

Cultural, social and individual aspects of food cognitions

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Abstract

This thesis explores the links between cultural, social and individual factors and the structure and content of food perceptions. Food perceptions are defined as cognitive structures which contain information about food and act as selective barriers in the food choice process. This thesis attempts to align food perceptions research within the theoretical foundations of social representations theory, a European tradition which is based upon the social and cultural nature of cognitions. The aims of this thesis were to investigate the content of taste and nutrition perceptions within Korea and Australia and to assess how shared these perceptions were using Q-methodology. Within-country differences between younger and older males and females were examined and the relationships of food perceptions to food use explored.

In Korea, meat is perceived very positively and was regarded as both tasty and nutritious by most Koreans. Cereal and vegetable foods were regarded less positively overall and traditional Korean foods and meals were also highly regarded, especially by older Koreans. In Australia, meat and meals containing meat were perceived to be very tasty and nutritious by older participants and viewed as tasty by most younger participants. Younger respondents viewed meat and meat dishes as quite low in nutrition however. This dichotomy also extended to the younger Australians' perceptions of vegetables – low in taste but high in nutrition.

The taste and nutrition perceptions were significantly related to actual food behaviour measured using a food frequency questionnaire. These taste and nutrition perceptions were able to predict the use of foods and food groups often without demographic factors adding to the predictive power of the models, with good amounts of variance explained. Food perceptions appear to mediate between the structural factors of a society, through the social processes outlined in the theory of social representations, and food behaviour.

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Declaration

This thesis has been submitted to the Faculty of Science, University of Adelaide for examination in respect of the Degree of Doctor of Philosophy.

This thesis contains no material which has been accepted for the award of any other degree or diploma in any University or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference is made in the text.

I give consent to this copy of my thesis, when deposited in the University Library, being available for loan and photocopying.

Natalie Beaumont-Smith

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Natalie



Chapter 1

Food perceptions

According to the famous dictum of Levi-Strauss' (1970) food is not only good to eat but good to think. Foods stimulate the senses including the taste buds and the visual systems, however, Rozin and Vollmecke (1986) believe "it is the *mental representation* invoked by this stimulation that is critical to the human's response" (p. 434, emphasis added). As humans, we think about food, we categorise food as edible or inedible and we have mental schemas (Kronl, 1990) which contain stores of information about particular food including its perceived health value, for example. This means that apart from the biological and nutritive role that food plays for us, food use is also a matter of cognitive evaluation. The perceptions of a food's taste, health value, convenience and price, for example, may all impinge upon an individual's or group's (eg. a family group) food choice.

Nutritionists define food consumption as the actual ingestion of food which imparts nutrients to the body (Sanjur, 1982a). The consumption of food, however, is under the influence of physiological (biological), cultural and individual factors. All organisms need to eat food to provide nourishment to sustain growth, and organisms eat the food found in their environments according to their biological make-up as carnivore, herbivore, or omnivore.

Biologically, humans, as omnivores, are able to eat all food that is safe and nutritious and found in their environment. Humans, however, do not do this. Humans have rules about which foods are deemed to be edible, which foods are selected for consumption, and the ways these

foods are to be prepared, combined, and consumed (Axelson, 1986; Fischler, 1988). These rules represent the foodways of a group and are cultural and thus learned.

1. The concept of culture

Hofstede (1991) defines culture as the “*software of the mind*” (emphasis in original, p. 4). It is learned throughout life but the most important times for learning are during childhood when children are socialised into the ways of their culture according to the values of their care-givers. Culture is always a group phenomenon as it is shared with people who exist in the same social environment where it is learned. Hofstede continues: “it is *the collective programming of the mind which distinguishes the members of one group or category of people from another*” (emphasis in original, p. 5). This means that differences between groups exist because each group has a specific set of rules for acting. However, this definition does not say anything about the origins of culture. This begs the question of which arose first the social group or the culture? How could groups even be defined as a group if they did not share a common frame of reference (or software)? But how could the common frame of reference be developed without the existence of a social group?

Triandis (1994) posits that culture arose because, historically (or even pre-historically), the chances of survival of a human group were increased when those individuals cooperated in the basic fundamentals of human needs like sharing food, shelter, water and mates. Culture conferred an evolutionary advantage as it increased the ‘fitness’ of the group. Triandis (1994) defines culture as:

“... a set of human-made objective and subjective elements that in the past have increased the probability of survival and resulted in satisfactions for the participants in an ecological niche, and thus became shared among those who could communicate with each other because they had a common language and they lived in the same time and place” (p. 22).

So the origins of culture may have been present even with *Homo erectus* as evidence for cooperative hunting and living, requiring a primitive form of communication, have been found (Ehrman & Parsons, 1976; Leakey, 1994).

Culture requires complex verbal communication together with an extension of time spent in childhood and adolescence for socialisation. The biological underpinnings of these requirements are some of the most important advances that have set modern humans apart from their ancestors. Culture could develop exponentially as the biological substrate would support oral, and then written, traditions and ways of behaving. Culture represents the factors that helped survival of the group in the past but is not so immutable that it cannot change when the environment (physical or social) changes in the future. One of the main advantages of cultural change and evolution (over genetic evolution) is that culture can be adapted rapidly when environmental conditions require changes in a group's behaviour patterns, traditions and their beliefs to continue to meet their biological needs (Dawkins, 1989; Gabora, 1997).

Triandis (1994) states that the environment provides the backdrop for culture. The environment is where people live and it provides the resources that people will use to survive. Culture will develop out of this survival as behaviours that helped people to survive in the past will be repeated again. Triandis calls this environmental ecology and he believes that ecology influences culture which in turn influences social behaviour in a one-directional manner. Using seafood as an example, if seafood is found in the environment (ecology), seafood will become an important part of the foodways of that group (culture) and the group will develop appropriate methods for collecting, preparing and eating that seafood (social behaviour).

However, the influence can be two-directional. Social behaviours can change and influence culture and cultures themselves can influence ecology. A more efficient way of collecting and preparing seafood may become part of the foodways of that group. This may even influence the ecology the way that fish-farming, for example, has influenced where, in the environment, various fish can be found. Ecological and historical factors shape culture. Examining these factors can help to explain why particular elements of a particular culture have become important. This adaptationist approach, where culture is used to equip the group for dealing

with their environment, is favoured by most contemporary researchers interested in food, diet and culture (Johns & Kuhnlein, 1990).

Culture also influences humans' cognitions by directing processing and use of information. The Western food system has changed so much that, for many, meat now comes in tidy, pre-sliced packages from the butcher or supermarket (Symons, 1993) and most urban dwellers do not respond in the same way to a cow as their ancestors may have done. To most city dwellers cows are not food anymore. This deterministic force directing cognitive and social activity is fundamental to the notion of culture. Brownstein (1995) maintains that a culture is made up of abstract notions which include:

“... propositions (of which beliefs form a subset), social conventions, rules (such as norms), techniques, values, concepts, and so forth, and not such things as institutions, material objects, actual behavior in the sense of behaviors, and the like” (p. 325).

These abstract concepts are learned through the socialisation process using language and images. They are social in the sense that their content is shared among members of a cultural group and are hence not known only by any one individual member (Brownstein, 1995). These notions are especially meaningful whenever cross-cultural contact occurs. The cultural frame of reference which one uses to interpret behaviour and understand the nuances in conversation, for example, is no longer appropriate as they are not shared between cultures.

In essence, culture refers to a set of shared patterns of knowledge, ideas, attitudes, beliefs and values as abstract notions and behaviour patterns as manifestations of culture which are learned; transmitted from one generation to another and between individuals. Some of these concepts are universally shared throughout the membership, whereas others are shared only within certain subgroups of the culture. Culture is dynamic as it can respond to historical and environmental changes such that it is almost always relevant to the situations of the time. The membership negotiates amongst itself (not necessarily consciously to change culture) those abstract concepts, like beliefs and attitudes, that will be relevant to the functioning of that society at that time.

The relationship between food and culture is highly complex and an explication of this relationship will be attempted throughout this thesis.

2. Food preferences

Food choices are directed by food preferences. Food preferences can be defined as the choice of one food in favour of another (Rozin & Vollmecke, 1986) and can be influenced by likes and dislikes, perceptions of the characteristics of the foods involved and a person's values among others. One may like chocolate but prefer celery because they perceive it to be healthier and they value good health. The correspondence between preference and choice is strong, particularly in affluent societies (eg. Randall & Sanjur, 1981). In poorer societies, the foods eaten are subject to the influence of cost and availability so the preference-choice correspondence may be much weaker (Rozin, 1990a). Despite the effects of environmental factors such as these, the variation in food preferences that exists in humans worldwide can be partitioned into the effects of biology, culture and the individual. Krondl and Lau (1978) maintain that biological, cultural and individual factors also affect food perceptions which act as cognitive barriers in food choice. This means that aside from the physiological need to satisfy our hunger, our culture and our individual preferences direct our food choices (Herman & Polivy, 1984). For example in traditional chilli-eating groups, the socialisation of individuals to eat chilli (culture), together with the preferred level of chilli flavouring in the meal chosen (individual), act together to influence their choices of meals using chilli.

2.1. Biology

Humans are omnivorous and our biology (the need for a variety of foods to supply all necessary nutrients together with general purpose dentition) impinges upon our food choices universally in three generally accepted ways. Humans have an innate propensity to accept sweet tastes and to reject bitter tastes (Messer, 1984a) which is believed to confer an evolutionary advantage (Rozin & Vollmecke, 1986). Sweetness is almost always associated with a source of

dietary energy so that ingesting sweet tasting foods will increase the chances of survival. Bitter tastes are quite often associated with the presence of toxic chemicals so avoidance of these would also ensure a likelihood of survival (Rozin & Vollmecke, 1986). Humans, as omnivores, also exhibit an ambivalence toward new foods, such that we have both a fear of, and an interest in, any potentially new food - the omnivore's paradox (Fischler, 1988). This paradox is believed to occur as new foods may, in the same instance, be both a source of valuable nutrients and possible toxins (Rozin, 1976a). Humans also have the ability to link any delayed consequences of ingestion with the flavour of the food. If nausea and illness result after eating a particular food, this food will then be avoided in future and perceptions and preferences altered (Rozin, 1988). This is usually referred to as 'taste aversion learning' and this avoidance will persist for the individual even if the food is important socially and culturally.

Cultural factors appear to account for most of the variation in food selection, because of the universal nature of these three biological influences. Indeed, Desor and colleagues (1975) found differences between Negro- and White- Americans in their preferences for sweet and salty tastes especially in younger subjects. However, it was difficult to determine how much of these differences could be explained by genetic predispositions or learned dietary preferences. Cultural differences, rather than biological, were thought to be more influential as many studies had found negligible, widespread genetic effects on food preferences (eg. Faust, 1974; Perusse et al, 1988; Rozin and Millman; 1987). It is generally thought, however, that because omnivores need a varied diet, few biological predispositions will exist in order for them to exploit most foods in their environment (Rozin, 1976b; Rozin & Vollmecke, 1986).

In a classic study Davis (1928) examined the food intakes of infant orphaned children who were able to select their own food from that offered, and hence regulate their own diets and how much food they ate. These children were pre-cultural as they had not learned the culture of their caregivers because of their young ages. This would mean that an investigation of the effects of biology on food choices could be attempted without the interactive effects of culture. Davis

found that the young children did indeed select diets that were well-balanced and appropriate for their needs. However, this study had some serious methodological limitations as the foods that were offered when selected on a random basis would also have been suitable for adequate growth. It should also be noted that the foods chosen most often by the infants were milk and fruits, foods that are naturally sweet (Story & Brown, 1987). Studies investigating the food choices made by young children from less than healthy alternatives have not been conducted (and indeed are unethical). Rozin (1990a) concludes that genetic factors cannot guarantee adaptive food selection as twin studies (eg. Rozin & Millman, 1987) show little hereditary effects on food preferences and omnivores have few genetic factors controlling food selection.

Genetic mechanisms can be used to explain a limited number of instances of specific taste and food preferences. Laboratory studies using mono- and di-zygous twins have revealed that sensitivity to a bitter tastant has a heritable component (Schmidt & Beauchamp, 1990). Holt and colleagues (2000) found that sensitivity to a bitter tastant was not related to sensitivity to sweetness, preferred sucrose level in food or frequency of intake of sweet foods and drinks. This means that being a 'supertaster' does not preclude many sweeter foods in the environment, only a more heightened sensitivity to bitterness which would have provided an evolutionary advantage historically. Duffy and Bartoshuk (2000) found that supertaster status was not associated with a lowered preference for bitter foods and beverages but they maintain that those who are sensitive to bitterness tend to use salty condiments to mask bitter tastes, particularly in vegetables. In this way individual preferences, and even cultural factors, are influencing the food choices of these individuals, rather than their biology.

Genetic variation in the levels of sustained production of the enzyme that breaks down the milk sugar lactose after infancy has been observed worldwide (Simoons, 1976). The avoidance of milk in these individuals who are lactose-intolerant is necessary for good health. Some cultural groups have been found to limit or avoid milk consumption because the majority of members are lactose-intolerant (Simoons, 1982) and milk does not even form part of their food system after

infancy. In this case the genetic constitution of individuals and groups are influencing their specific food preferences. However, at the group level this forms part of their foodways (ie. milk avoidance) even if not all members are lactose intolerant, so culture is also partly determining their specific food preference. This mechanism is known as biocultural evolution where culture supports the avoidance of a specific food which has its base in genetics (Katz, 1982; Katz & Schall, 1979).

Katz (1987) documents an example of the relationship between human biology and cultural behaviour. The use of soybeans in China and other Asian countries has been traced back thousands of years. It was first used as an important source of nitrogen in agriculture and then as an important food which, when consumed with rice, provided an excellent source of protein. Soybeans, however, need to be processed before use to inactivate an anti-trypsin factor (ATF) which can lead to severe ill health if consumed untreated. If soybeans are sprouted, fermented or boiled and made into a curd the ATF is successfully deactivated. The food practices of these countries evolved to incorporate many of these processes into the preparation of soybeans for consumption and hence utilise an important agricultural product. These food preparation techniques would then be passed on from generation to generation.

Prehistorically, the biology of modern humans provided for an advance in intellectual capacity (Ehrman & Parsons, 1976) which provided the biological substrate for the emergence of culture. This advance enabled complex language and memory systems to develop which allowed the communication and storage of information developed individually and socially (like soybean processing). Biology constrains humans by prescribing which nutrients are required for optimum survival. Cultural knowledge translates this biological requirement into food practices that can be transmitted from generation to generation (Johns & Kuhnlein, 1990; Katz, 1982). It has been suggested that this 'cultural wisdom' has been lost in many contemporary societies (Gussow & Contento, 1984) so that humans living in affluent societies are consuming diets (and engaging in lifestyles) that are conducive to bad, rather than good, biological health (eg. Simopolous, 1995).

This indicates that culture has a profound effect on a group's food preferences, even to the point of over-riding biological health. There is a movement of professionals advocating that we return to the diets of our ancestors, the one that we were genetically adapted to (eg. Eaton et al, 1997).

2.2. Culture

Culture influences food choices, preferences and perceptions in many ways. These influences include the definition of which foods available in the environment are designated as edible or inedible (Harris, 1985; Messer, 1984a). In many cultures caterpillars are prized delicacies and are extremely edible but in others they are shunned as foodstuff and are definitely not edible (eg. Keen, 1978). Culture provides the template for the types of foods to be consumed, the timing of their exposure, the flavours that will be enjoyed by its members, and how the food will be prepared (E. Rozin, 1982; Rozin, 1976a). These culinary rules also extend to the order of food in a meal, the order of meals over the day and week, and the foods eaten over the year through the changing seasons (Douglas & Nicod, 1974; Murcott, 1982a, 1982b; Messer, 1984a).

Cuisines

Broadly, the foodways of a culture are expressed through its cuisine. Fischler (1988) asserts that

“...cuisines consist of mental representations and the practices associated with them, all shared by individuals in a culture or a group. Cuisines involve culture-specific taxonomies and complex sets of rules about how to collect, prepare, combine and consume foods” (p. 196).

Cuisines help to modify the human biological universals (Rozin, 1976a). For example, the sources of sweetness in the food environment have become incorporated into cuisines around the world (P. Rozin, 1982) and sugar has become an important economic and political commodity (Mintz, 1985). Cuisines have also modified the rejection of bitter substances. Chilli pepper is a bitter substance which, according to our biology, should be avoided. However, many cuisines use chilli as an important part of their flavouring systems. Rozin and Schiller (1980) have found that the

initial rejection of chilli is changed to an acceptance, and even a craving, after the age of eight years in cultures which use chilli.

Cuisines also provide individuals with the framework of cultural knowledge about which foods are safe to eat and how to prepare them (eg. soybeans). Flavour principles are “unique flavouring combinations” (E. Rozin, 1982: 195) which are used repetitively in a culture and act as ethnic markers which make unfamiliar foods become more familiar (Rozin & Rozin, 1981). This is one way of alleviating the effects of the omnivore’s paradox, the ambivalence shown towards potential new foods (P. Rozin, 1982). Furthermore, flavour principles also add variety to the diet through the combinations of different flavours used in a cuisine. Thus “the conflict between desires for variety and familiarity is *transformed* into culinary themes and variations, in the culture” (E. Rozin, 1982: 230, emphasis in original).

2.3. Individual factors

Cultures are made up of individuals, and despite a common cuisine linking a cultural group defining the foods to be eaten and when, and the flavours to be enjoyed, there still exists substantial within-culture variation (Rozin & Vollmecke, 1986). This is despite the fact that everyone usually begins life by being nourished by a single food - milk (Birch, 1990). Social exposure factors may explain individual differences, but paradoxically, within-family correlations in food preferences are very low - typically below 0.3 (Borah-Giddens & Falciglia, 1993). Correlations between parents also tend to be much higher than child-parent correlations which further confounds the effect due to social exposure (Birch, 1980; Rozin, 1990b). Age differences and cohort effects may go some way to explaining individual differences (Garcia et al, 1975). Differences in food experiences, including food likes and dislikes, which can influence food acceptances and rejections may account for much of the within-culture variation (eg. Pilgrim & Kamen, 1959). How a food comes to be liked and preferred is still a matter for future research and elucidation (Booth, 1994; Rozin & Vollmecke, 1986).

The within-family paradox may be a particularly Western phenomenon as most of the studies have been conducted on individuals and families from Western societies with individualistic (rather than collective) ideologies. Markus and Kitayama (1991) contend that individualism, a philosophy which is inherent in many Western societies (like America where much of this research has taken place), stresses “attending to the self, the appreciation of one’s difference from others, and the importance of asserting the self”. Collectivism, on the other hand, emphasises “attending to and fitting in with others and the importance of harmonious interdependence with them”. The authors note that the way a culture construes notions of ‘self’ can influence “the very nature of individual experience” (all quotes p. 224). This hypothesis of the effect of cultural ideology on within-family food preferences has yet to be tested empirically.

The effects of socialisation on within-family food preferences are strongest (correlations up to $r=+0.6$) with food items regarded as dangerous and disgusting by that culture (Rozin et al, 1984). It could be postulated that strict socialisation in Western societies would occur with those food items regarded to be dangerous, disgusting or taboo than with the more nebulous realm of food likes and dislikes where the individual has more control. Children as young as four know which foods are edible or inedible (food taboos) and seven year old children demonstrate the same unwillingness as adults to consume foods contaminated by disgusting and dangerous items (Rozin et al, 1986). This provides more evidence for the stronger socialisation of these values. The rejection of new foods (food neophobia) also appears to show strong socialisation effects (Koivisto & Sjoden, 1996; Pliner & Loewen, 1997).

3. Classifications of foods

3.1. Food acceptance and rejection

Culinary taxonomies, including classifying those potential foods in the environment into edible items, lead to substantial cross-cultural differences in food habits. Cultural taxonomies and food selections and avoidances draw upon individual food perceptions and shared social and

cultural food ideologies. Rozin and colleagues provide a blueprint documenting those food acceptances and rejections which result from sensory-affective, anticipated consequences and ideational sources (Fallon & Rozin, 1983; Rozin, 1984, 1988; Rozin & Fallon, 1981; Rozin & Vollmecke, 1986).

Sensory-affective motivations can be directly associated with liking or disliking particular foods and these probably account for most of the within-culture variation in food preferences. These motivations relate to how pleasant a food is for each individual. Characteristics of flavour, smell and texture play a part here in food acceptance or rejection. Some people like the texture of soybean curd, or the flavour of ice cream, or the smell of freshly brewed coffee while others do not, leading to acceptances or rejections of these and other foods.

Anticipated consequences refer to a cognitive evaluation of the expected effects that a food will provide after ingestion. They may be rapid effects like satiation (acceptance) or nausea (rejection). The expected consequences may also be delayed involving cognitive perceptions of inherent characteristics of food. Some foods are regarded as beneficial because of the expectation that they will confer health or provide a higher social position like eating fruit for vitamins, salads for slimming or caviar for social reasons. Other foods may be classified as dangerous because they are perceived to contain toxins like avoiding chicken because it is believed to contain hormones, or its consumption is not socially appropriate like adults eating baby food, for example. These anticipated consequences must be socially shared as others must be able to identify these characteristics in you if these foods are eaten (Belasco, 1989; Stein & Nemeroff, 1995). Indeed, overweight people have had to endure stereotypes such as these in Western cultures in recent years (eg. Cassell, 1995; Fries & Croyle, 1993).

The third component of this taxonomy concerns ideational motivations for food acceptance or rejection. Foods are categorised according to their symbolic meaning or their origin and are commonly held cultural constructions. This component contains two sections - food appropriateness and the emotional values which foods provide. More food rejections are

associated with these motivations than food acceptances. Foods which are accepted solely on ideational grounds for appropriateness include ritual food like turkey at Christmas and cake at birthdays. Rejection as inappropriate include items which are not real food like grass and sand. Positive emotional values include food associated with gods or religious symbols like the drinking of wine in Christian ceremonies. Negative emotional rejections occur with items like insects and dogs in most Western societies reflecting their origins and symbolic nature. The thought of consuming even a minute trace of this category induces feelings of nausea and extreme negative emotional responses in cultures which reject these items as foodstuffs. Research has indicated that children as young as four years of age know about the food acceptance and rejection patterns for their culture (Fallon et al, 1984; Rozin et al, 1986).

3.2. Food taxonomies

Jelliffe (1967) maintains that food taxonomies, or classifications, arise out of a culture's history, economy and other social factors. Various classification systems that exist in different cultures appear to share common themes that appear worldwide based upon anthropological analysis. The dominant staple of the culture is invested as a cultural superfood and is often represented in religious ceremonies. This is like bread in many Western countries where it is an important Christian religious symbol. Rice in many Asian nations is invested with similar properties and indeed the term for 'food' in Korean is derived from the word for 'rice' and "dinner is ready" literally means "come and eat rice" (Si-sa, 1992 - Korean Dictionary).

Foods regarded as high or low in prestige are another common theme in food taxonomies. Prestige foods are usually of animal origin, are difficult to obtain, were traditionally associated with the elite members of the society, and are typically expensive. In Korea, beef could be seen to occupy this position (in their food taxonomy) as it was traditionally associated with feasting and in contemporary times is reserved for special occasions because it is quite expensive. In some Western countries, truffles and lobster (crayfish) could fill this role as they are difficult to obtain and expensive.

Several investigations of Western food classification systems have been carried out (eg. Fewster et al, 1973). Schutz and colleagues (1975) investigated food classifications held by women living in four American cities. They used a list of 56 foods presented in a grid together with 48 uses on which subjects rated the appropriateness of each food with each use on a seven-point scale. The women classified the foods according to prestige snacks, unfamiliar meal items, common meal items and healthy foods. Uses were classified according to functional implications when planning food, informal occasions, foods for meals and social uses. There was considerable agreement between subjects from the four cities in America indicating the existence of shared perceptions of the appropriateness of food items. This was particularly true for the foods perceived as common meal items and those perceived as appropriate for social functions. Furthermore, Schutz (1988) maintains that food appropriateness can be viewed as a “simple cognitive structure underlying food perceptions” (p. 115). It has been demonstrated that these rules of appropriateness are shared and food taxonomies for Western food systems do include concepts of food appropriateness.

3.3. Lay and professional food classifications

Food classification systems used in professional food selection guides can be criticised as they may be based mainly upon those classification systems held by the nutrition professional (Axelson et al, 1986; Schutz et al, 1975) and may not reflect the perceptions of food held by the lay community for whom they are intended. Axelson and colleagues used multidimensional scaling to examine the groupings of food and food perceptions of the lay community. The twenty-three foods chosen were individual food items that were representative of the range of foods presented in the Four Food Groups guide which is widely used in the United States. College students were asked to rate the perceived similarities of all possible combinations of pairs of the 23 foods.

