.184			
3	con-ext, con-bar, att-beh				0.068						
4	hhk, res-acc, beh bel										
5	norm-bel, beh-bel, con-ext, sub-norm	0.172667					0.265667		0.182		0.313
6	beh-bel, con-in, cop, att-beh	0.345333	0.342571	0.2608		0.359	0.169333				
7	kno-bel, hhk, beh bel, att-beh			0.249		0.32725		0.2645			
8	frb, res-tim, beh-bel								0.183	0.1255	
9	res-fin, beh-bel, soc-sup				0.147						
10	soc-sup, beh-bel, con-ext, sub-norm	0.178667	0.293571				0.317667		0.183	0.2	0.219
11	res-tim, beh-bel, con-int, att-beh				0.1665			0.3765		0.2375	
12	inf-hs, inf-osf, kno-bel										
13	con-bar, con-ext, sub-norm										
14	res-acc, soc-sup, norm-bel										0.31

Table 6. Levels of Heart Health concern in the context of Food Intake

Level of Concern	Decision making clusters	Means of Heart Health Variables	Heart health variable definitions
High	3	0.249 0.106	- Perceives certain resources as necessary for a heart healthy diet - Makes informed choices about heart healthy foods
	5	0.327 0.095	
	7	0.265 0.076	
Medium	1	0.033 0.135	Same as above
	2	0.074 0.134	
	6	0.06 0.122	
	10	0.063 0.094	
Low	4	0.015 0.02	Same as above
	9	0.027 0.027	
	8	0.19	- Perceives certain resources as necessary for heart health

5.44 Description of Groups 3 and 5 (High concern)

Definition

Based on variables 6,7 and 2 people make informed food choices based on their knowledge and manage resources to make heart healthy food choices. Meeting a physiological need is also evident in their food choice.

Application

They report limiting fat in the diet, by not eating gravy, and going on a low cholesterol diet. They base their heart health practices on information from doctors and nutritionists. They report watching weight, and eating to assuage hunger and thirst, maintaining energy levels.

5.45 Group 7 (High concern)

Definition

Variables 11,7 and 2 describe people as having knowledge about heart healthy foods and making informed choices. Managing time to accommodate meals and eating for sustenance.

Application

Transcripts show they increase fibre in the diet, lower fat and sugar and use low calorie dressings. Decisions on food consumption are based on feelings of hunger or thirst or keeping weight down. They rush through meals or make time for meals because of family members busy schedules.

78

5.46 Medium Level of heart health concern

Although a heart health concern was part of their decision making process, this concern was not strong enough to define and describe these clusters. Heart health concern was secondary when making food choices.

5.47 Group 1 (Medium concern)

Definition

Based on variables 6 and 1 people are self motivated and confident about personal food intake, they try to control their available resources to meet food needs.

Application

Resources are a key factor in food choice, having produce from their gardens, eating out at restaurants, at the legion and having food delivered. They indicate control over food choices and feel good about what they eat.

5.48 Group 2 (Medium concern)

Definition

Variables 6,11 and 1 describe this group as being confident about their food decisions, managing time resources to fit in their meals.

Application

Comments show they cope with work situations where there is limited food choice. They hurry through meals or skip them all together. To cope with this, they use convenience foods or prepare large amounts to have left overs for another meal.

5.49 Description of groups 6 and 10 (Medium concern)

Definition

Variables 5, 6 and 10 indicate that people live up to social expectations and depend on others to provide and make food choices. However, they are also confident about their food choices.

Application

Comments show, they uphold social norms when choosing food. They choose what family members enjoy, like making perogies for family and friends at Christmas. They reported that the foods they choose are determined by tradition, upbringing or what their mothers prepared. When entertaining guests they offer dessert because " that's the way it's done".

5.50 Group 4 (Low concern)

Definition

Based on variables 11,9 and 3 this group have limited finances and depend on others opinions when making food choices.

Application

They report that food is expensive. So they depend on others for certain food items like free chicken from the Hutterites or a husband's fishing. The presence or absence of others influences the amount and type of food eaten. In the absence of company, they eat just to maintain physiological energy levels.

5.51 Group 9 (Low concern)

Definition

Variables 11,10 and 8 characterise this group as having to consider time when planning meals. They depend on family members and others outside the family to make food decisions.

Application

They report that working hours determine meal times; for example a retired fellow has lots of time to eat leisurely, however one working shifts has limited time. Meals are chosen and prepared by family members or others.

5.52 Group 8 (Low concern)

Definition

Variables 10,8 and 5 show that people choose food to meet the expectations of others. Work situation and time limits affect their food choice.

Application

They report limited time because of balancing shift work, meal times as well as feeding young children. Other limitations and barriers include social stresses. They acknowledge pressure of social expectations and feel they have to survive. For example a single mother feels she has to "keep going for the sake of her children". They have added physical problems like illness which affect appetite and limit food choice.

5.6   EXPLANATIONS OF FOOD PREPARATION

The construct Food Preparation was one of the four Outcome Behaviours identified by respondents (see Methods, p.41), and the following analysis also answers Research Question II (see p.27).

5.61   Defining Construct Links

Pile sorting of concept maps for 30 respondents who referred to this outcome behaviour, resulted in the following nine variables.

5.62   Variables and variable definition

1. inf-osf, kno-bel, beh-bel, con-in, att-beh

    Definition: Utilizes and seeks information on food preparation.

2. hhk, beh-bel, cop

    Definition: Applies heart health information in preparing food.

3. res-acc, beh-bel, att-beh

    Definition: Perceives certain resources a necessary for food preparation

4. res-time, soc-sup, beh-bel

    Definition: Rely on others to minimise time spent
    in food preparation.

5. frb, soc-sup, con-ext

    Definition: Work situation and other people have an affect food preparation.

6. hhk, kno-bel, beh-bel

Definition: Aware of heart healthy meal preparation methods.

7. hhk, soc-sup, beh-bel, con-in, con-ext, att-beh

Definition: Emphasises heart healthy meals and considers others preferences when preparing meals

8. beh-bel, con-ext, att-beh

Definition: Is strongly influenced by situations or others when preparing food

9. Soc-sup, ext-con, sub-norm

Definition: Meals are prepared and provided by others. Does not control meal preparation.

Variables that have implications for heart health concern were variables 2,6 and 7. These variables had a heart health construct:

- Variable 2 where people apply heart health information food preparation.

- Variable 6 describes those who are aware of heart healthy meal preparation methods

- Variable 7 describes those who emphasise heart healthy meals and consider others preferences when preparing meals.

5.62   Defining decision making groups in the context of Food Preparation

K-means clustering resulted in 10 clusters with a 72.03% variation in variable values (Appendix K). Table 7 shows the selected variables that defined these clusters. Table 8 summarises different decision making groups by high, medium or low levels of heart health concern.

Table 7. Selected Variable means characterizing decision making groups
Food Preparation

	Variables	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	Group 9	Group 10
1	inf-osf, kno-bel, beh-bel, con-int, att-beh	0.392							0.182	0.45	
2	hhk, beh-bel, cop		0.113	0.069	0.0965						
3	res-acc, beh-bel, att-beh					0.04725	0.375			0.1	0.375
4	res-tim, soc-sup, beh-bel				0.1825						
5	frb, soc-sup, con-ext										
6	hhk, kno-bel, beh bel		0.219					0.083			
7	hhk, soc-sup, beh bel, con-in, con-ext, att-beh	0.464		0.495333				0.659	0.5945		
8	beh-bel, con-ext, att-beh					0.16425		0.197			0.375
9	soc-sup, ext-con, sub-norm			0.113333		0.07525			0.153		

85

Table 8. Heart health concerns when making decisions on Food Preparation

Level of Concern	Decision making clusters	Means of Heart health variables	Heart health variable definition
High	2	0.113 0.219 0.36	- Applies heart health information in food preparation - Aware of heart healthy meal preparation methods - Emphasizes heart healthy meals and considers others preferences when preparing meals
	3	0.069 0.02 0.495	
	7	0.026 0.083 0.659	
Medium	1	0.05 0.082 0.464	- Applies heart health information in food preparation - Aware of heart healthy meal preparation methods - Emphasizes heart healthy meals and considers others preferences when preparing meals
	4	0.097 0.013 0.460	
	8	0.019 0.072 0.594	
Low	5, 6, 9, 10	-	-

5.63 Group 2 (High concern)

Definition

Based on variables 6 and 2 people have an awareness of heart health and apply it to food preparation.

Application

Heart health is a priority in their food preparation. They report reducing fat in their diet by draining fat from meat, skinning chicken and having special recipes for beverages and meats. They cope with meal preparation by making large enough meals for leftovers or using convenience foods.

5.64 Group 3 (High concern)

Definition

Based on variables 7,9 and 2, this group applies heart health skills in meal preparation. They consider other peoples' opinion about meal preparation and value the support and provision they get from family and friends who share in meal preparation.

Application

Transcript comments show, children help with meal preparation, they exchange recipes and information with work colleagues and friends. They cook using low fat recipes, broil meat to drain fat and have skinless chicken. Due to demands on time, they cope by making larger meals that can be eaten as leftovers for the next day.

5.65 Group 7 (High concern)

Definition

Variables 6, 7 and 8 indicate that people are aware of and emphasise heart healthy diets. Food preparation is strongly influenced by situations or others.

Application

They report being on low cholesterol diets, staying away from fat and frying food. They allow others to influence meal preparations because they share meal preparation with children and spouses.

5.66 Description of groups 1 and 8 (Medium concern)

Definition

Based on variables 1 and 7 this group is well informed about heart healthy ways of preparing food, and considers others preferences when preparing meals.

Application

Comments show these are information seekers who have access to information through media or reading articles and recipes. Some information comes from family, friends and medical practitioners. However they report being sceptical of nutrition information and have strong opinions such as eating butter since "margarine is garbage".

They feel they know what is good for others to eat. However, they choose to listen to others when preparing meals for instance draining fat from meat since it bothers a spouse.

They share meal preparation with family and friends.

5.67 Group 4 (Medium concern)

Definition

Variables 2 and 4 characterise people as depending on others to minimise time spent on meal preparation. This group also perceives certain resources are necessary for meal preparation.

Application

Comments show that meal preparation has to fit into work schedules. To cope with this demand, they use microwave cooking, use convenient quick to cook foods like rice or pasta, use the oven by putting food in there and "forgetting" about it. They report making basic meals that don't require a lot of time or fuss and sharing tasks with family members. Although they have time constraints, they "make time" to prepare elaborate meals for guests.

5.68 Description of groups 5 and 10 (Low concern)

Definition

Based on variables 3, 8 and 9 people perceive the need for resources in food preparation. Meal preparation is strongly influenced by others because tasks are shared.

Application

From their comments, necessary resources include materials for canning fruit. Most meals are prepared by a spouse or others outside the family. They enjoy occasional food

preparation such as barbecues.

5.69 Group 6 (Low concern)

Definition

Variable 3 described this group as having access to certain resources when preparing meals.

Application

Comments show they have access to information sources like different magazines and information from family members who they feel are well informed or have attended some heart smart cooking classes. They use non stick cooking pans to reduce the amount of fat used in cooking.

5.70 Group 9 (Low concern)

Definition

Variables 1 and 3 characterise people as being informed about food preparation and perceiving a resource need for food preparation.

Application

They report information is from formal education and the media. Cooking skills were passed on from mothers and other family members. They enjoy cooking and would like to learn new recipes and ways of cooking but they have access to restaurants and therefore don't prepare most meals.

5.8 EXPLANATIONS OF FOOD CHANGE

The construct Food Change, was one of four Outcome Behaviours identified by respondents (see Methods, p.41), and the following analysis also answers Research Question II (see p.27).

5.81 Defining construct links

Pile sorting of concept maps for 25 respondents yielded definitions of construct links for this outcome behaviour and resulted in the following 14 variables.

5.82 Variables and variable definitions

1. hhk, beh-bel, con-in, att-beh

   Defined: Choose to change foods based on heart health knowledge.

2. hhk, beh-bel, con-ext, sub-norm

   Definition: Food change is determined by heart health concern and others opinions and needs.

3. hhk, beh-bel, know-bel

   Definition: Have knowledge on heart healthy diets

4. con-ext, con-bar, att-beh

   Definition: Perceive limitations in changing foods.

5. kno-bel, beh-bel, phys

   Definition: Foods changed to meet physiological need

6. res-acc, beh-bel, con-ext

   Definition: Food changes are influenced by available resources.

7. Inf-osf, hhk, beh-bel, con-in

   Definition: Actively seek heart health information from various sources.

8. norm-bel, beh-bel, att-beh

   Definition: Changes foods eaten to meet social expectations, situations or events.

9. res-fin, beh-bel, cop, con-ext

   Definition: Trying to manage limited finances may result in food changes.

10. res-time, beh-bel, con-ext

    Definition: Time and situations outside their control influence food changes

11. soc-sup, beh-bel, att-beh

    Definition: Others providing or helping in food preparation influence food change.

12. hhk, beh-bel, phys

    Definition: heart health and physiological needs influence food changes

13: res-acc, beh-bel, con-in, att-beh

    Definition: Feel they have to manage certain resources so to change foods eaten.

14: phys, beh-bel, con-in, att-beh

    Definition: Meet body requirements by changing certain foods.

    Variables 1,2,3,7 and 12 have implications for heart

health. The five variables used to define decision making groups included a heart health construct:

- Variable 1 where people change foods based on a concern for heart health.
- Variable 2 where a concern for heart health is seen when people get advice from others.
- Variable 3 where people indicate having knowledge on heart healthy diets.
- Variable 7 describes those who actively seek information from various sources on heart health
- Variable 12 where meeting a physiological need linked to heart health influences food change.

5.83   **Defining decision Making Groups in**
             the Context of Food Change.

The K-means clustering procedure yielded 10 decision making groups. The clusters explained 69.75% of variation in variable values (Appendix K).

Table 9 summarises the means for these decision making groups. Table 10 shows the different decision making groups by high, medium or low levels of heart health concern.

93

Table 9. Selected Variable means characterizing decision making groups
Food Change

	Variables	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	Group 9	Group 10
1	hhk, beh-bel, con-int, att-beh	0.08333	0.189	0.439666			0.4085	0.3902			
2	hhk, beh-bel, con-ext, sub-norm		0.1535					0.2438			0.107
3	hhk, beh-bel, know-bel			0.24							
4	con-ext, con-bar, att-beh		0.1355								0.124
5	kno-bel, beh-bel, phys									0.3	
6	res-acc, be-bel, con-ext	0.422			0.33				0.2025		
7	inf-osf, hhk, beh-bel, con-int							0.2852			
8	norm-bel, beh-bel, att-beh				0.33						
9	res-fin, beh-bel, cop, con-ext										0.203
10	res-time, beh-bel, con-ext					0.1625					
11	soc-sup, beh-bel, att-beh								0.192	0.1	
12	hhk, beh-bel, phys	0.04166		0.114333			0.1835				
13	res-acc, beh-bel, con-int, att-beh	0.251333			0.5	0.29825	0.5		0.4315		
14	phys, beh-bel, con in, att-beh					0.33725	0.408		0.4075	0.4	

Table: 10 Level of Heart health concern in the context of Food Change

Level	Cluster	Variable means	Variable definitions
1	2	0.189 0.153 0.097 0.107 0.074	- Chooses to change foods based on heart health knowledge - Food change is determined by heart health concern and others opinions and needs - Very sure of the knowledge they have on heart healthy diets - Actively seek information from various sources on heart health - Heart health and physiological needs affect food changes
	7	0.39 0.243 0.054 0.285 0.264	
2	1	0.083 0.033 0.016 0.041	-Chooses to change foods based on heart health knowledge - Food change is determined by heart health concern and others opinions and needs - Very sure of the knowledge they have on heart healthy diets - Heart health and physiological needs affect food changes
	3	0.439 0.05 0.24 0.11	
	10	0.07 0.107 0.035 0.035	
3	6	0.408 0.183	- Chooses to change foods based on heart health knowledge - Heart health and physiological needs affect food changes
4	4, 5, 8, 9	-	

5.84 Group 2 (High concern)

Definition

Variables 1,2 and 4 characterised people as choosing to change foods for heart health reasons. They also perceive limitations to making food changes.

