DEMOGRAPHICS AND BELIEFS OF CONSUMERS INDICATING PREFERENCE FOR HEALTHY FOOD OR DIETARY SUPPLEMENTS

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Dissertation submitted in the School for Physiology, Nutrition and Consumer Sciences at the Potchefstroomse Universiteit vir Christelike Hoër Onderwys in partial fulfilment of the requirements of the degree Magister Scientiae (Dietetics)

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AUTHORS' PERMISSION

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Authors' contributions

The contribution of each of the researchers involved in this study is given in the following table:

Name	***Role in the study***
WC du Toit M.Sc (Dietetics)-candidate	Responsible for literature searches, processing of data, statistical analysis, interpretation of results and writing of manuscript.
CS Venter D.Sc (Nutritionist/Dietitian)	Co-supervisor. Supervised the writing of the manuscript.
JC Jerling Ph.D (Nutritionist)	Supervisor. Supervised the statistical analysis and writing of the manuscript.

The following is a statement from the co-authors confirming their individual role in the study and giving their permission that the article may form part of this mini-dissertation.

I declare that I have approved the above-mentioned article, that my role in the study, as indicated above, is representative of my actual contribution and that I hereby give my consent that it may be published as part of the M.Sc mini-dissertation of Wilna du Toit.

Prof. CS Venter

Prof. JC Jerling

OPSOMMING

Gesonde voedsel en/of dieetsupplemente kan in die konteks van 'n gesonde lewenstyl gebruik word of om te kompenseer vir 'n ongesonde lewenstyl. Verbruikers neem toenemend beheer van hulle gesondheid deur voedselkeuses te manipuleer of dieetsupplementregimes te gebruik. Deur verbruik oor segmente te analiseer, kan bemarkers die optimale teiken vir enige spesifieke gesondheid- en welstandprodukte vasstel. Bemarkers kan bemarkersplanne saamstel vir die gemeenskaplike motiewe, gelowe en gedrag van die optimale teikensegment en met hulle kommunikeer deur algemene invloedryke bronne met sinvolle boodskappe wat tot hulle motiverings spreek. Gesondheidsorgberoepslui kan goeie kwaliteit, teikengerigte onderrig en intervensieprogramme ontwikkel indien hulle kennis dra van die voorkeure van hulle kliënte. Dit is dus belangrik om gesonde voedsel- en supplementverbruik en -voorkeure van die Suid-Afrikaanse verbruiker te identifiseer.

Doelstelling: Die doel van hierdie studie was om vas te stel watter demografiese en ander determinante geassosieer word met die individu se keuse tussen dieetsupplemente of gesonde voedsel.

Respondente/Opset: 'n Ewekansige steekproef van 1997 verbruikers in metropolitaanse gebiede, verteenwoordigend van die geslagsverspreiding, ouderdomsverspreiding en bevolkingsgroepe in Suid-Afrika het aan hierdie studie deelgeneem. Die data is geweeg, sodat dit verteenwoordigend van die totale Suid-Afrikaanse metropolitaanse verbruikerspopulasie is. Vraelyste, bestaande uit 17 voedselverwante afdelings, is deur navorsers en besigheidsvennote ontwikkel. Een van die afdelings het verskeie stellings oor voedsel, dieetsupplemente, gesondheid en siektetoestande bevat. MARKINOR, 'n marknavorsingsmaatskappy is gekontrakteer om die data in te samel. Verbruikers wat gesonde voedsel verkies is vergelyk met respondente wat supplemente verkies deur die onderskeidende demografie en opinies te identifiseer. Beskrywende veranderlikes het in geslag, ouderdomsgroep, maandelikse inkomste, ras, maatstaf van lewenstandaard (LSM), onderrig en kinders ingesluit, asook verskeie eetgewoonte en voedselverwante stellings.

Statistiese analise: Die kwantitatiewe data gegenereer deur die projek is met behulp van die STATISTICA®-program gedoen, om sodoende relevante tabelle, beskrywende statistiek en statistiese toetse te genereer.

Resultate: Ongeveer 61% (n=6 526) van die respondente het gesonde voedsel verkies, terwyl 20% (n=2 086) supplemente verkies het. Veral mans, mense ouer as 50 jaar, individue met 'n maandelikse inkomste van R9 000 – R17 999, Indiërs, LSM 7- of 8-respondente, individue met sekondêre onderrig en dié sonder kinders toon 'n voorkeur vir gesonde voedselkeuses. Hierdie individue is van opinie dat voedsel nie net vir genot is nie, maar ook vir gesondheidonderhouding. Die Suid-Afrikaanse verbruiker met 'n voorkeur vir supplemente sluit in: vrouens, 18-49-jariges, die met 'n maandelikse inkomste van R2 999 of minder, swartes, LSM 2-respondente, dié met geen of primêre onderrig en/of mense met kinders. Die hooffokus van respondente met 'n dieetsupplementvoorkeur was op die medisinale waarde van supplemente en dat voedsel alleenlik vir genot is.

Toepassing/Gevolgtrekkings: Sover ons kennis strek, was hierdie studie die eerste poging om voorkeure vir gesonde voedsel en supplemente in Suid-Afrika vas te stel. Verdere navorsing word benodig om te identifiseer watter supplemente of gesonde voedseltipes deur Suid-Afrikaners gebruik word in 'n poging om gesondheid te verbeter. Dit word aanbeveel dat 'n gepaste wetenskaplike instrument hiervoor ontwikkel word.

ABSTRACT

Healthy food and/or supplements may be used in the context of a healthy lifestyle or as a means to compensate for an unhealthy lifestyle. Consumers are increasingly taking charge of their health and manipulate food choices or use dietary supplement regimes. By analysing usage across segments, marketers can determine the optimum audience for any specific health and wellness product. Marketers can develop marketing plans to the common motives, beliefs and behaviours of the optimal target segment, and communicate with them through common sources of influence with meaningful messages that speak to their motivations. Healthcare professionals can mount high quality, targeted education and intervention programmes for consumers by getting to know their clients' beliefs. It is, therefore, important to identify healthy food and supplement use of South African consumers.

Objective: The purpose of this study was to determine which demographic factors and other beliefs are associated with an individual's choice between the usage of supplements or the eating of healthy food.

Subjects/Setting: A random sample of 1997 metropolitan consumers representative of the gender distribution, age distribution and population groups in South Africa was chosen. The data were weighted, so that they would be representative of the total South African metropolitan consumer population. Questionnaires consisting of 17 food related sections were designed by researchers in cooperation with business partners. One of the sections contained a number of statements about food, dietary supplements, health and disease. MARKINOR, a marketing research company, was contracted to collect the data. Consumers preferring healthy food were compared with supplement choosers with regard to demographic and belief factors. Explanatory variables included gender, age group, monthly income, race, living standard measure (LSM), education and children, as well as different eating habit and food related statements.

Statistical analysis: The quantitative data produced by the survey were analysed by using the Statistica®-programme in order to generate the relevant tabulations, descriptive statistics and statistical tests.

Results: About 61% (n= 6 526) of the respondents reported healthy food preference, while 20% (n= 2 086) stated they preferred supplements. Especially males, people older than 50 years, individuals with a monthly income of R9 000 – R17 999, Indians, LSM 7 or 8 respondents, individuals with secondary schooling and people with no children indicated a preference for healthy food. These individuals indicated the belief that food is not only for enjoyment but also for health maintenance. The South African consumer preferring supplements included: females, 18 to 49 year olds, people with a monthly income of up to R2999, blacks, LSM 2, people with no or primary schooling and/or people with children. The main focus of dietary supplement choosers was the medicinal value of supplements and the enjoyment value of food.

Applications/Conclusions: To our knowledge, this study was the first attempt to characterize the healthy food and supplement choosers in South Africa. Further research is needed to identify which supplements or healthy foods are used by South African consumers in order to ensure their health. It is recommended that a suitable scientific instrument be developed to this effect.

CONTENTS

LIST OF TABLES

LIST OF ABBREVIATIONS

ADA	American Dietetic Association
AHA	American Heart Association
AI	Adequate intake
AMA	American Medical Association
AMPS™	All Media and Products Survey
ANOVA	Analysis of variance
d	Effect size
DRIs	Dietary Reference |Intakes
DSHEA	Dietary Supplement and Health Education Act
EAR	Estimated average requirements
FBDGs	Food based dietary guidelines
FDA	Food and Drug Administration
HPA	Health Products Association
LSM	Living standards measure
MCC	Medicine Control Council
NCDs	Non-communicable diseases
NFCS	National Food Consumption Survey
NMI	Natural Marketing Institute
OEMD	Oxford English Mini Dictionary
p	Statistical significance
RDA	Recommended dietary allowances
SAARF	South African Advertising Research Foundation
UL	Tolerable upper intake levels
US	United States
USA	United States of America
USPSTF	United States Preventative Services Task Force
VITAL	Vitamins And Lifestyle Study
WdT	Wilna du Toit

CHAPTER 1

PROBLEM AND AIM

CHAPTER 1: PROBLEM AND AIM

1.1 Introduction

Food and/or dietary supplements may be used in the context of a healthy lifestyle or as a means to compensate for an unhealthy lifestyle (De Jong *et al.*, 2003). One of the biggest trends in the health care industry is that consumers are taking charge of their health and seeking alternative forms of medicine, for example, manipulating food choices or using dietary supplements (Greger, 2001).

On the one hand the public is bombarded with information regarding reasons why people should use dietary supplements, rather than eating healthy food. The use of dietary supplements continues to grow, despite increasing knowledge of problems surrounding these products, including questionable safety and efficacy, interactions with drugs and food and enormous out of pocket costs (McQueen *et al.*, 2003). Vitamins, minerals, herbal remedies and other supplements are commonly used by the public, but education about these products is not generally included in medical school curricula. Because many of these products are often marketed as natural dietary supplements, there is a general perception that they pose little or no health risk. Many physicians generally regard common vitamins and minerals as non-toxic and of some therapeutic effectiveness (Durante *et al.*, 2001; McQueen *et al.*, 2003). Furthermore, the American Medical Association (AMA) recently recommended that all adults take one multivitamin daily (Fletcher & Fairfield, 2002). This side of the debate is called "dietary supplements as the basis for good nutrition".

On the other hand, the public is requested by the medical team to use healthy food as a means to obtain optimal nutrition. This side of the debate is called "good food as the basis for good nutrition". The American Dietetic Association Position Statement on fortified food and dietary supplements (ADA, 2001) provides several reasons why relying on foods is usually the best strategy for optimal nutrition. These reasons focus mainly on unidentified constituents in the food matrix, nutrient-nutrient interactions, synthetic *versus* naturally occurring

nutrient forms' effectiveness and the bioavailability of the active ingredients in supplements. However, considering the recent recommendation in the Dietary Reference Intakes (DRIs) that women of childbearing age require an additional 400 µg of folic acid above dietary intake, and considering reported population intakes consistently below new Adequate Intake (AI) levels, it is implied that optimal nutrition may not be achievable through diet alone (Troppmann *et al.,* 2002).

Both sides of the debate provide the public with many facts and information to consider when making an informed decision. In an article written by De Jong *et al.* (2003), it is recommended that the consumer segments be clearly characterized in terms of who they are, their knowledge, norms and motivations for use in order to establish general educational goals and monitoring systems of safety and efficacy of food and dietary supplement consumption. The Health Products Association (HPA) survey, completed in South Africa, gave insight into the market share of the different health product categories but not into the characteristics and beliefs of the South African consumer (HPA, 2002). In this mini-dissertation the metropolitan consumers' demographic characteristics and beliefs will be identified in order to help the medical profession understand its client's needs.

1.2 Problem statement

The research questions that this study set out to answer were:

1. Which demographic factors are associated with an individual's preference between the usage of supplements or the eating of healthy food?
2. Which other beliefs are associated with an individual's preference between the usage of dietary supplements and the eating of healthy food?

1.3 Variables

All variables used in this study were subdivided into the groups depicted in Table 1.1. These were gender, age, monthly income, race, living standard measure (LSM), education and having children or not.

Table 1.1 Variables and their subgroups used in this study

Variable	Subgroups								
Gender	Male				Female				
Age	18 – 49 years old				50 and over years old				
Monthly income	R2999 or less		R3 000 to R8 999		R9 000 to R17 999		R18 000 or more		
Race	Black		White		Coloured		Indian		
LSM[1]	2	3	4	5	6	7	8	9	10
Education	Secondary schooling				Primary or less schooling				
Children	Yes				No				

[1]LSM (Living Standard Measure) divides the population into nine LSM groups, **10** (highest) to 1 (lowest) according to their living standard (SAARF, 2003)

1.4 Definition of terms

The following definitions apply to terms used in the context of this mini-dissertation.

Dietary supplements are defined as (SA, 2002): "Products containing any naturally occurring molecules and molecules synthesised by chemical or biological means or botanical extracts, derivatives, concentrates, enzymes, coenzymes, co-factors, naturally occurring hormones and precursors, animal source substances or metabolites intended to be consumed for their nutritional value in the maintenance and improvement of human health. A nutritional supplement must be in a dosage form such as capsules, tablets, liquids or powders. It includes, but is not limited to, vitamins, minerals, co-factors, essential fatty acids, amino acids, enzymes and co-enzymes, animal or

botanical extracts and derivatives, probiotics and non-nutrient dietary phytoprotectants".