The respondents appeared to follow the groups used in the Four Food Group guide but possessed a more complex classification system including a high-starch group. Furthermore,

foods like eggs, peanut butter and beans which are presented as meat substitutes in the professional guide were not classified with the meat group indicating a difference in perception. The underlying dimensions of classification used by these students included inconvenient-convenient, good-bad and animal-plant. The results from this study, however, reflect the views of a very limited (and highly educated) subgroup of the population. It is possible that the congruence of the respondents' classifications and those of the professionals is a reflection of this even though the subjects had not majored in nutrition. The respondents did achieve high scores on a test which assessed knowledge of the nutrient composition of the 23 target foods. The nutrients of interest, including vitamin A, may not have been commonly known by a more generic sample. However, Axelson's group have piloted an important methodological tool for investigating food perceptions and food classification systems.

Scientists' and nutritionists' views of food are often structured around nutrients dependent on the chemical composition of each food. However, it could be expected that lay people in industrialised nations do not perceive food in this scientific way. Similar types of food like steak and chicken can be interchanged easily according to nutritionists, but to the lay person social values (rather than nutrient values) are often used to classify foods, whether they are from the same 'food group' or not (Murcott, 1988a). Indeed, the very existence of food fads in Western nations implies that the lay community holds "deeply-rooted unscientific systems of belief concerning the properties of food" (Worsley, 1980: 65).

Worsley (1980) examined the food constructs held by lay (secondary students) and professional (students majoring in nutrition) groups in order to investigate the ways that these groups classified and perceived foods. It was expected that the nutrition students would perceive foods along dimensions relating to nutrition in accordance with their training and the secondary students would provide insight into the ways that younger members of the general public perceived foods. The respondents were asked to generate terms (constructs) which best described the differences between eighteen random pairs of foods drawn from eight target fruit and

vegetables. In the second phase, the respondents rated each of the eight foods on the terms which they had generated in the first phase.

A frequency analysis revealed that the nutrition students mentioned more constructs which were concerned with food use, nutritional properties and physical characteristics. The secondary students cited more evaluational constructs including good/bad, food effects (eg. fattening) and oral sensation (taste, texture). This was interpreted as an effect due to age (differences in ways of thinking according to Piagetian theory) as well as differences in education.

The two groups of respondents did see the same overall degree of similarity between the eight foods even though the constructs used to classify these similarities were different. The foods used however, were all fruit and vegetables and the inclusion of other types of foods may have yielded additional constructs and less overall similarity. This is still to be investigated. It was concluded that the meanings and classifications of food held by lay people should be made more familiar to nutrition educators to limit mis-communication and confusion from nutrition messages and campaigns (eg. Douglas & Nicod, 1974).

Other food classification systems in Western, lay populations have been examined. Golby (1964) found that foods are perceived to have various roles including: foods that are fillers (potatoes), foods that give energy (sugar), and foods that promote long-term health (fruit and vegetables). Social foods (coffee) and pleasure foods (cakes and sweets) were also found. The perceptions that these foods actually fulfil these roles is of interest. These perceptions would form part of the food ideology of a society (traditional or contemporary). Perceptions such as these also extend to food combinations including meals for "security and completeness" (Golby, 1964: 77) including 'meat and two veg' and 'fish and chips' from British cuisine (Murcott, 1982a). Any programs designed to modify food habits will need to address the roles which particular foods have for some individuals and groups.

3.4. Food taxonomies and notions of health held by traditional societies

Fischler (1988) maintains that culinary and dietary taxonomies are associated with other traditional taxonomies relating to ideas about health and medicine. These have typically been studied by anthropologists and are usually referred to as food ideologies (Sanjur, 1982b).

Messer (1984a) explains that the study of symbolic anthropology including food prohibitions and edible - inedible distinctions can provide a code for the understanding of other social and political relations of a group. This is particularly true of the Hindu Indian food classification system. This cultural group has extremely elaborate rules about the exchange and acceptance of food and meals. A Hindu Indian of a higher caste cannot accept the food that is prepared by someone from a lower caste as the food will no longer be pure enough for their consumption.

Anthropologists like Read and Sanjur use terms like food ideology to encompass all of the relations between food and culture including the "...attitudes, beliefs, customs, and taboos affecting diet and nutrition" (Sanjur, 1982b: 148) for any particular culture. The concept of food ideology involves notions of health and illness that form part of the complete life of a culture particularly for traditional societies. This

"...includes what people think about different kinds of food and their effect on their health and well-being, what kinds of food are suitable for individuals or categories of people at certain times and in certain conditions..." (Read, 1964: 54).

This can apply to the notions in the distinction between hot and cold, yin and yang in traditional Chinese society (Anderson, 1980; Boster & Weller, 1990; Messer, 1984a) or concepts of *alimento* and *fresco* in Latin America (Cosminsky, 1977). These food ideologies have origins in humoral medical classification and support the belief that disease is caused by an imbalance in the amount of heat or cold that an individual has (Messer, 1984a). Foods are classified into the hot-cold dichotomy together with diseases. Foods are used as medicines when individuals are ill. If the illness is a 'cold' illness then 'hot' foods are used to treat it. However, they are often not separated into categories of foods or medicines as they can be thought of as both at the same time

(Kuhnlein & Receveur, 1996). Most individuals believe that meals, and the diet in total, should contain a mixture of hot and cold foods to maintain a state of equilibrium. This extends to the types of foods which should and should not be eaten by people at different life stages including childhood, pregnancy and late adulthood, for example. This classification system exists most strongly in Latin America today (Sanjur, 1982b) and to some extent among migrant Chinese living in America (Anderson, 1980).

Read (1964) emphasises that research on food habits and nutritional status cannot be studied alone and out of context from the broad social and economic factors influencing a community. This applies to modern as well as traditional societies. Anthropologists have studied the socialisation process of teaching the cultural patterns and rules to children of traditional societies. This of course has included food. The child learns how to eat, what to eat, food combinations and the comments about food that reflect its taste, effects on health among other things from the adults forming part of the food ideology for the next generation.

These cultural lessons on foodways include the perceptions about the food eaten and the knowledge of the consequences of food. For example, Read (1964) cites an example in a Malay village where it was believed that it was bad for men to eat too much rice as it would make them sleepy, sluggish and stupid and unable to complete all of the work needed. This perception transferred to the feeding practices of young children. Rice should not be given to young children as they may grow up to be stupid.

The level of determinism inherent in these classification systems has been criticised by researchers like Messer (1984a, 1984b) and Laderman (1984). Messer questions the extent to which individual's actually use this form of classification (eg. hot-cold) in everyday meal preparation. She maintains that perhaps only during times of stress, like illness and pregnancy for example, would people become more strict adherents in balancing the food temperaments. Sanjur (1982b) reported on an anthropological study conducted in southwest Mexico investigating the food consumption and weaning habits of 125 mothers and infants. Results showed that before the

birth the pregnant women did not modify their diet in any way during their pregnancy. However, after the birth many foods were restricted including milk, eggs, and some vegetables.

Laderman (1984) criticises the notion of food ideology as being rather restrictive in the food domain when typically other systems of belief like religious ideology and kinship systems in traditional societies are more open to innovation, interpretation and rationalisation. Laderman hypothesised that food ideologies would be more flexible than first thought and conducted research in an east coast region of Malaysia. Basically the food ideology found supported previous work. Malays in this region believed that food existed in two forms only: fish and rice. Vegetables typically were used as relishes to help with the flavours of the fish and rice but were not considered to be real food. Fruit was there just to keep one's mouth busy. However, closer inspection found that the food behaviour was very different from the ideology stated. In the monsoon season when fishing was difficult people lived on dried fish, rice and wild greens and the preparation of these wild vegetables was a source of pride for these Malays.

There appears to be a synergy between food and notions of health (and illness) in the food taxonomies of traditional societies. In this way, no single food can confer good health but the correct balance of foods should lead to good health. Foods can also be used in the treatment of illness. These notions are transmitted through a process of socialisation as children learn about their group's food taxonomies. These classification systems are not entirely prescriptive but appear to be widely shared and are often relied upon when health may be compromised (Homans, 1983; Murcott, 1988b).

3.5. Notions of health held by Western societies

In Western societies concepts of health are often based upon scientific notions of nutrition (Gussow & Contento, 1984; James, 1990; Messer, 1984a). Foods defined as healthy are commonly tied up with the concept of 'natural foods' (Messer, 1984a) and knowledge of the nutritional value of foods is commonly gleaned from advertising, medical personnel and "accumulated cultural hearsay" (p. 443). There seems to exist common sense shared ideas of

health similar to that posited by anthropologists about food ideologies from traditional societies (eg. Walker, 1995), but in Western societies it seems to rely more on expert knowledge as the study of nutrition has become more scientific. Herzlich and Pierret (1989) document the creation of knowledge and understandings about AIDS in the lay French community. While the construction of AIDS by the French press is beyond the scope of this thesis, the charting of the reporting of, and writing about, this disease from a new phenomenon to a widespread understanding is useful. Herzlich and Pierret describe how the media played both reporter and constructor of knowledge about this new disease and influenced beliefs and perceptions about it. Basically, they view the media as the liaison between the scientific and lay communities (reified and consensual worlds, Moscovici, 1984). They maintain that the French press “passed information about this disease from the medical domain to ‘society’, from a level of social inquiry in the laboratory to a level of social concern” (p. 1236). This forms much of the basis of the theory of social representations and will be presented in Chapter 2.

Kronld and Lau (1982) maintain that “cognitive learning about foods is a continual process” (p. 147) whether it has a popular or scientific source, or whether it is based on rational or traditional knowledge. The media, particularly in industrialised societies, have an important role to play here as volumes of information are presented on all aspects of food, nutrition and health. Murcott (1993) contends that lay people often use the terms of nutrition educators like protein or vitamins without an understanding of what these concepts really mean.

Keen (1978) asserts that the health-food movement in America and its notions of ‘wholesome’ and ‘natural’ are leading to a move away from the science of nutrition to a link between food and health which can provide greater emotional and spiritual awareness. In a sense this movement is helping people to develop health notions more akin to traditional societies than contemporary ones. There are also those groups moving away from the thoughts of the ‘goodness’ of foods to the use of dietary and herbal supplements to maintain dietary adequacy (eg. Heaney, 1996).

3.6. The role of shared tastes in cultural and social groups

Food taxonomies, classifications systems, ideologies and perceptions all exist within cultural and social groups as they are shared by those members and form part of the identification symbols for a group.

Culturally shared tastes include the flavours common to a cuisine. All members of a cultural group possess the cultural knowledge of their group which emphasises the foods chosen, the manipulations involved in the food preparation, the flavours used and the rules associated with food use - the structure of cuisine (E. Rozin, 1982). The characteristic structure of any cuisine includes the incorporation and use of foods that were available to that cultural group (Logue, 1991). May (1957) maintains that a group's food habits at any one point in time are a product of their present environment and their past food history. This implies that if the food environment changes then food habits and cuisines are liable to change. For example, when potatoes were first introduced to the British Isles they were not really accepted as food by the English for almost two hundred years even though potatoes were readily accepted by the Irish (McKenzie, 1964). This is important as cuisines and a group's food habits must be seen as being dynamic structures able to cope with differences in food availability (Lowenberg et al, 1974). Indeed, as food availability changes through the 'global supermarket' in many Western societies and even in traditional societies the cuisines and shared cultural tastes are going to change (Gussow & Contento, 1984). This is particularly pertinent as the industrialisation of cuisine and the relative loss of cooking skills appear to prevail in many Western nations (Mennell et al, 1992).

Socialisation effects suggest that even tastes will be shared among individuals belonging to certain social groups (eg. Dacosta & Wilson, 1996). Barthes (1975) wrote about tastes which were shared among social groups, including food tastes. Barthes inferred that the distinction between social classes can be maintained through food ideologies and flavour principles. Groups from lower socio-economic classes in the United States were said to prefer sweeter tastes, whereas the upper classes were believed to prefer more bitter tasting foods. However, these

stereotypes may not have had any basis in reality (Hupkens et al, 2000; Santich, 1995). Douglas (1975) does maintain that “taste in food and palatability is socially determined” (p. 25).

Differences in social groups will yield differences in food preferences and tastes especially in different age and gender groups. Story and Resnick (1986) interviewed groups of American adolescents and found that they believed their fellow teenagers in general ate a diet of ‘junk food’ (foods high in calories, fat and sugar) in contrast to adults. This perception of the differences in tastes according to age highlights some of the stereotypes that exist in categorising the foods that are eaten by some social groups.

There may even exist patterns of taste according to gender. It is generally found that women tend to prefer foods which are lower in calories and select more foods from the fruit and vegetable food groups. Males tend to prefer foods which are higher in fat, salt and sugar (Logue & Smith, 1986; Rolls et al, 1991). This could be a reflection of the stereotypes of foods which are classified to be for men or women. In Australia meat is typically seen as being a ‘man’s food’ (Santich, 1994). Rappoport and colleagues (1993) found that men and women rated foods differently on a dimension of pleasure which included sensory and social factors, covering tastes. Factor analysis of the pleasure ratings suggest that men and women group meals and snacks differently. The females tended to give similar ratings to meals and snacks that had a similar place in a cuisine like traditional meals and fast food and snacks.

The number of meals per day and the timing of these meals are also culturally or socially determined (eg. Douglas, 1972; Douglas & Nicod, 1974). These meals may be quite stable throughout the year or may vary with the seasons in more traditional societies (Lowenberg et al, 1974; Messer, 1984a). However, these meal structures are quite dynamic within a culture and are able to change over time with the advent of new cultural values and the foods that are available to be consumed (ARC-MRC Committee, 1974; Fieldhouse, 1986). Rotenberg (1981) investigated the effects of industrialisation on meal patterns in Vienna, Austria. It was found that the traditional Viennese working day at the beginning of the nineteenth century consisted of five

meals. Within this pattern lunch was the main meal of the day and often consisted of three courses and was regarded as important family time. After World War II, the secondary phase of industrialisation in Vienna started and many more workers were employed outside of traditional family businesses and in factories. The meal pattern changed to a three meal day and the evening meal became the family meal as work and leisure time became much more structured.

In general, there appears to exist shared cognitions of the tastes that are acceptable to certain cultural and social groups. Cuisine determines the tastes that members will be socialised to enjoy whether that means caterpillars, honey ants or hamburgers. Membership of social sub-groups also determines the tastes that will be enjoyed by these individuals. Whether it is a gender effect in traditional societies which prohibits or allows certain foods to be consumed as part of a food ideology or whether it is the choice of foods perceived to be more masculine by males in Western societies, for example, shared perceptions still play a part in food selection.

4. Food perceptions

4.1. Introduction and background

Much of the research into food choices in social psychology have used attitude theories based upon the traditional Fishbein and Ajzen (1975) model (eg. Axelson et al, 1983; Feldman & Mayhew, 1984; Sapp & Harrod, 1989). Michela and Contento (1986) state that the tenets from this research are based upon the 'value by expectancy' model of motivation (eg. Lewin et al 1944) focussing on the motivations which influence food choices. The 'value by expectancy' model as it applies to food holds that people attach values to foods, according to their own personal value systems, together with an expected consequence of ingesting that food. This means that people will weigh up their values with their expectations from foods in the food choice process. For example, if an individual values good health they will choose foods that they perceive to be conducive to good health.

The focus of many nutrition education programmes has been on individual knowledge. It was assumed that by providing more accurate scientifically-based nutrition knowledge, so that 'expectations' were 'correct', the food choices of individuals, and hence the diet of the population and overall health, could be improved (eg. McClinton et al, 1971; Sims, 1978). This approach has been less successful than anticipated partly because knowledge plays only a small part in food choice and many nutrition educators had failed to understand this (eg. Johnson & Johnson, 1985), and partly because an individual's food perceptions and existing schemas of food information may have affected the encoding of the nutrition information (eg. Dugale et al, 1979). An understanding of other individual motives which underlie food choices and preferences is required. Kronl and Lau (1978) state that "the degree of biological hunger, long-term culturally-induced physiological adaptation,...[to the foods found in the environment]...short term influence of society, and personal bias all influence individual food choice" (p. 40).

Perceptions of food broadly refer to the cognitive evaluation of food characteristics. These perceptions can arise from the taxonomies and classifications which are used by the individual or group and the cuisine which they use as part of their cultural and social expression (eg. Atkinson, 1983). Perceptions of individual foods can also extend to the perceptions of whole meals. Meal perceptions can include the notions of what is appropriate to serve, and when it should be served (Rozin, 1976a; Rozin & Vollmecke, 1986) both in the context of the structure of the meal itself in relation to other courses (Douglas & Nicod, 1974) and in relation to the time of day which form part of the cuisine of a culture (Rozin, 1988). Indeed as Douglas (1972), writing about her experiences in Britain, maintains the structure of some meals is so fixed in some cultures that the expected content of that meal is almost incorruptible. To transgress these expectations is to make a meal that is perceived as just not 'proper' (Murcott, 1982b).

Cognitive perceptions of food and their relation to food habits have been investigated in a number of areas. These have included: perceived food size and its role in the symptomatology of individuals with anorexia nervosa (Yellowlees et al, 1988); perceptions of food safety (eg.

Conning, 1988; Knox, 2000); the perceptions of confectionery and its role in the diet (James, 1990); perceptions of foods which cause allergies (Parker et al, 1993); perception about foods high in starch (Monteleone et al, 1997); and some of the food perceptions held by children (eg. Singleton et al, 1992; Michela & Contento, 1986); adolescents (eg. Williams et al, 1993); and adults (eg. Sobal & Cassidy, 1990). The perceptions of food held by different social and cultural groups have also been investigated and compared (eg. Kronl et al, 1984; Lewin, 1943; Rozin et al, 1999).

Food perceptions research has employed a variety of qualitative and quantitative methodologies. Qualitative methodologies typically proceed by in-depth exploratory analyses including observations by anthropologists (eg. Laderman, 1984) and interviews by sociologists (eg. Murcott, 1983). Quantitative methodologies have an experimental focus involving the identification and measurement of factors thought to be associated with food perceptions. These techniques have typically involved research based on questionnaires (eg. Kronl et al, 1982; McKenzie, 1964; Sobal & Cassidy, 1987). Multidimensional scaling analysis has also been used to investigate the content of food perceptions (eg. Cypel & Prather, 1993; Drewnowski, 1984; 1996; Schiffman et al, 1979). Other techniques including the repertory grid have been found to be useful (eg. Bell et al, 1981). The cultural, social, individual and situational factors (Dickins, 1965) associated with the development of food perceptions and their relation to food use will be reviewed.

Kronl (1990) defines food perceptions as simply “the outcomes of previous real or vicarious food experiences” (p. 12). This definition encompasses individual sensory experience which is acquired together with cultural or social second-hand experience which is learned (Kronl & Lau, 1978). This implies that food perceptions involve both sensations and cognitions. Lau and colleagues (1984) define food perceptions as “...mental impressions or pictures of foods formed as the result of visual, olfactory, gustatory, auditory, and tactile experiences...” (p. 407). This cognitive evaluation of sensations are combined with other physical and symbolic stimuli which

add to the library of food perception information held in food schemas. This means that food perceptions exist at the individual level and at the social and cultural level. The perceptions of beef for example can include: it is enjoyable to eat (tasty, individual cognition), it confers a certain social position (social cognition), it is an important part of one's cuisine and it has always been eaten (cultural cognition, familiarity), or it is good for the iron levels (health, nutrition). One or more of these perceptions may be acting at once to influence food choices. Conversely, beef may be rejected because of other perceptions that may exist including: it is too expensive (price), it contains too much fat (health), it is cruel to kill animals for food (value principle). Food schemas contain stores of food perception information depending on an individual's values, experiences and other social and cultural influences (Kronl & Lau, 1982).

4.2. Theory of food perceptions

Kronl and Lau (1978) maintain that the relation of food ideologies, preferences, and perceptions to actual food behaviour including consumption need to be understood. They maintain that cognitions in the form of perceptions mediate between food availability and selection (Figure 1.1).

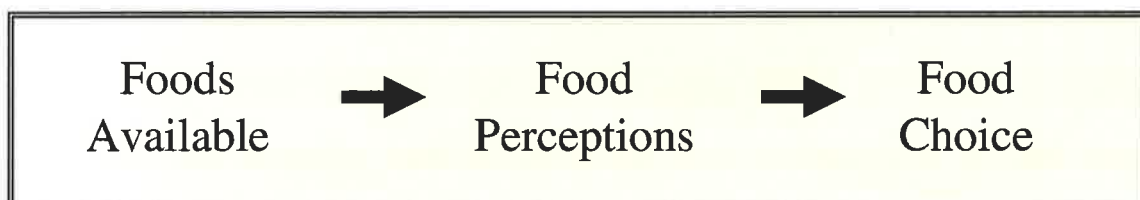


Figure 1.1. Flow diagram of food choice as mediated by food perceptions and food availability.

Kronl and colleagues (George & Kronl, 1983; Hrboticky & Kronl, 1985; Kronl, 1990; Kronl & Lau, 1978; 1982; Kronl, Hrboticky and Coleman, 1984; Kronl, Lau, Yurkiw and Coleman, 1982; Lau, Kronl and Coleman, 1984; Reaburn, Kronl and Lau, 1979) have developed a theory of food perceptions which attempts to divide the cognitive evaluation of food choice into units which incorporate both internal and external cues (eg. Pilgrim, 1957), including biological, cultural, social and individual factors (Figure 1.2).

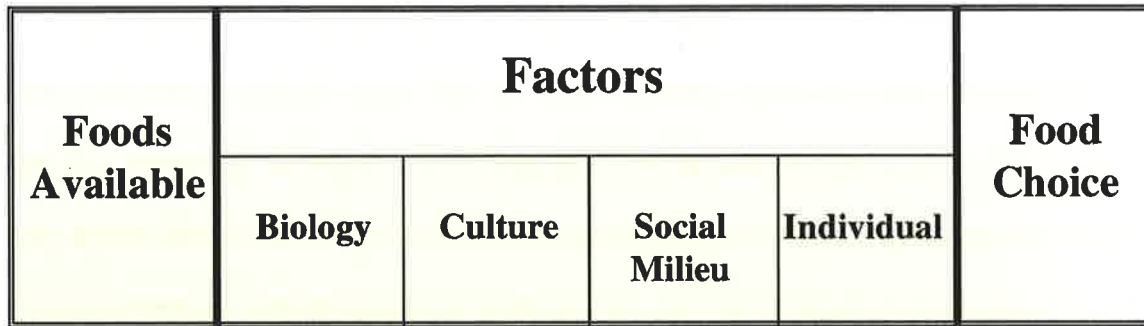


Figure 1.2. Factors influencing the selection process between food availability and food choice (adapted from Kronl and Lau, 1978: 41).

Food perceptions, including satiety, familiarity, taste, prestige and health are stores of information about foods which are influenced to differing degrees by these four factors (Figure 1.3).

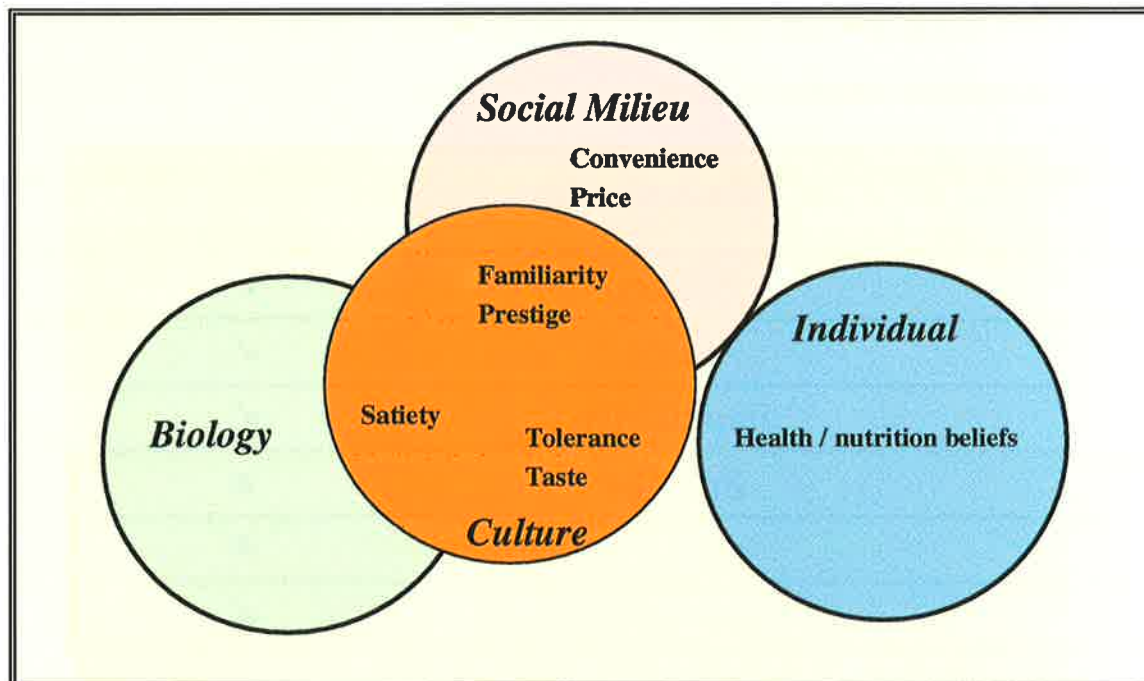


Figure 1.3. Factors influencing the different food perceptions according to Kronl and colleagues (adapted from Kronl and Lau, 1978).