Application

Comments show they changed to low calorie dressing and reduced the number of eggs eaten in a day. They seek information healthy eating from medical practitioners and family members.

Limitations that create changes in diet include avoiding certain foods because a family member is allergic to them or eating turnip to improve iron levels and eating certain foods when involved in exercising. They report that seasonal food availability cause changes in diet.

5.85 Group 7 (High concern)

Definition

Based on variables 1,2 and 7 this group seek information on heart health and change foods based on heart health knowledge.

Application

They report seeking information from health services, switching to heart smart cooking using the recipes and suggestions from the heart health project and reading articles on nutrition. They are concerned with maintaining or reducing

weight by increasing fibre, reducing fried chicken, salamis and sugars in their diet.

5.86 Group 1 (Medium concern)

Definition

Variables 1,6,12 and 13 describe people who choose to change their foods to maintain heart health. They consider the opinions of others, the availability of resources and meeting a physiological need.

Application

They report seasonal food changes because in winter fruits and vegetables are not readily available. They feel external pressure from family especially children who make them eat differently so they have changed certain food to meet this demand.

5.87 Group 3 (Medium concern)

Definition

Variables 1,3 and 12 describe people as changing their diet based on heart health knowledge and for physiological reasons.

Application

They report wanting to go on a diet, quitting smoking and eating healthy by reducing fat and meat in their diet. They indicate that omitting or eating certain foods will improve overall physical health and avoid aches and pains. They view fruit and vegetables as remedies for health while coffee, meat

and junk food are detrimental to health.

5.88 Group 10 (Medium concern)

Definition

Based on variables 9,4 and 2 people perceive financial limitation as barriers to change foods. They consider heart health and opinions from others when thinking of food changes.

Application

They report vegetables were not a priority when money was short. If 2% milk is cheaper than 1% then 2% will be purchased. To manage limited finances they watch for food sales.

5.89 Group 6 (Low concern)

Definition

Variables 1,12,13,14 describe people as basing food change on heart health knowledge, available resources to change foods and physiological factors.

Application

Transcript comments show if weight goes up they change cooking methods to reduce fat in food. They change foods depending on taste, preference and weight gain. They are limited in availability of foods when seasons change. Prices of food determine whether to buy chicken at a local farm or from the store.

5.90 Group 4 (Low concern)

Definition

Based on variables 6,8 and 13, food changes are influenced by the availability resources and meeting social expectations and norms.

Application

Comments observed indicate that seasonal availability of food influences changes for example having more tomatoes in summer. Food changes are minimal and occur during certain seasons of the year and only on special occasions like Christmas and Thanksgiving.

5.91 Group 5 (Low concern)

Definition

Variables 10,13 and 14 describe people as changing their foods according to physiological requirements and external influences. They also have to manage resources to effect food changes.

Application

They report that levels of activity like running or exercising determine the foods eaten since the activities change with the season. In summer barbecues, more fruit and fresh vegetables are available. When they have more time they skip meals like breakfast and sleep so foods or meals eaten change depending on available time.

5.92 Group 8 (Low concern)

Definition

Variables 6,11,13 and 14 describe people as changing foods depending on availability of resources, depending on others to provide food and meeting physiological needs.

Application

Comments indicate availability of resources like fishing and hunting deer, which are seasonal cause food changes. Family and friends hunt or fish providing foods that change the diet. They watch what they eat so as not to aggravate physical conditions such as stomach problems and other illnesses which temporarily change the foods eaten.

5.93 Group 9 (Low concern)

Definition

Based on variables 5,11 and 14, people depend on others to provide and implement food changes. Physiological factors also determined food change.

Application

From their comments, eating breakfast with friends at restaurants and having others make meals for them are external influences. They avoided caffeine drinks since these affected sleeping patterns.

5.94 Barriers to action and behaviour change.

When considering general health related behaviours, respondents that had lowest levels of heart health concern, based their food choices on other concerns indicating that there were other priority items in their decision making. These included influence from others, or making food decisions that met the standards and needs of others. Other external influences included financial constraints and social problems.

In deciding on personal food intake, respondents who had no heart health concerns indicated that they were limited in time resources to prepare and eat meals. For those that were generating income, working hours also infringed on their meal times and so time was seen as a barrier to eating heart healthy foods.

Other concerns included pleasing family members especially children and taking into account the food likes and dislikes of the family. They also depended on the presence or absence of others to eat, therefore the social atmosphere around meals was of more concern to them than heart health.

Physiological problems related to illnesses, allergies and inability to eat certain foods were a limitation. This had implications for choosing heart healthy foods because they could aggravate these conditions.

Within the context of food preparation, barriers and limitations to preparing heart healthy foods included the fact

101

that others prepared and chose foods indicating a lack of control in meal preparation, they value the support and provision of important others. Therefore foods are prepared by others limiting their food choices, or prepared for others again limiting their choices.

Eating out at restaurants was seen as a reason for not preparing foods and this again shows that the issue of control is lacking for those that have no heart health concern. This implies that those who control their food preparation and food choices have a better chance of implementing heart healthy eating.

For the food change outcome behaviour, respondents indicated other concerns aside from heart health that determined decisions to change their diets. Availability of food either due to season determined food change and so foods fluctuated between summer and winter when some foods were more available and less expensive.

Special events and occasions also determined food changes for these people in that social norms and values were key to changing food items to fit the Christmas, Thanksgiving and birthday scenarios.

Levels of physical activity although tied in to heart health were reported to be of importance when deciding to change foods so if one was more active, they ate different foods than when not active.

5.95   <u>Participation in MHHP activities.</u>

The following analysis aims to answer Research Question III.

5.96   Food Consumption

Out of the thirty respondents, twelve had participated in a heart health activity while the other eighteen had not been actively involved.

Food variety scores

Those respondents who participated in heart health activities, reported food variety scores ranging from 21 to 35 while those who had not participated in heart health activities reported lower food variety scores ranging from 14 to 29.

Fat Intake

Figure 6, shows that there was no significant difference in fat consumption of those actively involved in MHHP activities and non participants ($P > 0.05$).

Figure 6.

Fat intake for participants and non-participants
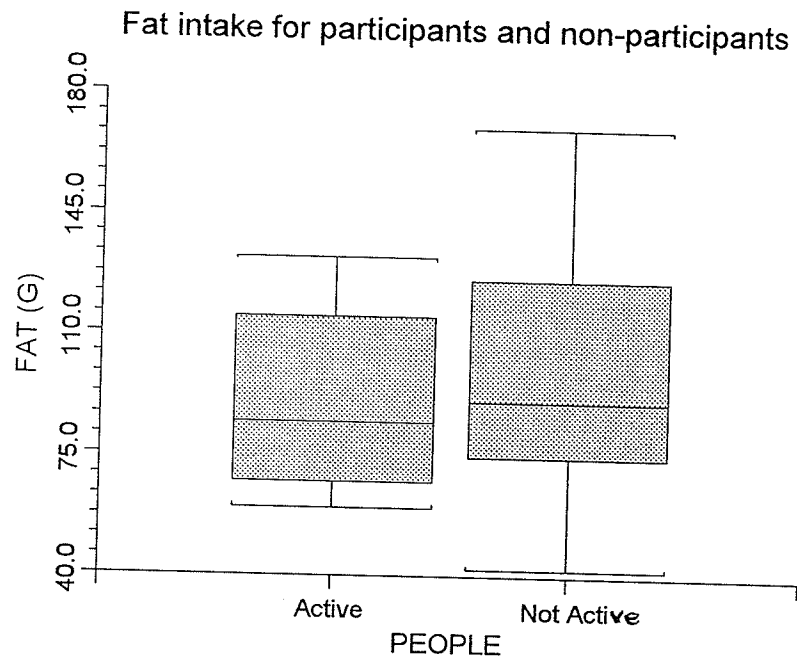
5.97   Heart Health Concern

Results show that those who did not participate in MHHP project activities and those who participated had high and low heart health concern across the four outcome behaviours. Table 11 summarises participants and non participants and their levels of heart health concern. Non parametric chi square tests showed that the two groups were similar in levels of heart health concern ($P > 0.05$).

Table 11. Frequency of participants and non-participants of MHHP activities by Heart Health concern for each of four outcome behaviours.

Health Behavior

People	High	Medium/ Low	Total
Active	4	6	14
Not active	7	7	10
Total	11	13	24

Chi-square (P > 0.05) not significant.

Food Intake

People	High	Medium/Low	Total
Active	5	7	12
Not Active	6	12	18
Total	11	19	30

Chi- square (P > 0.05) not significant,

Food Preparation

People	High	Medium/Low	Total
Active	4	8	12
Not Active	5	13	18
Total	9	21	30

Chi-square (P > 0.05) not significant.

Food Change

People	High	Medium/Low	Total
Active	3	6	9
Not Active	4	12	16
Total	7	18	25

Chi Square (P > 0.05) not significant.

CHAPTER VI

6.0   **DISCUSSION**

6.1   **Dietary patterns**

Food frequency results indicate that respondents had a higher than recommended intake of fat and a lower than recommended intake of carbohydrate based on Nutrition recommendations for Canadians, which state that the Canadian diet should include no more than 30% of energy as fat and it should provide 55% of energy as carbohydrates. These guidelines were targets for work in preventing and reducing risk for cardiovascular disease (Health and Welfare Canada, 1990).

A dietary survey conducted by Sevenhuysen et al. (1993) on fat consumption in Portage La Prairie, confirmed that adults were consuming more fat than recommended. Gelskey et al. (1991) in reporting highlights of the Manitoba Heart Health survey indicated that adults consumed less carbohydrates and more fat than recommended. This implies that there is still a need for nutrition intervention to encourage low fat, high fibre and carbohydrate food choices.

There was no difference in the fat consumption participants and non participants of the MHHP activities. This could suggest several situations. Firstly, nutritional messages may not be effectively implemented. Secondly, there may be other sources of nutrition information available to

107

those who are not aware of MHHP activities. Thirdly, there may be other complex underlying reasons not documented by food intake data, such as those with high concerns previously using more fat and the change to reduced fat changing their intake to the level of people with low concern.

BMI was positively associated with fat consumption ($r= 0.34$) confirming previous study findings. The presence of overweight and obese individuals suggested that fat consumption should be reduced to lower BMI and hence reduce risk for cardiovascular disease (Gelsky et al., 1991).

6.2 Food Variety scores

Wahlqvist et al. (1989) conducted a study using food variety index as an indicator of health in diabetics. A higher variety index was associated with healthy subjects while a low index was reported for people with diabetes. A high FVI was associated with good health while a low FVI was associated with compromised health.

This confirmed our results because those with higher food variety scores tended to have lower BMI ($r= -0.25$) suggesting they were healthier and had lower risk for heart disease than those with high BMI and low food variety scores.

6.3 In-depth Interview and Food Choice Interview

Results, suggest that the in-depth interview and analysis procedures did not provide the same detailed descriptions and interpretations as the Food Choice interview. However both

interviews provided similar data in terms of overall content and subject matter.

The FCM integrated both qualitative and quantitative data in the process of data collection and analysis, while the in-depth interview was limited to qualitative data interpretation. As suggested by Steckler et al. (1992) and Hochbaum (1981) this integration approach yielded rich meaningful data that not only quantified peoples food intake, but added insight to reasons surrounding their food choices.

In the FCM, the use of food pictures in focusing and generating information on food related behaviour allowed respondents to project their thinking and decision making on food in a relaxed manner. The change in interview dynamic was felt to explain part of the difference between in-depth interview and the Food Choice Map. Food stickers provided reference points for the respondent and provided a measure of internal validity.

Following usual qualitative analysis procedures, the in-depth interview can yield reasons and contexts of food choice. The reasons and contexts obtained from each transcript can in turn generate a general, overall conceptual model of determinants of food choice. By contrast, FCM analysis would generate individual decision making patterns. A generic conceptual model would not shed light on the different contexts that exist in the decision making of each individual.

The FCM analysis generated ratio values for construct links making it possible to objectively group people based on detailed data using K-means clustering. The in-depth interview does not supply such information. It would offer descriptions and no numerical values.

In addition to the descriptions of decision making groups, the content of comments made by respondents in the same groups provides real life experiences that are relevant to the design and content of nutrition education materials. This implies that the FCM is a useful tool for tailoring educational interventions to the needs of different subgroups.

The comments of individuals in these groups can also be used to judge the effectiveness of alternative communication or resource allocation strategies aimed at modifying individual behaviour, and the risk of cardiovascular disease. Comparing the two methods clarified the need for a different analysis process of the FCM transcripts given the magnitude of information recorded.

6.4 Behavioral determinants

Respondents reported different decision making patterns across the four outcome behaviours. However, for all outcome behaviours, those with high heart health concerns indicated internal control and motivation in deciding to exercise or attempt to lower fat in their diets. Their views illustrate that they avoided fat, modified some foods by removing excess

fat and substituted high fat foods for lower fat foods. In addition to heart health concern, they used other concepts and constructs in choosing food.

Although some of the people with heart health concern in the context of food preparation were well informed on the subject of heart health they were not highly motivated to put it into practice because they reported being sceptical about nutrition information. This implies that having knowledge does not mean acting on that knowledge, and these people need other sources of motivation to practice heart healthy eating.

Armstrong et al. (1992) conducted an exploratory study on perceptions and behaviours related to reducing dietary fat in adults. They reported 25 behaviours including avoidance, substitution, modification and independent behavioral dimensions like draining grease from foods. They reported that it was difficult for fat reducers to limit fat when eating outside the home or at restaurants, confirming that people perceive less control when others make decisions regarding meals.

Those with low levels of heart health concern, used different concepts in decision making. They do not have direct control in choosing, preparing and changing foods. For them, the concept of family, society and social norms as well as other environmental pressures have a greater impact on their food behaviour decisions than heart health concerns.

This implies that food choices are not solely based on heart health needs. There are barriers, limitations and other priorities to contend with. Conner (1993) conducted a study on individualised measurements of attitudes towards foods based on the theory of reasoned action. Results confirmed that people do not base all their decisions on cognition but also on other concepts or variables including economic, social and environmental influences. The differences are captured in the descriptions of decision making groups identified in Portage La Prairie.

Biggs and Fleury (1994) conducted an exploratory study on perceived barriers in reducing risk for heart disease. Their study confirmed that people lacked motivation to initiate and sustain heart healthy practices. Perceived barriers included inadequate resources like finances, social relationships, environmental factors like work situation, physical responses such as illnesses and allergies and affective responses like personal stressors. Similar patterns were observed for respondents in Portage La Prairie.

6.5 Participation in heart health activities in the community

There was no difference in heart health concern between people active in MHHP activities and those not actively involved. Those who did not participate in heart health activities also indicated high levels of heart health concern, implying that information for awareness of heart health risk

112

factors is available through sources in the community other than the MHHP project. It could be that those not exposed to the intervention were not as sensitised to the importance of heart health or the ones involved in activities were no longer concerned, because there are many people not aware of community interventions yet quite interested in their health.

Findings in this study have emphasised that determinants of food related behaviour differ for various contexts and situations. This implies that nutrition education information or activities should be geared to reaching subgroups of people within different contexts and situations.

CHAPTER VII

7.0   **CONCLUSION**

The two data collection tools utilised in documenting food related behaviours and concepts of decision making were different in terms of process and function. Both the in-depth interview and the food choice interview, with it's analysis technique described food behaviour and the reasons for those behaviours. The FCM analysis procedure, was a reliable process for describing food behaviour. In addition, the analysis procedure offered numerical estimates of behavioral determinants in the way constructs are weighted and assigned values.

This then allowed for objective and automatic grouping of respondents into decision making groups. With this method, new insights into behaviours were made possible while retaining the respondents experiences and point of view. Though both methods provided similar information, the in-depth interview lacked the detail to maintain individual respondent patterns of reasons for behaviour, and could not be used to define different combination of constructs in decision making.