Living Standards Measure (LSM) is a wealth measure based on the standard of living. The LSMs are calculated using 29 variables taken directly from the South African Advertising Research Foundation (SAARF) All Media and Products Survey (AMPS™). The 29 variables include: hot running water, refrigerator or deep freezer, microwave oven, flush toilet in or outside house, no domestic worker in household, video cassette recorder, vacuum cleaner or floor polisher, no cellphone in household, traditional hut, washing machine, personal computer in home, electric stove, television set, tumble dryer, home telephone, less than 2 radio sets per household, hi-fi or music centre, rural outside Gauteng or Western Cape, built-in kitchen sink, home security service, water in home or on plot, M-Net/DStv subscription, dishwasher, electricity, sewing machine, Gauteng or Western Cape and motor vehicle in household (SAARF, 2003).

Practical significance (effect size) comments on the practical significance of a statistically significant result in the case of random samples from populations. Practical significance can be understood as a large enough difference to have an effect in practice. Therefore, for means that differed significantly in the current study, practical significance was calculated as the standardised difference between two means divided by the estimate for standard deviation. This measure is called the effect size (d), which not only makes the difference independent of units and sample size, but also relates to the spread of the data (Steyn, 2000). The following can be followed as guidelines for the interpretation of the effect size, namely small effect: $d = 0.2$; medium effect: $d = 0.5$; large effect: $d = 0.8$ (Ellis & Steyn, 2003). Data with $d \geq 0.8$ is considered as practically significant, since it is the result of a difference having a large effect (Ellis & Steyn, 2003).

Beliefs are defined as "accepting as true or as speaking or conveying truth; think, suppose" (OEMD, 1985). **Believing in** is defined as "having faith in the existence of; feel sure of the worth of" (OEMD, 1985).

Attitude may be defined as a positive or negative feeling towards an object, issue or person (Foley *et al.*, 1979).

1.5 Delimitations

The statements put forward to the respondents were formulated by partners in the food industry and were not validated scientifically.

Because of the way the respondents might have interpreted the statements, this could have led to misinterpretation. This might also have led to incorrect conclusions.

Another misconception is that LSMs can be used as a psychographic or attitudinal measure. LSMs can tell a marketer that those in LSM 10 for example, have more commodities than others. It doesn't show their income, or whether they are predisposed towards spending money. To say that a product is being targeted at LSM 10 is to miss the point. LSMs™ are, therefore, not an alternate label for income. Income is actually very often a misleading variable on which to base a marketing strategy, especially if the predisposition of the person towards spending is not known (SAARF, 2003).

1.6 Importance of the study

The potential to self-medicate with a range of food and dietary supplements without any control mechanism is a key public health issue and it is, therefore, important for the medical and nutrition profession to identify food and dietary supplement users (De Jong *et al.*, 2003), as well as the beliefs that influence the choice between healthy food and supplements. Marketers of functional

foods and supplements may find such information useful in developing marketing plans. The purpose of this study was, therefore, to determine the demographic characteristics and beliefs regarding the link between food and health of South African consumers, indicating the preferences for food or dietary supplements.

1.7 Organization of the mini-dissertation

It was decided to choose the article option to report on the demographic characteristics and beliefs regarding the link between food and health of South African consumers indicating preferences for food or dietary supplements. A marketing research company, MARKINOR, was contracted to administer the questionnaires. After the study leaders identified the applicable statements, the researcher (WdT) conducted a literature research, analysed all the data statistically, interpreted the results and documented the study in the article and mini-dissertation format.

Chapter 2 gives an overview of literature covering the background information of available data on the objectives set above. First, relevant information regarding the importance of food for optimal nutrition, as well as available data on consumer motivation for food consumption will be discussed. A closer look will be taken at the circumstances where supplementation is indicated, as well as the characteristics of supplement users in other countries. Supplement market segments, safety and efficacy, as well as South African regulations are also reviewed. It was also decided to discuss the recommendation and selling of dietary supplements in detail. Finally, Chapter 2 reports on the role of the dietician and concludes with several points as recommendation for supplement use.

Chapter 3 is the manuscript prepared for submission to the Journal of Family Ecology and Consumer Sciences (see Appendix 1 for the journal specific guidelines for authors).

After each chapter the relevant references will be given. The references for Chapter 1 and Chapter 2 will be listed according to the guidelines provided by the Potchefstroom University. The references for Chapter 3 will be listed according to the journal specific guidelines in Appendix 1.

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CHAPTER 2

LITERATURE MOTIVATIONS FOR FOOD CONSUMPTION OR DIETARY SUPPLEMENT PREFERENCE

CHAPTER 2: LITERATURE MOTIVATIONS FOR FOOD CONSUMPTION OR DIETARY SUPPLEMENT PREFERENCE

2.1 INTRODUCTION

Two and a half thousand years ago Hippocrates stated "Let food be thy medicine and medicine be thy food". This statement highlighted the belief in the medicinal aspects of food (Abbey, 2000). In our modern society, the concept of "adequate nutrition" for survival is moving to "optimal nutrition" for good health.

Governments, healthcare organizations and consumers across the world acknowledge the link between nutrition and health. According to the American Dietetic Association (ADA), advances have been made in the science of food and nutrition, leading to a fine-tuning of many recommendations about eating healthfully (ADA, 2002). A number of epidemiological studies link the importance of diet and nutrition to optimize health and prevent disease. Scientific research has addressed the potential benefit of supplementing diets with vitamins and minerals (ADA, 2001).

All healthcare professionals are inundated with a torrent of medical and nutritional information. Efforts to address the challenge of surviving in the information jungle have resulted in a variety of information mastery techniques, such as evidence-based medicine (Kolasa, 2000). But, what do the public believe and/or do with the available data regarding food consumption or dietary supplement use? Which option does the public choose and which factors influence their decisions?

2.2 FOOD CONSUMPTION

Good nutrition primarily depends on appropriate food choices. Consuming a wide variety of foods in moderate amounts reduces the risk of inadequate and excessive intakes (ADA, 2001). The ADA states in a position statement on food fortification and dietary supplements that "the best strategy for promoting optimal health and reducing the risk of chronic diseases is to choose a wide variety of foods wisely" (ADA, 2001).

In 2001 the ADA concluded that the current available scientific research does not support the efficacy of supplement doses greater than the Recommended Dietary Allowances (RDA) for the prevention of chronic disorders, such as heart disease or cancer, but that recommendations might change as new research becomes available. The ADA stated that a wide variety of good foods, wisely selected as the basis of a nutritious diet, will meet dietary recommendations for most nutrients and is the best way to assure a balance of nutrients and healthy food components for which no recommendations have been established (ADA, 1997; ADA, 2001).

2.2.1 Food for optimal nutrition

The ADA position statement on fortified food and dietary supplements (ADA, 2001) provides ten reasons why relying on food is usually the best strategy for optimal nutrition:

1. Some food components are not easily incorporated into dietary supplements
2. Many unidentified constituents that may have important health benefits are found in the complex matrix of food (US Preventative Services Task Force, 2003)
3. Nutrient-nutrient interactions are important and high doses of one nutrient or food constituent may affect the absorption or metabolism of others
4. Much remains unknown about the biologically active compounds in food and research shows that there are more than the traditional nutrients in foods that may offer health benefits
5. It is difficult to identify the food constituents specifically responsible for the health benefits observed in epidemiological or clinical studies
6. Extracts of food compounds may differ from the forms that appear in foods in physiologically important ways and the bioavailability of many of the compounds is unknown

7. There is no scientific basis for the theory that if a small amount of a food constituent is beneficial then more must be better
8. Synthetic forms of some nutrients may not be as effective as those found occurring in foods naturally
9. Some synthetic forms may be more bioavailable than the forms in food and may provide greater risk of toxicity or imbalance
10. Animal studies demonstrate that present nutritional knowledge is inadequate to formulate diets artificially that optimise health in all respects and in all cells, tissues and organ systems. All the numerous potentially beneficial components of food have not yet been identified let alone the appropriate amounts and combinations.

The American Heart Association (AHA, 2001) in its scientific position on vitamin and mineral supplements recommends that healthy people obtain adequate nutrient intakes from foods eaten in variety and moderation, rather than from supplements. The AHA recommends that vitamin and mineral supplements should not substitute for a balanced and nutritious diet that limits excess calories, saturated fat, trans fat and dietary cholesterol (AHA, 2001). Considering all the available scientific evidence (epidemiological, primary prevention trials, secondary prevention trials), it is considered that the most prudent and scientifically supportable recommendation for the general population is to consume a balanced diet with emphasis on antioxidant rich fruits and vegetables and whole grains. This advice, which is consistent with the dietary guidelines of the AHA, considers the role of the total diet in influencing disease risk (Tribble, 1999).

In 2003, the United Kingdom's food watchdog, the Food Standards Agency, warned that many people could be damaging their health by taking vitamin and mineral supplements in doses that are too high. Most people in Britain do not need to take vitamins or dietary supplements because many foods are naturally high in vitamins (Kmietowicz, 2003).

2.2.2 Consumer motivation for food consumption

Since 1990, HealthFocus International has conducted a biennial consumer survey published in The HealthFocus Trend Report. The survey segments consumers based on motivation and attitudes towards health and nutrition. In 2001, HealthFocus conducted its first international benchmark survey in Western Europe, Australia, India, China, Brazil, Argentina and Mexico (Gilbert, 2002).

Despite the similarity in health concerns, there are substantial differences in what motivates healthy choices. In India, China, Brazil, Mexico and Argentina the motivations behind healthy choices are often caring for the well being of family members and the protection of future health. In the United States, Western Europe and Australia, motivations are improving daily health, protecting future health and feeling good (Gilbert, 2002).

Another key difference is in the way consumers define what is healthy for them and their families. Western Europeans tend to define a healthy product as having natural qualities and by how little a product is processed, rather than by its nutritional components. It is the reverse for American shoppers, where "healthy" is defined by fat, sodium and vitamin content (Gilbert, 2002).

A common feature of shoppers everywhere is that they want food that tastes good. When shopping, better taste is a strong brand influence for all shoppers. Better nutrition and price are also strong brand influencers for American and Indian shoppers. In Western Europe, Australia, China, Brazil and Argentina, "grown without pesticides" is a strong brand influence. Shoppers in China, Brazil and Mexico are more influenced by "no preservatives" and by "contains organic ingredients" than elsewhere (Gilbert, 2002).

Surveys also show that the way people deal with health concerns through nutrition and diet depends to a large extent on what healthcare system is

available. In parts of Europe, for example, where there is little opportunity to obtain or get medical treatment for cancer, there is an urgency to avoid getting it by dietary means (Gilbert, 2002).

In the HealthFocus Trend Report, the United States (US) market's psychographic profiles are segmented into a progressive scale from passive to reactive to proactive:

1. "Unmotivateds" (6%)
2. "Strugglers" (19%)
3. "Healers" (6%)
4. "Investors" (22%)
5. "Managers" (44%)
6. "Disciples" (2%) (Gilbert, 2002).

When looking at markets using the HealthFocus Segmentation, it is apparent that the Australian market is very similar to the market in the US. Both have a majority of "Managers", followed by "Investors" and "Strugglers". This means a more proactive market that is defining healthy as feeling good both now and in the future. India, China, Brazil and Mexico have the highest number of "Disciples", or those who are compulsive about their choices. About one in five shoppers in these markets are "Disciples", compared to less than 5% in other markets. This indicates a more disciplined approach to food choices. The Western European market seems to be where the US market was six to eight years ago, with more "Investors" looking to make healthy choices for future health. The Western European market will evolve towards "Managers" in the next few years. Nevertheless, Western Europe has many more "Unmotivated" shoppers and will probably continue to do so, led by France and the Netherlands. In these countries, consumers are taste-driven and less likely to make dietary choices for health reasons. Argentina also has many "Unmotivated" shoppers at this time, which may be a reflection of their current economic and political environment (Gilbert, 2002).

Shoppers' belief in the connection between food, disease prevention and health enhancement is quite strong. Across all markets surveyed, at least one in two shoppers agreed that some foods contain active compounds to reduce disease risk and improve long-term health. Three out of four agreed that some foods contain active compounds to help with current health. Some shoppers are making the connection between food and medicine. At least half of shoppers in each market surveyed agreed that foods can be used to reduce their use of drugs and other medical therapies. Interestingly, US shoppers are the least likely to make this connection, although attitudes have shifted greatly from 44% agreeing in 1992 to 51% agreeing in 2000 (Gilbert, 2002).

2.2.3 Conclusion

A vitamin pill is no substitute for a healthy lifestyle or diet, because foods contain additional important components such as fibre and essential fatty acids. In particular, a vitamin supplement cannot begin to compensate for the risks associated with smoking, obesity or inactivity. A holistic approach is needed (Willet & Stampfer, 2001).