In this way, food perceptions act as selective gates to food choice and consumption which direct the choice of food from that which is available in the environment. These gates are either open or closed and act as channels for food selection or barriers for food rejection in the cognitive evaluation of food choice.

Figure 1.4 shows a simple example of a person using their perceptions (not shown in any particular hierarchical order) to choose between bread or beef. Beef may be chosen over bread because prestige is an important consideration for the individual and they are not concerned with the negative outcomes on the food perceptions of convenience and health. On the other hand, they may choose bread over beef because they are not concerned with prestige but are price conscious (eg. McKenzie, 1979). The perceptions of food are believed to have different weights in the selection process depending on cultural and social values and other individual factors acting at the time of food choice and consumption (Kronl & Lau, 1982; Moskowitz & Chandler, 1978). Booth (1994) does explain, however, that factors used to evaluate different food items are rarely just present or absent (tick or cross in Figure 1.4) but are present to varying degrees which further complicates the cognitive evaluation of foods.

Beef	Foods Available	Bread
✓	Satiety	✓
✓	Taste	✓
✓	Familiarity	✓
✓	Prestige	✗
✓	Price	✗
✗	Convenience	✓
✗	Health / nutrition	✓
Food Choice		

Figure 1.4. An example of the use of food perceptions to evaluate the choice of beef or bread. A tick means that the food scores more highly for that perception.

Information processing theory holds that categorisation, schemas and heuristics provide shortcuts for the processing of information and decision-making in many domains (eg. Hassett & White, 1989; Tajfel, 1978; Tajfel & Wilkes, 1963; Taylor & Crocker, 1981) and the food domain is not expected to be any different. Kronl (1990) maintains that evaluations about a food's acceptance

or rejection proceed through food perceptions which form part of a food memory schema. Those foods which are frequently encountered may have schemas which are activated involuntarily and evaluations made almost unconsciously on an habitual basis. Kronl continues by stating that “such well-learned schemata allow the rapid judgements and evaluations typical of our everyday life” (Kronl, 1990: 12).

4.3. Critique of food perceptions

Relationships between biological, cultural, social and individual factors and food perceptions are likely to be more complex than that developed by Kronl and colleagues as depicted in Figure 1.3. For example, it could be argued that the perceptions of health/nutrition are influenced by factors other than those at the individual level.

Taste

Perceptions of a food's taste can be influenced by both sensory and cognitive factors (Cantin & Dubé, 1999). This would mean that biology, the social groups that one belongs to and individual preferences together with culture could influence taste perceptions. Section 2.1 (p. 5) detailed the effects that biology and genetics have on tastes (through innate taste preferences and sensitivities). It is generally understood that these influences can be quite vague as different preference levels for sweet tastes, for example, vary with cultures, social groups and individuals (eg. Booth et al, 1989).

The sensory characteristics of a food confer a taste that is perceived by the individual but the cultural unit specifies which foods will be tasted, ie. which foods are part of that culture's cuisine and are appropriate to eat (E. Rozin, 1982; Rozin, 1976a; Rozin, 1984). As Murcott (1982a) states, consuming food is not just an individual act but is also a “cultural affair” (p. 203). People eat food appropriate for that occasion and which has been prepared in the ‘right’ way. Perceptions also exist of which foods convey a marker of elevated social status or ethnicity or the foods that are appropriate for a particular subgroup within a culture (eg. Charles & Kerr, 1988), like meat pies for hardworking Australian tradesmen. Murcott (1982a) states that “what people

are prepared to take inside their bodies reflects their social identities, and their membership of social groups” (p. 204). If this is the case then shared perceptions of which foods are appropriate for your social group must exist (eg. Lupton, 1994). Murcott continues by stating that this knowledge is part of a code of conduct for eating and eating habits should be viewed as a product of a shared culture, whether it is the wider culture of a nation or a culture specific to a social group (Martin & Siehl, 1983). Section 3.6 (p. 21) provided evidence of the preference for different tastes by different social groups (eg. Barthes, 1975) which may influence their taste perceptions. In these ways, cultural and social group membership, together with individual food experiences, will influence taste perceptions indicating a degree of consensuality of tastes.

Health

Perceptions of a food’s ability to confer health and nutrition can be influenced by cultural and social factors. Krondl and Lau (1978) postulate that health ‘beliefs’ are held by the individual through their own individual schemas however, this view does not take into account the cultural and social aspects of the knowledge used to generate these stores of information. It was demonstrated in Sections 3.4 and 3.5 (p. 17 and p. 19) that people do not learn by themselves which foods are healthy (where each individual tests the foods they consume for deleterious health effects), rather this is social and cultural knowledge which individuals refer to. This can include the knowledge of which foods are suitable (provide health) for consumption by certain age groups (eg. Fischler, 1986) and the perceptions that different age groups can have about the health value of individual foods (eg. Horwath et al, 1995) and meals (eg. Klesges et al, 1991).

The content of food perceptions

Much of the research on food perceptions does not illustrate what the content of specific food perceptions are. When an individual makes a cognitive evaluation of whether a food is tasty or nutritious, we do not know what component of the food this person is attending to. It could be the sweetness of that particular food or it could be the protein content. This tradition of research has not typically investigated which specific elements of taste or nutrition are associated with

certain foods, and then how these may influence food use. For example, a person may avoid eggs because they are perceived to contain cholesterol and media reports have implicated cholesterol as a causative factor in heart disease. Food perceptions studies would have only found that this person viewed eggs as 'unhealthy' without elucidating the reasons for this perception and then perhaps where these perceptions came from. The investigations of the social (eg. media) and cultural (eg. cuisine) influences on the content of food perceptions have been limited. How prevalent the contents of food perceptions are within groups has also been largely ignored.

Individual level of analysis

The act of gaining information about the world (cognition) may generate stores of "perceived knowledge" (p. 401) in food memory schemas (Kronl, 1990) which can influence food consumption. Thus cognitive schemas may exist which contain foods defined as healthy or unhealthy, for example, which may affect food selection. This knowledge is built upon the individual's experience with that food and can include memories of flavour. However, this notion of food perception is held entirely at the individual level where individuals build up their own schemas of information. Most knowledge generation proceeds through negotiation and communication with others in society – hence the process of socialisation (eg. Moscovici, 1998). Food is fundamentally social and the consensual nature of this perceived knowledge about food has not been investigated. These notions will be expanded in Chapter 2.

4.4. Food perceptions and food use

Kronl and Lau (1978; 1982) maintain that food perception variables can be used to rank and compare different foods, to investigate differences in food perceptions between social and cultural groups, and to correlate scores on different perceptions of the same foods. Food perceptions can also be related to actual food use.

Kronl and colleagues (1982) found significant associations between the use of fourteen target foods and perceptions of the health and taste of those target foods. The perceptions of price, convenience and prestige have been found to be less important to food use than taste and health in

studies of adolescents (eg. George & Kronl, 1983) and adults (Kronl & Lau, 1982). The perceived health value of foods was more strongly related to food use among older respondents than among younger respondents. Taste perceptions of foods were strongly associated with food use in adolescents, adults and the elderly. They conclude that taste perception (the idea of whether a food is tasty or not) could be the last gate that a food has to pass before it is selected and consumed.

Kronl and colleagues (1984) investigated the effects of the food perceptions of prestige, health and taste, and the effect of acculturation on food use among two generations of Chinese adolescents. The two generations comprised those who migrated with their families (first generation) and those who were born to parents who had previously migrated (second generation). The use of dietary staples, like rice, were similar in the two groups reflecting the findings from other studies (eg. Grivetti & Paquette, 1978; Ho et al, 1966). Significant differences were found in the perceptions of peripheral foods which are used less often but do have an impact on overall diet. The perceptions of taste and prestige were significantly related to the use of cakes and potato chips respectively by the second generation. Both taste and prestige were significantly related to the use of ice cream in the second generation whereas perceptions of health were not significantly related to the use of any of these foods. A decrease in the use of some vegetables was also seen in the second generation. This indicates that food habits of immigrants do change with length of stay in a their new country (eg. Hsu-Hage et al, 1995). Peer effects are also likely in this age group (eg. Lau et al, 1984).

The investigation of food perceptions can be a valuable tool for helping to explain the cognitive processes involved in food selection. There is evidence that the perceptions of taste and health are more important than perceptions like prestige, price and convenience on food use. Perceptions of taste are particularly important for adolescents although food use among adults is still influenced by taste perceptions but health perceptions tend to become more important to older people. Perceptions of taste may be the most important because if a food is perceived to be

bad tasting then it is less likely to be consumed in any great amount when selecting from foods that are available. However, in the cases of medicines and chilli for example, the perceptions of health and the social and cultural effects of familiarity and prestige, respectively, would have to be high enough to overcome the negative taste perceptions. Nutrition professionals need to become more familiar with the perceptions of different foods held by different segments of the population (Kronl et al, 1984) and understand that factors other than knowledge and attitudes can influence food selection and consumption.

4.5. Cross-cultural investigations into food perceptions

Very little food perceptions research has investigated cross-cultural differences. This has primarily been attributed to the lack of a suitable methodology where researchers can be assured of the validity of concepts across different cultures, ease of administration, and results which will allow meaningful comparisons between cultural groups to be made (Sobal, 1998; Teufel, 1997).

Hertzler and colleagues (1982) used content and context as a way of classifying food behaviours across cultures. They define content as the observable cuisine of a culture including the actual foods used, the methods of preparation and the rules regulating consumption. Context refers to the connotative meanings associated with food - the “intangibles” (p. 421) of the food system that also govern food selection. These meanings include food perceptions, attitudes, and beliefs.

Food classifications are an example of content which are observable in a group’s food habits including their food preferences and cuisine. Context includes the connotative meanings associated with that group’s food classification system. These meanings or perceptions include nutritive value, the context emphasised by nutrition educators. However, food has several other meanings including taste or flavour, convenience and versatility. This means that because different cultural groups use different foods, the connotative meanings or perceptions of food must also differ indicating that cross-culturally the same food “could have different meanings attached to it depending on the cultural group” (Hertzler et al, 1982: 422). This means that

identical foods will evoke different perceptions in different cultural groups depending on the roles that this food has for the group concerned (eg. Lewin, 1943).

Rozin and colleagues (1999) examined attitudes to food and health across four countries: USA, Japan, France and Flemish Belgium. This study did not measure the perceptions of many foods directly, however, it does demonstrate the effects of culture on food beliefs and attitudes. Adults at airports and railway terminals and students and were interviewed using a 25-item questionnaire. Factor analysis across all countries revealed seven factors including: eating foods modified to be healthier (eg low-fat foods), worrying about foods instead of savouring them (eg ice cream is delicious versus fattening), link between diet and health, importance of food as enjoyment, and culinary associations of food versus nutritional associations (eg is pasta associated with sauce or bread?). In general, the American samples showed the greatest degree of concern and worry about food, ate modified foods the most frequently and showed the least enjoyment of food. The French samples displayed attitudes in direct opposition to those of the Americans. There were significant gender effects which were independent of country of origin where the females tended to be more concerned about food. The Japanese sample was the most likely to hold culinary-based perceptions of food while the Americans showed more nutrition-based perceptions. For example, the Japanese would tend to associate fried eggs with breakfast while the Americans would associate fried eggs with cholesterol. An analysis using Chernoff face representations of the results showed the American females as the most worried and the French males as the most happy. They relate these findings to the effects of culture on food perceptions and attitudes. Americans tend to be highly individualistic and hence believe themselves to be responsible for their own health for example.

McCracken (1982) developed the Infinite Cafeteria Test (ICT) where individuals imagine that they are confronted with every type of food or meal and they can choose their most liked and least liked foods (three of each) and rank order them. Following this three possible reasons for

these six choices are selected from a list of ten and rank ordered. The ten possible reasons include taste, appearance, smell and health.

The ICT was administered to Negro- and Anglo-American high school students. There were few differences between the two groups on the most and least preferred foods. The most preferred foods included steak, chicken, pizza and spaghetti, while the least preferred included liver and some vegetables. The reasons for liking and disliking the foods were taste, appearance and smell. Health was chosen less often for positive or negative preferences. As Rozin and Vollmecke (1986) maintain, taste is the most important determinant for liking a food, especially in adolescents where health concerns are seen as something to worry about later (eg. Story & Resnick, 1986).

This methodology, however, is based upon a hypothetical situation where the subject uses imagination to make selections. This obviously does not reflect real-life food selections a point conceded by McCracken. Taste was the most common reason selected for both preferred and disliked foods. It could be argued that this study did not really examine cross-cultural differences as the same peer influences would affect both groups. Even though each group may have its own cuisine, young people raised within the same overall culture may exhibit similar preferences, as was found in this study. Indeed, Kronl and colleagues (1984) found that the food preferences and perceptions of second generation immigrants reflected those of the host culture, particularly in adolescents.

Jussaume and Judson (1992) examined the demographic variables that may predict perceptions and concerns of food safety in Japan and the United States. One city from each country was chosen as the target city for investigation. Mailed questionnaires were sent to households selected randomly from the telephone listings of each city. The variables of interest in this study were concerns of food safety and trust in the ability of the public and private sectors to deliver safe food. Independent variables predicting perceptions and concerns with food safety were country of residence where Japanese residents were significantly more concerned about the

safety of the food supply, the presence of dependent children in the household, and the amount of vegetable consumption where a higher vegetable consumption was related to more concern with food safety. Cross-cultural comparisons suggest that while Japanese residents are more concerned with issues of the safety of the food supply, Americans and Japanese were both equally doubtful of the abilities of the public and private sectors to ensure a safe food supply.

This research demonstrates that concepts and perceptions can be compared across different cultures. However, the methodology chosen to measure these perceptions must be suitable to administer in each culture and validly measure each perception or concept of interest in each culture (eg. Triandis, 1994).

4.6. Studies of food perceptions among different age groups

Food perceptions have also been examined in various social groups within cultures, including age and gender and social status. Additional food perceptions aside from those postulated by Kronl and colleagues have been investigated in different groups including the perceptions of the different roles that foods have for people (eg. Golby, 1964), the caloric value of foods - which is slightly related to health (eg. Blackman et al, 1982; Sobal & Cassidy, 1990), the amounts of dietary fibre in foods (Sobal & Cassidy, 1991), food safety (eg. Lin & Millon, 1993), and the concept of seasonality (Wilkins et al, 2000).

Children

Singleton and colleagues (1992) examined the health perceptions of children aged between four and seven years. A majority of the children believed that eating the right foods would make you healthy. The 'right' foods were believed to be specific vegetables and fruit and the 'wrong' foods were those high in sugar.

Worsley and colleagues (1984a, 1984b) conducted two studies investigating the perceptions of food as a function of the obesity status of ten year old children and their food combination rules. This age group was chosen as it was postulated that children of this age tend to be norm-, rather than individually- oriented which would yield perceptions reflecting wider

society. In the first study, children rated both healthy and snack-type foods on attributes including tastiness, good for you and gives you energy, and differences according to obesity status were examined. The girls rated all of the foods in a similar way independent of obesity status indicating a high degree of shared agreement in their perceptions of the foods rated. The boys however, showed less agreement in their food perceptions according to obesity status. The heavier boys linked foods perceived as high in energy like cakes and sugar with the perceived consequences of growth and feeling full more than slim or average boys.

In the second study, six hundred and fifty children were asked to indicate how well each pair of foods from thirty-nine pairs would go together using a three point scale. The pairs of foods were chosen from forty foods commonly consumed by ten year old children. The taste, health and nutrition perceptions of two sets of ten foods were investigated. Interpretation of the multidimensional scaling analysis suggested a sweet-savoury rule where these foods do not go together in the same course of a meal and a distinction between snack and meal component foods perhaps representing the separate places that these foods occupy in the food systems of ten year olds. The solution accounted for nearly fifty percent of the variance indicating the consensual nature of these rules among the ten year old sample.

These findings indicate that children begin to reflect the values and perceptions of their culture and social groups through socialisation. Children are able to communicate the health perceptions and cuisine rules of their wider community. Rozin and colleagues have also shown that children are aware of some of the food rules and perceptions of their social group (Rozin et al, 1986).

O'Dea (1999) investigated the food beliefs of over 1000 Australian children and adolescents using open-ended questions and follow-up focus groups. These students could indicate if there were any foods that were restricted in their diets and who restricted them. This would show the effects of socialisation on food beliefs and the perceptions of individual food items mentioned spontaneously. Foods high in sugar and fat (eg. chocolate), sugar (eg. soft

drinks), fat (eg. hot chips), and those with colourings and additives (eg. sports drinks) were commonly mentioned. The reasons for forbidding these foods included: the food is 'bad for you', it will lead to weight gain, tooth decay, hyperactivity or acne. Many of the justifications for these restrictions were based on the nebulous realm of the general community or even from medical professionals.

Adolescents

Wobma and colleagues (1991) investigated the perceptions of snack foods in adolescents. Twenty-six commonly consumed foods and beverages were rated by students on a five-point scale according to health, taste and popularity among others. Females were more polar in their ratings of many of the snack foods and typically rated 'healthy' and 'unhealthy' foods in a more extreme way than males. Many fast-food snacks were also rated as less tasty by the females. The students then sorted the foods freely into groups, together with four additional anchor items including a 'snack liked by me' and these were analysed using multidimensional scaling. One of the dimensions ranged from high fat snacks like fried chips and meat pies through to carrots and apples. It was unclear, however, which perceptions were influencing these divisions - the adolescents could be dividing the snacks according to taste, popularity, or health. Overall, it was found that the girls were more concerned with health than the boys.

Williams and colleagues (1993) examined the relationship of food perceptions and the use of twenty-two commonly eaten foods. The foods were representative of meats, cereals, fruit and vegetables and snacks. The sample was selected randomly from the total adolescent student population from one Australian state and were aged from 11 to 16 years. The students rated their liking for the foods and its perceived healthiness on an instrument which was extensively pretested on adolescent volunteers. Results showed that on the dimension of liking, males significantly rated sausages, hot chips and ice-cream higher, and apples lower, than the females. This was related to average weekly use as the males used these foods and meat pies and soft drinks significantly more frequently than females who consumed apples more frequently. Typical

snack foods, were perceived as less healthy than cereals, fruit and vegetables and meats. Liking for a food was strongly associated with perceived usage by friends and healthiness was strongly related to perceived parents usage. This indicates that the importance attached to healthy foods appears to be attributed to adults, whereas liking and tastes are associated with peers. This is consistent with the findings of Story and Resnick (1986) in American teenagers.

The food preferences of American teenagers, as perceived by them, typically include fast-foods and foods high in sugar, salt and fat. Story and Resnick found that the teenagers' perceived barriers to eating a healthy diet included a lack of time to prepare healthy food, a lack of self-discipline in maintaining a healthy eating regimen and a lack of a sense of urgency in that they would worry about their diets when they were adults. Indeed Worsley (1980) proposes that adolescents are more dependent upon the sensory properties of food including taste than adults because they are more likely to think figuratively and be more concerned with immediate events than the long-term future.

College students

Sobal and Cassidy (1987) investigated the perceptions of dieting foods among college students. Students listed the foods that they purposely consumed and avoided because they were dieting foods. An average of at least one food per student was consumed because it was a dieting food including salads, fruit and vegetables. Yoghurt was the most frequently listed food that was avoided because it was perceived to be a dieting food.

Dieting foods were perceived to be healthy, nutritious and pure but not tasty. Dieting foods were perceived to be low in calories, fat, carbohydrates and sugar, and to confer good nutrition. However, it can not be inferred from the use of the terms calories and carbohydrates that they mean the same thing to the lay student population as they do to nutritionists. A certain amount of anchoring and objectification (Moscovici, 1984) of these terms within the language of the lay public may have occurred through the influence of media (Herzlich & Pierret, 1989). As Sobal and Cassidy (1987) write "people may use scientific nutritional language to justify

positions or express non-scientific beliefs or ideas without having scientific understanding of the terms they use” (p. 94). This will be explored further in Chapter 2.

Generally, the ability to name foods that were classified as dieting foods did not yield gender differences or differences between those with more or less dieting experience. These results suggest that this system of classifying foods is quite pervasive within the student population, and it exists irrespective of the level of experience and first-hand knowledge of dieting behaviour. Novice and expert dieters seem to share the same classifications of dieting foods. There also seemed to be a shared idea that grain foods like bread were taboo for dieters. The pervasiveness of this perception should be investigated further as nutrition educators, especially in Australia, are trying to encourage the use of foods from the breads and cereals group (National Health and Medical Research Council, 1992). Celery and grapefruit made up part of the list of the twelve most frequently listed dieting foods. There is a common belief that these foods, if eaten regularly, will lead to weight loss (Fanelli & Abernethy, 1986).

Adults

Sofer and colleagues (1964) used focus groups of women to investigate the perceptions of carbohydrates in relation to losing weight and the relationship between food and health. Carbohydrates were thought to be cheap, filling and enjoyable. However, the women saw negative effects of consuming too many carbohydrates as they could be fattening for all family members especially themselves so foods such as potatoes and spaghetti had to be limited. However, for themselves and their families carbohydrate foods could not be too severely restricted as this would limit the enjoyable aspect of eating. Health was not the main reason for food selection and they believed that it should not be. The concept of the ‘balanced diet’ was used and relied upon to provide the necessary nutrition. This was also provided by the “food culture” (p. 94) in which the meals and course structure of the cuisine could be relied upon to structure and provide the right nutrition. The women overwhelmingly saw themselves as the suppliers of food for their families rather than the recipients of meals. This could be related to Lewin’s (1943)

concept of women as the 'food gatekeepers' in control of the food channel from production to plate.

This theme of good and bad foods was also found in a study by Murcott (1993) who interviewed pregnant women. The women spoke of good food in two ways: the medical versus the gastronomic way of construing food. The medical included the nutritional side of food and included the language used by dietitians and nutrition educators. However, Murcott believed that these concepts like carbohydrates and vitamins were being recited from education materials without much understanding. The women were also less likely to spontaneously mention these concepts in association with nutrition and health when talking about food. The outcomes of consuming too many bad foods were conceived in physical terms like "it makes you fat and makes your skin greasy" (p. 307) and not in medical terms like heart disease or other medical consequences.

The gastronomy of good food concerned the ideas of taste, liking or disliking specific foods, meal structure and what foods could, or could not, go together in a whole meal. These concepts were mentioned spontaneously by the women. Sweet things like desserts and snacks were referred to in this regard. When taken together the medical appears to be in opposition to the gastronomic, that is it appears to be a battle between taste and nutrition which Murcott (1993) terms "naughty but nice" (p. 313). Murcott concludes that the sensory aspects of food had more saliency for these women than the health and nutrition aspects.

This study, while it provides in depth information from a few women, did not present how frequently the women mentioned these concepts and how consensual these concepts were for these women. It does, however, provide a few hypotheses for future empirical work in the areas of taste and nutrition including the tensions and intersections between them. Murcott does state that the importance "of sensory perception in relation to culturally-shaped conceptions" (p. 316) is a critical area for empirical research. This of course would include an analysis of the consensual nature of these perceptions.

James (1990) provides a sociological analysis of the role of confectionery and sweetness within British society. The idea of the personal responsibility for health has become entrenched in Western society, including Britain. The notions of “healthy eating” (p. 667) have taken over dietary considerations. However, it appears that this ideology exists paradoxically together with the ‘incorrect’ food choices that are made by the general public. Indeed, the consumption of confectionery has increased in recent years in Britain prompting an analysis of the role that confectionery, and food generally, has in society. The perception of confectionery as ‘bad’ means that the consumption of sugar becomes a moral issue (Fischler, 1987; Rozin, 1987) within the new ideology of ‘healthy eating’. Indeed, Pill and Stott (1982, 1985) have found differences in the degrees to which women accept responsibility for their own health which reflects their definitions of health, whether it is under their control or influenced by fate and chance.

Worsley and Worsley (1991) used a quantitative methodology and conducted a random survey of 418 women who rated how often 48 common foods and beverages ‘should’ be consumed (rarely to daily). This research was based upon the premise that people know which foods, and in what amounts, they should be consumed to achieve adequate health and therefore hold perceptions about which foods are healthy and unhealthy. The 48-item scale showed high internal reliability suggesting it contained only one dimension and higher ratings were found for ‘healthy’ foods over unhealthy foods. Multidimensional scaling analysis yielded two dimensions which accounted for 80% of the variation in ratings indicating highly shared perceptions of these foods. The first dimension appeared to separate healthy from unhealthy foods according to their perceived caloric (energy) value and their ability to make one fat. The second dimension appeared to distinguish between natural, traditional and modified foods. Similarities matrices for the age groups were calculated and it was found that younger women were more closely associated with the first dimension than the middle-aged or elderly women confirming the finding that younger women endorsed the use of ‘healthy’ foods more. One suggestion the authors make is that

perhaps these health perceptions do 'guide' the food amounts that are reported in food frequency questionnaires.

Multidimensional scaling has also been used to map cognitive perceptions. Drewnowski (1985) used multidimensional scaling to provide a graphic representation of food perceptions of nutrition in obese and normal weight subjects. Thirty-eight obese and thirty-five normal weight subjects judged the differences in perceived nutritional value between pairs made from sixteen target foods on a nine-point scale. These included common foods like ice cream, doughnuts, bread, fruit and vegetables.