Food intake results indicated that adults were not consuming recommended intakes of energy from fat and carbohydrates. BMI indicated prevalence of overweight and obese people who were at risk for heart disease. Those with high BMI also had low food variety again implying that eating

a wider food variety, would have positive effects on health.

We can conclude that there were no significant differences between those who participated in MHHP activities and those who did not for fat consumption (P > 0.05). They also had no significant difference in levels of heart health concern (P > 0.05). However, results indicate that people with high levels of heart health concern use different constructs when making decisions about food compared to those with lower concern.

These differences were found to depend on the behaviourial context the respondent considered in reporting decisions. This finding suggests that communications aimed at behaviour change should take the various levels of heart health concern, and their contexts, into account to ensure effective transmission of facts and ideas.

The contribution of this research to existing work on behaviourial determinants is to use the pattern of determinants itself as an influence on behaviourial outcomes. The application of the data collection and analysis process to the intervention activities of the MHHP shows new characteristics of groups in the community that can guide future communication for health or food behaviour.

CHAPTER VIII

8.0   FUTURE RESEARCH

Patterns of decision making determinants for different outcome behaviours were described. A study on the similarity of patterns across behaviours for each individual (intra-individual), would give insight into how similar decision making processes are for different behaviours.

Levels of heart health concern were described in detail. Assigning numerical values to the heart health concern variable would offer some associations with other demographic variables, thus validating the Food Choice Map further.

Data from the food maps may be compared to food frequency data giving insight on the utility of food choice maps as a potential dietary assessment tool.

Results from this study have identified subgroups of people and their decision making concepts. Further research would clarify the question of generalising such results to the general population. Results of future studies on decision making groups should have an impact on intervention messages.

New research can determine whether intervention messages or activities can be made more effective by using the understanding of their decision making process. Such studies can also address the balance of costs of new data collection and analysis procedures with the benefit of more effective intervention designs.

REFERENCES

Achterberg, C., 1988. Qualitative methods in nutrition education evaluation research. J. Nutr. Educ., 20:244.

Achterberg, C.L., and Shepherd, S.K., 1992. The components and use of qualitative research, In: Research successful approaches. (Ed) E.R. Monsen., American Dietetic Association press., New Mexico.

Aebi, H.E., 1982. Food acceptance and nutrition: Experiences, intentions, and responsibilities - A review. Food Tech. Austr., 34:374.

Ajzen, I., and Fishbein, M., 1980. Understanding attitudes and predicting social behaviour. Prentice Hall Inc., Engelwood Cliffs N.J.

Armstrong, J.E., Gilliam, J., and Stem, Jr., 1992. Behaviours to reduce dietary fat and related factors in the over-45 population. Home Econ. Res. J., 20:207.

Axelson, M.L., and Brinberg, D., 1993. A Socio-Psychological perspective on food related behaviour. Springer-Verlag, New York.

Bandura, A., 1977. Social Learning Theory. Prentice Hall Inc., Engelwood Cliffs N.J.

Biggs, J., and Fleury, J., 1994. An exploration of perceived barriers to cardiovascular risk reduction. Cardiov. Nurs., 30:41.

Block, G., 1982. A review of validations of dietary assessment methods. Am. J. Epidemiol., 115:492.

Boyle, M.A., and Morris, D.H., 1994. Community nutrition in action. An entrepreneurial approach. West publishing co., St. Paul, MN.

Buzzard, M.I, and Sievert, Y.A., 1994. Research priorities and recommendations for dietary assessment methodology. Am. J. Clin. Nutr., 59:275s.

Chenitz, W.C., and Swanson, J.M,, 1986. From practice to grounded theory: Qualitative research in nursing. Addison-Wesley publishing co., Health Sciences Division, Menlo Park, California.

Clendenen, V.I., Herman, P.C., and Polivy, J., 1994. Social facilitation of eating among friends and strangers. <u>Appetite</u>., 23:1.

Coates, T.J., 1981. Eating- a Psychological dilemma. <u>J. Nutr. Educ</u>., 13:34s.

Conner, M.T., 1993. Individualised measurement of attitudes towards foods. <u>Appetite</u>., 12:943.

Contento, I., 1995. Theoretical frameworks or models for nutrition education, In: The effectiveness of nutrition education and implications for nutrition education policy, programs, and research. A review of research. <u>J. Nutr. Educ</u>., 27:6.

Contento, I., and Balch, G.I., 1995. Nutrition education for adults, In: The effectiveness of nutrition education and implications for nutrition education policy, programs, and research. A review of research. <u>J. Nutr. Educ</u>., 27:6.

Coronios-Vargas, M., Toma, R.B., Tuveson, R.V., and Schutz, I.M., 1992. Cultural influences on food cravings and aversion during pregnancy. <u>Ecol. Food Nutr</u>., 27:43.

Daniel, M., Green, L.W., 1995. Application of the Precede-Proceed planning model in diabetes prevention and control: A case illustration from a Canadian Aboriginal community. <u>Diabet. Spectr</u>., 8:2.

Fishbein, M., and Ajzen, I., 1975. Belief, attitude, intention, and behaviour. An introduction to theory and research. Addison-Wesley Publishing Co., Inc., Philippines.

Gelsky, D., Macdonald, S., Young, K., 1991. Highlights report of the Manitoba heart health survey. Department of Community Health Sciences, University of Manitoba, Winnipeg, Canada.

Gibson, R.S., 1990. Principles of nutritional assessment. Oxford University Press Inc., New York.

Gittelsohn, J., 1992. An approach to the management and coding of data using microcomputers. <u>Indian J. Soc. Work</u>., LIII:611.

Hau, K., 1995. Confirmatory factor analyses of seven locus of control measures. <u>J. Pers. Asses</u>., 65:117.

Health and Welfare Canada., 1990. Action towards healthy eating. Canada's guidelines for healthy eating and recommended strategies for implementation. The report of the communications/ implementation committee.

Hendricks, J., Calasanti, T.M., Turner, H.B., 1988. Foodways of the elderly. Am. Behav. Sci., 32:1.

Hertzeler, A., 1976. A sociologic study of food habits. - A review. J. Am. Dietet. Assoc., 69:377.

Hertzler, A.A, Wenkan, N., and Standal, B., 1982. Classifying cultural food Habits and meanings. J. Am. Dietet. Assoc., 5:421.

Hintze, J.L., 1995. NCSS 6.0 User's Manual. Statistical system for windows. Number Cruncher Statistical Systems publishers., Kaysville, Utah.

Hochbaum, G.M., 1981. Strategies and their rationale for changing peoples eating habits. J. Nutr. Educ., 13:1.

Hodgson, J.M., Hage, B.H., Wahlqvist, M.L., Kouris-Blasos A and Lo, S.C., 1991. Development of two food variety scores as measures for the prediction of health outcomes. Proc. Nutr. Soc. of Austr., 16:62.

Holsti, O.R., 1969. Content analysis for the social sciences and humanities. Addison-Wesley Publishing Co., Inc., Reading, Mass.

Hoorweg, J., and Niemeyer, R., 1980. Preliminary studies of some aspects of Kikuyu food habits. Ecol. Food and Nutr., 9:139.

Houts, S.S., and Warland, R.H., 1989. Rotter's social learning theory of personality and dietary behaviour. J. Nutr. Educ., 21:172.

Kintsch, W., 1988. The role of knowledge in discourse comprehension: A construction-integration model. Psychol. Rev., 95:163.

Kohlmeier, L., 1994. Gaps in dietary assessment methodology: Meal vs list based methods. Am. J. Clin. Nutr., 59:175s.

Kristal, A.R., Abrams, B.F., Thornquist, M.D., Disogra, L., Croyle, R.T., Shattuck, A.L., Henry, H.J., 1990a. Development and validation of a food use checklist for evaluation of community nutrition interventions. Am. J. Public Health., 80:11.

Kristal, A.R., Shattuck, A.L, and Henry, O.J., 1990b. Patterns of dietary behaviour associated with selecting diets low in fat: Reliability and validity of a behavioral approach to dietary assessment. J. Am. Dietet. Assoc., 90:214.

Krondl, M., and Lau, D., 1982. Social determinants in human food selection. In: The psychobiology of human food selection. (Ed) M. Lewis., Avi Publishing Co., Inc., Westport, Connecticut.

Lee-Han, H., McGuire, V., and Boyd, N.F., 1989. A review of the methods used by studies of dietary measurement. J. Clin. Epidemiol., 42:269.

Lewis, C.J., Sims, L.S., and Shannon, B., 1989. Examination of specific nutrition/health behaviours using a social cognitive model. J. Am. Dietet. Assoc., 89:194.

Lorr, M., 1983. Cluster analysis for social scientists. Jossey-Bass Inc., Publishers, San Francisco, California 94104.

Microsoft Corporation., 1994. User's guide Microsoft Word, Version 6.0., Microsoft Corporation, U.S.A.

Miles, M.B and Huberman, M.A., 1994. Qualitative data analyses: An expanded source book. Sage publications, International Educational and Professional Publisher. Thousand Oaks, London.

Murcot, A., 1992. Cultural perceptions of food and eating: Obstacles to change ? Ecol. Food and Nutr., 27:283.

Northern Technical Data., 1995. Demeter: Nutrient analysis for Dos based computers, research program series, version 2.05., Northern Technical Data Inc., Winnipeg, Manitoba, Canada.

Pao, M.E, 1989. Obtaining data on food intake. In: Food intake assessment of the individual. Food and Nutrition Press Inc., Trumbull, Connecticut, U.S.A.

Parraga, I.M., 1990. Determinants of food consumption. <u>J. Am. Dietet. Assoc.</u>, 90:5.

Pelto, G.H., 1981. Anthropological contributions to nutrition education research.<u>J. Nutr. Educ.</u>, 13:1s.

Pennington, J.A.T., 1988. Associations between diet and health: The use of food consumption measurements, nutrient data bases and dietary guidelines. <u>J. Am. Dietet. Assoc</u>,. 88:10.

Perry, C.L., Baranowski, T., and Parcel, G.S., 1990. How individuals, environments, and health behaviour interact: Social Learning Theory, In: Health behaviour and health education. Theory, research and practice. (Eds) K. Glanz, F.M. Lewis, and B.K Rimer. Jossey-Bass Publishers Inc., San Franscisco.

Rappoport, L.H, Peters, R.G, Corzine, L.H, and Downey, R.G., 1992. Reasons for eating: An exploratory cognitive analysis. <u>Ecol. Food Nutr</u>., 28:171.

Rappoport, L., Peters, G.R., Downey, R., McCann, T., and Huff-Corzine, L., 1993. Gender and age difference in food cognition.<u>Appetite</u>., 20:33.

Roering, K.J., Boush, D.M., and Shipp, S.H., 1986. Factors that shape eating patterns: A consumer behaviour perspective, In: What is America eating?. Proceedings of a Symposium by Food and Nutrition Board. National Academy Press, Washington D.C.

Rozin, P., 1990. Acquisition of stable food preferences. <u>Nutr. Rev</u>., 48:106.

Sanjur, D., 1982. Social and cultural perspectives in nutrition. Prentice Hall Inc., Engelwood Cliffs, N.J.

Sevenhuysen, G.P., Gelskey, D., and Macdonald, S., 1991. The Manitoba Heart Health Project. Nutrition survey technical report. Department of Community Health Sciences, Faculty of Medicine, University of Manitoba, Winnipeg, Canada.

Sevenhuysen, G.P., Fieldhouse, P., Young, K.T., McNeil, C., Gelskey, D.E, and MaCdonald, S.M., 1993. The Manitoba nutrition survey: Fat consumption data. <u>Can. J. of Public Health</u>., 84:6.

Sevenhuysen, G.P., March, 1996. Graduate Seminar Presentation: The Food Choice Map. Department of Foods and Nutrition, University of Manitoba, Winnipeg, Canada.

Sevenhuysen, G.P., Gross, U., Trumble-Waddell, J., Tuffs, A., and Kiunga, A.G., 1996. Generating Data for Public Policy and Community Interventions: A user's Guide for The Food Choice Map Method. Department of Foods and Nutrition, University of Manitoba, Winnipeg, Canada [in press].

Shepherd, R., 1989. Handbook of psychophysiology of human eating. John Willey & Sons Ltd., Chichester, New York.

Shepherd, R., and Stockley, L., 1987. Nutrition knowledge, attitudes and fat consumption. J. Am. Dietet. Assoc., 87:615.

Shepherd, S.K., Achterberg C.L., 1992. Qualitative research methodology: Data collection, analysis, interpretation, and verification. In: Research successful approaches., (Ed) E.R. Monsen. American Dietetic Association Press, New Mexico.

Sparks, P., 1993. Commentary from the First Food Choice Conference. Explaining choice and choosing explanations: Comments on social dimensions of food attitudes and choice. Appetite., 20:217.

Sparks, P., Shepherd, R., Wieringa, N., and Zimmermanns, N., 1995. Perceived behavioral control, unrealistic optimism and Dietary change: An exploratory study. Appetite., 24:243.

Steckler, A., McLeroy, K.R., Goodman, M.R., Bird, S.T., McCormic, L., 1992. Toward intergrading qualitative and quantitative methods: An introduction. Health Educ. Quart., 19:1.

Strauss, A., and Corbin, J., 1990. Basics of qualitative research. Sage Publications Inc., Newbury Park, California.

Taylor, J., and Biglow, R., 1989. Introduction to qualitative research methods: The search for meanings. Second edition, John Wiley and sons Inc., New York.

Touliatos, J., and Compton, N.H., 1992. Research methods in human ecology/home economics. Iowa State University Press. Ames, Iowa.

Towler, G. and Shephered R., 1992. Application of Fishbein and Ajzen's expectancy-value model to understanding fat intake. Appetite., 18:15.

Van Dijk, T.A., and Kintsche, W., 1983. Strategies of discourse comprehension. Academic Press Inc., New York 10003.

Wahlqvist, M.L., Lo, S.C., and Myers, K.A., 1989. Food variety is associated with less macrovascular disease in those with type II diabetes and their healthy controls. J. Am. College of Nutr., 6:515.

Weller, S.C., and Romney, A.K., 1988. Systematic data collection, qualitative research methods series 10. Sage Publications, Newbury park, California.

Westenhoefer, J., and Pudel, V., 1993. Pleasure from food: Importance for food choice and consequences of deliberate restriction. Appetite., 20:246.

Winkleby, M.A., Flora, J.A., and Kraemer, H.C., 1994. A community-based heart disease intervention: Predictors of change. Am. J. Public Health., 84:5.

Winkleby, M.A., 1994. The future of community based cardiovascular disease intervention studies. Am. J. Public health., 84:9.

APPENDIX A

Regional map of Manitoba

The Central Region encompasses the middle segment of Manitoba with a population of 95,000. The economy is primarily agriculture and related industry. The following map illustrates the regional boundaries and location of the seven sites participating in the MHHP.