2.3 DIETARY SUPPLEMENTS

The recommendations outlined in the new Dietary Reference Intakes (DRIs) (Food and Nutrition Board, 2000) aim to define nutritional adequacy as that which prevents deficiency, maintains well-being and may promote health by optimising nutrient intake for the prevention of heart disease, birth defects, certain forms of cancer and other diseases. The importance of the form and/or source of nutrients was also considered. For example, new folate recommendations for adults suggest a dietary intake of 400 μg per day, with women of childbearing age requiring an additional 400 μg of synthetic folic acid above dietary intake. With reference to supplemental nutrients evident in the DRIs and considering reported population intakes consistently below new

Adequate Intake (AI) levels (Troppmann *et al.,* 2002), it is implied that optimal nutrition may not be achievable through diet alone.

In 1994, it was stated by the American Congress that there may be a positive relationship between sound dietary practice and good health, and that, although further scientific research is needed, there may be a connection between dietary supplement use, reduced healthcare expenses and disease prevention (FDA, 1995).

Aggressive marketing of supplements, positive reviews in the lay literature and dissatisfaction with the perceived impersonal approach of Western medicine have all been touted as reasons why patients seek supplements (Durante *et al.*, 2001). In this section dietary supplements will be discussed.

2.3.1 Definitions of dietary supplements

Traditionally, dietary supplements referred to products made of one or more essential nutrients, such as vitamins, minerals and protein. However, in 1994, the American Congress defined the term "dietary supplement" in the Dietary Supplement Health and Education Act (DSHEA) as "a product taken by mouth that contains a dietary ingredient intended to supplement the diet" (FDA, 2001). This includes vitamins, minerals, herbs, botanicals and other plant-derived substances, amino acids and concentrates, metabolites, constituents and extracts of these substances.

In 2002, the South African Foodstuffs, Cosmetics and Disinfectants Act of 1972 (Act No. 54 of 1972) regulations (SA, 2002) defined nutritional supplements. The South African definition, as stated in Chapter 1, places dietary supplements in a special category under the general umbrella of "foods", not drugs. Dietary supplements are not drugs. A drug, which sometimes can be derived from plants used as traditional medicine, is a substance that is intended to diagnose, cure, mitigate, treat or prevent diseases (FDA, 2001). Before marketing, drugs

must undergo clinical studies to determine their effectiveness, safety and appropriate dosages. The Food and Drug Administration (FDA) in the US, or Medicine Control Council (MCC) in South Africa, must authorize the drug's use before it is marketed. The FDA and MCC do not authorize or test dietary supplements.

2.3.2 Circumstances when nutrient supplementation are indicated

In 2002, the American Medical Association (AMA) recommended that all adults take one multivitamin daily. This practice is justified mainly by the known and suspected benefits of supplemental folate and vitamins B12, B6, and D in preventing cardiovascular disease, breast and colon cancer and osteoporosis and because multivitamins at that dose are safe and inexpensive in the USA (Fletcher & Fairfield, 2002). However, in 2003 the US Preventative Services Task Force (USPSTF) concluded that the evidence for or against the use of supplements of vitamin A, C, or E, multivitamins with folic acid, or antioxidant combinations for the prevention of cancer or cardiovascular disease was insufficient (USPSTF, 2003).

In 2001, the ADA position statement on food fortification and dietary supplementation (ADA, 2001) stated that supplementation may be valuable in the following circumstances:

- Women of childbearing age: 400 ì g/d of folic acid (recommended to reduce the risk of neural tube defects) (USPSTF, 2003)
- Adults older than 50 years: vitamin B_{12} (to overcome decreased absorption due to atrophic gastritis)
- Insufficient dairy product consumption: to meet the new and higher recommendations for calcium and vitamin D
- Limited dietary selection: strict vegetarians (require vitamin B_{12} supplementation), lactose intolerant individuals (need calcium) and individuals on strict weight-loss diets (multivitamin and mineral supplement

- Pregnant women: continue with iron supplementation until more research is available.

In 2002, Fairfield & Fletcher (2002) listed the following clinical situations in which vitamin deficiency syndromes occur:

- Poor vitamin intake (for example food faddism, elderly populations, malabsorption or parenteral nutrition)
- Abnormal vitamin losses (for example haemodialysis)
- Abnormal vitamin metabolism (for example genetic polymorphisms, alcoholism mixed with poor intake)
- Inadequate vitamin synthesis (for example vitamin D in the northern climates).

There are indications that dietary supplements are likely to be used by individuals who already have a healthy lifestyle (De Jong *et al.*, 2003) or as a sort of insurance policy against problems caused by poor diets (Brown, 2002; Satia-Abouta *et al.*, 2003). Supplementation can play a valuable role when diets do not meet science-based recommendations (USPSTF, 2003), but supplements are not necessarily formulated to fill the gaps between nutrient intakes from food sources and nutrient recommendations such as RDA or AI (ADA, 2001; Bender, 2002).

2.3.3 Characteristics of supplement users

Various demographic characteristics have been associated with a higher use of supplements amongst Americans (De Jong *et al.*, 2003; Greger, 2001):

- Being female
- Education beyond high school
- Higher income
- Being white
- Being older

- Positive lifestyle factors, i.e. nonsmokers, no or moderate alcohol use, using various cancer-screening tests, regular exercises
- Being more sensitive to dietary messages, i.e. optimal weight maintenance, adequate micronutrient consumption, eating fruits and vegetables
- Consume less dietary fat
- Feel strongly about health promotion or taking control of their own health rather than disease prevention
- Believe their health to be excellent or very good or have one or more health problems.

According to Radimer *et al.* (2000), herbal supplement users are associated with the following demographic characteristics:

- Younger
- More likely to be obese and/or on weight loss diets
- More likely to say they have a food allergy
- Have higher alcohol intakes
- Have more healthful lifestyles
- Eat more fruit and vegetables
- More likely to get health information from books.

Amino acid supplement users were:

- Younger
- Predominantly male
- Higher education
- Divorced or single marital status
- More likely to get diet and health information from non-physician healthcare providers, magazines, newspapers and books (Radimer *et al.*, 2000).

The demand for dietary supplements are directly tied to the reasons why consumers take vitamins, minerals, herbs and speciality supplements (Anon,

2001). According to the Dietary Supplement Survey (Anon, 2001) completed in the USA, the reasons for supplement use are:

- To feel better (72%)
- To help prevent getting sick (67%)
- To help get better when they are sick (51%)
- To live longer (50%)
- To build strength and muscle (37%)
- For a specific health reason (36%)
- For sports nutrition (24%)
- For weight management (12%).

The healthcare professionals can mount high quality, targeted education and intervention programmes for consumers by getting to know their clients' beliefs (Durante *et al.*, 2001; Greger, 2001).

2.3.4 Supplement market segments

By analysing usage across segments, marketers can determine the optimum audience for any specific health and wellness products. Marketers can develop marketing plans to the common motives, beliefs and behaviours of the optimal target segment and communicate with them through common sources of influence with meaningful messages that speak to their motivations (De Jong *et al.*, 2003).

By including all Americans in its Health and Wellness Trends Database, rather than concentrating on consumers with a self-confessed interest in healthy lifestyles, the Natural Marketing Institute (NMI) carves out specific consumer targets for clients using new segmentations. The NMI uses various measures across attitudes, behaviours, spending and product usage to identify consumer segments. Gilbert reports in the Nutrition Business Journal (Gilbert, 2002) that they have segmented the American population into five primary psychographic types, namely:

1. "Well Beings"
2. "Food Actives"
3. "Magic Bullets"
4. "Fence Sitters"
5. "Eat Drink & Be Merry".

The "Well Being" group (17% of the US population) are defined as those that are the most motivated to healthful practices and use all types of products and services. They are also opinion leaders, early adopters and influencers of others and are value-based and least impressed by brand image and price. They are estimated to spend 28% of the health and wellness products dollar, which equals around $55 billion in 2001 (Gilbert, 2002).

"Food Actives" (21% of the US population) seek health primarily through a balanced diet, exercise and good nutrition. They are swayed by doctors' recommendations but are less likely to use supplements. This group spends 20% of the health and wellness products dollar (Gilbert, 2002).

"Magic Bullets" (25% of the US population) want health quickly and easily. As a result they tend to be big users of prescription, over the counter products and supplements but not of healthy foods and are more likely to respond to brand image and be price sensitive than any other segment. They are estimated to spend 17% of the health and wellness products dollar (Gilbert, 2002).

"Fence Sitters" (19% of the US population) are neutral on most health issues. They know what to do for their health but do not always act on it. They are notable for their disdain for supplementation, although they may sometimes use food to achieve health aims. They are also price sensitive and yet spend 20% of the health and wellness products dollar (Gilbert, 2002).

"Eat Drink & Be Merry" (18% of the US population) tend to be younger and have fewer health issues. They are generally not concerned about their health or the

food that they eat and seek immediate gratification, although they might use a multivitamin. As is to be expected they spend an estimated 15% of the health and wellness products dollar (Gilbert, 2002).

It is estimated that 38% ("Well Beings" and "Food Actives") of the US population account for nearly 50% of spending on health and wellness products such as dietary supplements, natural and organic foods and functional foods. It is also reported that the largest user group of vitamins and minerals is the "Magic Bullets" (25.4%) followed by the "Food Actives" and "Well Beings". In the herbal category "Well Beings", who are more proactive about their health and actively seek out alternative healthcare, are the largest group of users (31%) followed by "Magic Bullets" and "Food Actives" (Gilbert, 2002).

According to Molyneaux, president of The Natural Marketing Institute, the role that motivation plays in marketing supplements usage is critical. She is of the opinion that "vitamins and minerals have mainstreamed and are reflected in the general acceptance across all segments except for "Fence Sitters". Even "Eat Drink & Be Merrys" will take a multivitamin/mineral (Gilbert, 2002).

2.3.5 Safety and efficacy

According to Goldie (2002), "One should never assume that something is without risk, even if it seems benign. All chemicals can be toxic in the wrong amounts, when taken for a long period, or taken by a person with certain diseases or conditions, or in combination with conflicting substances." Morris & Carson (2003) states "Adverse effects of vitamin supplements are best measured in clinical trials. In most studies of vitamin supplementation, adverse effects were not reported as might be expected in a pharmacologic trial".

Dietary supplements are generally considered as foods and are not subjected to the vigorous testing to prove safety and effectiveness as drugs must be. In the United States, supplements are in fact considered safe until demonstrated

hazardous by the FDA, often as a result of reports of ill effects from health professionals. Between 1993 and 2000, the FDA received over 2 800 reports of adverse effects of supplements (predominantly herbs), including 105 deaths (Brown, 2002). Consumers are generally unaware that supplements are regulated more similarly to foods than to drugs and yet they are often used for disease treatment or prevention. The allowed health claims often resemble claims of clinical efficacy for various diseases or conditions so closely that it is not surprising that they are viewed as drugs and yet, in reality, are not regulated for purity and potency.

The formulation, development and manufacturing technology involved in the preparation of dietary supplements are similar to those in the manufacture of drug products. The key differences that distinguish dietary supplements from drugs in the context of setting evaluation standards are the following (Srinivasan, 2001):

- Nutritional supplements provide benefits that are variable, often not easily quantitative and in the absence of valid biomarkers may be qualitative in nature
- Measurement of nutrient absorption lacks precision of characterization achieved with drug bioavailability
- Nutritional supplements are consumed for prevention and wellbeing
- Nutritional supplements do not exhibit characteristic dose-response curves
- Dosing intervals of nutritional supplements are not critical, in contrast to drug therapy.

The absence of dose response and the attendant of non-criticality of the dosing intervals for dietary supplements are key distinctions that should be reflected in the evaluative standards. It is important that the nutrient or bioactive ingredient contained in a dietary supplement is present in an absorbable form as the accepted definition of bioavailability is the portion of the nutrient that is digested, absorbed and metabolised through normal pathways (Srinivasan, 2001).

Many supplements are concentrates and extracts that may supply considerably higher quantities of substances than occur naturally in the diet and any biologically active ingredient consumed in excess, can be harmful. This is one of the reasons why Dietary Reference Intakes (DRIs) comprised of estimated average requirements (EAR), RDA's, AI and tolerable upper intake levels (UL), have now replaced the single RDA's of the past. No such guide, however, exists for herbals and botanicals (ADA, 1997).

According to Balluz *et al.* (2000), people should be evaluated carefully for the adequacy of their dietary intake, unusual dietary practices and specific lifestyle issues, such as vegetarianism or weight reduction diets, before they use any vitamin or mineral supplements.