The obese and normal weight subjects did not differ in their perceptions of the nutritional value of the target foods. The resulting two dimensional solution accounted for 93% of the variance in nutrition ratings. The dimensions were labelled healthiness, and protein and fat versus carbohydrates. High correlations were found between the obese and normal weight subjects on each of the perceived nutrient ratings, which together with the high degree of variance accounted for with the MDS solution indicates that perceptions of food according to nutrition are highly consensual between these subjects and did not differ according to weight status.

5. Conclusions

All of these studies on different age groups show that there appears to be a dichotomy and struggle between foods perceived to be tasty and those perceived to be healthy and nutritious and their consumption. Cognitive evaluations of the food perceptions of health and taste also appear to be related the most strongly to food use. Younger people, like adolescents, are more likely to rely on taste perceptions than older people which may be related to a younger person's heightened sense of the immediate over the future. These studies also demonstrate that different methodologies can be used to investigate food perceptions within social groups although cross-cultural investigations do require special techniques.

Stores of knowledge about food appear to exist in the minds of individuals. The effects of culture, social group memberships and individual factors on food perceptions and preferences and

the relationships between these cognitions and food choice and intake has been demonstrated at length. How do the cultural, social and individual factors inform these stores of information about food, determining food perceptions and preferences and hence influencing food choices and use? What is the content of these food perceptions? How does 'common sense' knowledge about food using food classification systems and ideologies of lay people and nutrition experts develop? How do the situations of the times including changes in economics and society impinge upon these stores of knowledge about food? The theory of social representations, which elucidates an epistemology of knowledge based upon the consensual nature of social beliefs and attitudes, may provide some theoretical answers to these questions and yield some insights in the ways that expert knowledge becomes shared and understood by the general community. This thesis aims to locate the concept of food perceptions within the tenets of social representations theory which will provide an essential social and cultural element to the study of food perceptions.

Chapter 2

Social representations

The question of how societies and groups develop shared ideas about physical objects (like food) and social phenomena (like attitudes) has intrigued anthropologists, sociologists and many social psychologists. It would be expected that the processes of socialisation and communication through everyday social interaction could be involved in the development of consensual knowledge. These processes have usually been investigated by anthropologists and sociologists particularly when studying the epistemology, transmission and maintenance of cultural knowledge (whether they are studying societies or groups within societies). However, in the areas of knowledge and beliefs, contemporary social and cognitive psychology has typically concerned itself with mechanistic studies of cognitions of individuals. This research focus has been a particularly dominant research tradition in American social psychology.

Some social psychologists have lamented the 'desocialisation' of social psychology (eg. Flick, 1998; Taylor & Brown, 1979) where the study of individual processes has assumed greater importance over the content of social knowledge shared by individuals (Augoustinos & Innes, 1990). It has been argued that this individualisation of social psychology merely reflects the wider ideology of 'individualism' prevalent in much of mainstream American society (eg. Sampson, 1977; 1981) and in this way re-emphasises the notion that social psychology is an historical science dependent upon the prevailing philosophy of the times (Gergen, 1973).

1. The evolution of social psychology

At the beginning of the twentieth century one of the founders of psychology, Wilhelm Wundt, believed that the investigation of collective phenomena such as language, myths and religion was of paramount importance to the discipline of social psychology (Farr, 1989). This philosophy holds that collective phenomena, including cultural knowledge, are not reducible to the processes of the individual. Culture is more than the sum of individuals: it provides a reality which cannot be known by only one individual.

Farr (1996) documents the demise of the 'social' from mainstream American social psychology which began with Allport who believed that collective phenomena like public opinion should only be approached as a psychology of the individual. However, as Gergen (1973) maintains, social psychology is subject to the influences of wider historical factors which can shape the directions of a discipline. From the 1920s, particularly in America, psychology evolved as a science where its methods of study were based on experimentation and positivism. There were some notable exceptions including the work of Lewin but within mainstream American social psychology, the importance of the study of individual processes emerged.

This individual social psychology paralleled the growing importance and salience in American society of the notion of 'individualism' (Farr, 1996). Individualism holds that individuals are the agents of action and are therefore responsible for their own behaviour - a concept important in many Western nations. This ideology, itself a collective phenomenon because of its pervasive and consensual nature, permeated much of the research on attitudes and information processing. For example, the positivist and experimental approach to social psychology focuses on how individuals process information about social and physical stimuli but does not consider the content of that information or how this content, in turn, affects the processing of that information (Augoustinos & Innes, 1990).

Farr (1989) maintains that "it has not been standard practice in American social psychology to include the analysis of culture alongside the analysis of cognition" (p. 163). One

approach which emerged in European social psychology in the 1960s incorporated social and cultural forces in explaining the development and transmission of knowledge. This approach focussed on the pervasiveness of the content of social knowledge as well as the processes involved in the communication of this knowledge among a social group or wider society. Moscovici began by investigating the social processes involved in the development of knowledge and perceptions of psychoanalysis within French society, a relatively new therapeutic method in the 1950s. Moscovici was not interested in psychoanalysis per se, but rather how it was treated in the mass media and communicated within everyday discourse (Farr, 1995). This treatment of psychoanalysis provides a good introduction to many of the concepts from the theory of social representations as it evolved.

2. A more 'social' social psychology: Investigating the pervasiveness of psychoanalytic concepts

Moscovici (1961) published his study detailing the pervasiveness of the dissemination of notions of psychoanalysis within different strata of French society. The aims of this research were to document the content of notions of psychoanalysis held by the lay community in France and to investigate the transformation of information from an academic domain into the public domain. In this transformation a scientific theory permeates a society and modifies the thinking and language of ordinary people. Information of a scientific nature becomes transformed into information that is known as 'common sense'. Once a theory is transformed through circulation it becomes a 'social representation'. A social representation is defined as "...the elaborating of a social object by the community for the purpose of behaving and communicating" (Moscovici, 1963: 251). The original research investigated the way the theory of psychoanalysis, originally used by 'experts' in the field, became 'common knowledge'; its attendant language and concepts transformed and used in everyday discourse and for the explanation of behaviour.

It has been said that humans are always actively trying to understand the world around them. The act of re-presenting something essentially functions to make the troubling, distressing

and unfamiliar less troubling and more familiar and hence able to be understood within people's existing frames of reference. Threatening unfamiliar notions are taken and compared and classified with known categories and this makes them less threatening. Moscovici (1981; 1984; 1998) maintains that psychoanalysis would have been disturbing and troubling to begin with as it was viewed as "medical treatment without medicine" (1984: 26) where the content of free associations were analysed (and perhaps judged) by therapists. However, psychoanalysis was compared in practice to a religious confession and subsequently lost its disturbing character. It became a normal process where the therapy session was seen to be analogous to the confessional process. This use of analogy was not just a simple alignment of processes (in this case) "...but an actual, socially significant merging, a shifting of values and feelings" (Moscovici, 1984: 26). By classifying psychoanalytic processes with religious processes the unfamiliar became familiar.

After this shift in values had occurred the content of psychoanalytic theory was able to be represented in the minds of individuals. But this knowledge was not just held at the individual level; it was knowledge that was shared such that communication could occur between individuals because they possessed a common understanding of psychoanalytic concepts. This meant that notions like 'the unconscious', 'complex' and 'neurosis' were commonly understood and could be discussed in conversation. More importantly, however, they served as an explanatory device. Behaviour that was viewed as odd and disturbing because it could not be classified as either 'mad' or 'sane' (unfamiliar) could now be labelled using psychoanalytic nomenclature (familiar). Individuals could explain their own and others' behaviours, as naming something invests it with familiarity. People became known as 'repressed' or 'having a complex'. A profusion of terms which were not found within the academic theory of psychoanalysis were generated to name these odd behaviours like "authority complex" or "timidity complex" for example (Moscovici, 1981: 197). In this way terms like 'complex' had been anchored within everyday discourse in French society.

The objectification of psychoanalytic terms and theoretical concepts involves making these unfamiliar abstract notions into familiar concrete entities and this process often advances through the use of imagery and iconic elements (Moscovici, 1981; 1998). Psychoanalysis typically deals with two opposing and binary constructs: the conscious and the unconscious. Images which were associated with these constructs included: voluntary-involuntary, exterior-interior and mind-soul. This image also included a spatial component where one was viewed as being on top of the other and where a pressure was perceived to exist between them leading to repression from which complexes originated.

In everyday conversations psychoanalytic terms and concepts were used and understood, rendering the concepts an independent existence and investing them with physical properties and images. In this way abstract notions like "... 'mind' and 'ego' are perceived as physical entities, and 'complexes' and 'neuroses' are construed as objective conditions which afflict people" (Augoustinos & Innes, 1990: 217). In this way these unfamiliar conditions may be classified together with existing categories of physical illness which encompass the ideas of affliction and causation making them familiar to the general community but perhaps different from the original scientific theory.

This example highlights some of the important tenets of social representations theory. Knowledge which originated within a scientific sphere is quite unfamiliar to the general population. When this information becomes available through communication (usually via the media), it becomes anchored in everyday categories and abstract notions become objectified into concrete entities using images and symbols. Once these processes have occurred, the information is made familiar. Social representations function to make unfamiliar physical and social phenomena familiar. This content can then be discussed in conversation, its meaning negotiated through dialogue, all of which aid the establishment of a common frame of reference. Thus scientific information is transformed into everyday knowledge and represented in the minds of a group, even if the resulting 'theory' bears little resemblance to the original. Conversations,

communication and negotiation of content ensure its social nature as the meaning must be shared in order for these social processes to occur.

Moscovici (1981; 1984; 1998) maintains that after a while the information contained within social representations becomes common sense - its origins forgotten. This is similar to the process whereby words from one language become embedded within another. For example, the word 'restaurant' originated within the French language but its use is so common place within the English language that its French origin is not remembered or even not known.

This, however, does not imply that social representations are static structures. Moscovici (1981; 1984; 1998) is adamant that because of the changing nature of contemporary society, new social representations continue to form while older ones die out giving the phenomena of social representations an important dynamic character. This is especially significant in many industrialised countries where the impact of the media is quite profound and new scientific discoveries are communicated and new concepts from distant cultures conveyed.

3. Social representations theory

3.1. A description of social representations

Collective versus social representations

It has been noted that the essential difference between primitive, traditional and industrialised societies is the level of organisation needed to maintain social order (eg. Brown & Price, 1985). An extensive and complex system of order is needed in contemporary industrialised societies. As societies developed and were able to support more and more people (with the supply of food, water and shelter) a complex system of organisation was needed to maintain a semblance of order. In the age of industrialisation which further promised stability in the food supply, even greater population settlements and urbanisation could occur. The advent of a greater interest in science leading to further technological advances together with greater political change, perhaps

because of the differences in social strata in the hierarchy of organisation, would all herald knowledge systems that would be quite dynamic in nature.

Traditional societal groups with their organisational structures would behave as they always had because that was what had worked previously. This implies an element of social and political stability which would continue unchanged until any exceptional situations arose which required new ways of thinking. For example, the collective representations which had always helped Aboriginal Australians survive in the past would have had to be greatly modified to accommodate the social upheaval when white settlers came to Australia. This change has been documented in the food habits and traditional cultural existence of Aboriginal Australians (eg. A. Lee, 1996).

This analysis implies that the social realities, and their attendant social representations, differ markedly between these two types of society. Kleinman (1980) defines social reality as the “world of human interactions existing outside the individual and between individuals” (p. 35) and this is where cultural and social rules for patterns of behaviour are negotiated. Kleinman maintains that the social realities, beliefs and values of traditional societies are quite homogeneous and shared by all individual members (collective representations). Developed societies, however, have social realities which are fragmented yielding many different attitudes and beliefs which differ as social groups within that society differ.

Moscovici (1981) built social representations upon this notion of ‘collective representations’ which was first elaborated by Durkheim. The collective representation contained information about myths, science and religion. They were believed to be quite static in their nature - the way that myths are reproduced over time, which meant that only one representation for a given phenomenon existed and it was true in all social situations. This is similar to the way the ethnic Azande tribe of central Africa fought witchcraft using the pronouncement of oracles to decide the administration of justice. All Zande members knew and understood these processes and did not question them (Evans-Pritchard, 1976) because they did not know that other justice

procedures existed or could be formulated and this was the procedure that had worked in the past. Durkheim viewed these collective representations as unchanging over time and change would only be brought about in exceptional circumstances and in situations outside of the normal social way of life for the group (Moscovici, 1988).

In modern societies, Moscovici contends that representations are constantly emerging, changing and dying as these societies as a whole are much more mobile and dynamic than traditional societies.

“When I refer to social representations, I do not have in mind those of primitive societies or those of remote eras. I am thinking of the social representations of our present society, of our political, scientific and human soil, where time is too short to allow the proper sedimentation, to create immutable traditions” (Moscovici, 1981: 185).

In contemporary societies, social representations fluctuate with social and political changes and with scientific and technological changes. Knowledge generated through science and political change becomes represented in social life through communication and as such these representations are quite dynamic.

“Social representations become increasingly important as the unifying systems we have (science, religion, ideology, the state) become more and more mutually incompatible. Mass communications have accelerated this tendency, and increased the need for a suture between the abstract status of our sciences and our general beliefs on the one hand, and our concrete activities as social individuals on the other. In other words, there is an increased need to keep reconstituting “common sense”, that sum of knowledge which constitutes the substratum of images and meanings without which no collectivity can operate” (Moscovici, 1981: 185).

The social representations of modern societies keep changing as the publication of popular science books and articles in the popular media provide up-to-date theories about many scientific concepts including the nature of the universe, the greenhouse effect and new dietetic and nutrition information. So Moscovici, while keeping Durkheim’s notion of shared representations of knowledge, substituted the word ‘social’ for ‘collective’ to reflect the dynamic nature of modern societies (Farr, 1987; Moscovici, 1988; 1998). This dynamism also reflects the changing nature of the groups which construct these social representations thus reflecting the changing nature of the “thinking society” (Moscovici, 1981: 182).

The dynamic nature of contemporary society together with their social representations can lead to investigations of the ways that thinking in groups and cultures differ and how society changes over time and even how new representations form.

“Society is constantly producing new representations to motivate actions and make sense of human interactions that spring from people’s everyday problems. And social representations can lead us to a social psychology enabling us to compare groups and cultures” (Moscovici, 1988: 217).

Kleinman (1980) maintains that this analysis of a changing society, particularly one which is changing from traditional sets of health and illness beliefs to one which contains some more modern elements, is quite important. Indeed, were Moscovici to study the representation of psychoanalysis in French society today, he may find differences from his results of the 1960s thus reflecting the statement that “...what seemed abstract to one generation becomes concrete to the next” (Moscovici, 1984: 37).

Moscovici’s assumption about the simplicity of traditional societies can be criticised. Many modern anthropologists recognise that the beliefs and organisational structures of traditional societies can be quite complex and the beliefs of the group do change in response to even moderate environmental changes (eg. Horton, 1982). Survival of the group would require this. Kleinman (1980) maintains that “developing societies are often viewed in an overly simplistic schema” (p. 37). Indeed, Moscovici may be subject to the influence of a social representation, that of the homogeneity of outgroups (traditional societies) and the heterogeneity of ingroups (contemporary societies), a theory elaborated by Tajfel (1981). This criticism aside, the theory of social representations offers a way of investigating beliefs and perceptions as they change with new scientific advances and other social and political changes, and the way these changes are communicated at least in modern societies.

Shared knowledge

Lloyd and Duveen (1989; 1990) maintain that the social nature of representations implies a sharing of knowledge between at least two people, that is the content is “intersubjectively shared” (1989: 180) by collectivities or groups. Social representations concern “the way

knowledge is represented in a society and shared by its members...[and]...this whole is also seen as greater than the sum of its parts, and thus irreducible to a collection of individual representations” (Moscovici & Hewstone, 1983: 99). The point that representations are shared by members of groups or societies gives them a social character which cannot be reduced merely to the sum of the individuals holding those representations. In this way shared ideas about aspects of society, like health and illness (eg. Herzlich, 1973; Kleinman, 1980) are more important than as a collection of individual perceptions. They exist at a different level of analysis (Doise, 1984; 1986).

The importance of the communication process

The nature of social representations is depicted as a set of structures which allow individuals as members of a group to communicate and understand one another. They also allow dialogue to occur about various enigmas which puzzle them like gravity, the sky and their neighbour’s behaviour. Social representations hold the answers to these enigmas in the sense that they are negotiated, through dialogue, between members of the groups which hold them. This shared knowledge represents “non-official ‘philosophies’” (Moscovici, 1981: 183) and eventually what becomes known as common sense. This implies that the creation of social representations arises through the processes of communication.

“Individuals and groups create representations in the course of communication and co-operation. Representations, obviously, are not created by individuals in isolation. Once created, however, they lead a life of their own, circulate, merge, attract and repel each other, and give birth to new representations, while old ones dies out.” (Moscovici, 1984: 13).

As a consequence of this social representations reflect the social reality of the group (following Kleinman’s definition on page 51); who generated the representation and its origins become ‘fossilised’ and eventually forgotten. In this way it develops into an aspect of the group’s everyday knowledge and hence their version of ‘common sense’.

The role of conversation in the formation and refining of social representations is central (Moscovici, 1984; 1998). Social interactions through conversation provide a forum for the

discussion of alien objects and ideas. They also allow individuals to become familiar with others' 'non-official philosophies' and to air their own. The image of a boardroom where collective decisions must be made provides an example of the negotiation and communication process. Opinions from all members are put forward and debate occurs. At voting time, each member knows how the others have voted and can change their minds and combine opinions. The final decision (representation) is truly a joint (social) one (Moscovici, 1988).

The consensual nature of social representations enables communication to occur between individuals holding that representation. Augoustinos and Innes (1990) state that social representations range from hegemonic structures, shared homogeneously by a society, or emancipated structures, only shared by subgroups within that society. This adds to the social nature of representations and allows communication to occur within groups and within society. This says nothing about how groups communicate with each other if they both do not hold the same social representation and this situation may in part explain some of the difficulties with intergroup communication. This notion will be more fully explored later.

Functions of social representations

The principal function of social representations is to make unfamiliar objects and concepts familiar by classifying them into existing categories and incorporating images which make abstract notions and terms more concrete. This occurs for both physical (eg. computers, Abric, 1984) and social (eg. intelligence, Mugny & Carugati, 1989) phenomena.

“Some representations concern facts and others ideas. The first displace their object from an abstract to a concrete cognitive level; the second, through a change of perspective, either compose or decompose their object - they may, for instance, present billiard balls as an illustration of the atom, or consider a person psychoanalytically as divided into a conscious and an unconscious. Yet both create pre-established and immediate frames of reference for opinions and perceptions within which objective reconstruction of both persons and situations occur automatically and which underlie individual experience and thought” (Moscovici, 1984: 53-54).

Social representations also provide explanations or attributions about the world, especially behaviour (Moscovici & Hewstone, 1983). They provide a guide for social action

where prediction and explanation of behaviour and events in the world are congruent with the representations held by the group. When people share a representation, people's behaviour is interpreted within the framework of this representation. For example, a pervasive representation in most Western societies is that of individualism (Augoustinos, 1991; Augoustinos & Walker, 1995; Moscovici, 1982) where the individual is seen as being solely responsible for their own actions. In many Western societies, the responsibility for obesity for example, is often attributed solely to the obese individuals themselves, especially their lack of control over their eating habits, and not to any situational factors or their heredity (eg. Hill & Silver, 1995; Jeffery et al, 1990).

The socialisation process of individual members of a group or society represents another function of social representations. They form part of the life for the group and therefore individuals are socialised into acquiring these representations. Moscovici and Hewstone (1983) state that "they restrain one's attitudes and perceptions, and one's attachments or repulsions with regard to objects" (p. 118) and these perceptions are socialised into the next generation. Anthropology has been the leader in research in this area. For example, individuals are socialised into a particular cuisine which determines their food choices including which foods are defined as edible and inedible. These food representations would also influence the attitudes toward food in determining which possible food items are considered offensive (eg. Rozin et al, 1986) and this becomes part of the socialisation process. This would also include the socialisation of representations of perceived responsibility for health and illness (Pill & Stott, 1982; 1985; 1986) and beliefs about illness causation and treatment options (eg. Kleinman, 1980).

All of these functions outlined here are really subsumed underneath the primary function of social representations which is to construct and organise social reality. Herzlich (1973) maintains that "if individual experience acquires its meaning as a result of encounters with cultural values and models, and it is channelled into shared conceptual categories, then here we have individual experience fusing with social reality to produce a unique entity within which communication, consensus and social norms become possible" (p. 11).

3.2. A definition of social representations

The discussion thus far has introduced the theory of social representations using the example of psychoanalysis together with a description highlighting the structure, purpose, nature and functions of social representations. A more complete definition of a social representation encompasses cognitive and social factors which provide a reality for the group sharing the representation.

Moscovici and Hewstone (1983) define social representations as “cognitive matrices coordinating ideas, words, images and perceptions that are all interlinked. They are common sense ‘theories’ about key aspects of society” (p. 115). Representations are social because these cognitions are shared by members of a society or by members of groups.

Moscovici has defined social representations as

“...cognitive systems with a logic and language of their own...and with a characteristic kind of discourse. They do not represent simply “opinions about”, “images of” or “attitudes towards”, but “theories” or “branches of knowledge” in their own right, for the discovery and organization of reality” (Moscovici, 1973: xiii).

“...the contents of everyday thinking and the stock of ideas that gives coherence to our religious beliefs, political ideas and the connections we create as spontaneously as we breathe. They make it possible for us to classify persons and objects, to compare and explain behaviours and to objectify them as parts of our social setting. While representations are often to be located in the minds of men and women, they can just as often be found ‘in the world’, and as such examined separately” (Moscovici, 1988: 214).

The notion of ‘representation’ encompasses a structure of knowledge shared by individuals held together by a common bond (Moscovici, 1984b). The concept of social representations denotes a cognitive structure containing knowledge about social and physical phenomena which help to organise perceptions, attitudes and opinions about those phenomena. As such, they are evaluative knowledge structures which organise the construction of reality. Moscovici (1981) states “when you classify someone as neurotic, Jewish or poor, you are not merely stating a fact, you are also making a judgement, and you are branding this person. By the same token, you reveal your “theory” about society and human nature” (pp. 193-4). Even though social representations contain aspects of stereotypes, the important distinction between this theory and existing social schema

theories is the incorporation of social forces (Augoustinos, 1991; Augoustinos & Walker, 1995). Social representations incorporate all aspects of stereotypes but they are shared between individuals, they are not involved only in individual cognition. This is an important distinction between social representations theory and existing mainstream theories of social psychology.

3.3. Development of social representations

The processes involved in the formation of social representations and the transformation of information from a purely scientific field into the language of lay people is an important part of this theory. Moscovici (1981; 1984; 1988; 1998) believes that social representations are created through the processes of anchoring and objectification. Anchoring is a process where unfamiliar notions and objects are assimilated and classified into familiar categories already existing in everyday cognition. Objectification proceeds by constructing images and icons of abstract notions which makes them more concrete and able to be understood. Objectification essentially makes the invisible visible like constructing models of molecules for example. Creating representations involves a transformative action which makes unfamiliar scientific theories or social concepts habitual and tangible and therefore familiar.

The representation of social and physical phenomena both occur in this way. Representations are built upon the mechanisms of transforming knowledge rather than learning (Moscovici & Hewstone, 1983). This means that professional or expert scientific knowledge is transformed into familiar and understandable entities for the lay population. For example, scientific concepts which are invisible like black holes, chemical compounds, waveforms and energy, are made visible by attaching visible imagery or models. Thus the warming of the earth through excess carbon dioxide emission is transformed into 'the greenhouse effect' a metaphor which uses the image and the model which exists in people's minds and experiences as a tool for representation.

Anchoring

The process of anchoring unfamiliar notions into familiar concepts can occur in two ways - naming and classification. The process of naming involves imposing an identity where the anonymous and unfamiliar is rendered familiar, and the process of classification involves associating the unfamiliar object with existing categories making it more familiar. Jodelet (1991) investigated the social representations of mentally ill patients held by rural villagers who were their carers. She found that these patients were identified (classified and named) with tramps and half-wits. Once this had occurred the mentally ill were ascribed the characteristics of this vagrant group.

Naming something which is unfamiliar allows it then to be verbalised and communicated as well as classified. Moscovici (1981) states that although the naming process may be a little arbitrary, "...the extent...[to which]...a consensus is reached, the association between the word and the thing becomes commonplace and thereafter assumes a character of inevitability" (p. 196) like the 'greenhouse effect' representing global warming. Herzlich's (1973) study on the social representations of health and illness in French society found that the word 'fatigue' was defined by the respondents as an intermediate state between health and illness and was exacerbated by the urban way of life. This elusive state could then be verbalised and understood and was ascribed a certain legitimacy in French society. Indeed many patients in Western societies like names to be given to conditions that are afflicting them even if they do not receive much more information. Naming at least makes the condition a little less threatening and unfamiliar.