PROVINCE OF MANITOBA
REGIONAL BOUNDARIES

THOMPSON REGION

NORMAN REGION

EASTMAN REGION

INTERLAKE REGION

PARKLANDS REGION

WESTMAN REGION

WINNIPEG REGION

CENTRAL REGION

1. Portage

2. Winkler

3. Seven Regions

4. Morden

5. Carman

6. North Norfolk

7. Altona
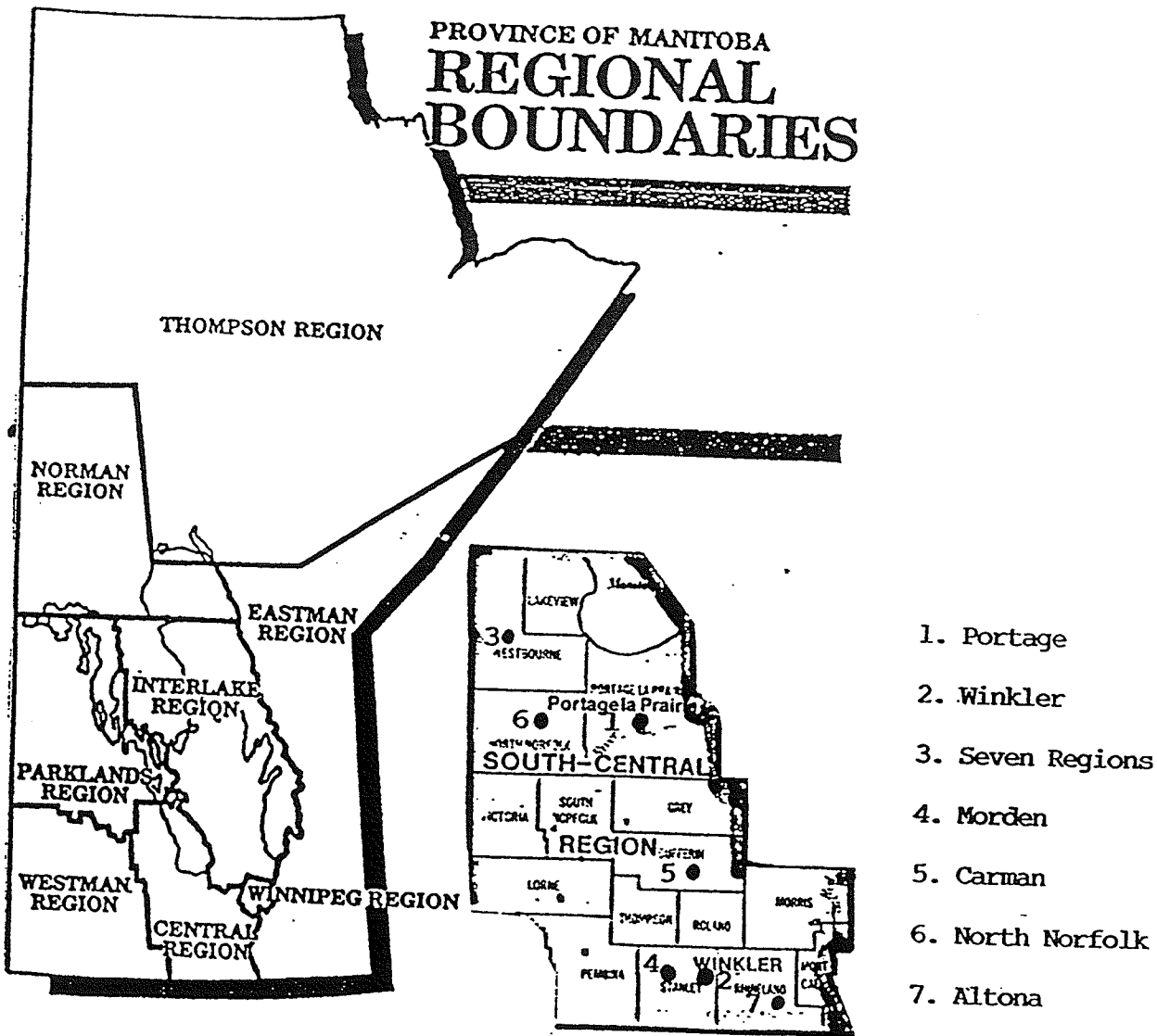
The Intervention office of the MHHP is located at the regional public health office in Portage La Prairie. A full-time Intervention Coordinator and a half-time Assistant to the Coordinator works from this regional office. To assist the seven committees in their heart health promotion programming, each community has hired a paid local contact person. The involvement of the regional public health staff in identifying appropriate individuals for this contract position was very important. Collaboration and partnerships with various groups and levels within the community provides for an integral network of support which contributes greatly to the success of the project.

APPENDIX B

Introductory letter to respondents

MANITOBA HEART HEALTH PROJECT

October 25, 1994

Dear respondent;

As you know, the Manitoba Heart Health Project (MHHP) is active in the Portage La Prairie area. You have already participated in the project by responding to the recent survey, and we appreciate your returning the completed questionnaire to us. The results of the survey will soon be available.

The MHHP would like to introduce Ann Kiunga, a student in the Human Ecology faculty at the University of Manitoba. Ann is interested in learning about food choices that people make, and the factors that influence the choice of foods that people serve/eat.

The MHHP has agreed to assist Ann in her research by introducing her to Portage La Prairie residents, in the hope that they will agree to be interviewed. This letter is our contact to you, a potential respondent for Ann's study.

Enclosed is an introductory letter from Ann, explaining her study in detail, and seeking your consent to be interviewed in the near future. We appreciate your cooperation in this project, as information that Ann collects about food choices that people make will assist the MHHP in providing useful nutrition programs.

We will telephone you in the near future, to obtain your permission for Ann to carry out the interviews at a mutually convenient time.

If you would like to learn more about the Heart Health Project or the research, feel free to contact:

> Mary Smith, Intervention Coordinator
> Manitoba Heart Health Project
>
> Portage La Prairie
> Phone

Yours sincerely,

Ethel Hook
Research Associate
Manitoba Heart Health Project

FACULTY OF HUMAN ECOLOGY

Department of Foods and Nutrition

416 Human Ecology Building
Winnipeg, Manitoba
Canada R3T 2N2

(204) 474-6874 (Office)
(204) 275-5299 FAX
(204) 275-0413 (Res)

October 1994

Dear Participant,

The Department of Foods and Nutrition at the University of Manitoba is carrying out a survey, with the approval of the Ethics Review Committee, on food preferences within Portage La Prairie.

Recent studies suggest that Dietary recommendations encouraging better nutrition to lower the risk for chronic diseases such as cardiovascular disease have not been readily accepted in everyday practice.

This study will be useful in understanding the barriers to change in food preferences. The results will be useful in designing and promoting better heart health activities in your community.

A representative random sample of Portage La Prairie residents is required for the survey. You have been randomly chosen to share your experiences and reasons for certain food choices. You will be interviewed twice in your home at your convenience. The first interview will be a discussion on general food choices and will take approximately 45 minutes. Within 2-3 weeks, the second interview will be conducted. It will be a more detailed discussion on your opinions and reasons for choosing certain foods and will take approximately 45 minutes. Both interviews will be audio taped and the tapes will be maintained, without your name or address listed, until the end of report writing, after which time all information will be deleted from the tapes. You will be measured for weight and height and asked to complete a Manitoba Heart Health questionnaire within the 2-3 week interval. This questionnaire will record your usual intake of certain foods and will be collected at the beginning of the second interview.

Participation is voluntary and non participation does not affect your benefits from the Manitoba Heart Health Project activities or services. In this regard, you will be telephoned in a few days to be asked whether you are interested in joining the study. In the meantime, I would be pleased to answer any questions you have. You may contact me at the above address or telephone numbers.

Thank you for your assistance.

Sincerely,

Ann Kiunga, Researcher
University of Manitoba

APPENDIX C

Consent form

THE UNIVERSITY OF MANITOBA

FACULTY OF HUMAN ECOLOGY

Department of Foods and Nutrition

416 Human Ecology Building
Winnipeg, Manitoba
Canada R3T 2N2

(204) 474-6874 (Office)
(204) 275-5299 FAX
(204) 275-0413 (Res)

November 1994

CONSENT FORM - FOOD CHOICE STUDY   REFERENCE NO.

I understand that the Department of Foods and Nutrition at the University of Manitoba is conducting a study on factors that determine food choices, and that the Manitoba Heart Health Project is assisting in this study. I understand that in participating in the study, I will be interviewed twice in my home with a 2-3 week interval between interviews and these interviews will be audio taped. I understand that at the first interview I will be measured for height and weight.

I understand that I will complete a questionnaire in between the two interviews and hand it to the interviewer at the beginning of the second interview. I understand that I am free to withdraw from the study at any time and that I can choose not to respond to particular questions. My name and address will be deleted from the data records and audio tapes to ensure confidentiality.

I realize participation is voluntary and that there is no remuneration for my involvement.

I _____, the undersigned, agree to participate in the research study described above.

_____   _____
(Signature of Participant)   (Date)

Address: _____

           _____

Tel.   _____

TO BE SIGNED BY THE INTERVIEWER:

To the best of my ability, I have fully explained to the subject the nature of this research study. I have invited questions and provided answers. I believe that the subject fully understands the implications and voluntary nature of the study.

_____   _____
(Signature of Interviewer)   (Date)

APPENDIX D

Food Variety Index: Classification of Foods

Biological Classification of Foods:

	Group		Examples
1	Animal	eggs	
2		milk	
3		dairy (eg. cheese, yogurt)	
4		fish	
5		shellfish (eg. mussels, oysters)	
6		crustaceans (eg. prawns, lobster)	
7		ruminants (eg. sheep, cattle)	
8		monogastric (eg. pig)	
9		poultry (eg. chicken, duck, turkey)	
10		game (eg. rabbit, bird, kangaroo)	Deer
11		liver	
12		brain	
13		giblets	
14	Plant - Vegetables	root, white (potatoes)	Cassava, turnip, radish
15		root, yellow (carrots)	
16		leafy (eg. spinach, cabbage)	
17		marrow	squash, cucumber, labucium,
18		flowers (eg. broccoli, cauliflower)	jackfruit (unripe)
19		stalks (eg. celery)	Asp...
20		onion-like (eg. spring onions)	
21		tomato	
22		peppers (capsicum)	
23		legumes (eg. beans, peas, lentils)	
24		mushroom and other fungi	
25	- Cereals and Grains	morning cereal	
26		corn	
27		oats/porridge	
28		rye(bread)	
29		rice	
30		pastry	
31		biscuits	
32		cake	
33		pasta	
34		bread (white wheat flour)	bun, ...
35		bread (wholemeal wheat flour)	
36	- Fruits	citrus (eg. oranges, lemons)	
37		tropical fruit (eg. mango, papaya, banana)	pineapple, jackfruit ...
38		stone fruit (eg. plums, apricots, cherries, peaches)	
39		apples	
40		pears	
41		berries (eg. strawberries, raspberries)	
42	- Nuts		

	Group		Examples
43	- Confectionary	lollies	
44		chocolate	
45	- Yeast	fermented	
46	Jam	jelly	
47	Added Fat		
48	Added Sugar		
49	Beverages	tea	
50		coffee	
51		alcohol	beer
52		soft drink	non alcoholic
53		water	
54	Animal	insects	
55	Plant	herbs and spices	

APPENDIX E

Construct Definition List

CONSTRUCT	CONSTRUCT DEFINITION	APPLICATION	EXAMPLES
Beh-bel	Behavior beliefs: the beliefs that underlie a person's attitude towards the behavior (Ajzen & Fishbein, 1980)	Belief - An individual's intrinsic information about their behavior and /or environment possessing an attribute. - person's subjective probability judgment concerning some aspect (behavior or action) of their world (Ajzen & Fishbein, 1975).	- I eat healthy - We're both pretty indecisive people - If I cut out my fat, that's when I lose my weight - I don't like to eat deli meats or anything like that
Att-beh	Attitude towards behavior: A personal evaluation of performing the behavior or having a specific opinion (Ajzen & Fishbein, 1980)	- Personal consequence of actions - May be positive or negative - Affect toward the action or behavior	- What we eat is bad - I don't like to eat deli meats or anything like that
Sub-norm	Subjective Norm: Positive or negative perception of social pressure to situations considered socially significant (Ajzen & Fishbein, 1980)	- social influence of affect toward behavior - May be positive or negative - evaluation of a normative belief	- My wife thinks it's best so I do it - My husband says I don't shop as wisely as he does, so I gladly give up
Norm-bel	Normative beliefs: Normative nature. Beliefs that certain referents think the person should or should not perform the behavior in question (Ajzen & Fishbein, 1975).	- Include external stressors - beliefs that are referenced external to the individual	- My mother used to make us eat porridge - It's a tradition, we always do that in our family - guests always expect dessert, that's the way it's done. - Perogies are always eaten with fish, in Ukrainian culture

Con-int	Control Internal: - Personal regulation of goal directed behavior or performance OR person's belief as to how easy or difficult performance of the behavior is likely to be (Ajzen and Madden, 1986) Personal control over outcomes; self efficacy (Bandura, 1977)	- Perception of personal control Internal control : attributes agency to oneself	- I am a whole lot more active in the summer, I go for my power walks - I help out as much as I can
Con-ext		External control: Attributes agency to others, environment or fate	- When my husband used to fish, we used to eat a lot of fish - It's just that everybody talks about fat not being good for you - After his heart surgery it is important that we watch, you know - When the weather is warmer, I can get my wife out for a bike ride
Con-bar	Control barriers: Perceptions of barriers to perform a behavior (FCM working group)	Limitations and situations that the individual finds difficult to overcome or deal with	- You only have so much, you want it to go further - I'd buy it two or three times if we could afford it. But we can't afford to buy it that often - Everything I like has fat in it, so I have to deprive myself often

Cop	Coping: effort made to master, tolerate or reduce demands that tax or exceed a person's resources in terms of physical, social and psychological resources (Cohen and Lazarus, 1979 in Kessler at al., 1985)	Efforts include strategies an individual puts into place when faced with such demands	- I'll make extra rice, him and I will have the rice , but my husband will still have the potatoes - I should be eating more vegetables, I know that's why I chew vitamins - I don't have anymore time than to get the basic (meal)
Frb	Family resource balance: Household resources (money, time, information, health) and proportion of resources available for food acquisition	- Income coming into household: * family, land, social services. * employment See appended description of entitlements, application of family resource balance	- I have to teach at night, I give Piano lessons - My wife works shift work - We grow our own corn and vegetables in our garden
Res-acc	Resource access: The availability of food and the ability to acquire available food (Campbell, 1991) (Reutlinger et al., 1986)	Food security, accessibility, availability as well as service accessibility. Food Security: Access by all people at al times to enough food for an active healthy life, and at a minimum includes: 1) Ready availability of nutritionally adequate and safe foods and 2) The assured ability to acquire personally acceptable foods in a socially acceptable way (Campbell, 1991)	- I don't drive, like I have food delivered - I go to Safeway, they have lots of choice - I don't make breakfast, that's what restaurants are for

Res-fin	Resource finance : Availability of food markets, quantity and quality of food present in those markets related to financial ability to acquire food that is available. (Campbell, 1991)	- limitations or restrictions to food and services due to finances - Ability to command resources	- I'd buy it two or three times if we could afford it. But we can't afford to buy it that often - I bought the 2% milk because it was on sale - He goes all over town wherever he can to get the best price
Res-tim	Resource time : Time is a commodity, a resource, a measure. The functionalist view of time. (Adam, 1995)	The how long,when, what order, or speed of a given task or situation Time integrates experiences in everyday life	- I prepare what I can and in the time I have to prepare it in - I do my weights about three hours a week of weights, and this is whenever I can fit it in - By the time we get cleaned up and do a few chores it's bed time, so there is no time - I am starting to realize actually how much that time is, I have two kids, we have a busy life
Soc-sup	Social support - perceived support by the individual - the emotional , instrumental and financial aid that is obtained from one's social network (Berkman, 1984)	- Physical, emotional and spiritual support - categories of support/assistance: *spouse,significant other, relatives friends, siblings, co-workers, community and others * two components of social interaction and social resources	- Usually my wife does supper unless she's working - When my husband used to fish, we used to eat a lot of fish - We get chicken from the Haderites for free because my husband deals a lot with them
Em	Emotion expressing a feeling towards an action, person, thought or object (FCM working		- It used to be that I used to worry about my weight - I'm happy when my children eat well

			- I hate that stuff with a passion, Kraft dinner, I hate that stuff
Phys	Physiology: physiological factors that affect intake (FCM working group)	A person's subjective probability judgment concerning some aspect (i.e. any physiological responses) of their world (Ajzen & Fishbein, 1975)	- don't feel hungry - I sleep better, I don't have to go to the bathroom so much then - I dare not touch those, I do sometimes and boy, the headaches
Know-bel	General knowledge belief: Correct or incorrect facts that explain their world; a situation or an object (FCM working group)	A person's subjective probability judgment concerning some aspect (any behaviors and non-behaviors) of their world (Ajzen & Fishbein, 1975)	- I'm very aware that this is nutritionally balanced meal - I know homogenized milk has got all the fat in it - I know the aspartame is not good for you, I guess I'm hooked on that as people are to coffee
HH-know	Heart health Knowledge: Correct facts that explain the prevention of heart disease and treatment of a heart condition	A person's understanding of the risk factors for heart disease and the application of Canadian guidelines for healthy eating and lifestyle changes - Enjoy a variety of foods - Emphasize cereals, breads and other grain products - Choose low fat dairy products, lean meats and foods prepared with little or no fat - Achieve and maintain a healthy body weight by regular physical activity and healthy eating - Limit salt, alcohol and caffeine (Health and Welfare Canada, Nutrition	- she was diagnosed with a cholesterol problem and I wasn't - I don't very often eat fried eggs, I don't like them - I usually cook the boneless, skinless chicken breasts - If my weight gets up, I'll cut back some stuff - I feel great when I walk, and eat smaller amounts of meat and eat more vegetables

		Recommendations , 1989)	
Inf-osf	Information outside the family: Information received outside health services or family (FCM working group)	Includes media, friends, work colleagues. Other information sources, libraries, schools	-I have read lots of magazines - We go to the library once a week - I did two years of nursing in University and of course we had to take nutrition
Info-hs	Information health services: Information received from health services (FCM working group)	- Including messages, advise and directions offered by medical or other health professional outside or within a health service premise	- My doctor told me not to eat eggs - When he had his heart surgery, the doctor and dietitian at St. Boniface said it is important that we watch, you know
Ss- cur	Social services-curative: treatment programs that are targeted at specific individuals delivering personal health services to control or cure disease episodes (Remington, 1990)	- could use the construct health services-curative	- I come once a month for treatment, I'll soon be done - When he had his heart surgery, the doctor and dietitian at St. Boniface said it is important that we watch, you know
Ss-prev	Social services-preventive: Disease prevention and health promotion efforts/strategies that benefit the entire community (Remington, 1990)	May relate to the individual or the whole community	- I went to the heart fair, and they told me to lose ten lbs. - I went to weight watchers

Additional Definitions required to understand the constructs

Attitude: A general predisposition, the person is not required to perform any specific behavior, rather it leads to a set of intentions that indicate a certain amount of affect toward the object in question (Ajzen & Fishbein, 1975).