2.3.6 South African regulations

The key items in the draft regulations governing the labelling and advertising of nutritional supplements of The Foodstuffs, Cosmetics and Disinfectants Act of 1972 (Act No. 54 of 1972) are as follows (SA, 2002):

- The information required shall be in English and at least one other official language of the Republic of South Africa
- The container must be tamper resistant and the contents shall be sealed
- All supplements must comply with quality criteria listed in an Annexure and may only contain permitted additives
- The identification of the supplement must contain all information specified on page 6 of the draft regulations
- It is prohibited to use words, pictorial representations, marks or descriptions that create the impression that the product has been made in accordance with recommendations of any health profession/al or organisation excluding religious organisations unless approved by the Director General

- It is prohibited to use the words 'heal' or 'cure' or any other medicinal claim
- It is prohibited to use the word 'natural' or any word or phrase with a similar meaning unless the active substance has not been processed
- Substances shall be expressed in terms of their approved name or accepted generic name but common names may be used in addition
- Vitamins and minerals must give an indication of the equivalent amount of the elemental vitamin or mineral and only compounds approved as safe by the legislation on Complimentary Medicines will be allowed
- All supplements must have a nutritional information table in a prescribed format and may not contain substances not listed in a prescribed annexure or exceed levels per daily-recommended dosage listed in the same annexure
- A number of mandatory statements are required on the label (SA, 2002):
    - 'Nutritional supplements cannot replace a balanced diet'
    - 'Do not exceed the recommended daily dosage'
    - 'Keep out of reach of children'
- Three types of claims are allowed (SA, 2002):
    - Nutrient function claims: Such claims pertain to efficacy and functionality of the nutrient or ingredient that is proven, including traditional use, or published in peer-reviewed clinical studies. Claims may only be made for the main nutrients in the formulation
    - Enhanced function claims: Such claims pertain to efficacy and functionality of the nutrient or ingredient that has been proven or published in peer-reviewed clinical studies and which has been submitted for evaluation to, and approved by the Director General of Health
    - Claims may refer to or emphasise the health enhancing/health supporting/health promoting aspects of the nutritional supplement provided the efficacy and functionality of the nutrient or ingredient has been proven or published in peer-reviewed clinical studies

and proof of these facts can be submitted on the request of the Director General of Health

- There are specific requirements for biotherapeutics that include (SA, 2002):
    - A list of names of allowed probiotic micro-organisms
    - A list of specific claims that can be made
    - Information that must be included on the label such as number of viable colony forming units per recommended dosage still valid at the end of the shelf life date and an indication of stability at South African average summer room temperatures.

2.3.7 Recommendation and selling of dietary supplements

As reported by Thomson *et al.* (2002), the ADA developed guidelines regarding the recommendation and selling of dietary supplements. The guidelines are summarised in 13 points:

1. All clients should receive a complete assessment of diet and dietary supplement use as a routine component of their nutritional status assessment
2. Recommendations for dietary supplements should be based on a thorough review of the currently available scientific evidence
3. Dietary supplementation should be complimentary to diet
4. All recommendations should be made in the client's best interest and should be safe to use, including reasonable assurance of freedom from product toxicity as well as causing no harm with respect to ongoing disease states
5. The dietetic professional is responsible for reporting any adverse reactions to national authorities and the referring health care professional
6. All recommendations for dietary supplementation should be documented in the client's medical record

7. The dietetic professional assumes responsibility and accountability for personal competence in practice and should participate in continuing professional education in the area of supplementation
8. The dietetic professional may make dietary supplements available to clients with respect to the unique nutritional needs of the individual
9. The dietetic professional must provide disclosure of any financial relationship regarding sales of dietary supplements to clients such as financial arrangements with specific manufacturers or suppliers
10. The dietetic professional must provide factual information regarding the availability of dietary supplements for purchase and should not advertise in a false or misleading manner
11. The dietetic professional maintains current knowledge regarding the regulation of dietary supplements including labelling, health claims, standards and definition
12. The dietetic professional understands the potential legal issues and complies with legal restrictions related to selling dietary supplements
13. Dietetic professionals choosing to sell dietary supplements need to investigate all aspects of business practice, including pricing and profit issues, liability concerns, inventory, retail policies and follow-up sessions related to use of products.

2.3.8 Role of the dietician

Consumers are faced with an overwhelming choice of dietary supplements. Therefore, dieticians must be prepared to offer feedback, advice, and recommendations concerning their appropriate use and safety based on current DRI recommendations (Troppmann *et al.,* 2002).

Because the content of supplements is not restricted to levels that adhere to safe upper levels (ULs), knowledge of product content and the new RDAs, AIs, and ULs and how and when they apply, is essential information upon which to base recommendations (Troppmann *et al.,* 2002).

The use of pharmaceutical/supplement company web-sites is recommended to attain similar access to product information (Troppmann *et al.*, 2002).

2.3.9 Conclusion

Kohler *et al.* (2003) state the following points as recommendations for supplement use:

1. Supplements should only be taken when there is proof that the diet cannot provide the quantities of nutrients needed. A nutritional evaluation by a dietician should determine if any deficiencies are present in the diet and supplements can be supplied accordingly. This evaluation should take into account body composition goals, dietary and medical history, food practices and preferences, and budgetary constraints
2. Dosages of supplements need to be calculated to avoid overdose
3. Individuals may respond differently to supplements and this needs to be taken into consideration
4. Supplements required in clinical situations require a proper medical diagnosis and again should only be prescribed by the physician and dietician in writing
5. All supplement labels should be carefully studied and the ingredients noted. Look for hidden relationships between ingredients (e.g. caffeine and guarana) or unstated ingredients.

2.4 CONCLUSION

Nutrition information must be presented with sufficient context to allow consumers to weigh the information and determine whether it applies to his or her unique needs (ADA, 2002).

Self-care is a consumer trend in that today's consumers are more pro-active in gathering nutrition and health information. Consumers need to ask questions,

thereby enabling them to make sound decisions that match their personal needs (ADA, 2002).

It is vital to identify and characterise food users and to investigate their knowledge and motivation not to use dietary supplements (De Jong *et al.*, 2003). It is also vital to identify and characterize dietary supplement users and to investigate their motivation for using dietary supplements. In the research reported in this mini-dissertation, the demographic characteristics and beliefs of urban South African consumers regarding preference for food or dietary supplements are studied.

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CHAPTER 3

DEMOGRAPHICS AND BELIEFS OF CONSUMERS INDICATING PREFERENCE FOR HEALTHY FOOD OR DIETARY SUPPLEMENTS

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OPSOMMING

Gesonde voedsel en/of dieetsupplemente kan in die konteks van 'n gesonde lewenstyl gebruik word of om te kompenseer vir 'n ongesonde lewenstyl. Verbruikers neem toenemend beheer van hulle gesondheid deur voedselkeuses te manipuleer of dieetsupplementregimes te gebruik. Deur verbruik oor segmente te analiseer, kan bemarkers die optimale teiken vir enige spesifieke gesondheid- en welstandprodukte vasstel. Bemarkers kan bemarkersplanne saamstel vir die gemeenskaplike motiewe, gelowe en gedrag van die optimale teikensegment en met hulle kommunikeer deur algemene invloedryke bronne met sinvolle boodskappe wat tot hulle motiverings spreek. Gesondheidsorgberoepslui kan goeie kwaliteit, teikengerigte onderrig en intervensieprogramme ontwikkel indien hulle kennis dra van die voorkeure van hulle kliënte. Dit is dus belangrik om gesonde voedsel- en supplementverbruik en -voorkeure van die Suid-Afrikaanse verbruiker te identifiseer.

Doelstelling: Die doel van hierdie studie was om vas te stel watter demografiese en ander determinante geassosieer word met die individu se keuse tussen dieetsupplemente of gesonde voedsel.

Respondente/Opset: 'n Ewekansige steekproef van 1997 verbruikers in metropolitaanse gebiede, verteenwoordigend van die geslagsverspreiding, ouderdomsverspreiding en bevolkingsgroepe in Suid-Afrika het aan hierdie studie deelgeneem. Die data is geweeg, sodat dit verteenwoordigend van die totale Suid-Afrikaanse metropolitaanse verbruikerspopulasie is. Vraelyste, bestaande uit 17 voedselverwante afdelings, is deur navorsers en besigheidsvennote ontwikkel. Een van die afdelings het verskeie stellings oor voedsel, dieetsupplemente, gesondheid en siektetoestande bevat. MARKINOR, 'n marknavorsingsmaatskappy is gekontrakteer om die data in te samel. Verbruikers wat gesonde voedsel verkies is vergelyk met respondente wat supplemente verkies deur die onderskeidende demografie en opinies te identifiseer. Beskrywende veranderlikes het in geslag, ouderdomsgroep, maandelikse inkomste, ras, maatstaf van lewenstandaard (LSM), onderrig en kinders ingesluit, asook verskeie eetgewoonte en voedselverwante stellings.

Statistiese analise: Die kwantitatiewe data gegenereer deur die projek is met behulp van die STATISTICA®-program gedoen, om sodoende relevante tabelle, beskrywende statistiek en statistiese toetse te genereer.

Resultate: Ongeveer 61% (n=6 526) van die respondente het gesonde voedsel verkies, terwyl 20% (n=2 086) supplemente verkies het. Veral mans, mense ouer as 50

jaar, individue met 'n maandelikse inkomste van R9 000 – R17 999, Indiërs, LSM 7- of 8-respondente, individue met sekondêre onderrig en dié sonder kinders toon 'n voorkeur vir gesonde voedselkeuses. Hierdie individue is van opinie dat voedsel nie net vir genot is nie, maar ook vir gesondheidonderhouding. Die Suid-Afrikaanse verbruiker met 'n voorkeur vir supplemente sluit in: vrouens, 18-49-jariges, die met 'n maandelikse inkomste van R2 999 of minder, swartes, LSM 2-respondente, dié met geen of primêre onderrig en/of mense met kinders. Die hooffokus van respondente met 'n dieetsupplementvoorkeur was op die medisinale waarde van supplemente en dat voedsel alleenlik vir genot is.

Toepassing/Gevolgtrekkings: Sover ons kennis strek, was hierdie studie die eerste poging om voorkeure vir gesonde voedsel en supplemente in Suid-Afrika vas te stel. Verdere navorsing word benodig om te identifiseer watter supplemente of gesonde voedseltipes deur Suid-Afrikaners gebruik word in 'n poging om gesondheid te verbeter. Dit word aanbeveel dat 'n gepaste wetenskaplike instrument hiervoor ontwikkel word.

ABSTRACT

Healthy food and/or supplements may be used in the context of a healthy lifestyle or as a means to compensate for an unhealthy lifestyle. Consumers are increasingly taking charge of their health and manipulate food choices or use dietary supplement regimes. By analysing usage across segments, marketers can determine the optimum audience for any specific health and wellness product. Marketers can develop marketing plans to the common motives, beliefs and behaviours of the optimal target segment, and communicate with them through common sources of influence with meaningful messages that speak to their motivations. Healthcare professionals can mount high quality, targeted education and intervention programmes for consumers by getting to know their clients' beliefs. It is, therefore, important to identify healthy food and supplement use of South African consumers.

Objective: The purpose of this study was to determine which demographic factors and other beliefs are associated with an individual's choice between the usage of supplements or the eating of healthy food.

Subjects/Setting: A random sample of 1997 metropolitan consumers representative of the gender distribution, age distribution and population groups in South Africa was chosen. The data were weighted, so that they would be representative of the total South African metropolitan consumer population. Questionnaires consisting of 17 food related sections were designed by researchers in cooperation with business partners. One of the sections contained a number of statements about food, dietary supplements, health and disease. MARKINOR, a marketing research company, was contracted to collect the data. Consumers preferring healthy food were compared with supplement choosers with regard to demographic and belief factors. Explanatory variables included gender, age group, monthly income, race, living standard measure (LSM), education and children, as well as different eating habit and food related statements.

Statistical analysis: The quantitative data produced by the survey were analysed by using the Statistica®-programme in order to generate the relevant tabulations, descriptive statistics and statistical tests.

Results: About 61% (n= 6 526) of the respondents reported healthy food preference, while 20% (n= 2 086) stated they preferred supplements. Especially males, people older than 50 years, individuals with a monthly income of R9 000 – R17 999, Indians, LSM 7 or 8 respondents, individuals with secondary schooling and people with no children indicated a preference for healthy food. These individuals indicated the belief

that food is not only for enjoyment but also for health maintenance. The South African consumer preferring supplements included: females, 18 to 49 year olds, people with a monthly income of up to R2999, blacks, LSM 2, people with no or primary schooling and/or people with children. The main focus of dietary supplement choosers was the medicinal value of supplements and the enjoyment value of food.

Applications/Conclusions: To our knowledge, this study was the first attempt to characterize the healthy food and supplement choosers in South Africa. Further research is needed to identify which supplements or healthy foods are used by South African consumers in order to ensure their health. It is recommended that a suitable scientific instrument be developed to this effect.

INTRODUCTION

One of the biggest trends in the health care industry is that consumers are taking charge of their health and seeking alternative forms of medicine, for example manipulating food choices or using dietary supplements (Greger, 2001:1339). The potential to self-medicate with a range of foods and supplements without any control mechanism is a key public health issue (De Jong et al, 2003:274).

The use of dietary supplements continues to grow, despite increasing knowledge of problems surrounding these products, including questionable safety and efficacy, interactions with drugs and foods and enormous out-of-pocket costs (McQueen et al, 2003:655). In the next few decades a range of newly developed foods and supplements will be introduced, accompanied by media messages and advertisements on the need to "optimize" nutrition, health and quality of life. This strategy will be attractive because there is a powerful psychological appeal to consumers to improve or maintain health using a pro-active and convenient approach (De Jong et al, 2003:273).