Scientific concepts can also be anchored in everyday discourse using the processes of naming and classification. This can apply to nutrient terms like calories, carbohydrates and additives, for example. These words can be associated (classified) with the foods that are perceived to contain them like pasta and bread (carbohydrates) or coloured cordials and processed foods (additives). This also applies to the hot-cold classification system for foods and illnesses used in many Asian cultures. When new (unfamiliar) foods are introduced they are classified into this system which gives them some degree of familiarity. In Latin America 'fresco' refers to the

notion of “cool” in the hot-cold dimension (Cosminsky, 1977: 203). Non-traditional foods such as bread, noodles and rice were classified as ‘fresco’ by some cultures in Latin America. These initially unfamiliar foods would not have been part of the cuisines of this region but classifying them within existing structures would help to make them more familiar and preliminary social representations about these foods could be made. This classification however, occurs at the cognitive level and says nothing about the practical implications of knowing how to prepare these foods and incorporate them into meals. The development of patterns of behaviour regarding their use within a meal would take much longer. Indeed, the availability of new tropical foods in produce markets in Australia and other countries also highlights this level of food unfamiliarity. Once these foods are classified as ‘fruits’ or ‘vegetables’ their place in the cuisine can be ascertained. Marketers are careful to incorporate recipes and ideas for use when introducing these novel foods for general sale.

Representations are evaluative structures and values can be assigned to categories depending on the perceptions associated with them. The values associated with certain foods can reflect the underlying evaluative structure of the representation. In this way, according to the social representation from the group you belong to, meat and its consumption can be a symbol of tradition (Worsley et al, 1996) a source of good nutrition (Santich, 1994) or definitely not for consumption if you are a vegetarian (eg. Fiddes, 1994; Maurer, 1995), and this food item and its consumers are evaluated on the basis of these perceptions.

Objectification

Objectification refers to transforming an abstract notion into a concrete entity. This can be achieved by imbuing the notion with meaning, usually through the construction of images and the use of language, which can then be communicated. Objectification involves making the abstract concrete and the invisible visible or tangible. Theories which at one point in time are considered to be outlandish may be considered to be quite credible later on as they become more widely

represented. This means that a change in perspective has occurred making the concepts familiar and tangible and saturated with reality.

Moscovici and Hewstone (1983) document the objectification of the scientific theory of lateralisation of brain functions and hemispheric dominance. This theory, at the scientific level, involves the specialisation of various functions in the two halves of the brain; the left controlling verbal and analytical knowledge and the right controlling global and perceptual knowledge. Experts maintain that this specialisation falls along a continuum and is not an all-or-nothing affair. However, this theory has been objectified by the lay population to include the image of two independent brains each corresponding to different types of thoughts, emotions and behaviour. Using this representation, people are classified as being left-brained or right-brained and common opposites are used as descriptors: sciences-arts, logical-illogical, masculine-feminine to name a few. This objectified theory, now represented in society is used to explain people's behaviour including their occupations: 'She is good at music because she is right-brain dominant', even though the resulting representation may bear little resemblance to the scientific theory that it developed from.

3.4. Aspects of reality: consensual and reified universes

The discussion so far has highlighted a distinction between scientific knowledge and everyday knowledge. Moscovici believes that knowledge is represented differently in these two spheres and that different modes of thought, rules for knowledge generation and discourses exist between the sciences and everyday life. To help in making this distinction, Moscovici defined the reified universe to be for the sciences and the consensual universe to be for the lay population.

"... science is the mode of knowledge corresponding to the reified universes and social representations the one corresponding to the consensual universes. The former attempts to construct a map of the forces, objects, and events unaffected by our desires and consciousness. The latter stimulates and shapes our collective consciousness, explaining things and events so as to be accessible to each of us and relevant to our immediate concerns" (Moscovici, 1981: 187).

Social representations involve the transformation of knowledge from different types of 'expert' spheres so that they may be understood, communicated, and used in explanations in the

'lay' spheres. Moscovici and Hewstone (1983) state that even though much research attention in social psychology has focussed on the attributions that people make in their explanations of reality, little research has focussed on where attributions come from. Indeed, it has been suggested that people hold theories about causality of health and illness for example including factors like genes and bacteria and yet little is known "about how such technical terms become part of the lay person's repertoire of explanations" (pp. 98-99). Moscovici (1984b) writes of social representations:

"the content usually is drawn from a field of science. The transformation engenders within society images, ideas, and languages that make communication and action feasible. New entities such as charisma, the unconscious, the split brain, complexes arise, enriching society's ontology and reshaping its reality" (p. 966).

In the consensual universe conclusions are believed to carry more weight than premises because the purpose of social representations is to make the unfamiliar more familiar. "The representations we shape (about a scientific theory, a nation or an artifact) always reflect an incessant effort to turn something unfamiliar or something that feels unfamiliar to us into something ordinary and immediately present" (Moscovici, 1981: 190, sic). Social representations are based upon conclusions and in this way the consensual universe operates on the basis of conclusions. People are categorised and judged (conclusions) and any information which is gathered and processed merely confirms the original impression. This means that "... in social thought, conclusions have primacy over premises... the verdict rather than the trial dominates our social relations" (Moscovici, 1981: 190). People, generally take findings as givens, as immutable facts (like nutrition findings), incorporate them into representations and use them in explanations of behaviour.

In contrast, the method of science proceeds in the opposite direction - from premises to conclusions. It requires the repetition of experiments and scientific distance from the research object. Scientists need to bring counter-evidence to their theories in order to account for any criticisms and they need to supply numerous interpretations of their results.

For example, one popular explanation of a child's hyperactive behaviour was their consumption of food additives particularly food colouring agents. This explanation was based upon the original scientific research conducted by Feingold in the 1970s (eg. Feingold, 1977). This theory quickly gained prominence in the lay community as it provided explanations for the erratic behaviour of children (conclusions) and it even persists today with the existence of organisations like the Feingold Association of America. Scientific investigations of this hypothesis have continued which question the original findings (eg. Harner & Foiles, 1980). The results of one meta-analysis of twenty-three studies concluded that food dyes do not cause hyperactivity (Kavale & Forness, 1983). However, this pervasive social representation of these original scientific findings has continued perhaps because it provides an easy explanation of behaviour and because it supports another widespread notion - that 'natural' is good and 'artificial' is bad (eg. Herzlich, 1973) where technology is ruining the environment and the natural order of things (eg. Fiddes, 1994).

The role of the media in the development of social representations is crucial, particularly in industrialised societies. The vast number of popular science books and special reports in other media have aided in the transformation of expert knowledge into social representations so that it becomes part of the social reality.

"The mass media have...increased the need of a link between, on the one hand, our purely abstract sciences and beliefs in general and, on the other, our concrete activities as social individuals" (Moscovici, 1984: 19).

The process of communication, and the media especially, uses the vocabularies that science invents and transmits them, together with images, to the lay public so that after a while everyone has a vague notion about economic rationalism, inflation, unemployment, the greenhouse effect and psychoanalysis. They can then use these representations as explanations of the world around them. For example, the strange weather patterns can be attributed to the 'greenhouse effect' (conclusion) even if 'the sciences' are not ready to agree based on such little available evidence (premises).

3.5. The importance of empirical investigations of social representations

Existing social representations and the way that they change over time need to be investigated. This is particularly salient in the health professions including nutrition and medicine where disease profiles and treatment schedules can be represented quite differently in the professional and lay spheres (eg. Launer & Habicht, 1989).

“...specialists must translate technical concepts in line with prevailing representations of the body...They must match the socially accepted symptomatology with the contents of the diagnosis. The ‘conversation’ can take place only after these representations have been properly aligned. Medical consultations and therapies are actually one of the most important sources of social representations. Patients spontaneously transform the doctor’s interpretations and comments, which they then proceed to disseminate and use for ‘diagnosing’ or ‘advising’ their friends and relations. By virtue of a normal shift, the content passed in this manner acquires a moral dimension or is integrated into a moral system which rules what is ‘good’ or ‘bad’” (Moscovici, 1984b: 965).

It would appear to be an important public health issue to investigate lay representations of health and illness so that beneficial communication can occur between medical professional and lay patient (R. Lau & Hartman, 1983; R. Lau et al, 1989).

Kleinman (1980), while not studying social representations per se, investigated the cultural beliefs about health and illness held by Chinese living in Taiwan and America. He found that health values and beliefs influence the types of treatment sought for different illness conditions. He labelled this the health care system which encompasses “both the result of and the condition for the way people react to sickness in local social and cultural settings, for how they perceive, label, explain, and treat sickness” (p. 26).

Any health care system can generally be partitioned into the popular, professional and folk sectors all of which are active in different degrees in any society. Illness is first defined and treatment behaviours initiated within the popular sector which encompasses the lay community. Indeed research has shown that 70 to 90 percent of illness episodes in the United States are treated within the framework of the popular sector, usually within the home (Hulka et al, 1972). In this self-treatment the sick person and their family use strategies that they have learned through everyday communication with other members of their social networks. In this way social

representations of illness and treatment strategies are born, changing with the times as their successes and failures are evaluated. Kleinman (1980) states:

“The family can disregard signs of illness by considering them to be ordinary or “natural”, or they can validate the person’s sick role. They can institute therapy with treatment modalities known to them, or they can consult with friends, neighbours, relatives, and lay experts about what to do” (p. 52).

All of this occurs within the popular sector. Only when they decide to move outside the popular sector do they go beyond the health care boundaries of the family into the folk or professional sectors. The health sector chosen (folk or professional) depends upon the representations the family and sick person have of the treatment efficacy of each sector which incorporates their values and beliefs.

When people enter either the professional or folk sectors they encounter different values, beliefs and language styles used by these sectors of the health care system. Indeed, many health professionals are likely to characterise the condition experienced as a disease rather than an illness that is experienced by the person (Kleinman, 1980).

One of the functions of representations about health and illness would be to anchor disease terms in ways that would be understood by the wider community and objectify abstract afflictions into conditions that become concrete and able to be experienced and then explicated. Conditions like “‘colds’, ‘hyper-tension’, ‘lumbago’ or ‘backache’, ‘nerves’, ‘lump in the breast’, ‘upset stomach’ are terms that need to be situated in the semantic illness networks...[of]...popular culture before they can be adequately explicated” (Kleinman, 1980: 140-141). These labels convey meanings that are negotiated within the wider society so that representations are built up about what symptoms accompany which conditions. They also convey personal meanings for the people who are experiencing these conditions when they use a particular label for their condition and the way they explain their symptoms to their health practitioner.

This similarity of representations about illnesses between lay and health professional would be particularly important in compliance to treatment schedules. If lay representations of illness typically revolve around sets of symptoms which provide them with a concrete feeling of

ill health, compliance to treatment for conditions without symptoms may be quite low. Hypertension is typically asymptomatic and chronic which may not conform to the representations of sickness held by many lay people who are accustomed to taking medication to alleviate illness symptoms. The compliance rates for hypertension have usually been quite poor and this may be a reflection of differences in representations about illness held by lay and medical people (Meyer et al, 1985).

This could also apply when dietary advice is given. If the food advised for someone's diet does not fit in with their cuisine, food perceptions and the repertoire of meals acceptable to them, a high failure rate is likely to ensue. However, if the consultant is aware of the prevailing representations of food held by the person, individual negotiation can take place, perhaps leading to a higher success rate in dietary modification (Terry, 1994). The philosophies guiding nutrition and other health professionals are likely to influence how prepared these consultants are to recognise that representations exist which incorporate beliefs other than their own scientific ones (eg. Achterberg & Trenkner, 1990) and that these alternative representations have their own validity for the individual.

Validity of social representations

According to Moscovici, it is impossible to objectively assess the true validity of our representations as this is what we know. Only history can judge how 'correct' these representations have been. Moscovici (1984) wrote:

“nobody's mind is free from the effects of the prior conditioning which is imposed by his representations, language and culture. We think, by means of a language; we organise our thoughts, in accordance with a system which is conditioned, both by our representations and by our culture. We see only that which underlying conventions allow us to see, and we remain unaware of these conventions” (p. 8).

In this way, the factual validity of social representations is unimportant; it is the pervasiveness that is significant and it is this pervasiveness which provides the validity (Moscovici, 1984b). For example, foods that have been labelled by a culture to be excluded from its diet, either through

food taboos or simply as unsuitable for consumption, are typically not questioned. Perhaps only in extreme times like starvation are these culinary rules likely to be broken.

In the 1600s before Galileo, the representation of our solar system was such that everything revolved around the earth. This notion was widely accepted and understood. However, Galileo exposed the error in this representation and showed that everything within the solar system revolved around the sun. Over time (history) the original representation was judged to be incorrect. However, before this revolution, people could not see the solar system in any other way. After Galileo, people could see both the 'true' representation and the old one. They were able to understand both ways of thinking.

4. Examples of social representations research

The examples introduced below present an illustration of the types of methodologies that have been employed in social representations research. Herzlich (1973) used a semi-structured interview format to investigate representations of health and illness in French society. The responses were content analysed and themes of health and illness genesis, definitions and their attendant behaviours were explored, highlighting the use of qualitative methods. Several criticisms have been made about the analysis and reporting of this research.

Investigations of social representations of the food domain per se have not been conducted, although studies of the prevalence of perceptions about the risk of foods generated through the use of biotechnology have started to emerge (eg. Gaskell et al, 1999; Hoban, 1995). The research of Drewnowski (1985; 1996) can be re-interpreted within this theoretical tradition which provides an example of the utility of this approach for food perceptions research. Drewnowski (1985) used the quantitative technique of multidimensional scaling to investigate the perceptions of target foods held by obese and non-obese subjects and to investigate the perceptions of vegetables held by a sample drawn from the general public.

4.1. An investigation of the social representations of health and illness

Herzlich (1973) used qualitative techniques to investigate the content of the social representations of health and illness in French society. Three particular aspects were examined including the genesis of health and illness conditions, the definitions of health and illness and the behaviours of the healthy and the sick. These research aims attempted to encapsulate a broader philosophy of health and illness which is defined by both the individual who experiences and perceives the states of health and illness and the wider society which defines rules of action and legitimises the experience as illness or health. Herzlich defines the representation of health and illness as “the complex psychological elaboration by which the experience of each person and the values of information current in society are integrated into one significant image” (p. 11). In this way concepts and perceptions from the individual and wider society are blended to construct the social reality of health and illness.

Eighty French participants who were resident in either Paris or rural Normandy were interviewed. It was expected that these different residential areas would enable any demographic differences in the genesis of health and illness to be explored. Education was considered to be another important variable in investigating the representation of health and illness and this was measured by the occupation of the participant which was classified as either professional or technical. Variables of age and gender were also represented evenly across the sample.

Analysis of pilot interviews identified themes relevant to health and illness. These themes were used to construct an interview guide which allowed exploration of these ideas within the open interview style of the main study. These themes included the definitions and classifications of health and illness, the causes of illness, the factors which were important for health and norms of health and illness. The interviews in the main study typically lasted for 90 minutes. Twenty of the participants were re-interviewed with the transcription of the first interview to comment on and clarify concepts generated.

Genesis of health and illness

Two themes about the genesis of health and illness encompassed factors which were exogenous to the individual including the nature of society and the 'way of life' and factors which were endogenous to the individual like resistance or a reserve of health. Health and illness was represented as a struggle between the individual and society.

The urban way of life was always associated with illness. It produced feelings of "fatigue and nervous tension" (p. 20) which lead to the experience of a state which was intermediate between health and illness with both biological (lowered resistance) and psychological effects (increasing anxiety and depressed affect). The 'way of life' was seen to influence health and illness in three general ways: 1) facilitate the genesis of illness; 2) determine the length of illness for an individual; and 3) increase the number of pathogens that individuals would be exposed to through living in the urban environment.

Health and illness represented a conflict between the individual and their environment. The notion of constraint was part of the representation of health and illness which expressed the conflict between the individual and society. Constraint was expressed through pollution and the rhythm of life. The urban way of life was perceived to attack the individual through pollution (air, food, water and noise) from which there was no escape. Individuals who actively chose to live in the city were seen to be healthier than individuals who felt trapped. The rhythm of life and time-schedules were constraints that the individual felt unable to alter. In this way it was the social way of life or society which constrained individuals by imposing obligations and restrictions. This led to a paradox: the society brings illness but the society also demands that individuals should be healthy to cope with the demands of society.

This distinction between the individual and society was also associated with other opposites: natural - artificial, rural - urban, normal - abnormal, healthy - unhealthy. For example, some foods were regarded as unhealthy because they had been altered from their natural state - they were manufactured and these products were viewed with suspicion. It was believed that healthy food could only be found in the country. Unhealthiness was not viewed "as an intrinsic

quality of an object” (p. 35) but rather the lack of fit between the object and the individual. Manufactured foods were not regarded as unhealthy in themselves but rather the ‘chemicals’ in them were perceived to be harmful to the physiology of the individual who would eat them.

Perception of the harmful way of life through the senses was also associated with the notions of toxicity and the way of life. For example, advances in food production technology were believed to be related to the decline in the tastes of foods like vegetables. These foods were viewed negatively because they were seen to have been tampered with and therefore contained less of the elements thought to be good for health - like vitamins. In this way toxicity “is the concept logically necessary to relate the present perceptions of the individual - the unhealthiness of the way of life and his own state of fatigue or malaise - to the anticipated illness” (p. 47). Sensory and cognitive perceptions of food were important components of the representation of health and illness.

Definitions of health and illness

Herzlich (1973) identified three types of health mentioned by the participants: 1) absence of illness - where the subject is not aware of a state of health as it is merely not being ill; 2) someone has good health because they have a good reserve of health which incorporates notions of physical robustness and resistance; and 3) equilibrium. Equilibrium was explicated as a perceived experience that one either has or loses, that is an all or nothing state, which encompassed the absence of fatigue together with physical and psychological well-being. Equilibrium was a term that the participants found difficult to define and Herzlich supposed that upon repeated usage by the community it had taken on an “implicit meaning” (p. 60) which most could understand who shared the representation of this term.

Fatigue was defined as a state of tiredness which can lead to psychological impairment because the body can no longer cope as well physically with the demands of life. Fatigue can lead to difficulty in relating to others, especially to family members. Roles were seen to be upset by

prolonged states of fatigue. In this sense, a state of fatigue was viewed as quasi-permanent almost a normal occurrence.

Illness was represented as the inability to participate in society. In this way the representation of illness included behavioural components. People who were ill were unable to carry out normal activities that occur in everyday life. Illness was seen to disrupt relations with people so that psychosocial as well as physical well-being was upset. In this way notions of health and illness were represented in terms of conduct - healthy people could continue with their roles in society but sick people were unable to do so.

The representation of health and illness encompassed notions of the individual and society, where the individual is equated with health (through their reserve of health) and society is equated with illness which is mediated through the 'way of life'. These conditions are subjectively experienced through activity where health enables the capacity for activity and taking part in society and illness leads to inactivity and the exclusion from society. "Indeed, the states of health and illness, which are themselves obscure, acquire meaning through the social behaviour of sick and healthy persons" (p. 92).

Health behaviours

Herzlich briefly discussed specific activities that participants believed helped to build an individual's reserve of health including diet, personal hygiene and rest. Of these three factors diet was believed to be the most important. An individual's food perceptions, especially relating to health, were important here and reflected notions of the medicinal or health-giving properties of foods. These behaviours included paying attention to meal combinations and dietary variety. Herzlich summarises health dietary behaviours thus:

"to watch and correct one's diet, not to eat too much but to eat enough, to choose certain foods and avoid others; all of these things seem psychologically more 'present' for the individual than, for example the more habitual body hygiene. In this field, people take pains, or think they ought to take pains, and also believe that these are effective" (p. 97).

This may reflect a more pervasive representation of food and diet - that of 'you are what you eat'. Herzlich writes that individuals take care with the food they eat because it can embody the unhealthy elements of the way of life. In taking care with diet one can control the body's assimilation of these unhealthy, toxic factors. In this way, natural foods were seen as better than chemical remedies in the form of medicines for the maintenance of health.

4.2. Critique

Herzlich's investigation of the social representations of health and illness is regarded as a seminal piece of research in this tradition. Many critics of mainstream social psychology have lamented the over-reliance of the discipline on quantitative methodologies which seem to omit many of the cultural and sociological factors reflected in everyday life. However, qualitative methodologies also have their deficiencies.

Farr (1977) maintains that accepting lay participants' responses at 'face value' can lead to problems. In this case health, a favourable condition, was associated with the individual and illness, an unfavourable condition, was associated with society. This may merely be a reflection of an attributional artefact where lay responses about favourable outcomes are usually attributed to the self and unfavourable outcomes to external factors. This phenomenon of 'self-serving' attributions has been investigated empirically in both classroom (eg. Hewstone et al, 1982) and more 'real-life' contexts (eg. Moghaddam et al, 1995) with results consistent with this hypothesis. Indeed, psychological health can be compromised in some circumstances when this favourable attributional style about the self is not adopted (eg. Crocker et al, 1993). If these results were also found in interviews with groups of individuals, where the stock of arguments could be openly negotiated, this criticism may have been avoided (Farr, 1995).

Herzlich's account of the results does not demonstrate convincingly that the notions identified are shared widely within the sample studied (Augoustinos, 1991; Augoustinos & Walker, 1995). This is a problem with some qualitative studies where simple statistics like frequencies are not reported. The reader is not able to independently assess the degree of

consensus of the participant responses, a property of social representations which is considered to be important by Moscovici. Indeed, when some interview transcripts are supplied discrepancies do occur. For example, the transcripts of the views of the urban way of life were very different for a young artist and an older housewife.

Herzlich attempted to balance the types of participants according to area of residence, occupation, gender and age because it was believed that these variables were important in shaping the representations of health and illness. However, Herzlich did not analyse the effects of these variables on the views of health and illness, even at the qualitative level. The account could have incorporated transcribed examples of participants from these groups. The reader would then have been able to assess any differences (or similarities indicating degrees of consensus) of these variables on representations of health and illness.

However, Herzlich's research provides important 'signposts' for any subsequent investigation of views of health and illness. Particularly important for this thesis were the perceptions of food alluded to by some of the participants and their relation to health and nutrition. The notions of the natural - artificial distinction, including the distinctions between natural foods and those that were manufactured or mass-produced using advanced farming technologies, and health maintenance behaviours, for example appear to be important and provide clues to research direction.

4.3. Food perceptions: A re-analysis of consensus

Social representations of food and food perceptions have not been investigated directly. However, many studies have used multi-dimensional scaling (MDS) and other statistical techniques which have inadvertently provided measures of consensus. For example, Drewnowski has investigated the food perceptions held by obese and non-obese subjects (Drewnowski, 1985) and the perceptions of vegetables held by the general public (Drewnowski, 1996) using MDS.

Drewnowski (1985) had 73 obese and non-obese subjects rate how nutritionally different food pairs were using those generated from sixteen target foods. Two dimensions accounting for

ninety-three percent of the variance in the subjects' responses were found. The first dimension included concepts of nutrition and energy content and the second dimension highlighted a distinction between carbohydrate and protein/fat content. Obese and non-obese subjects had a high degree of consensus in their representations of the target foods according to carbohydrate content as most individuals were plotted in similar positions on the dimensional structure. The correlations between the obese and non-obese subjects in their perceptions of the carbohydrate content of each food was very high ($r=0.96$) providing more evidence of shared perceptions of these foods. Similar results were obtained when subjects rated the perceived fat and protein contents of each food. Less consensus was seen between obese and non-obese subjects' ratings of perceived energy content and nutritional value when positioned on the two dimensional structure.

The number of target foods was quite limited and over-emphasised snack foods which may have artificially yielded a high degree of consensus. Several generic categories were also included (eg. fruit, vegetables and cereals) rather than including exemplars which may have made these categories difficult to rate and also over-emphasised the differences between these and the other 'less healthy' target foods. This may also have inadvertently tapped into a representation of 'good' versus 'bad' food. The small number of target foods used may not reflect the variety in people's diets everyday but this is a more general criticism of MDS and will be dealt with in Chapter 3.

Drewnowski (1996) investigated the perceptions of twenty common vegetables held by three groups of 50 members from the general public. These perceptions would highlight the classifications of vegetables and provide some marketing ideas for public health nutritionists to increase the consumption of vegetables in the American population. Fifty subjects rated the perceived similarity of these target vegetables and three dimensions accounting for seventy-nine percent of the variance were found indicating a high degree of consensus in these food perceptions. The first dimension was labelled 'calories' as it highlighted a distinction between starchy vegetables and green, leafy vegetables. Dimension two highlighted a distinction between

yellow/red vegetables and green vegetables and was labelled 'colour'. The colour dimension was also found to be important when the second group of fifty subjects were asked to rate the compatibility of each vegetable pair. The most compatible vegetable pairs were green and non-green combinations. It was concluded that nutrition educators need to be aware of other factors important in the classification of vegetables by the general public which can be used to direct nutrition education campaigns promoting the consumption of vegetables.

5. Critique of social representations

The criticisms of social representations have helped in the development and refinement of this theory. Moscovici deliberately made the definition of a social representation as vague as possible and refrained from making strict methodological guidelines for research as it was recognised that different methodologies would suit different research topics. However, several criticisms have challenged the theory of social representations which have stimulated debate about the utility of this theory for investigating social phenomena.