Normative nature: Beliefs that certain referents think the person should or should not perform the behavior in question (Ajzen & Fishbein, 1975).
Note: the totality of normative pressure is subjective norm

Self efficacy
Note: "this and related research thus provides further evidence that although personal control over outcomes (i.e. self efficacy) is important, it is not sufficient for intrinsic motivation . The feelings of competence must be accompanied by perceived autonomy for people to be intrinsically motivated (Deci & Ryan, 1991; Ryan, 1993). Therefore, behavior must also be self determined

Entitlements
A semi legal concept, focusing on the bundles of goods and services that a person can legitimately establish command over, using the laws, regulations, conventions, opportunities and rights ruling in the society in question. This also reflects ownership, on the one hand, and opportunities of production and exchange on the other (Sen, 1984)
This generic construct is further divided into family resource balance (frb) and food security which encompasses resource access (res-acc) and resource finance (res-fin).

Food Security
1. The definition explicitly includes every person at all times, even though defining a situation that seems to be unattainable may seem counter productive, a less inclusive definition cannot be justified on either ethical or nutritional basis

2. Two dimensions accessibility are differentiated; the availability of food and the ability to acquire food (see paper)

3. Enough food for an active, healthy life implies a diet with sufficient energy, nutritional quality and safety to prevent diet mediated malnutrition or limitations in activity levels

4. Food insecurity includes limited or uncertain access to food in socially and personally acceptable ways.(see paper)

Resource Time

Time is a resource, a measure that determines the how long,when, what order,or peed of a task or event. It intergrates and regulates experiences in everyday life; treated as a commodity that has to be handled economically. Contemporary western life continues to be conducted in such time, that is the time of clocks,hours,days,years and calendars. The synchronizing of chores, schedules, commitments, plans and hopes for the future. (Adam, 1995 pp. 74,84)

Heart health knowledge

<u>Diet and exercise recommendations to Prevent Atherosclerosis (CVD)</u>

The goal of dietary measures is to slow the advance of heart disease is to reduce the total blood cholesterol, particularly LDL cholesterol. Abnormal lipid profiles may be due to poor health habits as overeating, overconsumption of fat, or under activity. To normalize their blood lipid profiles, these people may need to change their lifestyles.

To control obesity which is a risk factor, the maintenance of a healthy body fat level is recommended. The onset of obesity especially abdominal or android distribution of fat has been associated with the development of high blood cholesterol, hypertension and diabetes mellitus. (Canadian Dietetic Association, 1990)

To keep total fat down, consumers have to learn to select low fat foods. If the % of calories from fat is to be less than 30%, then it's especially important to limit foods such as cream, butter, margarine, mayonnaise, cream cheese; foods high in hidden fat which include meat marbled with fat ,whole milk , nuts, chocolates and cheeses.

To help lower cholesterol, maintaining a appropriate body weight through exercising and healthy eating. Choose foods high in soluble fibre; oats, oatbran, barley, legumes fruits and vegetables. (Whitney, Hamilton and Rolfes, 1990)

APPENDIX F

Food Choice Interview Guide

FOOD CHOICE INTERVIEW GUIDE.

FOOD FREQUENCY

1. What food do you eat often?

2. When in the day do you usually eat that (mentioned)
    food?

3. Which meal(s) or snack(s) does that food usually belong
    to?

4. Which other foods do you usually eat at this meal or
    snack?

5. How often during a week do you eat these mentioned
    foods during this meal/snack — do you eat these foods
    more often, less often or the same number of times as
    the first one?

6. What other meals or snacks do you eat during the day?

Repeat the next 2 questions for every meal and snack until
the interviewed person agrees that this is the food pattern
for one week

7. What foods do you usually eat at this (newly mentioned)
    meal or snack?

8. How often during a week do you eat these mentioned
    foods during this meal or snack?

FOOD CHOICE

9. What about the first food you mentioned, are there
    other foods that could take its place in that meal?

10. How often do you eat the(se) alternative food(s) — more
    often, less often or as frequent as the food you first
    mentioned?

11. Are there alternative choices for each of the foods in
    their respective meals?

12. How often do you eat these alternative foods — more
    often, less often or as frequent as the food you first
    mentioned?

13. Why do you actually choose the first mentioned food
    more often than the alternative food(s): (taste, price,
    less effort, availability, etc.)?

14. The foods you eat most often are very important for you. Why?

15. Which meals or snacks do you eat alone or with others?

16. Who are the persons?

17. What relationship are the people to you? (specify whether family members, friends, professional relationships, etc)

18. How often do you eat this meal (snack) with these persons?

19. Do you share the money for the foods/meal? With whom/who contributes?

20. Who decides whether to buy cheap or expensive items in the shop/restaurant/vendor?

21. On what occasions do you spend more money on food that usual and which foods are these?

FOOD PREPARATION

22. Where is this meal (ask for every meal of the day!) prepared (come from) usually?

23.* Do you prepare it alone or get help? How long does it take to prepare?

24.* What stops you spending more time on preparation (reasons like house work, work, friends, family)?

25. Why do you prefer restaurant or vendor service food (reasons like taste, friends, less effort, no cooking facility, cooking skills)

26a* Where do you buy your food? (supermarket, small shops, market)

Special additional questions for those persons interviewed living in a family

27a Who in the household gets/earns money or produces something to sell?

28a What are the daily activities (not job label) of the ones who earn money?

29a Who decides within the household which foods are bought? What are the criteria (reasons like taste, liked/disliked by family members, cheap/expensive,

quality, nutrients, health reasons, etc.?

31. Have you changed the amounts you eat or buy of any of these foods/meals in the last 6 months? Which ones?

32. Why did you (or member) have to change or want to change? (reasons like other working/studying field, separation from family, economic, health reasons, etc)

33. Did the amount increase or decrease, and by how much the consumption of any of these foods/meals? Why? (reasons like too hot to eat much food, not hungry, different taste/food preparation, etc.)

34. Are you shortly going to change the amount of any of these foods you eat? Which ones? Why?

35. Where do you get information on the best buys, what is in the food, how healthy it is?

36. Whose opinion is important in making these food choices?

37. Do you feel you have to wait for the decision of any person before buying or spending money? Which person?

APPENDIX G

In-depth Interview Guide

IN-DEPTH INTERVIEW GUIDE: FOOD CHOICE STUDY.

Demographic Information.

Ref. No.-----

Age -------

Age   18-25   26-35   36-45   46-55   56-65   66+

Gender Male ---   Female ---

Ethnic Background/ Area of Family origin

Location of immediately related family

Level of education

Elementary
Secondary / High School
College
University

Employment status

Managerial / Professional
Other White collar
Blue Collar
Student
Retired
Home Maker
Self employed
Unemployed

Regular source of income

Type of transport used on daily basis

Date of last visit to any health service

Frequency of visits to any health service over the last 6 months

Weight in Kgs.------

Height in m -------

Has your weight changed by about 2 Kgs,up or down in the last
twelve months ?

Why do you think this happened/did not happen ?

Are you on any special diet because of health reasons ?

Compared to other people your age, how would you rate your
health ?

Question Guide.

How often do you eat this food item in a week.

(Interviewer reads food item and checks it off in the table).

Food Item   Times in a week.

	0	1	2	3	4	5	6	7	8	>9
Breads, rolls, muffins										
Pasta/Spaghetti										
Fruits										
Green leafy Vegetables										
Potatoes										
French fries										
Whole Milk										
Hard Cheeses										
Eggs										
Ice Cream										
Yoghurt										
Processed Meats										
Roasts/Steak										
Hamburger, regular										
Chicken, with skin										
Chicken, no skin										
Fish										
Butter										
Margarine										
Other Spreads										
Nuts										
Chocolates										
Sauces/ Dressings										
Coffee										

Are you aware of the MHHP activities in Portage ?

1. Have you participated in any of the Manitoba Heart Health
    Project activities?

2* Which ones?

3. Why do you eat this food so often? (from the above recorded
    foods)

4. When in the day do you eat this food?

5. What combination of foods makes a meal?

6. Does that combination differ from a snack?

7. Do you usually eat the same meals or snacks?

8. What other meals or snacks do you usually eat ?

How many people are there in your household ?

9. Who do you usually eat with?

  * What relationship are the people to you?

10. Do you pool income together for food ? with whom / who
    contributes ?

11. How do you get your food ?
    Who does the purchasing of the foods ? Where ?

12. Who chooses the foods you eat?

13. What methods of cooking do you use for meats/chicken/fish?

14. What are your sources of Food and Nutrition information ?
    (Magazines, recipe books, friends...)

15. * Why do you use these particular sources of information?

16. Have you ever received nutrition information ?

17. What would be your most preferred way of obtaining Nutrition
    information ?

APPENDIX H

Manitoba Heart Health Food Frequency Questionnaire

THE MANITOBA HEART HEALTH PROJECT

MANITOBA HEART HEALTH PROJECT

NUTRITION SURVEY

Nutrition

Introduction

The University of Manitoba and Manitoba Health are conducting an important health study in the province. The questions on this form are about food and your health. This information will be used for planning programs in the province. Please take time to answer all questions carefully. This will ensure that the survey will be useful for improving the health of Manitobans.

When answering place an "X" to indicate your response..

eg.   ⊗   Yes

O   No

Write numbers in the boxes provided filling all the boxes.

e.g. |0|3|

Reference No.

V1	V2	V3	V4
□□□	□□□□	□	□□
1 2 3	4 5 6 7	8	9 10
Cluster	Sample	Group	Interviewer

The questions below are about:
- the **kinds** of foods and beverages you eat and drink regularly and
- the **amounts** of foods and beverages you eat and drink regularly.

Complete the chart on the next pages, thinking back over the past year. Include everything you eat and drink at home and away from home.

For every food, mark Yes or No.

If Yes:

- write number of times
- mark Day or Week or Month
- mark one of the three serving sizes.

Here are some examples showing how to complete the chart...

Bob drinks homo milk three times a day - about 1 cup each time.
This is how he would show that on the chart.

		Do you have this food or beverage at least once a month?	About how many *times* per day or week or month?	About how much do you have *each time*?		
2.	Homo (whole) milk and beverages made with it	⊗Yes → ONo	|0|3|	⊗Day OWeek OMonth	⊗ 1 cup	O more than 1 cup	O less than 1 cup

Sue eats shreddies for breakfast five times a week, 3/4 cup each time.
She would record her cereal this way.

| 14. | Bran Flakes, Corn Bran, Muffets, Shredded Wheat, Shreddies, Weetabix | ⊗Yes → ONo | |0|5| | ODay ⊗Week OMonth | ⊗ 3/4 cup | O more than 3/4 cup | O less than 3/4 cup |

	Do you have this food or beverage at least once a month?	About how many times per day or week or month?		About how much do you have *each time*?	

Bob eats steak once a week, 8 ounces each time.
He would show that on the food chart like this.

25.	Roast beef and steak	⊗Yes → ○No	|0|/|	○Day ⊗Week ○Month	○ 4 ounces	⊗ more than 4 ounces	○ less than 4 ounces

Sue eats spaghetti and meatballs once a month, 1 1/2 cups each time.
She would show that on the chart like this.

44.	Spaghetti, lasagna, other pasta with meat-tomato sauce	⊗Yes → ○No	|0|/|	○Day ○Week ⊗Month	○ 2 cups	○ more than 2 cups	⊗ less than 2cups

Bob eats green peas 2 times a week, 1/2 cup each time.
He would record his green peas like this.

56.	Green peas	⊗Yes → ○No	|0|2|	○Day ⊗Week ○Month	⊗ 1/2 cup	○ more than 1/2 cup	○ less than 1/2 cup

Sue drinks tomato juice twice a week, 1/2 cup each time.
This is how she would show that on the chart.

74.	Tomato, mixed vegetable juices	⊗Yes → ○No	|0|2|	○Day ⊗Week ○Month	⊗ 1/2 cup	○ 1 cup	○ more than 1 cup

Bob drinks tomato juice once every 3 or 4 months.
He would show that on the chart like this.

74.	Tomato, mixed vegetable juices	○Yes → ⊗No	|_|_|	○Day ○Week ○Month	○ 1/2 cup	○ 1 cup	○ more than 1 cup

		Do you have this food or beverage at least once a month?	About how many *times* per day or week or month?	About how much do you have *each time*?		

White or Chocolate Milk to Drink

1.	2% milk and beverages made with it	○Yes → ○No	[| |]	○Day ○Week ○Month	○ 1 cup	○ more than 1 cup	○ less than 1 cup
2.	Homo (whole) milk and beverages made with it	○Yes → ○No	[| |]	○Day ○Week ○Month	○ 1 cup	○ more than 1 cup	○ less than 1 cup
3.	1% milk and beverages made with it	○Yes → ○No	[| |]	○Day ○Week ○Month	○ 1 cup	○ more than 1 cup	○ less than 1 cup
4.	Skim milk and beverages made with it	○Yes → ○No	[| |]	○Day ○Week ○Month	○ 1 cup	○ more than 1 cup	○ less than 1 cup
5.	Milkshakes	○Yes → ○No	[| |]	○Day ○Week ○Month	○ small	○ regular	○ large

Cheese, Yogurt and Eggs

6.	Hard cheeses such as cheddar	○Yes → ○No	[| |]	○Day ○Week ○Month	○ 1 inch cube	○ more than 1 inch cube	○ less than 1 inch cube
7.	Processed cheese slices (Including on sandwiches and hamburgers)	○Yes → ○No	[| |]	○Day ○Week ○Month	○ 1 slice	○ 2 slices	○ less than 2 slices
8.	Cottage Cheese	○Yes → ○No	[| |]	○Day ○Week ○Month	○ 1/2 cup	○ more than 1/2 cup	○ less than 1/2 cup
9.	Cheese spreads	○Yes → ○No	[| |]	○Day ○Week ○Month	○ 1 tbsp.	○ more than 1 tbsp.	○ less than 1 tbsp.
10.	Yogurt	○Yes → ○No	[| |]	○Day ○Week ○Month	○ small container	○ 1/2 cup	○ more than 1/2 cup
11.	Eggs	○Yes → ○No	[| |]	○Day ○Week ○Month	○ 1 egg	○ 2 eggs	○ 3 or more eggs

Nutrition

		Do you have this food or beverage at least once a month?	About how many *times* per day or week or month?	About how much do you have *each time*?		