Dietary supplements have been marketed to different segments of the world population (De Jong et al, 2003:274). These segments have not yet been clearly defined and characterized in South Africa. The only figures available for South Africa came from the Health Products Association (HPA, 2002) and gave insight into the market share of the different health product categories and not the characteristics and beliefs of the South African consumer.

De Jong et al (2003:273) recommend that the consumer segments be clearly characterized in terms of who they are, their knowledge, norms and motivations for use in order to establish general educational goals and monitoring systems of safety and efficacy of food and dietary supplement consumption.

The present study explored the demographic characteristics and beliefs regarding the link between food and health of South African consumers indicating preferences for food or dietary supplements. Beliefs can be defined as "accepting as true or as speaking or conveying truth; think, suppose" (OEMD, 1985).

METHODS

Respondents and questionnaires

One thousand nine hundred ninety seven (1997) South African respondents, representative of the four population groups of South Africa (whites, blacks, coloureds and Indians) were randomly chosen from metropolitan areas from the nine provinces in South Africa. Questionnaires, consisting of 17 food-related sections (with a number of subsections), were designed by researchers in co-operation with business partners. MARKINOR, a market research company was contracted to collect the data using face to face interviews and random sampling. Random sampling results in every sampling unit in a finite population having a calculable and non-zero probability of being selected in the sample. The chance of a unit being included in a sample can be calculated. Random sampling has been widely adopted by leading research bodies because of its sound theoretical basis which allows the legitimate use of the mathematics of probability. It is the only completely objective method of sampling populations (Chrisnall, 2001:99). One of the 17 food-related subjects contained a number of statements on eating habits, food and health. Consumers' opinions were evaluated on a five-point Likert scale (Table 1), indicating "very likely", "likely", "neither likely nor unlikely", "unlikely" and "very unlikely".

TABLE 1: THE 5-POINT LIKERT RESPONSE SCALE

Very likely	Likely	Neither likely nor unlikely	Unlikely	Very unlikely
(5)	(4)	(3)	(2)	(1)

For descriptive purposes absolute numbers and percentages of participants were calculated for demographic characteristics. Categories for gender, age group, monthly income, population group, living standards measure (LSM), education and children were constructed based either on the distribution of the data or based on logical cut-off points.

STATISTICAL ANALYSIS

Statistical analysis was done with the STATISTICA®-6.0 (StatSoft Inc., Tulsa, USA) programme. The data were weighted, so that they would be representative of the total South African metropolitan consumer population. The weighted count (n) data in the tables should be interpreted with three zeros behind the value, for example count=6526 should be read as count=6 526 000. One way ANOVA (analysis of variance) was done on the weighted data of the different variables to determine if there were statistically significant differences ($p<0.05$) between the variables. Tukey's test for unequal numbers (honest significance difference) was performed on the means of the variables to determine practical significance where statistical differences were found in the one way ANOVA.

Practical significance can be understood as a large enough difference to have an effect in practice. Therefore, for means that differed significantly in the current study, practical significance was calculated as the standardised difference between two means divided by the estimate for standard deviation. This measure is called the effect size (d), which not only makes the difference independent of units and sample size, but also relates to the spread of the data (Steyn, 2000:1). The following can be used as guidelines for the interpretation of the effect size, namely small effect: $d=0.2$, medium effect: $d=0.5$, large effect: $d=0.8$ (Ellis & Steyn, 2003). Data with $d>0.8$ was considered as practically significant, since it is the result of a difference having a large effect. Cross tabulations were done to calculate the differences in frequencies within the subgroups of race and LSM groups. The LSM is an unique means of segmenting the South African market. It cuts across race and other techniques of categorising people, and instead, groups people according to their living standards using criteria such as degree of urbanisation and ownership of cars and major appliances. LSM one indicates rurals with the lowest standard of living, while ten indicates urban consumers with the highest standard of living (Haupt, 2003). This study included LSM 2 to 10.

The number of respondents included in the analysis may differ because of the way in which data are presented.

RESULTS

Table 2 summarises the study participants in a frequency table with regard to their preference for food consumption, dietary supplement use or no preference for either food consumption or dietary supplement use. The statement was formulated as "I would rather take a supplement than eat healthy food". Approximately 61% (n=6 526) preferred healthy food, 20% (n=2 086) stated that they preferred supplements, while 18% (n=1 885) stated that they had no preference in their choice of healthy food or supplements.

TABLE 2: FREQUENCY TABLE IDENTIFYING FOOD CONSUMPTION OR DIETARY SUPPLEMENT PREFERENCE

"I would rather take a supplement than eat healthy food"	**Count (*n*)**	**Percent (%)**
Healthy food consumption preference	6 526	61
Dietary supplement preference	2 086	20
Neutral	1 885	18
Do not know	198	1

In order to characterise the study participants with regard to their preference for healthy food or supplements, a cross-tabulation was drawn with the respective demographic variables and question F1_09 ("I would rather take a supplement than eat healthy food"). Frequency distribution illustrated the relation between the demographic variable and the respondents' preference for either healthy food or supplements. Only the healthy food and dietary supplement preference frequency distribution are presented in Table 3. The neither likely nor unlikely preference frequency distribution data will not be reported in Table 3. The last column summarises the mean answer on the 5 point Likert scale (Table 1). As an illustration, answers of 2.44 and 2.50 would be interpreted as the male respondents implying they would be less likely than the females to prefer supplements (Table 3).

Of the male participants, 63% (n=3 356) preferred healthy food, while 19% (n=1 015) preferred supplements. When asked question F1_09, 61% (n=3 170) females preferred healthy food and 21% (n=1 071) preferred supplements. When the mean answers of male (2.44) and female (2.50) participants are plotted on a 5-point scale (Table 1), females are more likely to choose a supplement than eat healthy food.

TABLE 3: CROSS-TABULATION BETWEEN THE DEMOGRAPHIC VARIABLES AND HEALTHY FOOD OR DIETARY SUPPLEMENT PREFERENCE

Demographic variables	Percentage values		Mean of 5-point Likert scale
	Healthy food preference (%)	Dietary supplement preference (%)	
Gender			
Male (1)	63 (n=3 356)	19 (n=1 015)	2.44[a 3]
Female (2)	61 (n=3 170)	21 (n=1 071)	2.50[a]
Practical significance [1]			NONE [1]
Age group (years)			
18-49 (1)	61 (n=4 738)	21 (n=1 617)	2.50[a]
50 and over (2)	66 (n=1 437)	17 (n=373)	2.36[a]
Practical significance			NONE
Monthly income [2] (South African Rand)			
Up to 499 – 2 999 (1)	58 (n=2 693)	23 (n=1 078)	2.56[abc]
3 000 – 8 999 (2)	66 (n=1 714)	17 (n=435)	2.36[a]
9 000 – 17 999 (3)	68 (n=910)	17 (n=231)	2.40[be]
18 000 and over (4)	66 (n=338)	13 (n=68)	2.18[ce]
Practical significance			1-4 (0.31:SMALL)
Race			
White (1)	70 (n=1 803)	12 (n=317)	2.26[ab]
Black (2)	56 (n=3 435)	24 (n=1 475)	2.61[acd]
Coloured (3)	68 (n=840)	19 (n=239)	2.41[bce]
Indian (4)	80 (n=448)	10 (n=55)	2.09[de]
Practical significance			1-2 (0.30:SMALL), 2-4 (0.42:SMALL)
Living Standards Measure (LSM)			
LSM 2 (1)	48 (n=190)	34 (n=136)	3.02[abcdefg]
LSM 3 (2)	55 (n=354)	21 (n=133)	2.62[ahijkl]
LSM 4 (3)	51 (n=657)	31 (n=404)	2.80[mnopqr]
LSM 5 (4)	57 (n=1315)	22 (n=497)	2.56[bmstuvw]
LSM 6 (5)	65 (n=1 267)	19 (n=369)	2.36[chns]
LSM 7 (6)	71 (n=590)	14 (n=113)	2.32[dlot]
LSM 8 (7)	71 (n=567)	14 (n=109)	2.21[ejpu]
LSM 9 (8)	70 (n=687)	14 (n=140)	2.27[fkqv]
LSM 10 (9)	68 (n=899)	14 (n=185)	2.30[glrw]
Practical significance			1-2 (0.32:SMALL), 1-4 (0.37:SMALL) 1-5 (0.54:MEDIUM), 1-6 (0.57:MEDIUM) 1-7 (0.66:MEDIUM), 1-8 (0.61:MEDIUM) 1-9 (0.59:MEDIUM), 2-7 (0.34:SMALL) 2-8 (0.29:SMALL), 3-5 (0.36:SMALL) 3-6 (0.39:SMALL), 3-7 (0.48:MEDIUM) 3-8 (0.43:SMALL), 3-9 (0.41:SMALL) 4-7 (0.29:SMALL)
Education			
No or primary schooling (1)	58 (n=892)	23 (n=354)	2.63[ab]
Secondary schooling (2)	63 (n=4 770)	20 (n=1 492)	2.44[a]
Tertiary schooling (3)	62 (n=864)	17 (n=240)	2.48[b]
Practical significance			NONE
Children			
Yes (1)	62 (n=3 890)	21 (n=1 345)	2.52[a]
No (2)	63 (n=2 636)	18 (n=741)	2.39[a]
Practical significance			NONE

[1] Practical significance: Indicates the difference in effect size between groups as well as the d-value. Small effect: d=0.2; medium effect: d=0.5; large effect: d=0.8.

[2] A total weighted count of 1 387 000 participants refused to disclose their yearly income or did not know what their income was.

[3] Means for each separate question and variable with a symbol in common differ statistically significantly from each other ($p<0.05$) (ANOVA).

A statistically significant difference between the gender groups was found, indicating that gender does play a role when choosing food or supplements. No practically significant difference was identified between males and females for food or supplement preference.

In response to statement F1_09, 66% of the 50 and above age group (Group 2) reported healthy food preference, whilst a smaller percentage (61%) of the younger than 50 age group (Group 1) preferred healthy food. The mean answers of group 1 (2.50) and group 2 (2.36) confirm the higher preference for supplements in the younger age group. A statistically significant difference was found between the two age groups for statement F1_09, indicating that age does play a role in the choice between healthy food and supplements. No practically significant difference was identified between the age groups for statement F1_09, indicating that the statistically significant difference or variation has no practical importance for the decision maker or food industry.

From the monthly income group 3 (R9 000 – 17 999), 68% (n=910) indicated the highest healthy food preference, while 23% (n=1 078) from group 1 (R2 999 and less) reported the highest preference for supplements (Table 3). A total weighted count of 1387 000 participants refused to disclose their yearly income or did not know what their income was. Statistically and practically significant differences between the various groups are indicated in Table 3.

Of the population groups, 80% of the Indian respondents preferred healthy food, whilst only 56% of the blacks preferred healthy food. Twenty four percent (n=1 475) of the blacks indicated they were more likely to choose supplements than healthy food, which was a greater percentage than the other population groups. The Indian participants indicated they were less likely to choose supplements (mean: 2.09) compared to the other mean answers. Statistically significant differences were found between the black respondents and all the other population groups, between whites and coloureds, as well as between the coloureds and Indians for this statement. It seems, therefore, that race plays a role in the choice between healthy food and supplements. Small practically significant differences were found between the whites and blacks (d=0.3), as well as the black and Indian population groups (d=0.42).

LSM 7 (71%, n=590) and LSM 8 (71%, n=567) consumers indicated the highest preference for healthy food, whilst LSM 2 respondents indicated the highest preference (34%, n=136) for supplements. The LSM 2 group (mean: 3.02) indicated they were more likely to choose supplements than healthy food, when compared to the rest of the LSM groups. LSM 8 (mean: 2.21) indicated that they were least likely to choose supplements rather than healthy food. Statistically significant differences between the different groups, as summarized in Table 3, indicate that LSM plays a role in the decision making process between healthy food and supplements. A medium practically significant difference (d=0.2) was found between the different groups (Table 3).

Individuals with secondary schooling indicated the highest preference for healthy food (63%, n=4 770), whilst respondents with no or primary schooling indicated they were more likely to choose supplements (23%, mean: 2.63) than healthy food, when compared to the other education groups. Statistically significant differences were found between the no or primary (group 1) and secondary schooling group (group 2), as well as between groups 1 and 3 (tertiary schooling), indicating that schooling plays a role in the choice between healthy food and supplements. No practically significant difference was found between these three groups.

Participants with no children indicated a slightly higher preference (63%, n=2 636) for healthy food than participants with children (62%). Respondents with children ($p<0.02$) indicated the highest preference (21%, mean: 2.52), whilst childless respondents reported a slightly lower preference (18%) for supplements. Having children seems to play a role in the choice between healthy food and supplements. No practically significant difference was found between these two groups.

In the final step, the data was analysed for identification of beliefs that would be most important for healthy food choosers and which ones for dietary supplement choosers. A comparative statistical analysis was done by cross-tabulating the original statement ("I would rather take a supplement than eat healthy food") with various other statements (Table 4). In the Table the opinion options of "very likely" and "likely" were grouped into one group ("very likely"), "very unlikely" and "unlikely" were grouped as "very unlikely", whilst the "neither likely nor unlikely" group is not depicted in the Table. Statements F1_01, F1_20 and F1_21 tested the opinions of the respondents on the enjoyment factor associated with food. Statements F1_02, F1_07, F1_10, F1_17 and F1_21 probed the respondents' opinions on the association between food or supplements and

disease prevention or management. The third aspect investigated by statements F1_06, F1_15, F1_16 and F1_22, were their opinions on food and its effect on health maintenance. The data is summarized in Table 5 (for healthy food choosers) and Table 6 (for supplement choosers). Statement F1_21 has been used in two of the three sections investigated.