Jahoda (1988) writes that according to Moscovici social representations direct the thinking of society and individuals within that society. These social representations make the unfamiliar familiar. However, as Jahoda (1988) writes "if we are so shackled by representations, the question arises how someone like Moscovici is able to break out - in other words the problem of reflexivity" (p. 197). In this way, how is society able to understand something which is unfamiliar when they do not have a representation about it and its attendant language. Indeed, how was someone like Gallileo able to 'see' another way of conceptualising the solar system for example? Moscovici maintains that all perceptions and thoughts are based on social representations. If this is logically the case, one might question how unfamiliar objects and notions are then able to be perceived and thought about (McKinlay & Potter, 1987).

Jahoda (1988) continues this theme in his criticism of the motivational force that individuals and groups must experience, according to Moscovici, when encountered by unfamiliar objects and events. Moscovici maintains that the unfamiliar is threatening which must be made

familiar through social representations. The genesis of social representations can be understood within the Piagetian paradigm which removes this motivational force. New ideas and objects impinge upon the group which stimulates interpersonal communication about these items. These items then become “transformed and assimilated in modified form as well as producing some accommodation in the group members” (p. 201). The mechanisms of communication and comparison with existing categories (or the generation of new ones) are still needed but the process appears to progress more naturally than as an instance of threat removal.

Jahoda maintains that if the group encountered an idea that was so foreign then it would be ignored. Food research supports this. In modern societies the numbers of foods available has grown enormously and new items are added monthly (Heywood & Lund-Adams, 1991). Yet for many people, particularly older people their food habits have a certain stability and they are more likely to ignore many of these new food items. This theme will be explored in subsequent chapters in this thesis.

Markova (1982) writes that knowledge generation progresses through cognitive and sensory perception pathways. The mind is always comparing “its experience of an object with its knowledge of an object” (p. 111). Any disparities between the perceptual and cognitive systems are reconciled and knowledge progresses. External standards to which the individual can refer do not exist rather it is the interaction between these systems that leads to knowledge generation or advancement. This however, does not incorporate the social nature of knowledge genesis. Moscovici (1998) writes that we cannot ‘know’ anything by ourselves; that all knowledge is social in origin.

Jahoda (1988) maintains that the notion of social representations can be equated with the concept of culture. Sperber (1985) writes: “consider a human group. That group hosts a much larger population of representations... widely distributed, long-lasting representations are what we are primarily referring to when we talk of culture” (p. 74). Indeed, the notion of culture as defined by Triandis (1994) appears to be congruent with the more general notions of social

representations. When referring to the social representations of food, cultural knowledge and beliefs would be very important.

5.1. Different aspects of social representations theory

Wells (1987) believes that Moscovici's social representations theory is made up of two components - the phenomenal theory and the meta-theory. The meta-theory is chiefly defined as the distinction between the physical and social aspects of reality. The phenomenal theory deals with the 'phenomena' of social representations themselves. Wells maintains that it is possible to accept the premises of one level while questioning the other. Wells' criticisms are directed predominantly at the meta-theory.

The meta-theory

The meta-theory essentially involves the distinction for Moscovici between the physical and social aspects of reality. For Wells, the physical aspects of reality are built upon sensory perceptions including internal perceptions of biological needs together with external perceptions of physical stimuli. The social aspects of reality concern the social lives of individuals including communication and interaction. Moscovici maintains that all reality is socially constructed and our perceptions and experience are dependent upon our representations. Hence our perceptions of physical states are dependent upon our socially constructed representations and so there is a distinction between the two aspects of reality. However, Wells argues that we can never truly escape from the physical world and that the "...notion of reality must depend fundamentally on its connection with our knowledge of the external world" (p. 436). Wells maintains that the physical world constrains the social world to a certain extent. Wells argues that it is perhaps more fruitful to regard the physical and social worlds as "...two different aspects of the same fundamental reality" (p. 438).

McKinlay and Potter (1987), together with Wells (1987), criticise the distinction between the consensual and reified universes. They maintain that Moscovici's theory supposes that all individuals must interpret their reality through the medium of their social representations. This

would obviously include scientists, as social beings, so that scientists themselves are constrained by their representations and cannot be 'representations-free' (Farr, 1987). McKinlay and Potter (1987) state that it would be "...a profound mistake to think of science as an unproblematically asocial realm of activities in which knowledge of 'pure fact' is generated; the scientist is as much trapped in his social world as is the layman" (p. 479). This view mirrors the concerns that the sociology of scientific knowledge has aired including the claim that scientific knowledge itself is embedded in a particular history and culture (Sampson, 1978; Gergen, 1973; 1984). Indeed, Kincaid (1990) maintains that the values and beliefs of the time play a role in scientific research (in physical and social sciences) as they determine what will be investigated, what questions will be asked and what will be published. As Farr (1987) maintains, perhaps the distinction between the reified and consensual worlds is too rigid and perhaps the relationship is more fluid between the sciences and the lay community. Moscovici (1998) has clarified this distinction between the sciences and the general community, acknowledging that scientists are under the influence of their social representations and cannot detach from them. "We understand that even the way of naming and communicating these elements of science presupposes and conserves a link with the knowledge of common sense" (p. 236).

A logical extension of this view of scientists and science as grounded in social representations is that one cannot determine the 'correctness' of a social representation (McKinlay & Potter, 1987). Moscovici maintains that there are veridical or illusory representations but their validity stems from the fact that the content is shared by many individuals and negotiated by them. However, the theory does not allow for the 'correctness' of a representation to be assessed as this would be reverting to a comparison with scientific knowledge. This type of reductionism would be eschewed by Moscovici. McKinlay and Potter (1987) write that "...there is no representation-free way of identifying which representations are veridical and which are not" (p. 484).

The phenomenal theory

One of the fundamental premises of Moscovici's social representations theory is that these phenomena are shared by group members and that the content of representations is arrived at through negotiation implying a consensus of ideas. Potter and Litton have directed most of their criticisms of the theory at this premise (Potter & Litton, 1985; Litton & Potter, 1985). Potter and Litton have criticised the vague notion of what constitutes consensus as Moscovici does not define how widely a notion needs to be shared before it can be called a 'social representation'. Similar criticisms of Herzlich's (1973) study on health and illness representations have already been outlined. Potter and Litton maintain that by studying consensual knowledge structures, important diverse representations may be missed or ignored. While the notion of diversity within shared representations is an important point, Moscovici does not preclude diversity in his notion of social representations. "There is a consensual universe, but there is not a precise consensus on every element at each level" (Moscovici, 1985: 92). Diversity is important in the dynamic life of social representations.

Potter and Litton maintain that 'linguistic repertoires' may have an important function in the study of social representations in the course of their development, especially the study of metaphors. However, Moscovici asserts that social representations are more than linguistic representations of concepts, they also contain important symbolic and iconic components which are important for the anchoring and objectification of unfamiliar notions. These fundamental pictorial elements would be lost if language were the only medium used in their investigation together with notions which cannot be verbalised (Hewstone, 1985; Moscovici, 1985; Semin, 1985).

One final problem central to social representations theory which has plagued research in the social sciences for many years is the notion of salience of group membership to the individual. Indeed, social representations are said to define the group as they share notions which are considered important for the functioning of the group as a unit. However, concern has been expressed at the use of the group as a unit of analysis, when for the individuals concerned this

group membership, defined by the researchers, may have little meaning (Augoustinos & Innes, 1990; Potter & Litton, 1985). This criticism is an important one and must be taken into consideration in social representations research.

6. The utility of social representations theory to the study of food perceptions

6.1. Representations of food and eating: A re-interpretation.

In many traditional societies there is a pervasive belief that 'Man ist was Man isst' (you are what you eat). This means that there is a transfer of physical and personality characteristics from the 'food' to the eater (Rozin & Nemeroff, 1990). However, the 'food' in question typically refers to animals eaten for food such that one may acquire the 'cunning' characteristics if a fox is eaten, or 'strength' if a lion is eaten. A traditional example is presented by Meigs (1984). She maintains that the Hua of Papua New Guinea will typically prefer to eat food that is fast-growing so that they may also grow fast. This may be similar to Durkheim's notion of a 'collective representation'.

This belief also exists in some contemporary societies. The Jewish tradition of the kosher dietary system typically restricts the intake of some animal foods (eg. pork) "...to avoid an undue strengthening of the animal nature in man..." (Grunfeld, 1972: 8). Although this dietary system has evolved over millennia, it continues to exert an influence on the Jewish diet today.

Nemeroff and Rozin (1989) wanted to investigate whether the notion of 'you are what you eat' is still present at some level in contemporary Western society in the USA. They hypothesised that despite the widespread acceptance of the scientific notions of digestion (social representation) there may still exist vestiges of the belief that 'you are what you eat' in educated American university students (previous social representation which may still be in existence).

Nemeroff and Rozin (1989) employed a technique developed by Asch (1946). This technique initially involved the manipulation of only one attribute in an attribute checklist to investigate how this manipulation influenced impressions made of people. Each subject sees only

one list. It is widely believed that this technique offers a truly demand-free method of attaining people's beliefs as the research hypotheses remain hidden. In this study short vignettes about a hypothetical culture which manipulated only the food that was eaten were presented to 310 students. One group received the vignette with the traditional culture eating wild boar but hunting marine turtle only for its shell. The second vignette only changed the food consumed and hunted: eating marine turtle but hunting wild boar only for its tusks. The subjects read their vignette and then rated the males of the society on eight attributes including irritable - good natured and slow moving - fast moving. A second sample of 20 subjects rated the animals themselves on the attributes to indicate what the predicted direction of the relationship would be.

The results showed that indeed, the subjects rated the boar-eating culture as more boar-like, including being a good runner, fast-moving and unreliable, than turtle like. Most of the attributes were in the predicted direction using the animal attribute check.

This research shows that a general notion does exist in American society that you are what you eat even though scientific concepts of digestion have become more widespread through education. This indicates that two social representations of digestion exist in American culture (and perhaps in other Western nations) - a representation based on scientific principles, and a representation based upon laws of contagion and sympathetic magic (Rozin et al, 1986; Rozin et al, 1989). Moscovici believes that social representations are continually forming and changing to reflect the mobile nature of societies' ideas. It could be said that these social representations reflect changes over time to the representations of ingestion with some vestiges of the more traditional belief still reflected in contemporary society.

More traditional representations could have been invoked because the experiment required subjects to evaluate stereotyped behaviours of traditional cultures (eg. hunting and eating 'strange' foods). If the same result is found using more modern foods and situations, then there would be more confidence that these results do reflect a pervasive representation. A similar study involved the rating of attributes of people when shown their shopping lists (Haire, 1950). Half of

the subjects rated people listing “Nescafe” instant coffee and the other half listing “Maxwell House” drip ground coffee. Laziness was attributed more to the ‘instant coffee’ users than to the ‘ground coffee’ users reflecting food use stereotypes of the times. This research shows that perceptions of people can be modified by knowledge of the foods that they eat and the food behaviours that they engage in, perhaps reflecting the widespread notion of “you are what you eat”.

6.2. Advantages of social representations theory to the study of food perceptions

A pared-down version (McKinlay & Potter, 1987) of social representations theory has much to offer the psychological study of food perceptions. These advantages can be outlined as follows:

- it allows the degree of consensus to be included in the analysis;
- it does not prescribe any particular methodology and both qualitative and quantitative techniques have been successful;
- it allows social and cultural variables to be included in the analysis together with individual cognitions. In fact social representations theory recommends the inclusion of social and cultural knowledge in the interpretation of representational content and structure;
- it allows the investigation of knowledge structures of food which can include an analysis of where this knowledge comes from and how it is transformed in everyday thinking and communication;
- it allows an investigation of the evaluative function of representational structures to be examined. For example, it allows an investigation of how people evaluate foods in general and when making food selections, particularly the examination of food perceptions and how these affect the food choice process. An investigation of the evaluation of foods according to the perceptions of taste and health/nutrition would fit within this framework;
- it can provide a theoretical framework for conducting cross-cultural investigations provided that the cultural underpinnings of the representations were understood.

In these ways, the theory of social representations can provide essential social and cultural elements to the psychological investigation of food perceptions. This theory provides a way of interpreting the content of food perceptions within the historical, economic and social factors of a given society.

7. Aims of the thesis

This thesis aims to investigate:

- the content of food perceptions within two diverse countries;
- how consensual this content is within different age and gender groups within these two cultures;
- how the structural factors of a society, at a given point in time, may inform the content of these perceptions; and
- how food perceptions influence food intake, ie. how socially shared knowledge of food influences the food behaviour of individuals.

Chapter 3

Q-methodology: A pilot study

Chapter 1 presented an analysis of food perceptions research conducted in the social sciences, particularly in psychology which has tended not to systematically investigate the effects of culture on cognitions, or indeed food cognitions. The importance of cultural and social variables as well as individual factors on food perceptions was highlighted and the use of a methodology which could measure the effects of cultural and social factors on food beliefs within social psychology was emphasised.

Chapter 2 presented an analysis of the current state of social psychology and how much of mainstream contemporary social psychological theory has investigated individual differences on social phenomena, in preference to social factors. Social representations theory was presented as an alternative framework for the inclusion of social and cultural phenomena within social psychological research based on the notion of consensus. Social representations can be widely shared by a society (including cultural notions like defining those foods that are edible and inedible) which help to form the identity of that cultural group or they may be shared by only a sub-group within a society which may act as social markers (eg. the foods used, or perceived to be used, by vegetarians, working class Australians, and adolescents). Social representations also function as interpretive devices which can explain social behaviour (like explaining a child's hyperactive behaviour in terms of the artificially coloured food they have eaten) or physical phenomena (like explaining the failure of food crops, drought and the unseasonally hot weather in terms of the 'greenhouse effect').

A methodology which can assess how widely shared representations are about food that can be used across cultures is needed. The food perceptions held by two differing cultural groups – Koreans and Australians will be investigated in subsequent studies. This chapter provides the background to the choice of methodology to be used to assess these perceptual structures and indicate their degree of consensus. A pilot study, conducted in Korea, on the importance of some food perception factors will also be detailed. This will allow an assessment to be made of the usefulness of the chosen method in a non-Western cultural environment and the identification of which food perception factors will be used in further studies.

1. Cross-cultural methodology

1.1. Reduction of threats to internal and external validity

Triandis (1994) provides a checklist of problems to address when conducting cross-cultural research. These include issues at various stages of the research process from inception, experimental design and data collection methods - particularly the issues of translation, measurement and concept equivalence across different cultures, through to analysis and interpretation including the elimination of rival hypotheses which is especially important in cross-cultural investigations. Rival hypotheses can limit both the internal and external validity of cross-cultural research results and can include conceptual and structural issues.

Conceptual issues

Cross-cultural differences may exist in the definition and understanding of the concept within the cultures under investigation rather than any true difference in the level of effect of that concept. For example, intelligence has been extensively investigated across many cultures but often the characteristics that are regarded as 'intelligent behaviour' are very different. If a standard methodology is used which measures those behaviours considered important manifestations of intelligence in one culture only, then apparent (but erroneous) differences in intelligence across cultures will emerge (eg. Berry & Bennet, 1992). Triandis maintains that an

investigation of the meanings of the concepts under study within the cultures of interest must be included as part of any cross-cultural research programme (eg. Hofstede & Bond, 1984).

Structural issues

Differences in reactions to 'testing' or 'experimental' situations may vary markedly across cultures. Sets of instructions may not be understood in the same way which can lead to differences in test results. Some solutions to this problem include using a test which measures how well respondents understand what is required of them, or test the contents of the experimental protocol or questionnaire, for example, beforehand in a pilot study or pre-testing situation. The level of motivation to comply with a researcher's request may not be the same across cultures. Reactions to experimenters may also be different. People in different cultures may be very wary of 'foreigners' and may be suspicious of the 'real' reason behind the research. The engagement of helpers who are native to the culture will help to alleviate these problems.

The meaning of the test situation across cultures may also be different. The language of the instructions or questionnaire instruments may affect the way the situation is interpreted. Pilot investigations together with the use of native helpers should minimise this problem. Some respondents may feel anxious in a testing situation or others may find the tests challenging and these problems can be compounded across cultures. This would depend heavily on the topic of the testing situation but respondents may still believe that there is a 'correct' answer to test items. Carefully worded sets of instructions together with pilot testing can help to lessen this effect.

The types of responses that people give may also be culturally based leading to an effect which is independent of the topic under investigation. Some people are socialised to respond in certain ways and these may differ across cultures. Some cultures reinforce differences in opinions while others reinforce similarities (eg. Marin et al, 1992). Methodological and statistical controls can be used to reduce the effects of differences in response styles.

Differences in the nature of social relations among cultural members may also vary across cultures. For example, the relations between husband and wife or between employment supervisor

and subordinate may be such that they are expected to agree with the opinions of the dominant one. In other cultures this may not be the case. This means that the ethical acceptability of tests or questionnaires must be established prior to data collection. Pilot tests are needed where respondents are free to verbalise about how pleasant or unpleasant the test situation is, together with discussions about the tests with cultural natives.

Sample equivalence across cultures may also be difficult to obtain such that any observed effect may indeed be due to demographic differences rather than the variable of interest. Sampling from as many demographic groups as possible can help to limit these effects. However, some of the differences among demographic variables between cultures may indeed be interesting and help to explain some of the findings. For example, if 25 year old females are different on psychological maturity, marital status and education between cultures, what factors in these cultures are leading to this difference? A deeper understanding of each culture is necessary before interpretations of these issues can be performed. Discussions of such interpretations with cultural natives can help in these situations.

Triandis (1994) maintains that the interpretations which can be attributed to true cross-cultural differences or similarities are enhanced if these conceptual and structural effects are addressed during experimental planning. Any effects found are more likely to be real effects if these rival alternative hypotheses are minimised. The methods which help to make the research programme more rigorous include the use of pilot testing and practice items, engaging the help of cultural natives in the preparation of the research protocol, data collection and results interpretation, and a deeper understanding of the culture(s) of interest by the person or team conducting the research. Triandis stresses the importance of ethnographic work where the investigator lives among people of the culture and becomes an observer of their lives. This method can often yield a more thorough understanding of the values and social relations of the target culture which can aid in the interpretation of results.

1.2. Translation

Triandis maintains that translations are really no better than approximations of text and concept equivalence. However, if translations are needed there are standard procedures which help to maximise these approximations. The use of back-translation is imperative. This involves a process where the text is translated into the new language by translator A. The first version of the translation is then back-translated by translator B into the original language. The two same-language versions are compared for accuracy and concept clarity. The errors are discussed and corrected. This corrected version is then translated by translator C. The versions are again compared. This process is continued until the best match is agreed upon.

Triandis maintains that it is best not to translate single words as the meanings of words can be dependent on the context of a sentence. However, the use of single-word foods native to the culture could be used because they represent physical entities rather than concepts where the meaning can be misinterpreted. The use of pilot testing is imperative once again which tests both the efficacy of the instructions and whether there are any difficulties in answering any questions or completing test procedures. Observations of respondents completing questionnaires or particular tests can yield information on specific item difficulties. Discussions with the respondents after completion can help to determine if the difficulty was with the text, the concept or something else which may need to be altered before major testing begins. If interviews are to be conducted timing of responses together with post-interview discussion with the interviewer can also help to maximise concept clarity and questioning ease (eg. Baghurst et al, 1997).

2. The choice of methodology

One aim of this research is to investigate perceptions about food across two cultures - Korea and Australia, within the theory of social representations. This means that the conceptual requirements of the method used for interpreting respondents' cognitive perceptions about food must be able to produce perceptual structures and be able to provide a measure of the degree of consensus among respondents within the two cultures of interest. This will provide an indication

of how shared particular ideas about food are and to allow the structure of those perceptions to be identified within those cultures. The method must also be easy to administer to respondents across the two cultural environments in two languages and across different age ranges. It must be easy to translate and the instructions need to be clearly understood by all respondents to enable easy completion regardless of age and culture.

Two techniques which have been used successfully in different groups which fit these criteria include multidimensional scaling and Q-methodology. Multidimensional scaling has been used successfully in the food domain particularly the field of psychophysics through the assessment of sensory perceptions of food (eg. Popper et al, 1988; Schiffman et al, 1978) and as a tool to identify the social representations of groups within Australian society (eg. Augoustinos, 1991b).

Q-methodology has also been used successfully as a technique by different age groups including children (eg. Taylor et al, 1994), adolescents (eg. Sutnick, 1981), adults (eg. McCrae et al, 1986) and the elderly (eg. Hayslip, 1985). Q-methodology has been used to identify perceptions of food (eg. Fairweather, 1990) and social phenomena like personality (eg. John et al, 1994) and international relations (eg. Dryzek et al, 1989). This method has also been used successfully in a non-Western cultural environment to investigate food attitudes (Simpson, 1989). The use of Q-methodology in the domain of food and food beliefs has been recommended (eg. Brown, 1995).

Both of these methods allow respondents to compare stimuli using criteria that are relevant to them personally rather than using those generated by the investigator. In the case of multidimensional scaling, the attribute that a respondent uses to compare the similarity of two foods is up to them. For example, sweetness may be the criterion used to compare (on a rating scale) the similarity between food A and food B but acidity may be used to compare food A and food C. In the case of Q-methodology, the researcher sets a scale from 'completely agree' to 'completely disagree' for example, and the respondents arrange a set of stimuli within these

extremes. How the stimuli are arranged is a matter for their own subjective opinions in evaluating the attributes of the stimulus items within the bounds of the scale extremes. Both methods will be briefly introduced and their advantages and disadvantages examined. Their utility within the special case of cross-cultural research will be assessed.

2.1. Introduction to multidimensional scaling

Multidimensional scaling (MDS) is a set of techniques used where respondents indicate on a rating scale the degree of similarity (or dissimilarity) between objects (stimuli). Algorithms within MDS are used to reduce these similarity ratings into dimensions of perceptual space in the form of maps of those objects where cognitive perceptions can be inferred (Hair et al, 1995; Schiffman et al, 1981). The maps represent the average similarity rating between each object with every other object. If two objects are consistently rated as similar then they will be located close together on the map. One advantage is that the respondents use their own criteria or attributes that they believe are relevant when making the similarity rating between objects. This is particularly important in sensory tests where respondents often cannot verbalise what is different about the taste of substance A from substance B beyond the simple tangible descriptors of salty and sweet for example (Schiffman et al, 1981).

Each object is then rated on a list of adjective descriptors (attributes) by the respondents before the multidimensional space can be interpreted including, good - bad, strong - weak for example. Cognitive perceptions can be inferred by investigating the structure of the dimensions and relating (through multiple regression) these attributes to the positions of the objects within the dimensions.

The technique also measures the degree of individual variation which can provide an indication of how shared the resulting perceptual dimensions are within the group. MDS assesses how each individual's perceptions fit within the overall analysis of the group and indicates the relative importance of each dimension to each individual within the context of the whole group. In

this way the degree of consensuality of the resulting perceptions can be assessed empirically (Schiffman et al, 1981).

Structural factors in experimental design and data collection can be a disadvantage in MDS procedures. In the experimental design an assessment must be made of the number of stimulus objects to be included in the set for similarity ratings by the respondents. Schiffman and colleagues (1981) recommend that a minimum of twelve stimuli should be used for a two-dimensional solution and eighteen stimuli for a three-dimensional solution. However, in the data collection phase the time taken to complete all of the necessary similarity comparisons between pairs of even twelve stimuli is quite high. The number of comparisons needed can be calculated by using the following formulae shown in Equation 3.1.

Equation 3.1. Formulae used to calculate the number of comparisons needed in a MDS stimulus set.

$$C_2^n = \frac{n!}{2! (n-2)!} \quad OR \quad \frac{n(n-1)}{2}$$

$n = \text{number of stimuli}$

For example, if the minimum of twelve stimuli are used then this requires 66 comparisons to be made to generate the similarity ratings between all possible pairs of stimuli. Schiffman and colleagues (1981) recommend that "...no more than 55 verbal or visual judgements be attempted in one session" (p. 20) which would take about one hour for questionnaire-based stimulus comparisons. These recommendations are important because respondent attention and compliance can be compromised. However, if the respondents also need to complete attribute ratings and questions on background demographics even more time is required. All of this can lead to a stimulus set which is limited in number or to a data collection phase which needs to extend over several sessions which can lead to missing data. In the case of cognitive food

perceptions research, the number of foods or food statements which need to be part of the stimulus set would certainly need to be greater than twelve because of the large numbers of possible foods used by the culture or social group of interest.

Schiffman and colleagues (1981) maintain that incomplete data designs can be used where each respondent rates a reduced set of possible comparisons only. This has been used previously by Worsley and colleagues (1984b) who state that because only a small number of respondents rated each comparison pair (of foods) out of the total, "... the proportion of error variance was likely to be high" (p. 44) and the amount of variance that the dimensional solution accounted for was quite small. They conclude that this method requires further research.

The utility of MDS approaches across different cultures is not known. However, the efficacy of this procedure in helping to identify shared representations about food cannot be denied. What is needed is an approach which will allow comparisons to be made between a large number of stimuli without leading to respondent fatigue or requiring several data collection sessions.