Breakfast cereals

12.	Oatmeal porridge, oat bran	○Yes → ○No	[| |]	○Day ○Week ○Month	○ 3/4 cup	○ more than 3/4 cup	○ less than 3/4 cup
13.	All-bran, 100% Bran, Fibre-One, Fibre Plus Bran Buds, Fibre Up, Fruit and Fibre	○Yes → ○No	[| |]	○Day ○Week ○Month	○ 3/4 cup	○ more than 3/4 cup	○ less than 3/4 cup
14.	Bran Flakes, Corn Bran, Muffets, Shredded Wheat Shreddies, Weetabix	○Yes → ○No	[| |]	○Day ○Week ○Month	○ 3/4 cup	○ more than 3/4 cup	○ less than 3/4 cup
15.	Any other cooked or dry cereal such as Cream of Wheat, Corn Flakes, Rice Krispies	○Yes → ○No	[| |]	○Day ○Week ○Month	○ 3/4 cup	○ more than 3/4 cup	○ less than 3/4 cup

16. If you eat cereal, do you usually add sugar?   ○Yes   ○No

17. Which **ONE** of the following do you use most often on your cereal?

○Cream/Half & Half   ○Homo (whole) milk   ○2% milk   ○1% milk   ○Skim milk

Bread, Rolls and Muffins

	Do you have this food or beverage at least once a month?	About how many times per day or week or month?	About how much do you have each time?		
18. Whole wheat or light rye bread and rolls	○Yes → ○No	└┴┘	○Day ○Week ○Month	○ 1-2 slices	○ 3-4 slices	○ 5 or more slices
19. Dark rye, pumpernickel, fibre-enriched bread and rolls	○Yes → ○No	└┴┘	○Day ○Week ○Month	○ 1-2 slices	○ 3-4 slices	○ 5 or more slices
20. White, Italian, French, egg, raisin bread and rolls	○Yes → ○No	└┴┘	○Day ○Week ○Month	○ 1-2 slices	○ 3-4 slices	○ 5 or more slices
21. Bran or corn muffins	○Yes → ○No	└┴┘	○Day ○Week ○Month	○ 1 muffin	○ 2 muffins	○ 3 or more muffins
22. Any other muffins such as blueberry, plain, chocolate chip	○Yes → ○No	└┴┘	○Day ○Week ○Month	○ 1 muffin	○ 2 muffins	○ 3 or more muffins
23. Bannock	○Yes → ○No	└┴┘	○Day ○Week ○Month	○ 1 biscuit size	○ 2 biscuit size	○ 3 or more biscuit size

	Always	Usually	Sometimes	Rarely,Never
24. If you eat bannock, do you...				
– fry it	○	○	○	○
– bake it	○	○	○	○
25. If you eat bread or bannock do you add ...				
– butter, margarine or lard	○	○	○	○
– mayonnaise, salad dressing or cheese spread	○	○	○	○
– peanut butter	○	○	○	○
– jelly, jam, honey or other sweet spread	○	○	○	○
26. If you eat muffins, do you add				
– butter, margarine or cream cheese	○	○	○	○
– mayonnaise, salad dressing or cheese spread	○	○	○	○
– peanut butter	○	○	○	○
– jelly, jam, honey or other sweet spread	○	○	○	○

Meat, Poultry and Fish

	Do you have this food or beverage at least once a month?	About how many times per day or week or month?	About how much do you have each time?		
27. Roast beef and steak	○Yes → ○No	└┴┘	○Day ○Week ○Month	○ 4 ounces	○ more than 4 ounces	○ less than 4 ounces
28. Roast pork and pork chops	○Yes → ○No	└┴┘	○Day ○Week ○Month	○ 4 ounces	○ more than 4 ounces	○ less than 4 ounces
29. Liver, any type	○Yes → ○No	└┴┘	○Day ○Week ○Month	○ 4 ounces	○ more than 4 ounces	○ less than 4 ounces
30. Fried chicken, nuggets, chicken sandwiches	○Yes → ○No	└┴┘	○Day ○Week ○Month	○ 2 pieces/ 6 nuggets/ 1 s'wich	○ 4 pieces/ 9 nuggets/ 2 s'wich	○ more than 4 pieces/ 9 nuggets/ 2 s'wich
31. Barbecued chicken	○Yes → ○No	└┴┘	○Day ○Week ○Month	○ quarter chicken	○ half chicken	○ 2 pieces or slices
32. Any other chicken, turkey or other poultry	○Yes → ○No	└┴┘	○Day ○Week ○Month	○ 1-2 slices	○ 3-4 slices	○ 5 or more slices
33. Fried fish, fried fish sandwiches	○Yes → ○No	└┴┘	○Day ○Week ○Month	○ 1 piece/ sandwich	○ 2 pieces/ sandwich	○ 3 or more pieces/ sandwiches
34. Any other fish, canned, fresh or frozen, such as tuna	○Yes → ○No	└┴┘	○Day ○Week ○Month	○ 1 piece/ 1/4 cup	○ 2 pieces/ 1/2 cup	○ 3 or more pieces/ 3/4 cup
35. Hamburgers and cheeseburgers	○Yes → ○No	└┴┘	○Day ○Week ○Month	○ single pattie	○ double pattie	○ more than 3 single or 2 double patties

	Always	Usually	Sometimes	Rarely,Never
36. If you eat meat or chicken do you add gravy?	○	○	○	○
37. If you eat meat, do you eat the fat on it?	○	○	○	○
38. If you eat chicken do you eat the skin?	○	○	○	○
39. If you eat fish do you have tartar sauce or mayonnaise with it?	○	○	○	○

		Do you have this food or beverage at least once a month?	About how many times per day or week or month?	About how much do you have each time?		
40.	Wieners, hot dogs	○Yes → ○No	└┴┘	○Day ○Week ○Month	○ 1 regular	○ 1 large/ 2 regular	○ more than 1 large/2 regular
41.	Bacon	○Yes → ○No	└┴┘	○Day ○Week ○Month	○ 1-2 slices	○ 3-4 slices	○ 5 or more slices
42.	Sausage	○Yes → ○No	└┴┘	○Day ○Week ○Month	○ 1/2 links	○ 3-4 links	○ 1-2 large sausages
43.	Cold cuts, luncheon meats such as bologna, salami, chicken loaf, ham	○Yes → ○No	└┴┘	○Day ○Week ○Month	○ 1-2 slices	○ 3-4 slices	○ 5 or more slices

Other Meals

		Do you have this food or beverage at least once a month?	About how many times per day or week or month?	About how much do you have each time?		
44.	Meat and chicken pies	○Yes → ○No	└┴┘	○Day ○Week ○Month	○ 1 slice/ small pie	○ 2 slices/ small pies	○ 3 or more slices/sm pies
45.	Meat and fish stews	○Yes → ○No	└┴┘	○Day ○Week ○Month	○ 1 cup	○ more than 1 cup	○ less than 1 cup
46.	Spaghetti, lasagna, other pasta with meat-tomato sauce	○Yes → ○No	└┴┘	○Day ○Week ○Month	○ 2 cups	○ more than 2 cups	○ less than 2 cups
47.	Macaroni and cheese, other pasta dishes with cheese	○Yes → ○No	└┴┘	○Day ○Week ○Month	○ 2 cups	○ more than 2 cups	○ less than 2 cups
48.	Pizza	○Yes → ○No	└┴┘	○Day ○Week ○Month	○ 1-2 slices	○ 3-4 slices	○ 5 or more slices
49.	Any other mixed dishes made with ground meat, fish or chicken	○Yes → ○No	└┴┘	○Day ○Week ○Month	○ 1 cup	○ more than 1 cup	○ less than 1 cup
50.	Any other pasta, such as noodles	○Yes → ○No	└┴┘	○Day ○Week ○Month	○ 1 cup	○ more than 1 cup	○ less than 1 cup
51.	Perogies	○Yes → ○No	└┴┘	○Day ○Week ○Month	○ 4-6	○ more than 4-6	○ less than 4-6
52.	Rice, any type	○Yes → ○No	└┴┘	○Day ○Week ○Month	○ 1 cup	○ more than 1 cup	○ less than 1 cup

Vegetables

		Do you have this food or beverage at least once a month?	About how many times per day or week or month?	About how much do you have each time?		
53.	French fries, home fries, pan fried potatoes	○Yes → ○No	└┴┘	○Day ○Week ○Month	○ Regular fries	○ large fries	○ 1 cup
54.	Any other potatoes - baked, boiled, salad	○Yes → ○No	└┴┘	○Day ○Week ○Month	○ 1 cup	○ more than 1 cup	○ less than 1 cup
55.	Broccoli	○Yes → ○No	└┴┘	○Day ○Week ○Month	○ 1/2 cup	○ more than 1/2 cup	○ less than 1/2 cup
56.	Carrots, raw and cooked	○Yes → ○No	└┴┘	○Day ○Week ○Month	○ 1/2 cup	○ more than 1/2 cup	○ less than 1/2 cup
57.	Corn	○Yes → ○No	└┴┘	○Day ○Week ○Month	○ 1/2 cup/ small cob	○ more than 1/2 cup	○ less than 1/2 cup
58.	Green peas	○Yes → ○No	└┴┘	○Day ○Week ○Month	○ 1/2 cup	○ more than 1/2 cup	○ less than 1/2 cup
59.	Green beans, string beans, yellow beans	○Yes → ○No	└┴┘	○Day ○Week ○Month	○ 1/2 cup	○ more than 1/2 cup	○ less than 1/2 cup
60.	Any other beans, peas, lentils - lima, navy baked, pork and beans	○Yes → ○No	└┴┘	○Day ○Week ○Month	○ 1/2 cup	○ more than 1/2 cup	○ less than 1/2 cup
61.	Squash, all types	○Yes → ○No	└┴┘	○Day ○Week ○Month	○ 1/2 cup	○ more than 1/2 cup	○ less than 1/2 cup
62.	Salad - combination lettuce and tomato	○Yes → ○No	└┴┘	○Day ○Week ○Month	○ 1 cup	○ more than 1/2 cup	○ less than 1/2 cup
63.	Any other salads such as coleslaw, carrot, bean, spinach	○Yes → ○No	└┴┘	○Day ○Week ○Month	○ 1 cup	○ more than 1 cup	○ less than 1 cup
64.	Any other vegetables such as cabbage brussel sprouts	○Yes → ○No	└┴┘	○Day ○Week ○Month	○ 1/2 cup	○ more than 1/2 cup	○ less than 1/2 cup

	Always	Usually	Sometimes	Rarely,Never
65. If you eat potatoes or rice do you add butter, margarine, gravy or sour cream?	O	O	O	O
66. If you eat vegetables, do you add butter, margarine, cheese or other sauce	O	O	O	O
67. If you eat salads, do you add – diet, low fat, low calorie dressings or mayonnalse,	O	O	O	O
– or regular mayonnalse, salad dressing, or salad oll?	O	O	O	O

	Do you have this food or beverage at least once a month?	About how many times per day or week or month?	About how much do you have each time?		

Fruit

68. Apples, applesauce	OYes → ONo └┴┘	ODay OWeek OMonth	O 1 apple/ 1/2 cup	O 2 apples/ 1 cup	O more than 2 apples/1cup
69. Bananas	OYes → ONo └┴┘	ODay OWeek OMonth	O 1 banana	O 2 bananas	O 3 or more bananas
70. Oranges, nectarines	OYes → ONo └┴┘	ODay OWeek OMonth	O 1 orange/ nectarine	O 2 oranges nectarines	O 3 or more oranges/ nectarines
71. Pears, peaches fresh or canned	OYes → ONo └┴┘	ODay OWeek OMonth	O 1 fruit/ 1/2 cup	O 2 fruit 1 cup	O more than 2 fruit/1 cup
72. Raisins, prunes, other dried fruit	OYes → ONo └┴┘	ODay OWeek OMonth	O 1/2 cup	O 1 cup	O more than 1 cup
73. Any other fruit, Including berrles and fruit cocktall and salad	OYes → ONo └┴┘	ODay OWeek OMonth	O 1 fruit/ 1/2 cup	O 2 fruit/ 1 cup	O more than 2 fruit/1 cup

	Do you have this food or beverage at least once a month?	About how many times per day or week or month?	About how much do you have each time?		

Beverages

74. Orange juice	OYes → ONo └┴┘	ODay OWeek OMonth	O 1/2 cup	O 1 cup	O more than 1 cup
75. Apple, other citrus juices	OYes → ONo └┴┘	ODay OWeek OMonth	O 1/2 cup	O 1 cup	O more than 1 cup
76. Tomato, mixed vegetable juices	OYes → ONo └┴┘	ODay OWeek OMonth	O 1/2 cup	O 1 cup	O more than 1 cup
77. Fruit drinks such as Tang, Kool-Ald	OYes → ONo └┴┘	ODay OWeek OMonth	O 1/2 cup	O 1 cup	O more than 1 cup
78. Regular soft drinks not diet	OYes → ONo └┴┘	ODay OWeek OMonth	O small/ 1 can	O medium	O large
79. Coffee	OYes → ONo └┴┘	ODay OWeek OMonth	O 1 small cup	O 2 small cups	O 3 or more small cups
80. Tea	OYes → ONo └┴┘	ODay OWeek OMonth	O 1 small cup	O 2 small cups	O 3 or more small cups

81. If you drink coffee... -do you add sugar?　OYes　ONo

82. - which ONE of the following do you use most often?

ONo milk or cream　OCream or evaporated whole milk　OHomo(whole) milk or evaporated 2% milk　O2% milk　O1% milk　OSkim milk

83. If you drink tea... -do you add sugar?　OYes　ONo

84. - which ONE of the following do you use most often?

ONo milk or cream　OCream or evaporated whole milk　OHomo (whole) milk evaporated 2% milk　O2% milk　O1% milk　OSkim milk

Nutrition

	Do you have this food or beverage at least once a month?	About how many *times* per day or week or month?	About how much do you have *each time*?		

Desserts and Snacks

85.	Ice cream, ice milk, sherbet	◯Yes → ◯No	└┴┘	◯Day ◯Week ◯Month	◯ 1 scoop	◯ 2 scoops	◯ 3 or more scoops
86.	Cake	◯Yes → ◯No	└┴┘	◯Day ◯Week ◯Month	◯ 1 slice	◯ 2 slices	◯ 3 or more slices
87.	Pie	◯Yes → ◯No	└┴┘	◯Day ◯Week ◯Month	◯ 1 slice	◯ 2 slices	◯ 3 or more slices
88.	Cookies, crackers	◯Yes → ◯No	└┴┘	◯Day ◯Week ◯Month	◯ 1-5	◯ 5-10	◯ More than 10
89.	Doughnut, danish, croissant	◯Yes → ◯No	└┴┘	◯Day ◯Week ◯Month	◯ 1	◯ 2	◯ 3 or more
90.	Potato chips	◯Yes → ◯No	└┴┘	◯Day ◯Week ◯Month	◯ small bag	◯ more than small bag	◯ less than small bag
91.	Popcorn	◯Yes → ◯No	└┴┘	◯Day ◯Week ◯Month	◯ 2 cups	◯ more than 2 cups	◯ less than 2 cups
92.	Peanuts, other nuts, seeds	◯Yes → ◯No	└┴┘	◯Day ◯Week ◯Month	◯ 1/2 cup	◯ more than 1/2 cup	◯ less than 1/2 cup
33.	Chocolate	◯Yes → ◯No	└┴┘	◯Day ◯Week ◯Month	◯ regular bar	◯ large bar	◯ 2 pieces

---

Nutrition

94. Any other food or beverage you have at least once a month? If so, please give the *name, number of times eaten*, and *amounts each time.*

_____ └┴┘ ◯Day ◯Week ◯Month _____

_____ └┴┘ ◯Day ◯Week ◯Month _____

_____ └┴┘ ◯Day ◯Week ◯Month _____

	Do you use them at least once a month	About how many *capsules or tablets* per day or week or month	How much calcium in each capsule or tablet?		
95. Calcium supplements	◯Yes → ◯No	└┴┘ ◯Day ◯Week ◯Month	◯ 50-300 mg	◯ 301 - 900 mg	◯ More than 900 mg

96. Are you presently following a special diet?

◯Yes   ◯No

97. Was this diet prescribed by a doctor or any other person who gives treatments or advice?

◯Yes   ◯No

- Who?