TABLE 4: STATEMENTS FOR IDENTIFICATION OF BELIEFS OF CONSUMERS PREFERRING HEALTHY FOOD OR SUPPLEMENTS

Item number	Statements
Statements regarding opinions on food and enjoyment	
F1_01	"Food is for enjoyment only"
F1_20	"I have enough to worry about without now having to consider everything I eat"
F1_21	"I don't want to have to think about disease when I choose my food"
Statements regarding opinions on food or supplements and disease	
F1_02	"The food you eat can influence the development of diseases"
F1_07	"Some food types can actually prevent the development of some diseases"
F1_10	"Nutritional supplements can safeguard me from developing certain diseases"
F1_17	"Healthy food is only for people that already have a disease"
F1_21	"I don't want to have to think about disease when I choose my food"
Statements regarding opinions on food and health management	
F1_06	"Some food types can actually make me healthier"
F1_15	"I buy food that claims to contribute to my health"
F1_16	"I have become more aware of food that I have heard is healthy"
F1_22	"I don't believe food can have an effect on my health"

When evaluating the data in Table 5 and 6, it is important to remember that the percentage value (in the last column of the Tables) should be interpreted as the total respective responses for that specific statement, for example: for statement F1_01 29% answered positively and 71% did not agree.

When evaluating the data in Table 5 on the enjoyment factor associated with food, it is clear that people who prefer healthy food do not use it for enjoyment only (71%, n=4000), are indecisive when having to consider everything they eat (50%, n=2 503) and do not want to think about disease when they choose their food (65%, n=3 538).

TABLE 5: BELIEFS OF RESPONDENTS PREFERRING HEALTHY FOOD

Item number	Statements	Healthy food preference (%)
Statements regarding opinions on food and enjoyment		
F1_01	**"Food is for enjoyment only"**	
	Very likely	29 (n=1 640)
	Very unlikely	71 (n=4 000)
F1_20	**"I have enough to worry about without now having to consider everything I eat"**	
	Very likely	50 (n=2 503)
	Very unlikely	50 (n=2 467)
F1_21	**"I don't want to have to think about disease when I choose my food"**	
	Very likely	65 (n=3 538)
	Very unlikely	35 (n=1 936)
Statements regarding opinions on food or supplements and disease		
F1_02	**"The food you eat can influence the development of diseases"**	
	Very likely	76 (n=4 057)
	Very unlikely	24 (n=1 287)
F1_07	**"Some food types can actually prevent the development of some diseases"**	
	Very likely	94 (n=5 438)
	Very unlikely	6 (n=324)
F1_10	**"Nutritional supplements can safeguard me from developing certain diseases"**	
	Very likely	81 (n=3 860)
	Very unlikely	19 (n=892)
F1_17	**"Healthy food is only for people that already have a disease"**	
	Very likely	10 (n=600)
	Very unlikely	90 (n=5 493)
F1_21	**"I don't want to have to think about disease when I choose my food"**	
	Very likely	65 (n=3 538)
	Very unlikely	35 (n=1 936)
Statements regarding opinions on food and health management		
F1_06	**"Some food types can actually make me healthier"**	
	Very likely	98 (n=5 931)
	Very unlikely	2 (n=139)
F1_15	**"I buy food that claims to contribute to my health"**	
	Very likely	84 (n=4 342)
	Very unlikely	16 (n=855)
F1_16	**"I have become more aware of food that I have heard is healthy"**	
	Very likely	84 (n=4 636)
	Very unlikely	16 (n=864)
F1_22	**"I don't believe food can have an effect on my health"**	
	Very likely	25 (n=1 370)
	Very unlikely	75 (n=4 095)

When healthy food choosers were asked their opinions on the association between food or supplements and disease prevention or management, they indicated the following (Table 5):

- Seventy six percent indicated it was very likely that food could influence disease development
- Ninety four percent (n=5 438) agreed that some food types can prevent disease development
- The majority (81%) were of the opinion that supplements can safeguard against disease development
- Ninety percent (n=5 493) replied that healthy food is not only for sick people

- Sixty five percent (n=3 538) indicated they did not want their food choices to be influenced by thoughts of disease.

When the association between food and health management was addressed, the majority of respondents (98%, n=5 931) preferring healthy food indicated some food types could make one healthier, while 84% (n=4 342) would buy food that claims to contribute to their health. Eighty four percent were of the opinion that they have become more aware of food that they have heard to be healthy and 75% (n=4 095) confirmed their belief that food would have an effect on their health.

When evaluating the data in Table 6 on the enjoyment factor associated with food, 52% of individuals indicating a supplement preference believe food is for enjoyment only, while 77% (n=1 250) indicated that they do not want to consider everything they eat and 1 344 respondents (80%) stated they preferred not thinking about disease when foods are chosen.

The second factor investigated was the opinions of supplement choosers on the association between food or supplements and disease prevention or management. The majority of respondents preferring supplements indicated that food could influence (76%, n=4 057) or prevent (94%, n=5 438) disease development. A large percentage of the respondents (88%, n=1 463) indicated that supplements could safeguard against the development of certain diseases and that healthy food is not for sick people only (57%). Eighty percent (n=1 344) indicated that they did not want to think about disease when they choose food, thereby indicating their preference for the medicinal properties of supplements and the enjoyment properties of food.

The results of the association between food and health management are summarized in Table 6. Ninety four percent of respondents preferring dietary supplements indicated their belief in the statement that some food can make one healthier. However, 58% (n=948) of the respondents stated that they did not believe food can have an effect on their health. This group also indicated an increased awareness about food that claims to contribute to their health (90%, n=1 548) and food they have heard is healthy (89%, n=1 559), possibly due to increased marketing programmes.

TABLE 6: BELIEFS OF THE RESPONDENTS PREFERRING DIETARY SUPPLEMENTS

Item number	Statements	Supplement preference (%)
	Statements regarding opinions on food and enjoyment	
F1_01	**"Food is for enjoyment only"**	
	Very likely	52 (n=963)
	Very unlikely	48 (n=881)
F1_20	**"I have enough to worry about without now having to consider everything I eat"**	
	Very likely	77 (n=1 250)
	Very unlikely	23 (n=383)
F1_21	**"I don't want to have to think about disease when I choose my food"**	
	Very likely	80 (n=1 344)
	Very unlikely	20 (n=340)
	Statements regarding opinions on food or supplements and disease	
F1_02	**"The food you eat can influence the development of diseases"**	
	Very likely	76 (n=1 321)
	Very unlikely	22 (n=382)
F1_07	**"Some food types can actually prevent the development of some diseases"**	
	Very likely	94 (n=1 638)
	Very unlikely	6 (n=106)
F1_10	**"Nutritional supplements can safeguard me from developing certain diseases"**	
	Very likely	88 (n=1 463)
	Very unlikely	12 (n=200)
F1_17	**"Healthy food is only for people that already have a disease"**	
	Very likely	43 (n=751)
	Very unlikely	57 (n=992)
F1_21	**"I don't want to have to think about disease when I choose my food"**	
	Very likely	80 (n=1 344)
	Very unlikely	20 (n=340)
	Statements regarding opinions on food and health management	
F1_06	**"Some food types can actually make me healthier"**	
	Very likely	94 (n=1 733)
	Very unlikely	6 (n=118)
F1_15	**"I buy food that claims to contribute to my health"**	
	Very likely	90 (n=1 548)
	Very unlikely	10 (n=171)
F1_16	**"I have become more aware of food that I have heard is healthy"**	
	Very likely	89 (n=1 559)
	Very unlikely	11 (n=191)
F1_22	**"I don't believe food can have an effect on my health"**	
	Very likely	58 (n=948)
	Very unlikely	42 (n=694)

Table 7 summarises the results found when one way ANOVA and unequal number honest significant differences (N HSD) were calculated for the different opinion statements (column 2) and the original statement (F1_09: "I would rather take a supplement than eat healthy food"). The mean answers on a 5-point scale indicated by healthy food (column 3) or supplement choosers (column 4) are given. Statistically ($p<0.05$, indicated by alphabet letters) and practically significant differences (column 5) between the two groups for the statement are also reported.

TABLE 7: STATISTICAL AND PRACTICAL SIGNIFICANCE RESULTS

Item number	Statements	Healthy food preference mean on a 5-point scale	Supplement preference mean on a 5-point scale	Practical significance (d value: effect)
Statements regarding opinions on food and enjoyment				
F1_01	"Food is for enjoyment only"	2.49[a] [1]	3.04[a]	0.43:SMALL [2]
F1_20	"I have enough to worry about without now having to consider everything I eat"	3.01[a]	3.58[a]	0.50:MEDIUM
F1_21	"I don't want to have to think about disease when I choose my food"	3.34[a]	3.65[a]	0.27:SMALL
Statements regarding opinions on food or supplements and disease				
F1_02	"The food you eat can influence the development of diseases"	3.62	3.71	NONE
F1_07	"Some food types can actually prevent the development of some diseases"	4.22[a]	4.14[a]	NONE
F1_10	"Nutritional supplements can safeguard me from developing certain diseases"	3.74[a]	3.94[a]	NONE
F1_17	"Healthy food is only for people that already have a disease"	1.86[a]	2.85[a]	0.84:LARGE
F1_21	"I don't want to have to think about disease when I choose my food"	3.34[a]	3.65[a]	0.27:SMALL
Statements regarding opinions on food and health management				
F1_06	"Some food types can actually make me healthier"	4.37[a]	4.20[a]	NONE
F1_15	"I buy food that claims to contribute to my health"	3.75[a]	3.95[a]	NONE
F1_16	"I have become more aware of food that I have heard is healthy"	3.81[a]	3.96[a]	NONE
F1_22	"I don't believe food can have an effect on my health"	2.45[a]	3.21[a]	0.60:MEDIUM

[1] Means for each separate question and variable with a symbol in common differ statistically significantly from each other ($p<0.05$) (ANOVA).
[2] Practical significance: Indicates the difference in effect size between groups as well as the d-value. Small effect: d=0.2; medium effect: d=0.5; large effect: d=0.8.

In the first section, evaluating the association between food and enjoyment, the results are as follows. Healthy food choosers (mean: 2.49) indicated that they were less likely to choose food for enjoyment than supplement choosers (mean: 3.04). Statistically significant ($p<0.05$) and a small practically significant difference (d=0.43) were found between the two groups for statement F1_01, indicating that enjoyment plays a role in the decision making process. Both healthy food and supplement segments indicated they were likely to have enough to worry about without having to consider everything they eat (3.01 and 3.58 respectively). Statistically ($p<0.05$) and medium practically significant difference (d=0.50) between the two segments for statement F1_20 were found. The mean answer of 3.65 for dietary supplement choosers (*versus* 3.34 for healthy food choosers) indicates that they do not want to think about disease when they choose their food. Statistically and a small practically significant difference were found between the two groups for this statement.

When the statements regarding the opinions on food or supplements and disease were tested, the respondents indicating a preference for healthy food were less likely than supplement choosers to agree that food can influence disease development. However, no statistically or practically significant differences were found. When asked their opinions on whether some food types could actually prevent the development of some diseases, the healthy food choosers were statistically significantly ($p<0.05$) more likely to agree (mean: 4.22) than those respondents who preferred supplements (mean: 4.14). Respondents choosing supplements were more inclined to agree that nutritional supplements could safeguard them from disease development (mean: 3.94) than healthy food choosers (mean: 3.74). A statistically, but not practically significant difference was found between the two groups for this statement. Healthy food choosers were very unlikely (1.89) to believe that healthy food is only for sick people, as opposed to dietary supplement choosers (2.85). A statistically and a large practically significant difference were found between the two groups for statement F1_17, indicating that the statistically significant difference has a large practical importance for the decision maker. The mean answer of 3.65 of dietary supplement choosers (*versus* 3.34 from healthy food choosers) indicates that they do not want to think about disease when they choose their food. A statistically and a small practically significant difference was found between the two groups for this statement.

When investigating the responses to statements on food and health management, the following results were found. Both healthy food and supplement choosers were in strong agreement (mean: 4.37 and 4.20 respectively) that some food types can make one healthier. A statistically, but not practically significant difference was found between the two groups for statement F1_06. Respondents of the healthy food and the dietary supplement segment indicated it was more likely (mean: 3.75 and 3.95 respectively) that they would buy food with health claims. A statistically, but not practically significant difference was found between the two groups for statement F1_15. Surprisingly, participants in favour of healthy food indicated they were less likely (mean: 3.81) than dietary supplement choosers (mean: 3.91) to have become more aware of healthy food. Statistically, but not practically significant difference was found between the two groups for this statement. Healthy food choosers were less likely to agree (2.45) and supplement choosers more likely to agree (3.21) that they do not believe food can have an effect on their health. A medium practically significant difference ($d=0.60$, $p<0.05$) between the two groups for statement F1_22 was found.