2.2. Introduction to Q-methodology

Q-methodology involves respondents sorting cards of statements or other stimuli along a continuum according to how important, for example, each statement is to them. This provides a measure of the respondent's subjectivity (Brown, 1980) as the Q-sort reflects their opinions, attitudes and values at the time of sorting. The resulting data are factor analysed across respondents (not stimulus statements) and respondents who sort the items in similar ways are grouped together which reflects their shared common perspective (Brown, 1980; McKeown & Thomas, 1988).

Those respondents who load highly on only one factor are said to define the structure of that factor and their Q-sort data are thus given a higher weight than someone with a lower loading. From this weighted data a factor composite is generated which reflects the structure of the factor as it is defined by the data. The content of the respondents' beliefs, perceptions or

attitudes (depending on the initial stimulus set) can be inferred from the structure of the factor composite and how it varies in comparison with other factors yielded in the same analysis. The percentage of variance accounted for by the factor solutions and the number of respondents associated with each factor reflect the degree of consensus among respondents in the sample.

The number of actual comparisons in the Q-sort procedure is less than for MDS because respondents initially read through all items and sort them into three general groups according to how much they agree, disagree or are neutral on each item, for example. This means that the number of stimulus items in the set can be larger than using the MDS technique. The respondent can see all of the stimulus items at once and can easily and visually compare one with another, particularly near the end of the Q-sort procedure where finer adjustments can be made. In this case the assumption of “transitivity” is made which states that “for items a , b and c , if $a > b$ and $b > c$, then $a > c$ ” (Brown, 1980: 201). Piaget (1971) has demonstrated that most people master these logical distinctions by the age of eight. In this way, respondents are making similarity rankings of many stimulus items in a relatively short time which can help to overcome the disadvantages of standard MDS data collection techniques highlighted earlier.

2.3. Q-method and MDS

Q-methodology and MDS both contain the necessary elements to allow an investigation into the content and structure of beliefs, perceptions and representations held by samples of respondents. Both methods allow an empirical investigation of the degree of consensus of that content and structure. The data from this research are to be collected in two cultural environments so a technique which makes that collection easier without introducing error will provide structural advantages as well as limiting the threats to validity outlined in Section 1.1 on page 86.

The Q-method can also be used to generate matrices of similarity data more easily in the data collection phase than MDS, according to the criteria previously outlined for the two cultures of Korea and Australia. This means that data obtained using the Q-method is amenable to analysis using factor analytic (standard Q-analysis) or MDS techniques (including correspondence

analysis) or both for confirmation of findings. This analysis indicates that the Q-method is the most appropriate tool to use in collecting data on an investigation of the shared perceptions of food across two cultural environments.

2.4. The theory underlying the Q-method

Q-factor analysis

Q-methodology began over sixty years ago when William Stephenson wrote that respondents (rows) rather than traits or tests (columns) could be factor analysed providing that the units of measurement were the same across the column items (Stephenson, 1935a; 1935b; 1953). This is outlined in Brown (1980) and can be demonstrated with reference to Table 3.1. The usual way that factor analysis proceeds (ie. using the R-method after Pearson's r) is that each column of data uses its own measurement unit, like metres, kilograms and seconds for example. Each data point for any given column down all rows is the same as each respondent's weight is measured in kilograms and response time in seconds, for example. When Pearson correlations are performed each column of data is standardised based on its mean and standard deviation. For example, each respondent's weight is standardised in terms of the average of the weights from all respondents in the sample and the unit becomes the standard deviation (ie. how far above or below the mean weight a respondent's weight was located in standard deviation units). This occurs for all of the columns that are to be correlated. In this way, the columns become independent of their units of measurement, but more importantly, the columns have the same units of measurement - the standard deviation, and these columns are then able to be correlated with other columns and factor analysis can proceed.

Table 3.1. Hypothetical set of data demonstrating equivalence of measurement for each data point within a given column variable down all rows.

Person	Weight (kg)	Height (m)	Response Time (sec)	Age (years)
1	55	1.65	110	20
2	75	1.80	130	40
3	65	1.80	150	60
4	65	1.70	115	30
5	70	1.75	110	18

However, in Q-methodology the rows are correlated and factor analysed. This is more than just a simple factor analysis of the transposed data matrix because for any given row the units of measurement for each data point across the columns will be different. This indicates that means and standard deviations cannot be calculated because trying to calculate an average of 55 kilograms and 110 seconds is nonsensical. For correlation and factor analysis to proceed the units of measurement for any given row across each column must be equivalent.

Q-methodology involves respondents arranging a set of statements or items (the Q-sample) along a continuum or Q-distribution which may range from “very important to me” to “not at all important to me”. The way that each respondent sorts those statements reflects a ranking of those statements on “importance to me”.

If some of the values’ items introduced by Schwartz (1992) are used as an example, the equivalence of measurement across columns can be demonstrated. In this example, respondents could sort six of the value items on an “importance to me” continuum and the results may be represented as the hypothetical data set shown in Table 3.2. The data represent the rank order of the value items according to how important they are to each respondent, where a higher score reflects a higher degree of importance. This means that measurement equivalence across columns (value items) for each respondent (row) is attained because the unit of measurement is “degree of importance” to each respondent. In this way correlation and factor analysis can proceed where respondents are grouped together (row factor analysis or Q-methodology). Using this example the

data for subjects 1 and 5 would be highly positively correlated (and negatively correlated with subject 3) and they would all be grouped together in a factor.

Table 3.2. Hypothetical Q-sort results on values' statements demonstrating unit of measurement equivalence across columns.

Person	Daring	Pleasure	Creativity	Authority	Respect for tradition	Humble	Age
1	5	6	4	3	2	1	20
2	1	3	2	6	5	4	40
3	1	2	3	4	6	5	60
4	5	6	4	2	3	1	30
5	5	6	4	3	2	1	18

Q-distribution

Each respondent sorts the stimulus set (Q-sample) along the continuum using either a forced or unforced Q-distribution. Marker cards are generated which break up the continuum like that shown in Figure 3.1. This figure shows a Q-distribution example which runs from +3 to -3 and the extreme cards define the continuum anchors. In forced Q-distributions, respondents are asked to place a certain number of stimulus cards under each marker card (the numbers in brackets).

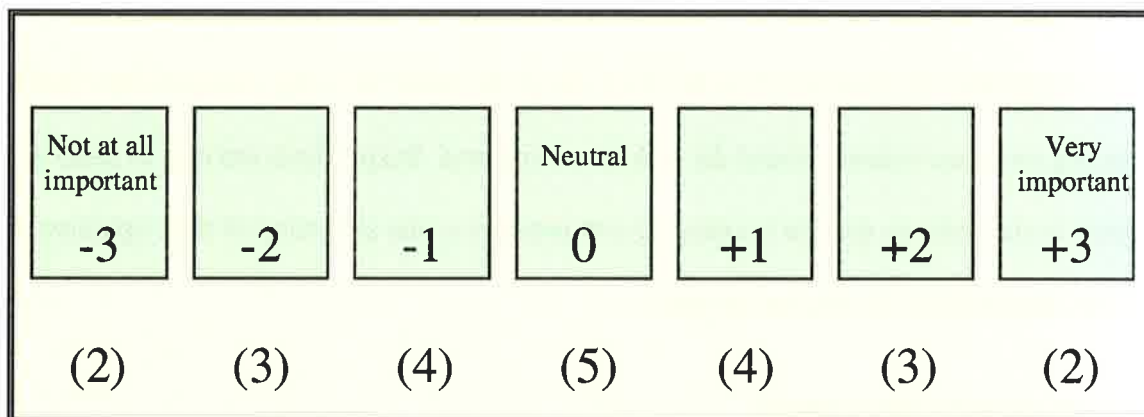


Figure 3.1. Example of a forced Q-distribution with marker cards and the number of stimulus cards to be placed underneath (in brackets).

Q-methodology can be criticised at least on experiential grounds that 'forcing' respondents to adhere to a particular distribution can be constraining and may not truly reflect the respondent's subjectivity. Brown (1971) investigated the differences in factors obtained from the use of fourteen different Q-distribution types including dichotomous, trichotomous, and random

distributions, and those with differing levels of skew and kurtosis to measure the effects of forced and unforced distributions. It was concluded that the effects of distribution type were negligible and factors are almost entirely affected by the placement patterns of the stimulus items alone. Further research has shown that even if respondents varied the format of their sort from the forced distribution (ie. they placed more items in a category than was required), the technique's reliability and the resulting statistical treatments were not affected (eg. Cottle & McKeown, 1981). Indeed, respondents may find it helpful to have a guide in stimulus sorting particularly with larger stimulus sets (eg. Simpson, 1989).

The sorting procedure

Respondents are usually instructed to sort the items initially into three piles - one for high importance, one for low importance and one for neutral (if importance is the sorting criterion). If the continuum from Figure 3.1 is used as an example, respondents are asked to look through the first pile and to choose the two most important items and to place them under the '+3' card. They then choose the next three most important items and so on until all cards from that pile have been sorted. They then begin at the negative extreme and choose the two cards that have the lowest amount of importance for them and continue until all of the cards from this pile are used. Finally the remaining cards are ordered around the middle, neutral area. Respondents are able to make any adjustments to the order so that the resulting Q-sort provides a true indication of their opinions on the stimulus items before the data are recorded.

Level of measurement scaling

One of the criticisms which has been directed at the Q-method is that it generates data at the ordinal level of scaling. Ordinal data is based upon ranks whereas interval data requires that the interval between 2 and 3 on a scale is the same as that between 4 and 5 on the same scale (eg. Hair et al, 1995). It may be that the interval between +2 and +3 on the Q-distribution is not the same as that between 0 and +1 because a respondent may have had to place an item lower on the scale than preferred because of the forced nature of the distribution (Brown, 1980). In this way, the degrees

of importance between +2 and +3 are closer together than the degrees of importance between 0 and +1 indicating that the intervals are not equal.

However, factor analysis can be based upon correlations which have been generated using either Pearson r (interval or ratio data) or Spearman r_s (ordinal data) techniques. Brown (1971) has demonstrated that factors generated from correlations based upon the Pearson r or the Spearman r_s lead to factor loadings with the same magnitude and direction. This creates factor composites with underlying factor structures which are the same and therefore independent of the calculation method. Brown (1980) concluded that within the framework of factor analysis “the interval - ordinal distinction is of no importance; ie. the same results occur whether or not intervals are assumed to exist” (p. 289).

The literature remains unclear on this issue for statistical techniques other than factor analysis. Some of the data generated in this pilot study were examined using linear probability modelling (logit analysis) which uses a non-metric dependent variable and can use either non-metric or metric independent variables as predictors. The results were compared with multiple discriminant analysis which uses a non-metric dependent variable with metric independent variables. The results were equivalent in every way. This means that data generated using the Q-method can be used with some statistical techniques which assume an interval level of scaling. The Q-distribution, with the numbers of items to be placed underneath each marker card, used in this pilot study approximates the normal curve indicating that the ordinal data may be equivalent to interval data and thus be used with parametric statistical tests.

The pilot study: An investigation of important food characteristics among Koreans

3. Introduction

There are a number of factors which are important in the process of food selection and many of these were outlined in Chapter 1. Common sense tells us that people select food because it is available and at a reasonable cost, for its taste, and because of habit and previous exposure. However, many other food perception factors can influence the food selection process. These can be grouped into the broad themes of cultural, social, individual (personal, psychological) and situational factors (after Dickins, 1965). Cultural factors include cuisine, and values while social factors can include the family, shared knowledge about food and sub-groups within a society like age and gender differences. Individual influences can include personality, mood, individual likes and dislikes including organoleptic preferences and individual knowledge structures used to store information about food. Situational factors can include socio-economic status, availability, marketing and the social context in which the food is to be consumed. Many of these factors may be acting at the same time, or even conflicting, in any given food selection situation.

To date a lot of the food research undertaken by the social sciences has concentrated on clinical populations including the investigations of behaviours related to cardiovascular disease and obesity (eg. Brownwell & Wadden, 1992; Gartside & Glueck, 1995) and the links between diet and disease have been well documented. However, the onus for health care in many industrialised societies at least, is shifting to the individual (eg. Pill & Stott, 1982; 1985) so investigations of people from normal populations is warranted. Public health campaigns typically inform people of what behaviours need to be changed but do not know what initially drives the behaviour and therefore how easy, or difficult, it will be to change. In this case with food selection



behaviour, the food perceptions considered important by the average person in choosing food need to be investigated. Some factors influencing the diet may be particularly difficult to modify, especially a few of the situational factors outlined earlier and particularly among different social groups.

The investigation of the food perceptions considered important by the average person becomes particularly pertinent when the population of interest is in a period of nutrition transition like the situation many Asian countries are currently experiencing (eg. Chen & Xu, 1996; Popkin, 1994). Nutrition transition can be defined as the progression from a situation of food and nutrient deficit through to food and nutrient excess where dietary inadequacies may be found at both extremes (Young et al, 1994). This means that a country in the stage of nutrition transition must cope with groups at both ends of the nutrition and health spectrum.

This situation usually arises in countries which experience rapid urbanisation and modernisation where pockets of poverty and affluence co-exist. Indeed, many multiple-country studies have shown strong relationships between gross national product and diet composition, at least at the population level (eg. Perisse et al, 1969). This trend is toward greater food intake variety and overall diets that are higher in fats and lower in complex carbohydrates (Drewnowski, 1997). Protein intake does not appear to vary as widely at the population level over time and during transition (Kwon et al, 2000). The state of nutrition transition occurs concurrently with rapid social transition (influenced by rising incomes) and the two are completely intertwined. In these cases, public health systems must be able to simultaneously cope with both the nutrient deficiency diseases of poverty and the non-communicable diseases of dietary excess.

Korea is in a stage of nutrition and social transition particularly observed in a widening gap in health status between urban and rural Koreans (Kim et al, 1992). The impact of Westernisation is changing Korean society in a multitude of ways and this is reflected in both the nutrition, health, disease, and social spheres. This is affecting health behaviours and beliefs extending to the types of health treatments sought (eg. Chin, 1992), as would be postulated by Kleinman outlined in

Chapter 2, and to the types of clothes worn and foods consumed (eg. Korea Annual, 1995). Younger Koreans are eating more Western-style convenience, snack foods and the meal patterns of all Koreans appears to be changing (eg. Kim & Oh, 1996). This social and nutrition transition analysis will be expanded in Chapter 4.

Age is a potent and salient social factor within any society and can often determine one's social position, particularly in societies which uphold Confucian values like Korea (eg. K. Lee, 1991; Peng, Zebrowitz and Lee, 1993). In these societies, the importance of age, especially older age, is reflected in the Confucian value system (eg. Park & Cho, 1995). However, the cultural values of many of the younger Koreans are shifting away from the traditional values espoused by older Koreans (eg. Kang, 1992; Kang and Morgan, 1988). It is likely that differences in food consumption based on age arise because of social changes in that society (Axelson, 1986). Garcia and colleagues (1975) conducted a longitudinal study of thirty-five white American women from 1948 to 1966 and found that the food patterns of these women remained quite stable after the age of 30 years. This implies that once adults are accustomed to the flavours of foods of their cuisine, they are generally more likely to prefer this familiarity over unfamiliar foods and flavours. Older respondents often perceive foods according to their health value than their perceived tastiness in contrast to younger respondents (Kronl & Coleman, 1988). The effect of age on the level of importance of food perception factors will be investigated.

Gender can also have a large influence on the types of foods chosen. Men and women in industrialised societies have been found to consume different foods even though many of their food perceptions are similar, indicating that the values and attitudes about food held by men and women differ. Sobal and Cassidy (1990) found that male and female American university students were equally able to nominate commonly perceived 'dieting' foods although USDA random population survey data indicate that consumption of these types of foods does differ between men and women (Rolls et al, 1991). The effect of gender on the level of importance of food perception factors will be investigated.

Food perceptions may differ between age and gender groups and also between people with differing amounts of food experience. Those people with a lot of experience in food acquisition and preparation may consider different food perception factors to be more important than others.

The aims of the pilot study were threefold: 1) to demonstrate the utility of the Q-method in investigating shared perceptions about food and its appropriateness in Korea; 2) to investigate which characteristics were considered to be most important by a Korean sample when choosing food; and 3) to investigate any differences in food perceptions between males and females, between older and younger Koreans and between those Koreans with and without cooking experience. In this way, the pilot study reported here presents the analysis in terms of which food perceptions are important to Koreans and as a test of the methodology. Those perceptions considered to be the most important will be used as the basis for investigations of food perceptions in subsequent studies.

4. Method

4.1. Sample of respondents

An age-stratified convenience sample of 142 Koreans participated in the study. The sample was stratified on the basis of age for two reasons. Firstly, the findings of Garcia and colleagues (1975) suggest that food preferences generally become settled after the age of 30 years; and secondly, the social expectations within Korean society are quite strong. In general, males and females are usually married by the time they are aged thirty and the female commonly takes full responsibility for food preparation. Some females, particularly female students residing with their parents, have little cooking experience until marriage. The age criteria for group stratification was between 18 and 29 years for the younger groups and 30 years and above for the older groups. The characteristics of this sample are shown in Table 3.3.

Table 3.3. Number of participants and average age of groups in the Korean pilot study sample.

Group	N	Age (mean \pm SD)
YF	60	22.2 \pm 0.8
YM	49	22.9 \pm 2.8
OF	25	45.9 \pm 9.6
OM	8	55.0 \pm 15.1

The groups included 109 young female (YF) and young male (YM) participants who were studying generalist undergraduate degrees at two universities in Seoul, Korea. The older female (OF) participants were selected from women connected with the National office of the Korean YWCA and the older males (OM) were selected from security staff located at Seoul National University. Older males are underrepresented when compared to the numbers in the other three groups. This was a reflection of differences in respondent willingness to be tested and is indicative of more general cultural effects.

4.2. Materials

All of the marker and stimulus cards measured 13cm by 10.5cm and were made from white, unruled index cards. Two Q-samples were generated and each set had a colour-coded border for easy identification. The first Q-sample consisted of Korean magazine titles which enabled respondents to practice the Q-sort procedure before the main Food Perceptions Q-sample was administered. This would ensure complete comprehension of the Q-sort procedure.

Practice Q-sort

Marker cards

A row of seven marker cards was placed at the top of a large desk. These cards were marked according to the Q-distribution presented in Figure 3.2 with the (-3) marker placed on the extreme left and the (+3) marker on the extreme right. The continuum ranged from “liked the most” (+3) to “disliked the most” (-3). The (-3), (+3), and (0) marker cards had the appropriate words printed on them in Korean (larger font) and English (smaller font). All marker cards had the number of stimulus cards to be placed underneath them printed in brackets.

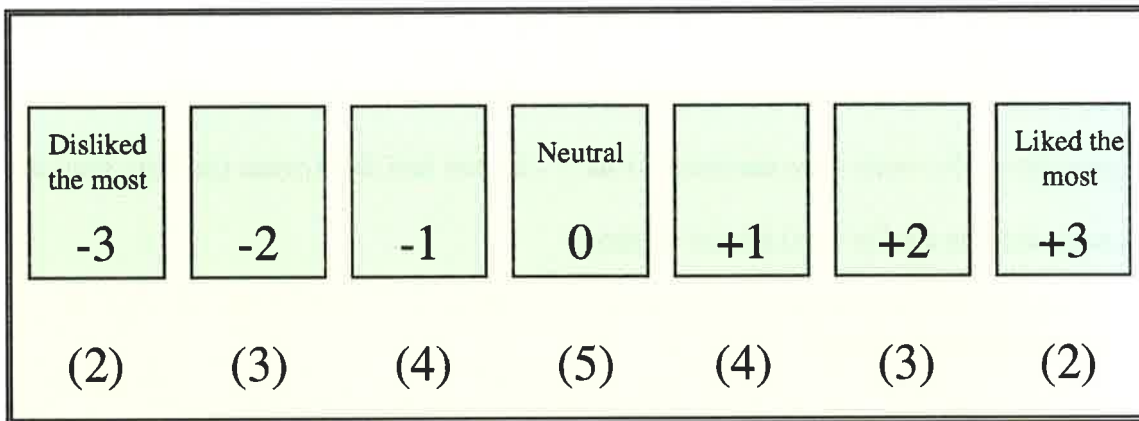


Figure 3.2. Distribution of marker cards and condition of instruction for the practice session.

McKeown and Thomas (1988) discuss the issue of using a distribution which ranges from 'most positive to most negative' rather than just 'most to least'. They maintain that the 'most to least' option implies that all of the items contain at least some of the quality of the condition of instruction. This option does not leave any room for complete rejection of the item. If the condition of instruction ranges from 'most to least agree', the implication is that all respondents will agree with all of the statements at least to some degree - which may not be the case. However, if the continuum ranges from 'agree with the most' to 'disagree with the most' then respondents have a place for those statements with which they do not agree. They advocate the use of most positive to most negative conditions of instruction. However, the items are placed in rank order so that the negative (or least) end reflects those items disagreed with when compared to those ranked higher. The types of items contained within the Q-sample will probably determine how the condition of instruction is worded. In this case, the 'amount of liking' for each of the magazine titles was the requirement so the most positive to most negative option was chosen to help reflect the continuum to be used in the main Food Perceptions Q-sort.

Q-sample

A small Q-sample of twenty-three Korean magazine titles (Appendix A) was generated so that respondents would be able to practice the sorting procedure. These titles were selected from a

range of those sold at a popular magazine and bookshop in downtown Seoul. These titles were purposely chosen so that all respondents would like or dislike some of them to aid in the practice sorting procedure. The cards were numbered from 1 - 23 and had the Korean (in large font) and English equivalent (in smaller font) printed on them.

Food perceptions Q-sort

Marker cards

A row of eleven marker cards, marked according to the distribution presented in Figure 3.3 was placed at the top of a large desk. The extreme marker and middle cards were printed with the words “most unimportant” (-5), “most important” (+5) and “neutral” (0) in Korean (larger font) and English (smaller font). The cards were arranged in the same way as in the practice session, with the negative end on the left and the positive on the right.

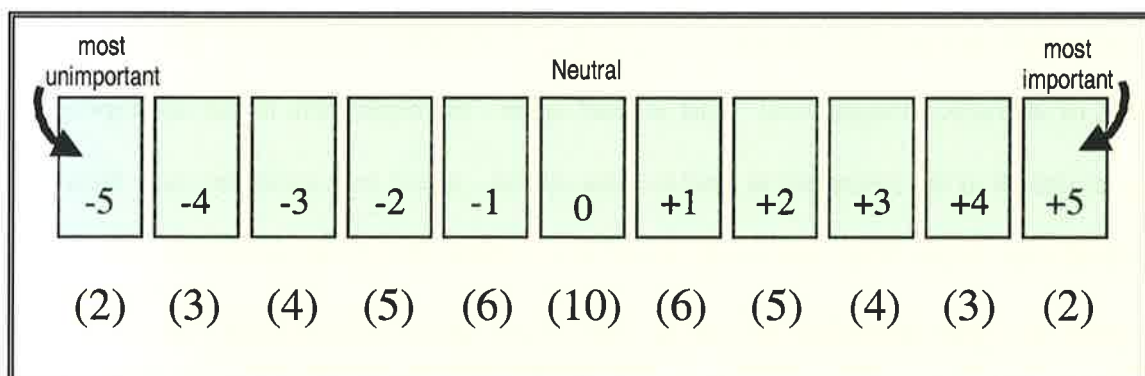


Figure 3.3. Distribution of marker cards and condition of instruction for the food perception test session.

Q-sample

One could not assume *a priori* what factors were important to Koreans when they chose food so opinions from twenty Koreans were sought. Ten older females who were cooks in a university cafeteria in Seoul, were asked to list some of the characteristics of food that were important to them using the form in Appendix B. Five young males and five young females were also questioned in the same way. Their answers were translated into English and coded to generate part of the Q-sample. All translations were checked by two other Koreans. Additional items were added from the literature and the complete Q-sample of fifty stimulus words and

phrases relating to food is shown in Table 3.4. The completed list was shown to three other Koreans to check for familiarity with the terms and concepts before proceeding with the generation of the item cards. Examples can be found in Appendix C.

Table 3.4. Stimulus items of the food perception factors used in the Q-sample.

No.	Factor	No.	Factor
1	Nutrition*	26	Oiliness
2	Creaminess	27	Safety*
3	Taste*	28	Crispness
4	Cleanliness*	29	Harmony of cooked food*
5	Cooking time*	30	Additives*
6	Storage period*	31	Cooking method*
7	Familiarity	32	Spiciness
8	Sincerity*	33	Tradition*
9	Natural*	34	Price*
10	Fattiness	35	Packaging
11	Convenience*	36	Smell
12	Hygiene*	37	Beautiful*
13	Health*	38	Shape
14	Cuisine	39	Size
15	Ripeness	40	Sweetness
16	Texture	41	Flavour*
17	Freshness*	42	Cooking knowledge*
18	Habit	43	Quality*
19	Calories	44	Saltiness
20	Preservatives	45	Ease of cooking*
21	Season	46	Source/Origin*
22	Colour	47	Enjoyment*
23	Appearance*	48	Smoothness
24	Juiciness	49	Temperature
25	Availability*	50	Appreciation*

* denotes factor listed by Koreans

Some of the terms are particular to the Korean lexicon and require further explanation. Sincerity (8) refers to the emotion and effort that the food preparer puts into the food or meal. If the level of sincerity is high then the food will be appreciated even if the result is not as tasty as expected. Convenience foods are thought to lack sincerity. Harmony of cooked foods (29) reflects the overall appearance of the food within the meal structure as well as the correct balance of flavours, ingredients, textures and colours. This is particularly important in Korean cooking at both everyday meals and feasts (Hyun, 1988; Kim & Oh, 1996). The term beautiful (37) is related

to harmony (29) and to appearance (23) but particularly refers to the attractiveness of the food. 'Beautiful' is distinct from 'appearance' as a food can be negative in appearance but the food may still be selected. For instance, someone may not like the look of raw chicken but still purchase it because they like the taste of chicken. 'Beautiful' relates more to perfect looking fruit and vegetables like apples or watermelon. The Q-sample cards were randomly numbered from 1 - 50 and this was printed together with its Korean (in large font) and English equivalent (in smaller font).