◯Doctor
◯Nutritionist or dietitian
◯Other_____ (specify)

Please use the space below for any comments which you would like to add.
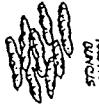
APPENDIX I

Completed Food Choice Map

FOOD CHOICE MAP   Respondent ID....

Name

	1	2			5	6	

Milk powder

BREAK FAST

+3

LUNCH

MILK powder

p.m.

+4

DINNER

APPENDIX J

Generic construct/concept map

Mapped Variables for each of four Outcome Behaviours

10 Variables for Health care bahaviours
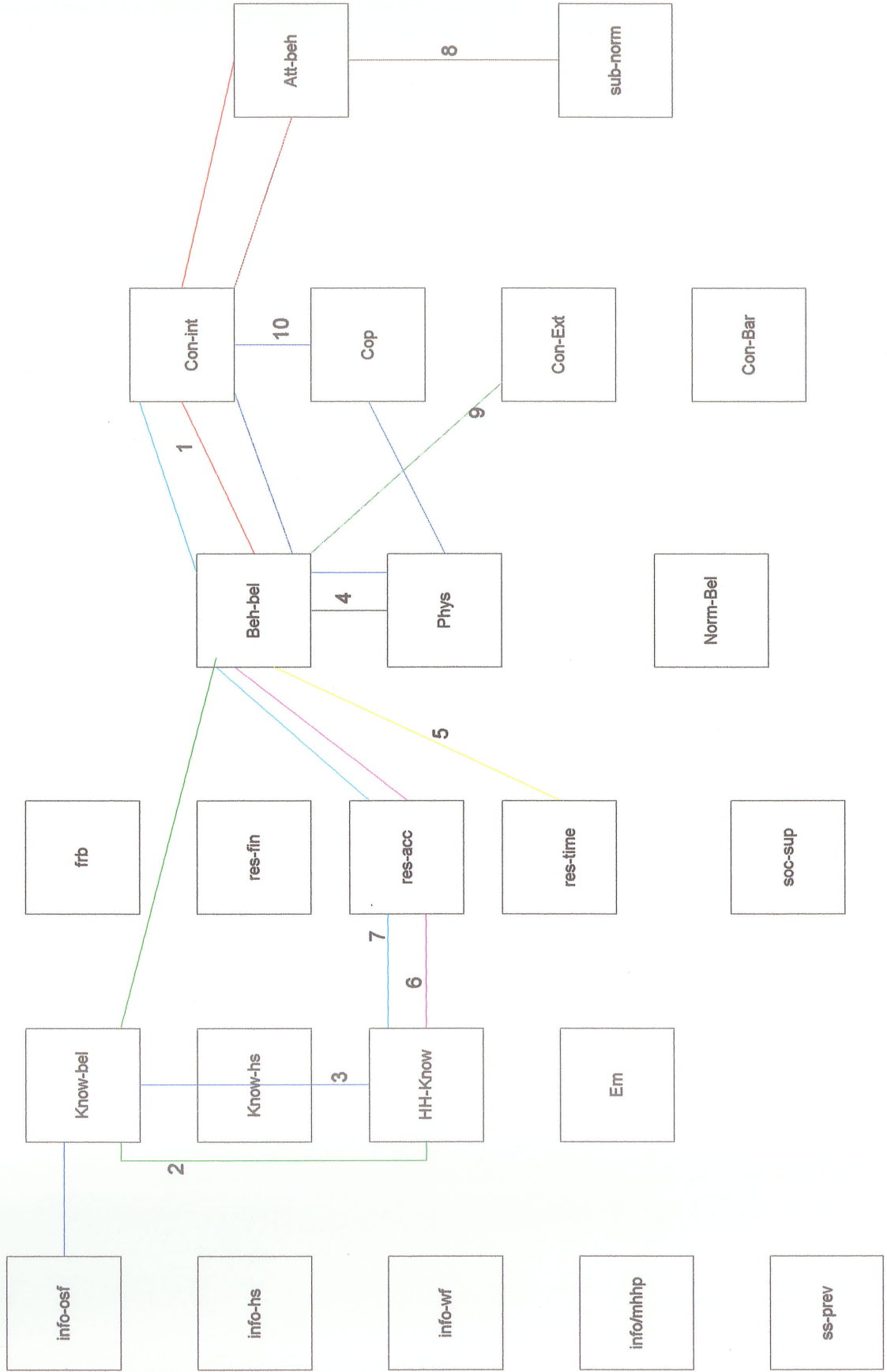
Att-beh

sub-norm

Con-int

Cop

Con-Ext

Con-Bar

6

13

3

Beh-bel

Phys

2

Norm-Bel

5

14

frb

res-fin

res-acc

res-time

soc-sup

1

11

10

8

9

Know-bel

Know-hs

HH-Know

Em

7

4

info-osf

info-hs

info-wf

info/mhp

ss-prev

12
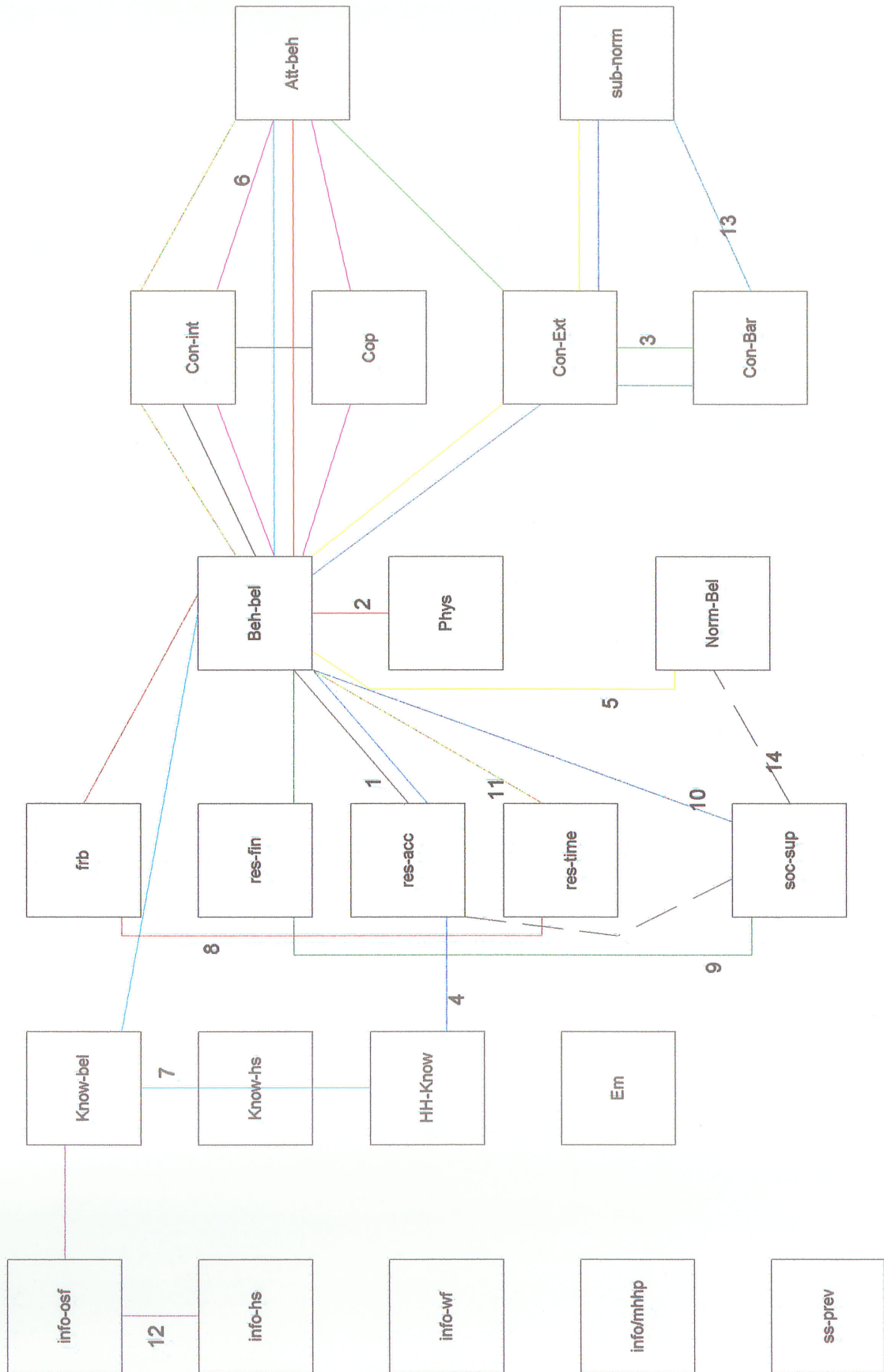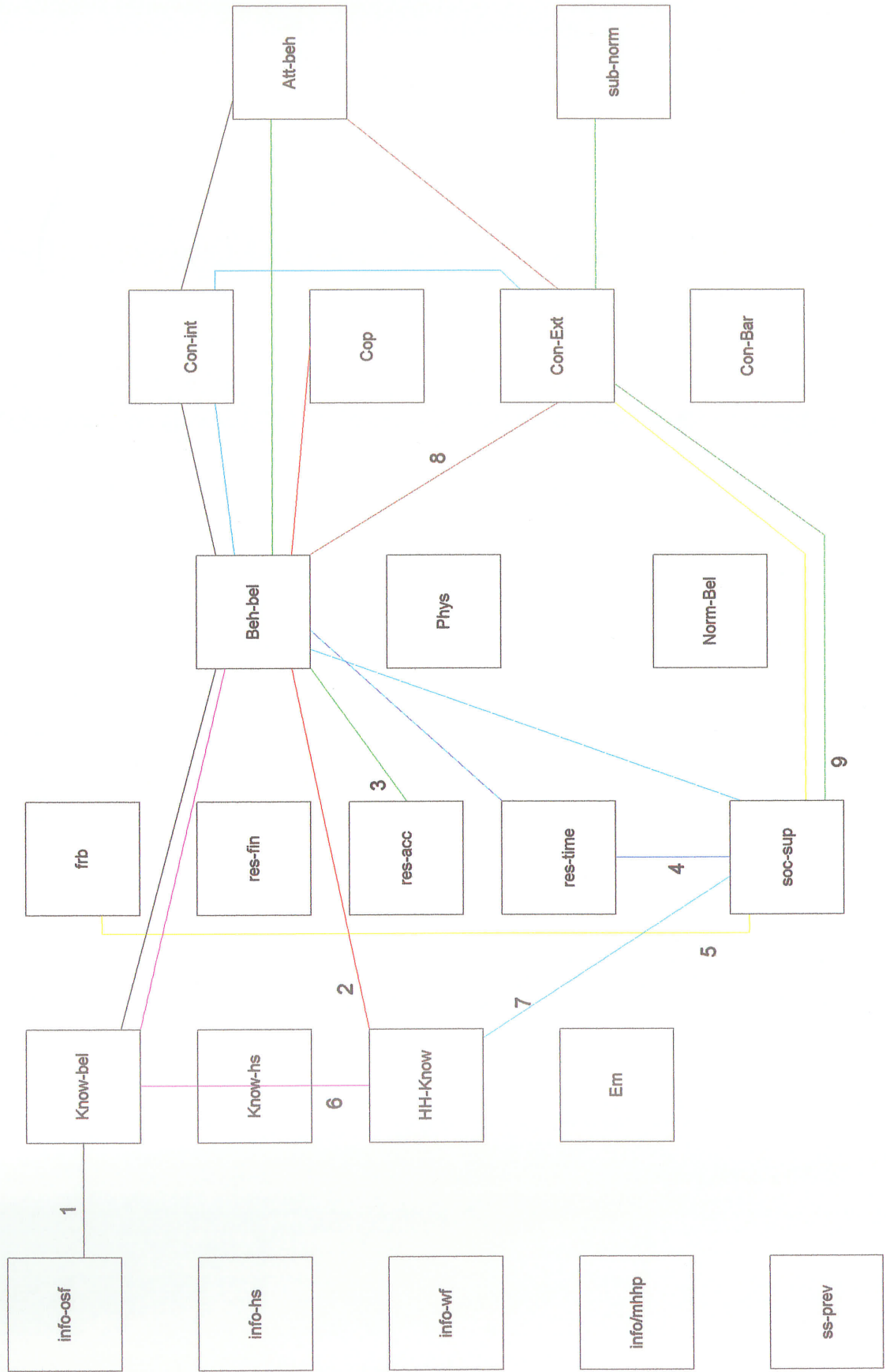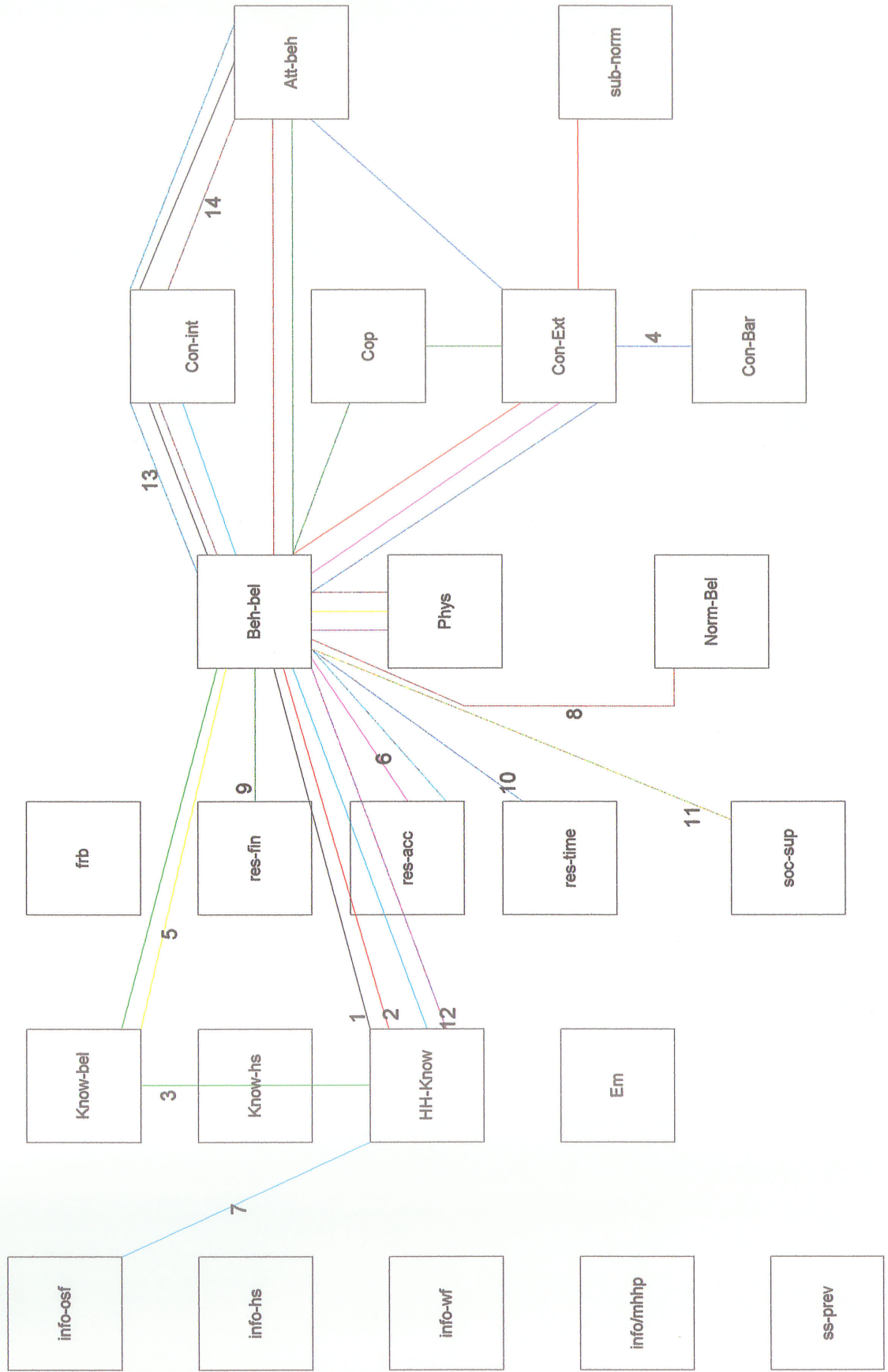
APPENDIX K