In order to combat nutrient deficiencies, efforts have centered on addition of selected nutrients to the food chain in the form of food fortification and administration of supplemental nutrients (Caballero, 2003:76). The evidence for the beneficial effects of supplements in healthy populations (with the purpose of preventing future diseases) is limited and moving from supplements to food-based strategies (for the management of deficiencies) is a goal for all researchers (Caballero, 2003:77). But what does the South African population indicate as their main nutrient source preference? From the findings in this study it can be concluded that the South African population illustrates a high preference for healthy food (61%) and a much lower preference for dietary supplements (20%). This may be explained from a time-period point of view as wholesale introduction of dietary supplements occurred much later in many African countries than on the other continents. If the time-frame for dietary supplement definitions can be used as an indicator for supplement introduction, then South Africa (who's draft regulation on labelling of dietary supplements was gazetted in 2002) (SA, 2002), is nine years behind the USA (where the FDA Dietary supplement health and education act (DSHEA) supplement criteria was published in 1994) (FDA, 1994), and two years behind the European Union (who defined food supplements in 2000) (ECC, 2000).

Table 8 summarises the main trends in demographic variables and opinions distinguishing the respondents who preferred healthy food from those choosing dietary supplements. A preference for healthy food was indicated mainly by males, people older than 50 years, individuals with R9 000 – R17 999 monthly income, Indian population group, LSM 7 or 8 respondents, individuals with secondary schooling and people with no children.

TABLE 8: TRENDS IN DEMOGRAPHIC AND OPINION DIFFERENCES BETWEEN HEALTHY FOOD AND SUPPLEMENT CHOOSERS

Variables	Healthy food choosers	Supplement choosers
Demographic	Male 50 and over years old R9 000 – 17 999 income Indian race LSM 7 or 8 Secondary schooling Having no children	Female 18-49 years old R2 999 or less income Black population group LSM 2 Primary or less schooling Having children
"Food is for enjoyment only"	Disagree	Agree
"I have enough to worry about without now having to consider everything I eat"	Indecisive	Agree
"I don't believe food can have an effect on my health"	Disagree	Agree

DISCUSSION

To our knowledge, this study was the first attempt to characterize the healthy food and supplement choosers in South Africa. South African respondents in the following demographic variable groups tended to prefer dietary supplements: females, 18 to 49 year olds, people with a monthly income of up to R2 999, blacks, LSM 2, people with no or primary schooling, and/or people with children. According to De Jong et al (2003:280) and Greger (2001:1340), various demographic characteristics have been associated with a more frequent use of supplements amongst Americans: being female, education beyond high school, higher income, being white and being older. It is clear that the South African demographic supplement preference indicators/determinants differ substantially from the American population with regard to monthly income, race, education level, LSM (unique to South Africa) and age group.

This study was carried out in metropolitan areas of South Africa. In South Africa, as in many other developing countries, the African population is experiencing rapid urbanisation. The percentage of Africans living in urban areas increased from 35.8% in 1993 to 43.3% in 1996 (Anon, 2000). During the same period, the percentages of coloureds, Indians and whites in urban areas remained within a relatively constant range. With continuing migration from rural areas to cities there is increasing transition to an urban western manner of life. Positive public health benefits from these changes include considerable reductions in occurrences of most disorders/diseases linked with

poverty and poor hygiene, especially among the very young, with consequent significant increases in survival time. Adverse changes, however, include rises in occurrences of lifestyle-related non-communicable diseases (NCDs) (Vorster, 2002:239). The complexity of the effects of urbanisation on nutritional status is demonstrated by Bourne et al (1993) who showed in the BRISK study (n=983 adult Africans, aged 15-64 years from the Cape Peninsula) that although the subjects followed a prudent diet regarding fat and carbohydrate intake, their diet was low in fibre, vitamins and minerals. Compared with rural Africans, their diet was in a transitional phase towards progressively atherogenic diet. The studies of Jooste et al (1990), Vorster et al (2000) and Charlton (2000) described the same trends. The National Food Consumption Survey (NFCS) which was conducted in 1999 among South African children 1-9 years revealed that the great majority of children consumed a diet deficient in energy and of poor nutrient density to meet their micronutrient requirements (Labadarios et al, 2003). The authors recommended that maize, wheat flour and sugar be used as vehicles for fortification on a mandatory basis, a recommendation which has since been implemented by the Government in 2003 (SA, 2003). The estimate cost is R2.74 per person per year (SA, 2002b) compared to about R1.70 per person per day for a multivitamin/mineral supplement.

Supplements may be useful for selected groups to obtain desirable amounts of some nutrients as specified by science-based nutrition standards. Women and the elderly may benefit from supplements of some nutrients (ADA, 2001:115). In the Vitamins and Lifestyle (VITAL) study, the association between dietary supplement use during the previous 10 years, their demographic characteristics and self-reported medical conditions were examined (Satia-Abouta et al, 2003:54). The survey showed women tended to use supplements more generally for disease prevention, whereas men chose to use supplements only after receiving a diagnosis of a condition (Satia-Abouta et al, 2003:54). Durante et al (2001:247) also found that women were more likely to use supplements than men (72.9% vs 43.8%, p=0.002). Considering supplement recommendations for pregnancy (folate and iron) and osteoporosis (calcium) (ADA, 2001:120), females might be expected to consume on average more vitamins and minerals than males. These reasons might explain why South African females have a higher preference for supplements than males.

As indicated in Table 8, the older age group indicated a preference for healthy food whilst the younger age group preferred supplements. It would be a good choice for the older individual to prefer healthy food as food contains natural amounts of phytochemicals. However, in 2002, the American Medical Association (AMA) (Fletcher & Fairfield, 2002:3129) recommended that all adults should take one multivitamin daily. This practice is justified mainly by the known and suspected benefits of supplemental folate and vitamins B12, B6, and D in preventing cardiovascular disease, breast and colon cancer and osteoporosis and because multivitamins at that dose are safe and inexpensive in the USA (Fletcher & Fairfield, 2002:3129). In South Africa, black seniors have been shown to have a low energy and micronutrient intake as well as being at high risk for chronic diseases of lifestyle in certain groups (Charlton & Rose, 2001: 2425). A recommendation for the older person would be to consume a daily dietary supplement or fortified food in order to prevent chronic diseases. Durante et al (2001:246) reasoned that older patients take more prescription drugs than younger patients. Their lower levels of hepatic drug metabolism, cardiac output and renal function affect drug clearance and place them at greater risk of adverse effects and interactions between supplements and drugs. According to Durante et al (2001:246), the sources of information are critical to beliefs and preferences about effectiveness and safety of dietary supplements. Younger patients tended to obtain information from friends, family, stores and other sources, whereas older participants heard about supplements from physicians or the lay media.

Although no research has been done in order to define the demographic variables of a leading South African nutritional supplement company's distributors and users, company spokespersons said that the majority of their distributors are female, of the white population group and/or older than 30 years. Possible reasons why females become distributors are that it would be an easy and less expensive way to ensure the family's health, as a means of obtaining an income that would supplement the husband's income and could also ensure social interaction with other people (Personal communication, 2003).

It would be difficult to explain, without speculation, why respondents in the monthly income group R2 999 or less and LSM 2 prefer dietary supplements. Possible reasons might include selling supplements for a monthly income, obtaining supplements at a cheaper price when they become product distributors, feeling that they need a

supplement as health insurance to compensate for a nutritionally deficient diet, receiving supplements from individuals in the higher monthly income/LSM groups or clinics (the individual might thus see/use it as a sign of prestige) or hearing that supplements have more nutritional value than healthy food. Further research is needed to establish the true reasons for supplement preference in these groups. It is important to remember that the study focused on preference rather than on the use of supplements, implying that the respondents in these groups prefer dietary supplements and do not necessarily buy or use supplements.

It is not surprising that Indians prefer food to supplements. The Indian housewife and mother perceives her cooking of traditional Indian meals as an art, a privilege and an expression of her love for her family (Mia, 1992). Most South African Indians are either Muslim or Hindu. The Islamic prescriptions regarding religion, lifestyle, eating patterns and hygiene are followed faithfully by many Muslims. Special dishes are prepared for the many feasts. Many foods, including vegetable dishes are fried either in ghee (clarified butter) or in sunflower oil. The result is a diet high in fat and possibly low in vitamins and fibre (Mia, 1992). An interesting feature is the belief that the stomach should be one third filled with food, one third with liquid and one third with air. This belief could protect against overeating and obesity. The Hindu religion prescribes vegetarianism in various forms. Many Hindus "fast" one day a week, a period during which no pulses, cereals or legumes are eaten, but milk, root vegetables and fruit are allowed (Richardson & Cleaton-Jones, 1986:5).

Charlton (2000) reported that several factors contribute to the poor health status of the South African urban elderly. Some of these factors include lack of information, poor urban environment and infrastructure, poverty, dietary habits and poor micronutrient intake. The trend that blacks prefer dietary supplements may, therefore, be an advantage as it gives an indication of a target group for fortified food products or vitamin and mineral supplementation.

Participants with no children indicated a slightly higher preference (63%) for healthy food than participants with children (62%). Having children seems to play a role in the choice between healthy food and supplements. Possible reasons for supplement preference in families with children might include trying to ensure the children's health by using supplements or lack of time to prepare nutritional meals or being under the

impression that healthy food is not nutritious enough. These reasons are, however, speculation and further research is needed.

According to Gilbert (2002:10), there are various consumer motivations for healthy food consumption. These motivations include the well being of family members, protection of future health, improving daily health, feeling good and the way they define which food is healthy for them and their families. In this study possible consumer attitudes towards enjoyment, disease prevention and health maintenance were identified.

Setting the respondents indicating healthy food preference apart from the supplement choosers is the fact that they believe food is not for enjoyment only and that they believe food can have an effect on their health (Table 8). The respondents, therefore, indicated that food can be enjoyed and used for medicinal properties. This then leads back to what Hippocrates stated 2 500 years ago: "Let food be thy medicine, and medicine be thy food" (Abbey, 2000:1).

The demand for dietary supplements may probably be ascribed to the same reasons why consumers in the US take vitamins, minerals, herbs and specialty supplements (Anon, 2001:31). According to the Dietary Supplement Survey (Anon, 2001:31), the reasons for supplement use are to feel better (72%), to help prevent getting sick (67%), to help get better when they are sick (51%), to live longer (50%), to build strength and muscle (37%), for a specific health reason (36%), for sports nutrition (24%) and for weight management (12%). The main focus of dietary supplement users would, therefore, be on the medicinal value of supplements.

According to a leading South African nutritional supplement company using network marketing as a means of distribution, there are many reasons why their distributors use and sell supplements. The two company spokespersons said their distributors feel they get better nutritional value for their money when they buy supplements instead of healthy food. Another possible reason is that people are too busy with work or too tired to prepare a nutritional meal and these individuals would, therefore, prefer a supplement to ensure their optimal nutritional status and health (Personal communication, 2003).

According to McQueen et al (2003:655) and Gilbert (2002:10), the main reasons why many people believe in supplements are firstly because they believe supplements are often derived from natural sources and are intrinsically safer than synthetically created conventional medications. Secondly, consumers may prefer the easy access that supplements offer, rather than the sometimes lengthy and inconvenient process necessary to acquire fresh healthy food. Thirdly, dietary supplements offer hope when conventional therapy does not. Many supplements are marketed for disorders that are generally considered incurable or for which conventional treatment options are limited. Fourthly, a considerable shift has been observed towards pro-active care (for preventing disease or its complications) and the desire not just to stay disease free but to optimize health as well. Fifthly, dietary supplement use is a statement of independence. Sixthly, the aging individual, who is generally vital, looks forward to a longer life and wants to prove that old does not equal infirm.

In this study, consumer's attitudes towards enjoyment, disease prevention and health maintenance were evaluated. Respondents of the supplement segment indicated food was for enjoyment only and that they have enough to worry about without having to consider everything they eat. Surprisingly, their opinion about the effect of food on their health was not strong. It is clear that the respondents believe in the medicinal value of supplements and the pleasure value of food.

Both healthy food and dietary supplement choosers agreed on the following points:

- Food can influence the development of diseases
- Some food types can actually make a person healthier
- Some food types can actually prevent the development of some diseases
- Nutritional supplements can safeguard a person from developing certain diseases
- They buy food that claims to contribute to their health
- They have become more aware of food they have heard is healthy
- Healthy food is not only for people who already have a disease
- They do not want to think about disease when choosing their food.

The demographic variables and trends identified in this study have implications (both in practice and educational) for the whole of South Africa. It is important that nutritional education starts early - already in school - in order to ensure a South African population that is able to analyse all information presented to them about healthy food choices

and/or dietary supplement regimes critically. The healthcare team should be thoroughly trained by institutions or individuals standing objectively on the outside of the food versus supplements debate. This will ensure an educated and well equipped professional resulting in an informed client going to various market outlets, being able to choose wisely in order to ensure his/her own health and disease management. Communicating the food based dietary guidelines should be the first step in the way forward.