K-Means Cluster analysis report for each of four Outcome Behaviours

K-Means Cluster Analysis Report

(OB)   HEALTH BEHAVIOURS

Minimum Iteration Section

Iteration No.	No. of Clusters	Percent of Variation	Bar Chart of Percent
1	5	43.54	|||||||||||||
3	6	35.80	||||||||||
5	7	31.86	|||||||||
8	8	26.90	|||||||||
10	9	22.98	|||||||
12	10	19.99	||||||

Iteration Section

Iteration No.	No. of Clusters	Percent of Variation	Bar Chart of Percent
1	5	43.54	|||||||||||||
2	5	43.54	|||||||||||||
3	6	35.80	||||||||||
4	6	35.80	||||||||||
5	7	31.86	|||||||||
6	7	33.47	||||||||||
7	8	27.34	|||||||||
8	8	26.90	|||||||||
9	9	23.74	||||||||
10	9	22.98	|||||||
11	10	21.48	|||||||
12	10	19.99	||||||

Page 2
Database C:\ANN\ANNHB2.S0
Time/Date 10:41:19 12-06-1995

Cluster Means

Variables	Cluster1	Cluster2	Cluster3	Cluster4
v1	0	0.0743	0	0.0976
v2	0.49	0	0	0.1984
v3	0.2679	0	0	0.0838
v4	0.133	0.1783333	0	0.1558
v5	0	0.1076667	0	0
v6	0	0.2006667	0	0.0406
v7	0	0.3103333	0	0.0602
v8	0	0	0	0.0078
v9	0	0	0.1439	0.0045
v10	0	0.148	0	0.1236
Count	3	3	1	5

Variables	Cluster5	Cluster6	Cluster7	Cluster8
v1	0.16	0.166	0.1605	0.11875
v2	0.2293333	0.1955	0.0555	0.0925
v3	0.087	0	0	0
v4	0.066	0.0955	0.1084	0.0965
v5	0	0	0.05458	0
v6	0	0.2249	0.1087	0
v7	0	0.3529	0.216	0
v8	0.2043333	0.057	0.0525	0
v9	0.0146	0.04557	0.0828	0
v10	0.2126667	0.3445	0.16656	0.40225
Count	3	2	2	4

K-Means Cluster Analysis Report

(OB) HEALTH BEHAVIOURS

Cluster Means

Variables	Cluster9
✓v1	0.4903333
✓v2	0.1276667
v3	2.766667E-02
v4	2.766667E-02
v5	0
v6	0.022
✓v7	6.666667E-02
v8	0
v9	0
v10	0
Count	3

Cluster Standard Deviations

Variables	Cluster1	Cluster2	Cluster3	Cluster4
v1	0	0.1281718	0	6.959382E-02
v2	0	0	0	4.763717E-02
v3	0	0	0	6.385296E-02
v4	0	6.960125E-02	0	3.636894E-02
v5	0	1.921805E-02	0	0
v6	0	6.278004E-02	0	5.802413E-02
v7	0	5.278573E-02	0	8.438127E-02
v8	0	0	0	1.744133E-02
v9	0	0	0	8.944272E-03
v10	0	0.2563435	0	0.1743124
Count	1	3	1	5

K-Means Cluster Analysis Report

(0B) FOOD INTAKE

Minimum Iteration Section

Iteration No.	No. of Clusters	Percent of Variation	Bar Chart of Percent
1	6	49.04	|||||||||||||||
6	7	43.56	||||||||||||||
7	8	38.69	|||||||||||
11	9	34.11	|||||||||||
13	10	31.34	||||||||||

Iteration Section

Iteration No.	No. of Clusters	Percent of Variation	Bar Chart of Percent
1	6	49.04	|||||||||||||||
2	6	51.28	||||||||||||||||
3	6	49.75	|||||||||||||||
4	7	45.10	|||||||||||||||
5	7	44.51	|||||||||||||||
6	7	43.56	||||||||||||||
7	8	38.69	|||||||||||
8	8	38.69	|||||||||||
9	8	41.73	|||||||||||||
10	9	37.20	|||||||||||
11	9	34.11	|||||||||||
12	9	36.65	|||||||||||
13	10	31.34	||||||||||
14	10	31.38	||||||||||
15	10	31.34	||||||||||

Page 2
Database C:\NCSS60\FI.S0
Time/Date 21:01:01 02-06-1996

(08) FOOD INTAKE

Cluster Means

Variables	Cluster1	Cluster2	Cluster3	Cluster4
1	0.2223333	0.231	0.16041	0.0735
2	0.1556667	0.164	0.1996	0.1335
3	3.266667E-02	1.214286E-02	0.00886	0.068
5	0.033	7.414286E-02	0.106	0.0145
5	0.1726667	0.1335714	0.1294	0
6	0.3453333	0.3425714	0.2608	0.1175
7	0.1356667	0.1345714	0.249	0.0295
8	0	0.049	0.0322	0
9	0	0.031	0.0536	0.147
10	0.1786667	0.1414286	0.11	0
11	0	0.2935714	0.1724	0.1665
12	2.166667E-02	0	0.0582	0.0145
13	7.066666E-02	2.871429E-02	0.0206	0.064
14	4.833333E-02	2.771429E-02	0.0064	0
Count	3	7	5	2

Variables	Cluster5	Cluster6	Cluster7	Cluster8
1	0.19425	0.1343333	0	0.134
2	0.219	7.866666E-02	0.184	0.109
3	0.02025	2.466667E-02	0	0.122
5	0.095	6.033333E-02	0.076	0
5	0	0.2656667	0.0535	0.182
6	0.359	0.1693333	0	0.158
7	0.32725	0.1223333	0.2645	0
8	0.0765	5.333333E-02	0.072	0.183
9	0.0265	2.766667E-02	0.0135	0
10	0.03325	0.3176667	0.103	0.183
11	0.21325	0.162	0.3765	0.171
12	0	2.333333E-02	0	0
13	0	0.1206667	0	0.146
14	0.0025	3.433333E-02	0.0355	0.012
Count	4	3	2	1

K-Means Cluster Analysis Report

Food Intake

(oB) FOOD INTAKE

Cluster Means

Variables	Cluster9	Cluster10
1	0	0.156
2	0.1595	0
3	0	0
4	0.027	0.063
5	0.1525	0.313
6	0	0.156
7	0.027	0.094
8	0.1255	0
9	0	0
10	0.2	0.219
11	0.2375	0.156
12	0.027	0
13	0	0
14	0.024	0.31
Count	2	1

Cluster Standard Deviations

Variables	Cluster1	Cluster2	Cluster3	Cluster4
1	5.257693E-02	4.554119E-02	0.0259191	0.1039447
2	4.864497E-02	5.738176E-02	5.018765E-02	6.434672E-02
3	0.0170098	1.744925E-02	0.0130269	2.828427E-02
4	4.403408E-02	4.040804E-02	4.608687E-02	0.0205061
5	2.421432E-02	3.026471E-02	5.150534E-02	0
6	4.673685E-02	5.937412E-02	0.0342301	0.1661701
7	0.1458984	7.338905E-02	4.176123E-02	0.0417193
8	0	0.0280654	2.531205E-02	0
9	0	2.908035E-02	3.785895E-02	0
10	5.713435E-02	2.187736E-02	7.118638E-02	0
11	0	8.714137E-02	0.1260885	0.2354666
12	1.877054E-02	0	1.736951E-02	0.0205061
13	1.965536E-02	3.620182E-02	3.823349E-02	9.050967E-02
14	1.556706E-02	1.883007E-02	8.792042E-03	0
Count	3	7	5	2

K-Means Cluster Analysis Report

(OB)   FOOD PREPARATION

Minimum Iteration Section

Iteration No.	No. of Clusters	Percent of Variation	Bar Chart of Percent
2	6	43.63	|||||||||||||||
6	7	38.27	|||||||||||
7	8	33.98	||||||||||
10	9	30.86	||||||||||
13	10	27.67	|||||||||

Iteration Section

Iteration No.	No. of Clusters	Percent of Variation	Bar Chart of Percent
1	6	48.31	|||||||||||||||||
2	6	43.63	|||||||||||||||
3	6	45.04	||||||||||||||||
4	7	43.45	|||||||||||||||
5	7	40.72	||||||||||||
6	7	38.27	|||||||||||
7	8	33.98	||||||||||
8	8	36.24	||||||||||
9	8	33.98	||||||||||
10	9	30.86	||||||||||
11	9	31.96	||||||||||
12	9	30.92	||||||||||
13	10	27.67	|||||||||
14	10	27.97	|||||||||
15	10	27.97	|||||||||

K-Means Cluster Analysis Report

(08) FOOD PREPARATION

Cluster Means

Variables	Cluster1	Cluster2	Cluster3	Cluster4
1 C2	0.3929	0.10133333	0	0
2 C3	0.05147	0.11310	0.0698	0.09659
3 C4	0.10328	9.133333E-02	4.533333E-02	8.866667E-02
4 C5	0.08428	0	2.366667E-02	0.18251
5 C6	0.00626	1.433333E-02	6.266667E-02	1.766667E-02
6 C7	0.0828	0.21910	2.366667E-02	1.366667E-02
7 C8	0.4647	0.36066675	0.49533333	0.4603333
8 C9	0.11327	0.0784	6.766666E-02	9.483334E-02
9 C10	0.06167	0	0.11333333	4.966667E-02
Count	5	3	3	6

Variables	Cluster5	Cluster6	Cluster7	Cluster8
1 C2	0	0	4.933333E-02	0.1828
2 C3	0	0	0.0236	0.0195
3 C4	0.047253	0.3759	5.566667E-02	0.0455
4 C5	0	0	5.733333E-02	0.1459
5 C6	0	0	0	0.10310
6 C7	0	0	0.0831	0.07257
7 C8	0	0	0.65910	0.59159
8 C9	0.164258	0	0.1979	0.0955
9 C10	0.075256	0	0.036	0.15310
Count	4	1	3	2

K-Means Cluster Analysis Report

(OB) FOOD PREPARATION

Cluster Means

Variables	Cluster9	Cluster10
C2	0.45	0
C3	0	0
C4	0.17	0.375
C5	0	0
C6	0	0
C7	0	0
C8	0	0
C9	0.052	0.375
C10	0	0
Count	2	1

Cluster Standard Deviations

Variables	Cluster1	Cluster2	Cluster3	Cluster4
C2	6.310309E-02	0.1755145	0	0
C3	5.517971E-02	5.311309E-02	5.985817E-02	7.627516E-02
C4	5.169816E-02	0.0347035	5.064912E-02	6.290204E-02
C5	3.537937E-02	0	4.099187E-02	3.408666E-02
C6	1.386362E-02	2.482606E-02	1.115049E-02	1.972477E-02
C7	2.941088E-02	1.509967E-02	4.099187E-02	3.347636E-02
C8	7.581887E-02	0.3298429	0.181288	1.885382E-02
C9	5.424666E-02	7.391211E-02	3.200521E-02	6.204326E-02
C10	4.074064E-02	0	1.738773E-02	0.0320853
Count	5	3	3	6

K-Means Cluster Analysis Report

(OB) FOOD CHANGE

Minimum Iteration Section

Iteration No.	No. of Clusters	Percent of Variation	Bar Chart of Percent
1	6	48.77	|||||||||||||||
4	7	42.85	|||||||||||||
7	8	39.08	||||||||||||
11	9	34.26	||||||||||
14	10	30.25	|||||||||

Iteration Section

Iteration No.	No. of Clusters	Percent of Variation	Bar Chart of Percent
1	6	48.77	|||||||||||||||
2	6	52.81	||||||||||||||||
3	6	50.02	|||||||||||||||
4	7	42.85	|||||||||||||
5	7	44.90	|||||||||||||
6	7	44.41	|||||||||||||
7	8	39.08	||||||||||||
8	8	39.21	||||||||||||
9	8	41.49	||||||||||||
10	9	35.19	||||||||||
11	9	34.26	||||||||||
12	9	36.64	||||||||||
13	10	30.72	|||||||||
14	10	30.25	|||||||||
15	10	30.25	|||||||||

(OB) FOOD CHANGE

Cluster Means

Variables	Cluster1	Cluster2	Cluster3	Cluster4
v1	8.333334E-02	0.189	0.4396667	0
v2	3.333334E-02	0.1535	5.066667E-02	0
v3	1.666667E-02	0.097	0.24	0
v4	0	0.1355	2.033333E-02	0
v5	0	0.105	0.086	0
v6	0.422	0.174	4.533333E-02	0.33
v7	0	0.107	0	0
v8	0	0.0515	0.1116667	0.33
v9	0	0	4.033333E-02	0
v10	0	0	0	0
v11	1.433333E-02	0.0565	0	0
v12	4.166667E-02	0.074	0.1143333	0
v13	0.2513333	0.266	0.177	0.5
v14	0	0.2275	0.2173333	0
Count	3	2	3	1

Variables	Cluster5	Cluster6	Cluster7	Cluster8
v1	0	0.4085	0.3902	0
v2	0	0	0.2438	0
v3	0	0	0.054	0
v4	0	0	0	0.079
v5	0	0	0.0114	0
v6	0.179	0.125	0.1084	0.2025
v7	0	0	0.2852	0
v8	0	0	0.1096	0
v9	0	0.0835	0	0.0395
v10	0.1625	0	0	0.0525
v11	0	0	0.0266	0.192
v12	0	0.1835	0.1078	0
v13	0.29825	0.5	0.2644	0.4315
v14	0.33725	0.408	0.227	0.4075
Count	4	2	5	2

Page   3
Database   A:\FCHG.S0
Time/Date   14:23:08 02-12-1996   *(OB) FOOD CHANGE*

Cluster Means

Variables	Cluster9	Cluster10
v1	② ① 0	⑤ 7 0.0715 12
v2	② ① 0	⑥ 1 0.107 19
v3	② ① 0	① 0 2
v4	② ① 0	⑨ 1 0.124 21
v5	22 ⑫ 0.3	⑦ 3 0.0265 10
v6	17 ⑦ 0.2	④ 13 0.1595 17
v7	② ① 0	⑧ 4 0.0355 12
v8	② ① 0	① 0 2
v9	② ① 0	⑩ 4 0.203 24
v10	② ① 0	⑨ 0.0895 18
v11	19 ⑨ 0.1	⑦ 4 0.0355 11
v12	② ① 0	③ 4 0.0355 9
v13	14 ③ 0.2	① 9 0.0895 10
v14	21 ⑧ 0.4	③ 7 0.0715 10
Count	1	2

Cluster Standard Deviations

Variables	Cluster1	Cluster2	Cluster3	Cluster4
v1	0.1443376	8.626702E-02	0.1523166	0
v2	5.773503E-02	3.606245E-02	8.775724E-02	0
v3	2.886751E-02	6.505382E-02	6.902174E-02	0
v4	0	0.0106066	3.521837E-02	0
v5	0	2.828427E-03	0.0779487	0
v6	0.1894123	4.384062E-02	0.0546382	0
v7	0	0.1513208	0	0
v8	0	0.072832	3.781975E-02	0
v9	0	0	6.985939E-02	0
v10	0	0	0	0
v11	2.482606E-02	2.899138E-02	0	0
v12	7.216878E-02	4.24264E-03	0.1009175	0
v13	0.2295764	2.262742E-02	0.1623545	0
v14	0	3.181981E-02	0.1883463	0
Count	3	2	3	1