CONCLUSIONS AND RECOMMENDATIONS

Formerly, most national dietary guidelines were essentially nutrient-based (fat, alcohol, salt, sugar, calcium, iron) and did not address traditional foods and dishes, eating patterns, food availability or sustainable food production. It is, therefore, not surprising that their use were met with only moderate success. There is a gathering momentum for a shift towards a more integrated way of describing the human diet, which incorporates not only the nutrient composition of foods, but also the non-nutrient components of food, food patterns (for example traditional diets), locally available foods and their influence on morbidity and mortality levels in populations. This paradigm shift is likely to make a significant contribution to human health, to the maintenance of cultural diversity and to optimal nutritional status in a sustainable environment. This approach has come to be known as food based dietary guidelines (FBDGs). FBDGs aim to reduce (i) chronic malnutrition (ii) micronutrient malnutrition and (iii) diet-related communicable and non-communicable disease (Gordon-Davis & Van Rensburg, 2002:200). Country and cuisine specific FBDGs are based directly upon diet and disease relationships of particular relevance to the individual country and the age group they are targeting.

In this study, it has been identified that healthy food choosers use food as a means of medication by indicating food is not for enjoyment only and that food can have an influence on their health. Both healthy food and supplement choosers indicated they believe food does influence disease development and health management. The South African population should understand, however, that conventional healthy foods and dietary supplements are not intended to treat disease but rather to provide nourishment (with essential nutrients as well as other potentially beneficial food components that may help prevent disease). Functional foods do, however, have a valid place for use in the South African consumer's diet.

Both healthy food and supplement chooser groups indicated that they believe that nutritional supplements could safeguard a person from developing certain diseases. Therefore, it is the healthcare team's and marketer's responsibility to inform South Africans that dietary supplements must be used in the context of the total lifestyle picture and cannot begin to compensate for the health risks associated with smoking, obesity or inactivity. The field of dietary supplementation is intrinsically filled with complexities and challenges. Scientists, the healthcare profession, the marketers, governments and the general population need to be educated on how and why to choose nourishing foods that also have a health promoting effect.

Recommendations of dietary supplements should be based on evidence-based principles, making it essential to evaluate scientific evidence for efficacy and safety and provide information based on quality research and substantial scientific evidence. At present, consumers are informed about nutrition recommendations and dietary guidelines from a wide variety of sources. A healthcare professional can truly understand a client's motivation for using supplements only after open discussion with that person. Because of the continuing growth of supplement use, such discussion should no longer be an extra service provided by some dieticians but rather an essential component of nutritional care (McQueen et al, 2003:655).

All the players in the healthy food *versus* dietary supplement debate should consider the nutrient contributions from food, fortified food and supplements and appropriately apply dietary reference intakes (DRIs) for dietary assessment, aware of the potential pitfalls. The public should be made aware of the upper levels (UL) included in the theoretical framework of the DRI values (NICUS, 2003:10). With every contact the public should be reminded that UL, defined as the highest known intake not associated with adverse effects, should not be exceeded for any known nutrient, although marketers might imply the opposite for chronic disease prevention.

The aim of the present study was to explore the demographic characteristics and beliefs regarding the link between food and health of South African consumers indicating preferences for food or dietary supplements. All defined goals were met. The results obtained are of public health importance and can be used by the South African government (initiating target programmes and products for target groups),

nutritional supplement companies (for a more individualised and personalised approach and product range), marketing companies (for targeted marketing programmes) and all healthcare professionals (for continued education and better insight into the motivational reasons for supplement use).

To combat malnutrition, the immediate, underlying and basic causes of the problem need to be addressed, and there must be short, medium and long-term actions at various levels and by a range of actors. Economic development strategies and appropriate social spending by government are important to achieve sustainable improvement in nutritional status. In addition, relatively low-cost direct nutrition programmes such as behaviour change strategies and micronutrient fortification, may have considerable impact (May et al, 1998:19).

Further studies are, however, appropriate (by using structured surveys based on an appropriate theoretical basis) to further explore the South African consumers' beliefs about and use of healthy food and dietary supplements, their demographic and other lifestyle characteristics.

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APPENDIX 1

JOURNAL OF FAMILY ECOLOGY AND CONSUMER SCIENCES

Preparation and technical detail of manuscripts

Components of a manuscript

Each separate part of the manuscript begins on a new page. Arrange the different parts as follows:

- Title page
- Summary in Afrikaans if the article is in English, and vice versa
- Abstract of 200 words in English with five to ten search words in English
- Text
- References
- Tables
- Figures

1. Title page

The manuscript is sent anonymously to the reviewers, but all identifying information should appear on the title page:

- concise title that reflects the contents of the article (Avoid study, effect and new and use terms that are useful for information retrieval.)
- name, current address, telephone number, fax number, e-mail address of each author (Male authors may give only their initials if they prefer. However, it is customary for female authors to write one first name in full. The same initials and/or name should be consistently used for publications in the JFECS to facilitate indexing.)
- information on support the author/s received, financial or otherwise, whether the manuscript forms part of a larger project, and other relevant information
- a colour photo may accompany the manuscript, or an electronic photo may be dispatched in .jpeg / .gif format to: seugnet@icon.co.za when the final manuscript is presented for publication.

2. Summary

The second page of the manuscript – numbered Page 1 – contains the title of the article and a summary of the article in Afrikaans if the article is in English, and vice versa. In a research article this abstract should present a summary of, for example, the hypotheses, the method, the most important findings, and the implications. For a review and other articles it should cover aspects such as the aims, the most significant viewpoints of various writers, a summary and/or a conclusion.

3. Abstracts and search words

An abstract of not more than 200 words in English. Please supply five to ten search words in English.

4. Text

The text begins on a separate page. Manuscripts should be typed in 1,5 or double spacing on A4 paper, on only one side of the paper. Leave 30 mm margins on both sides, an extra space between paragraphs and between subheadings. Number every paragraph in the left-hand margin to facilitate the task of the reviewers. Headings and subheadings: No more than three heading and subheading levels should be used. Headings and subheadings are not underlined. The three levels are dealt with as follows:

HEADING

First-level headings are typed in the upper case bold. Two spaces (three manual line breaks) are left above and two below the heading.

Second-level subheading

This subheading is typed in lower case bold. A space (two manual line breaks) is left above and below the subheading.

Third-level subheading A space (two manual line breaks) is left above the subheading. The first sentence begins on the same line, with five spaces between the subheading and the start of the sentence.

5. Writing style

Authors should use correct technical terminology and avoid unnecessary repetition and circumlocution. All numbers from one to twelve are to be written in full, except fractions, units of measurement, statistical data and symbols. When a number is inevitable at the beginning of a sentence it must be written in full. Only acknowledged abbreviations and symbols should be used. Less well-known abbreviations have to be explained. The symbols % and °C are typed next to the figure without a space (25% and 40°C). Metric terminology and symbols have to comply with the recommendations of the Metrication Department of the SABS.

6. References

The Journal uses a user-friendly adaptation of the Harvard system:

- References in the text Literature cited in the text is arranged unnumbered and alphabetically according to author on a separate page.
- Quotations and references to literature in the text are accompanied by the author's surname, the year of publication and the page number, in brackets (Smit, 1987:12).
- Facts or arguments that are not those of the author are supported by a source reference. When the source is an article, the author's name and the date are required. When the source is a book, the page/s are also required.
- References to literature with three or more authors require the first author's name only, followed by et al (Louw et al, 1986:34).
- Different publications by an author in the same year are indicated by a, b, etc: Brown (1998a & 1998b) found that ...
- References to different publications of the same author are made with the dates in chronological order: (Du Plessis, 1987, 1988, 1995a, 1995b & 1999).
- References to an anonymous source require the title of the publication in the place of the author's name (Fur and fur-like fabrics, 1971:15).
- References that are frequently used by authors who publish in the JFECS are illustrated below. Please note the use of punctuation marks, spaces, italics and capitals.

Books, government publications, proceedings and theses:

KINGDON, J. 1997. The Kingdon field guide to African mammals. San Diego. Williams. (Book with one author)

GIBSON, R. 1997. Prisoner of power: the Greg Blank story. Johannesburg. Clarke. (Book with subtitle)

ESCHLEMAN, JR. 1993. The family. An introduction. 7th ed. London. Allyn & Bacon. (Book with several editions)

SWART, PJ & BLACK, JP. 1999. A tour of South Africa. Johannesburg. Haigen. (Book by two authors)

LONGENECKER, JG, MOORE, CW & PETTY, JW. 1994. Small business management: An entrepreneurial emphasis. 9th ed. Cincinnati. South-Western.

South African Association of Family Ecology and Consumer Sciences. 2000. Home economics in South Africa. Pretoria. (A book published by an organisation, association or institution)

South Africa. Department of Constitutional Development. 1993. Negotiating a democratic South Africa. Pretoria. Government Printer. (A government publication)

Fifth National Congress of the South African Association for Family Ecology and Consumer Sciences. Potchefstroom. 2000.

Proceedings. Pretoria. South African Association for Family Ecology and Consumer Sciences. (Proceedings of conferences, congresses)

NYE, FI & BERARDO, FM (eds). 1966. Emerging conceptual frameworks in family analysis. 1966. London. Collier-MacMillan. (Book with an editor or compiler as author)

McINTYRE, J. 1966. The structure-functional approach to family study. In Nye, FI & Berardo, FM. 1966. Emerging conceptual frameworks in family analysis. London. Collier-MacMillan. (Chapter by an author in a book edited by another person)

SCHöNFELDT, HC. 1997. Effect of age on beef quality. PhD thesis. Pretoria. University of Pretoria.

Articles in journals:

ERASMUS, AC. 1998. A suggested approach to educating consumers on the purchase of electrical household appliances. Journal of Family Ecology and Consumer Sciences 26(2):145-151. (Article by one author)

VILJOEN, AT & GERICKE, GJ. 1998. Methodology for the collection and application of information on food habits and food preferences in menu planning of heterogeneous groups. Journal of Family Ecology and Consumer Sciences 26(2):89-102. (Article by two authors)

BOSMAN, MJC, VORSTER, HH & STEYN, HS. 1998. The effect of storage on the characteristics of high-fibre muffins with different levels of a protein-based fat substitute. Journal of Family Ecology and Consumer Sciences 26(2):131-144. (Article by three or more authors)

KOTZE, NJ. 1999. The influence of residential desegregation on property prices in South Africa: the Pietersburg case study. Journal of Family Ecology and Consumer Sciences 27(1):48-54.

Administration of technical information groups. 1959. Canadian Journal of Chemistry 30(1):7-14. (Article by unknown author)

GWEZI, P. 2000. Flood victims near city get a helping hand. Pretoria News 16 February:1. (Article or news item under author's name)

Crime down within 3 years, says Selebi. 2000. Pretoria News 16 February 2000:2. (Anonymous article or news item)

Jonassen, DH. Technology as cognitive tools: learners as designers. Available on line. URL: http:/itech1.coe.uga.edu/itforum/paper1/paper1.html. Accessed 15 April 1999. (Article on the Internet)

7. Tables

Well-planned tables contribute to the value of an article. In view of the relatively high cost associated with publishing tables, only essential information should be included in support of the text. Each table has to be typed on a separate page and as far as possible in 1,5 or doublespacing. Tables have to be numbered and given headings that reflect the content:

TABLE 1: RANKING OF THE FIVE MOST IMPORTANT ACTIVITIES AND RESPONSIBILITIES OF HOME ECONOMISTS

Each column should have a heading and should contain measurements of the same unit. No full stops are used after headings. Note the use of a decimal comma. Abbreviations (explained in a footnote under the table) may be used as space is limited. In the text a table is referred to by its number: Table 1 or (Table 1). Indicate placement of the table in the text as follows:

Place Table 1 here

Please look at other specific technical details about typing tables, and for examples of tables elsewhere on the Web site.

8. Figures

Carefully selected graphs, sketches or other graphic material that could facilitate understanding of the text. Bear in mind that figures have to fit into one or two columns of the Journal. Detail may be lost in the process of scaling down graphic material to fit into one or two columns. Design the graphics with the width of a column (75 mm) or page (170 mm) in mind. The largest size graphics is 225 mm x 170 mm. Text-based figures should be constructed in Microsoft Office PowerPoint 97/2000 and saved as a PowerPoint Presentation (.ppt format). Use Arial type-face as the base font for all text-based figures. Charts should be constructed in Microsoft Office Excel 97/2000 and saved an Excel spreadsheet (.xls format). Use Arial type-face as the base font for all text in charts.

Graphical material accompanying the text should be in a format that is ready for typographical processing. Additional fees will be charged for editing of incorrect graphical material. Photographs or maps should be clear, with sufficient contrast. Protect photographs and maps between two sheets of cardboard. Do not attach photographs or maps to the protective cardboard or manuscript. Identify photographs and maps by writing in soft pencil on the back near the edge. All photographs and graphic material are referred to as figures. Most of the conventions for tables apply to figures as well, except that figures have subscripts:

FIGURE 1: FACTORS THAT INFLUENCE THE FORMATION OF HABITUAL EATING HABITS

In the text figures are referred to by their numbers: Figure 1 or (Figure 1). Indicate placement of the figure in the text as follows:

Place Figure 1 here