4.3. Procedure

Pretesting and instructions

Instructions for both the practice and test sessions were slightly modified from those presented by McKeown and Thomas (1988) and Brown (1980). The instructions were translated into Korean and these sets of instructions were tested in two ways. Firstly, the instructions were translated back into English and any discrepancies checked and corrected. Secondly, the practice session was administered to two Koreans who were asked to read and follow the instructions and their sorting behaviour was observed and any questions noted. Both of these respondents (who did not take part in the pilot study) did not have any problems with the sorting procedure and instructions. The English and Korean sets of instructions can be found in Appendix D.

Practice session

Each respondent was seated individually at the practice session desk and the instructions were shown to them together with a verbal summary explaining the overall procedure. This summary emphasised the word "most liked" and "most disliked" while indicating the appropriate marker cards of the distribution. It is a university entry requirement that Korean students are able to understand English so English was used in the verbal summary. However, they were shown the Korean instruction set and it remained on the desk throughout the Q-sort for easy reference. A Korean helper was always on hand if Korean verbal instructions were required, particularly for the older non-student respondents. Respondents were instructed to sort the magazine titles

according to how much they liked them. After completing this Q-sort and providing any clarifications, the respondents were seated at the Food Perception Q-sort. The results from the practice session were not recorded.

Test session

Respondents were shown the Food Perception sorting instruction set which they could refer to if they wished. A short verbal summary highlighting the words “most important” and “most unimportant” was given while indicating the appropriate marker cards. Respondents were further instructed that there were no right or wrong answers and that their own opinions were sought. Upon completion of the Q-sort the data were recorded on a pro-forma and respondents completed a short demographics questionnaire (Appendix E). The stimulus cards were shuffled after each respondent. The overall procedure, including practice and test sessions, lasted for approximately twenty minutes. Data were entered using a custom-made computer program which had in-built checking mechanisms to eliminate data entry errors (A. Beaumont-Smith, 1993). There were no missing data.

5. Results

5.1. Analysis using the Q-method

Introduction

The Q-method was briefly introduced in Section 2.2 on page 93. To summarise, Q-methodology proceeds by entering the respondents as variables into factor analysis. Thus respondents who sort the items in a similar way will be correlated with each other and will be grouped together by factor analysis. This means that respondents who load solely and significantly on only one factor are said to define that factor (Brown, 1980) because they all sorted the items in a similar way. The factors are rotated to help factor separation and orthogonality.

A composite Q-sort is constructed to represent each factor for the purpose of factor interpretation. The loadings are used to weight the respondents' Q-sort results such that those respondents with higher factor loadings on only one factor are given a higher weight than those with lower loadings. These weights are used to calculate factor scores which are normalised z-scores that are then rank ordered and converted into whole numbers to represent the original Q-distribution continuum (eg. +5 to -5). Reliabilities are calculated and the composite Q-sorts compared (in the case of two or more factors) and interpreted.

Factor structure and scores

All of the respondents (n=142) were entered into a principal components factor analysis with varimax rotation. Analysis of the scree plot indicated a three factor solution was optimal and these accounted for 42.2% of the variation in respondent sorting. Using the following formula in Equation 3.2 loadings in excess of 2.58 standard error units (SE) = ± 0.36 were regarded as significant (p<0.01, two-tailed) following Brown's (1980) recommendation. The number of respondents with significant loadings on only one factor and the factor reliabilities, which are dependent upon the number of respondents defining each factor, are shown in Table 3.5.

Equation 3.2. Calculation of standard error for Q-sample of fifty.

$$SE = \frac{1}{\sqrt{N}} = \frac{1}{\sqrt{50}} = 0.141$$

N = number in Q-sample

Table 3.5. Number of respondents defining each factor and factor reliability.

Factor	Number of respondents	r
A	37	0.993
B	29	0.991
C	20	0.988

The factor scores shown in Table 3.6 represent a composite of the way that all respondents defining that factor sorted the Q-sample items according to their degree of importance to each individual. The food perception items that received a factor score of ± 3 or greater were considered for interpretation of each factor as these define the extremes of the factor aiding interpretation. It is important to note that there is no difference in degree of importance across items with the same rank value (eg. the two items at +5). The age and gender characteristics of the respondents who defined each factor are shown in Table 3.7. The factor scores for all of the items can be found in Appendix F.

Table 3.6. Factor composites with scores greater than ± 3 for three factors.

Score	A	B	C
+5	Taste	Taste	Hygiene
+5	Freshness	Health	Health
+4	Cleanliness	Nutrition	Nutrition
+4	Sincerity	Hygiene	Taste
+4	Health	Freshness	Freshness
+3	Nutrition	Cleanliness	Cleanliness
+3	Calories	Calories	Calories
+3	Hygiene	Price	Sincerity
+3	Enjoyment	Quality	Safety
-3	Creaminess	Ripeness	Colour
-3	Juiciness	Juiciness	Crispness
-3	Additives	Spiciness	Size
-3	Sweetness	Smoothness	Ease of cooking
-4	Oiliness	Natural	Cooking time
-4	Spiciness	Beautiful	Appearance
-4	Saltiness	Size	Sweetness
-5	Fattiness	Creaminess	Creaminess
-5	Preservatives	Tradition	Packaging

Table 3.7. Percentages of variance, frequencies and percentages of age and gender characteristics of respondents defining each factor.

	A		B		C	
	30.0%		7.7%		4.6%	
	n	%	n	%	n	%
YM	23	62.2	5	17.0	7	35.0
YF	10	27.0	20	69.4	3	15.0
OM	1	2.7	1	3.4	3	15.0
OF	3	8.1	3	10.3	7	35.0
TOTAL	37	100	29	100	20	100
Younger	33	89.2	25	86.0	10	50.0
Older	4	10.8	4	14.0	10	50.0
Males	24	65.0	6	21.0	10	50.0
Females	13	35.0	23	79.0	10	50.0

Many of the food perception items regarded as important in the food selection process are common across the three factors. This means that the differences in the factor structures can be found at the unimportant (negative) end together with those items which are unique to each factor. Factor A accounted for 30% of the shared variance (across the total sample $n=142$) and was predominantly defined by younger respondents, particularly younger males. The items which

were regarded as more important overall to this group than those groups identified in Factors B and C were sincerity and enjoyment. The items considered to be less important were preservatives and additives, and many particular taste elements including saltiness and spiciness. Taste overall, rather than some of these particular factors, was considered more important in the food choice process. The amount of oil or fat in the food is also considered to be less important by this group.

Factor B accounted was predominantly defined by younger females. Taste is ranked as most important but price and quality are also seen to be important. Organoleptic qualities are seen to be less important including smoothness as well as some appearance factors including 'beautiful' and 'size'. Other cognitive perceptions including 'natural' and 'tradition' were also considered to be less important to this group.

Factor C was not defined by any particular group but more younger males and older females were associated with this factor. Food safety was considered more important overall by this group as 'hygiene' and 'safety' were included at the positive end. Sincerity was also considered to be important. Appearance issues including packaging, overall appearance, colour and size were considered to be less important. Procedural issues about cooking were also considered to be less important overall. The cooking expertise of those respondents who defined this factor was examined and 75% of the respondents in this group were not responsible for the cooking at home.

The issue of sincerity, that is the positive emotions and effort put into food preparation by the food preparer, is interesting. The average rank on sincerity for those who did not cook (7.2) was higher than those who did cook (6.8). While this difference is not statistically significant its importance to those who do not cook cannot be ignored. However, sincerity is also strongly associated with gender as many more males ranked it higher on importance than females. In Korea the males tend not to be responsible for the cooking. This indicates that those who do not do the cooking tend to believe that sincerity is more important than those who are responsible for the food preparation.

5.2. Correspondence analysis

A two-dimensional graphic representation of frequencies of importance for each item (using correspondence analysis for ten groups) can be found in Figure 3.4. The ten groups included in this analysis were the four subgroups (YF, YM, OF, OM), those aged less than thirty (younger), those aged thirty and over (older), cooks and non-cooks and males and females. This meant that subtle differences according to age or gender or a mixture of the two could be investigated. A table of frequencies of a 'most important' ranking for each item by the ten groups was generated (defined as a score of 9 (+3) or greater). This frequency data was then converted to percentages according to the numbers of respondents in each of the ten groups and entered into a correspondence analysis. Correspondence analysis calculates the degree of association between all row and column categories in a contingency table and then generates a spatial map of row and column variables together. The proximity of each item to each other item and to each group indicates the degree of association between them such that those which are positioned closer together have a higher association. The two-dimensional solution shown in Figure 3.4 accounted for 80.3% of the variance in association scores.

Younger respondents were associated with taste, enjoyment, habit, source, harmony and saltiness while older respondents were associated with ripeness, season, tradition and packaging. Males were associated with sincerity, crispness and natural while females were not clearly associated with any item overall. Cooks were associated with cooking issues including cooking knowledge, ease of cooking, quality, availability, nutrition, health while non-cooks were associated with price and cuisine.

A cluster of food safety issues including freshness, hygiene, safety, storage period, additives and preservatives can also be observed and the preservatives and storage period items are also associated clearly with older females. Younger females were associated with texture, fattiness and cooking method and convenience to a lesser extent. Younger males were associated

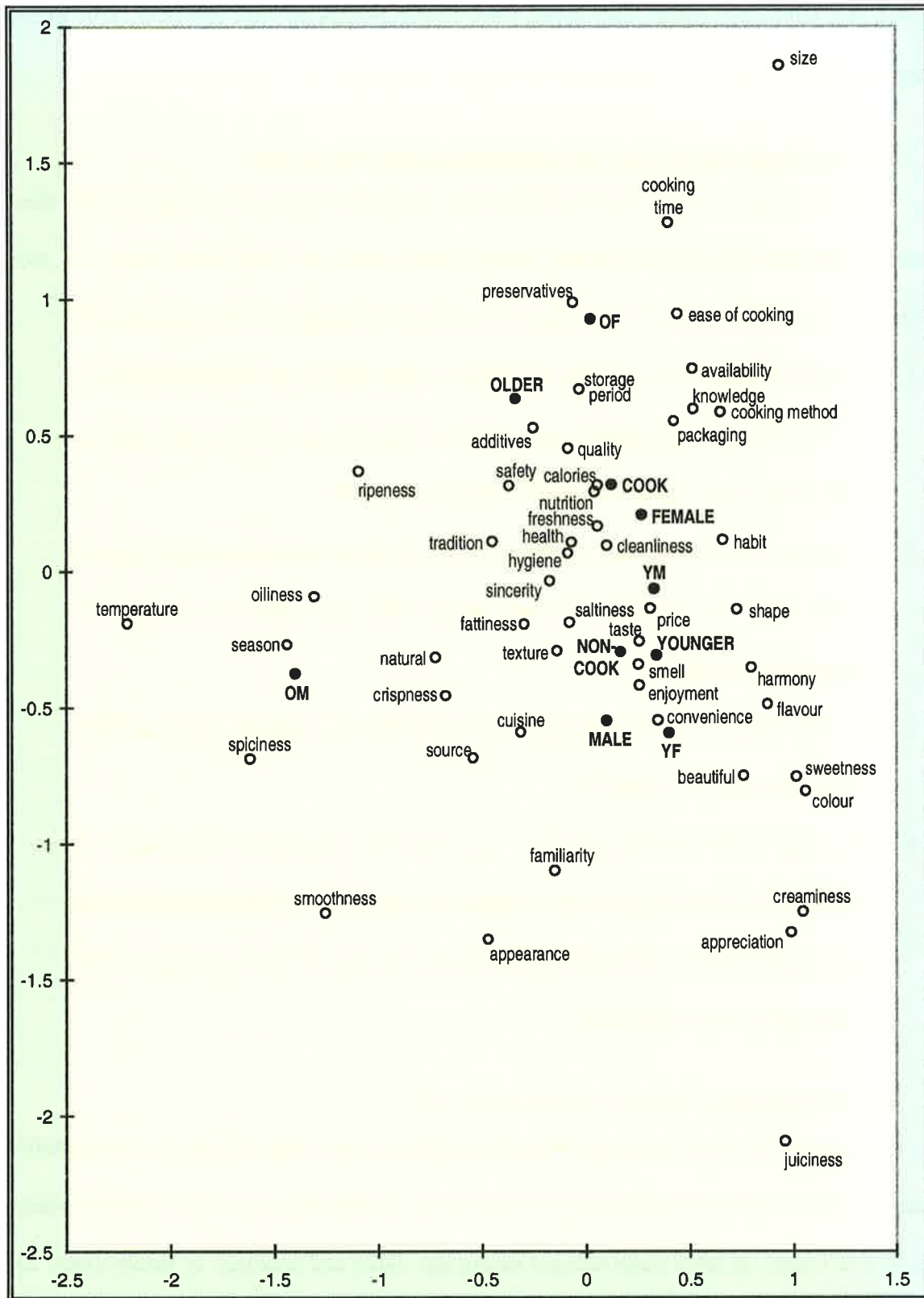


Figure 3.4. Correspondence analysis of frequency of importance rankings of food perception items by ten respondent groups.

with smell and familiarity while older males were clearly associated with spiciness. This picture generated by the correspondence analysis will help the interpretation of subsequent results.

5.3. Relative importance of food perception items between groups

Two percentage values were calculated for each food perception item so that direct comparisons between the age and gender groups could occur on those items ranked as most important and most unimportant. These values were calculated using the following procedure:

1. The Q-distribution (-5 to +5) was re-scaled to range from 1 (-5) through 6 (0) to 11 (+5). This removes the negative signs making interpretation a little easier and does not have any effect on the distribution (see Brown, 1980).
2. The number of times that each item was placed in the extremely important range (9, 10 and 11) was totalled for each group (this was used in the previous correspondence analysis).
3. This was repeated for the frequency that each item was placed in the extremely unimportant range (1, 2 and 3).
4. Percentages were then calculated for each item on frequency of importance and unimportance. This enables a direct comparison between the groups on those items ranked high on importance and unimportance. The top ten food perception items for each group were compared.

Relative importance (Figure 3.5 and Figure 3.6)

Chi-square (4x2: df=3) analyses were performed in some cases to test for an association between 'age/gender' group and frequency of importance (a rank of 9, 10 or 11) or less importance (a rank of 8 or lower). In other cases where a strong age (older and younger) or gender (male and female) association was suspected additional chi-square (2x2: df=1) analyses were performed.

There were thirteen individual food perception items which appeared in the top ten list for importance over all four groups. Six of these top ten ranked food perception items were common to all four groups. These included taste, nutrition, health, freshness, hygiene, cleanliness and

calories. Safety also appeared in the top ten for importance in all groups except the younger males. Price was the tenth food perception item listed for importance for the younger male group only, but the importance of price was not significantly associated with this group ($\chi^2(3)=1.6$, ns.).

The relative percentages of importance for some of these common food perceptions did differ across the groups however. Taste was the most important food perception item for significantly more younger males (73%) and females (82%) than older males (50%) and females (44%) ($\chi^2(3)=13.2$, $p<0.01$). Significantly more younger females ranked taste at the most important end of the continuum than all other groups. The trend appeared to indicate that there were significant age differences in the frequency of ranking taste as most important for all respondents ($\chi^2(1)=12.1$, $p<0.01$). This indicates that taste was perceived to be more important in the food selection process for younger respondents, particularly the younger females. Enjoyment was also significantly more important to younger than older respondents ($\chi^2(1)=4.7$, $p<0.05$).

There appeared to be gender trends in two of the food perception items. Quality appeared in the top ten for importance for both female groups while sincerity made the top ten list for males only. This was confirmed by chi-square analyses (quality: $\chi^2(1)=5.5$, $p<0.05$; sincerity: $\chi^2(1)=3.9$, $p<0.05$). This indicates that food quality is more important to females and sincerity is more important to males. These results are also depicted in the correspondence analysis (Figure 3.4).

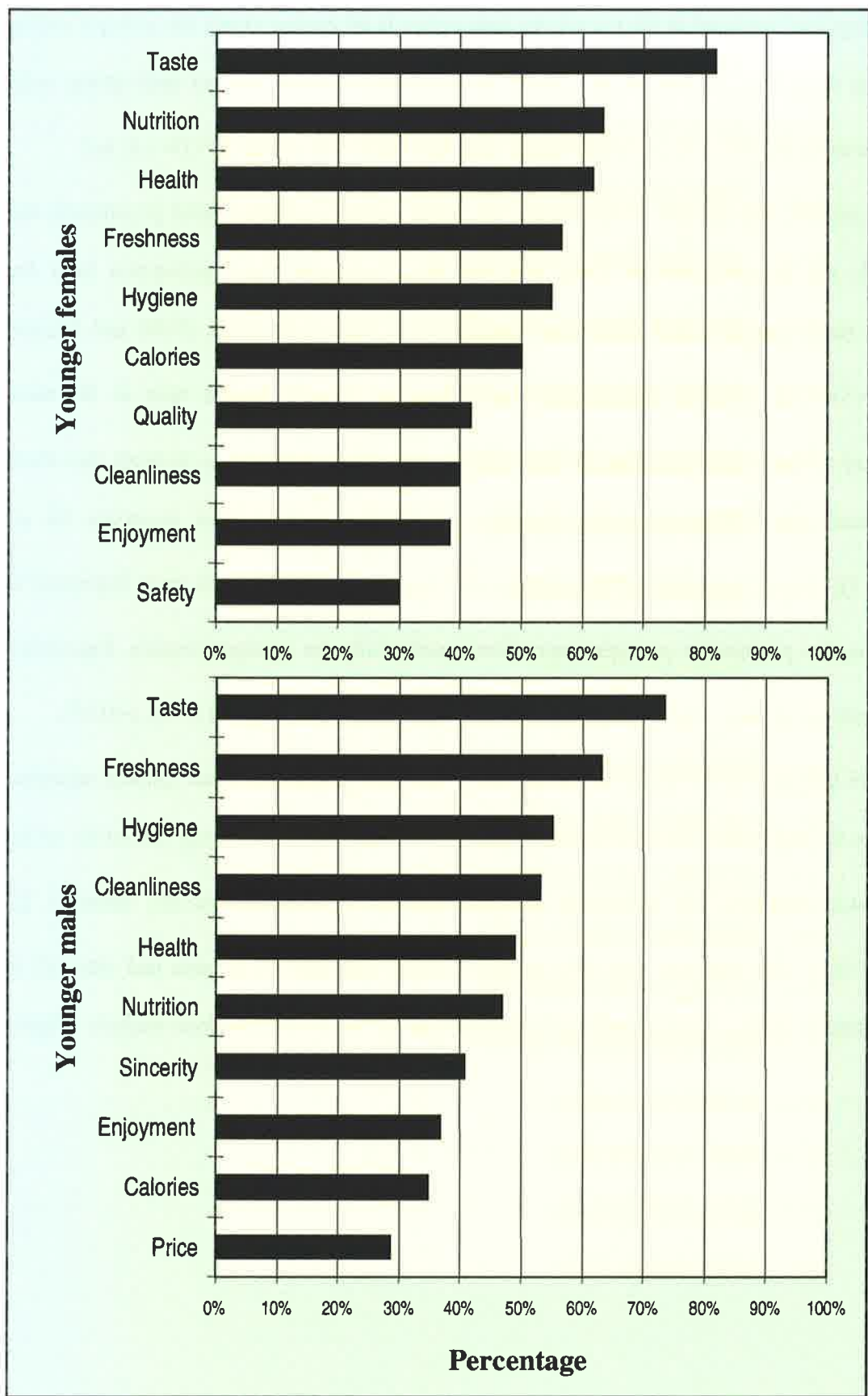


Figure 3.5. Top ten most important food perception items as ranked by younger males and females.

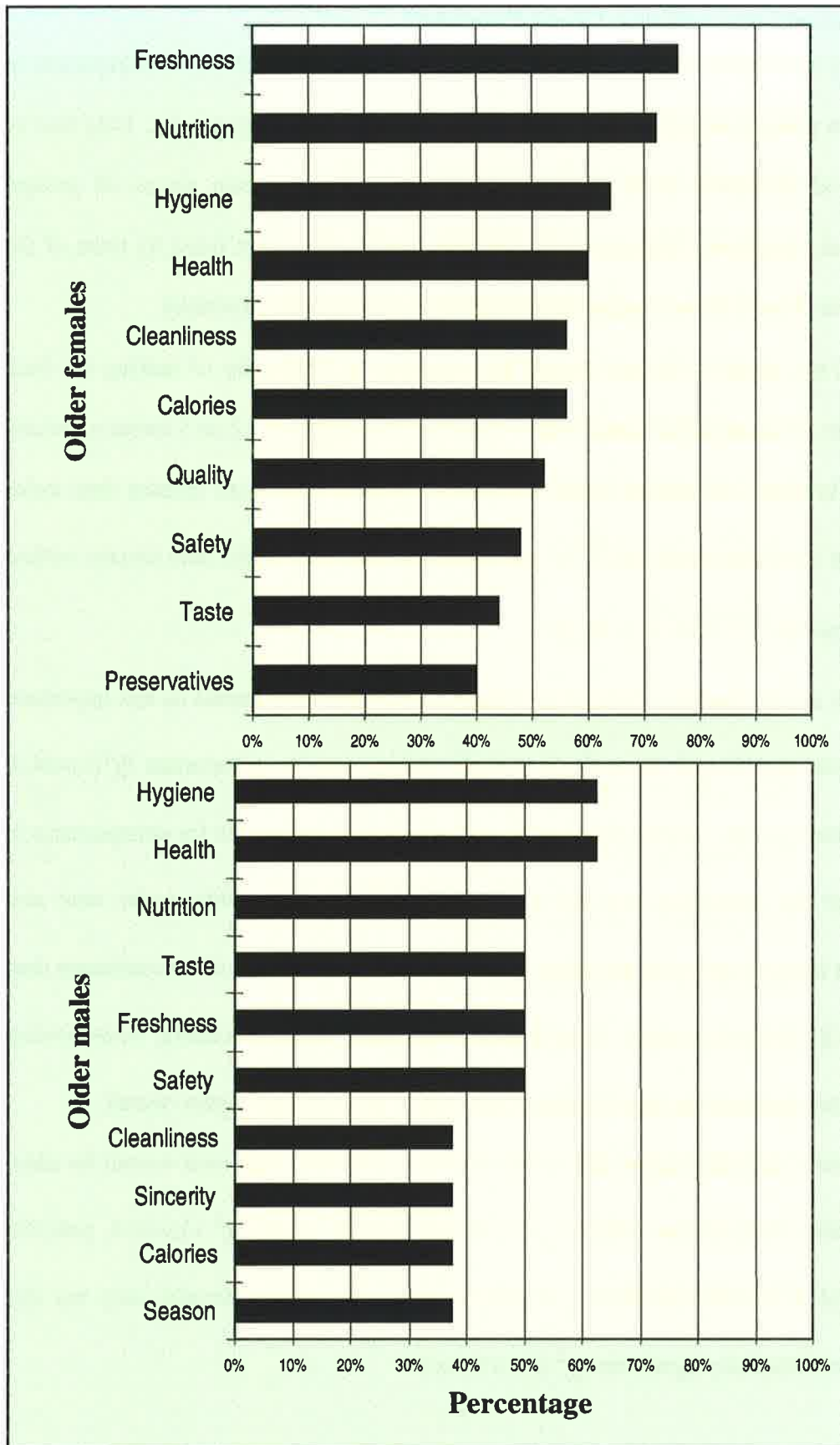


Figure 3.6. Top ten most important food perception items as ranked by older males and females.

Relative unimportance (Figure 3.7 and Figure 3.8)

There was more variability in the types of food perceptions thought to be unimportant in the food selection process as eighteen separate items appeared in this top ten list. Only two of these top ten food perception items, creaminess and size, were common across all groups. Spiciness, saltiness, sweetness, fattiness, packaging and preservatives were listed by three of the groups and all were thought to be unimportant overall when making food selections.

There did not appear to be any overall age trends in the frequency of ranking the food perception items in the unimportant range of the continuum (a ranking of 1,2 or 3 versus a ranking of 4 or above). However, two gender trends were noted. Significantly more females than males ranked 'natural' at the unimportant end ($\chi^2(1)=5.4, p<0.05$) and more males than females ranked additives as unimportant ($\chi^2(1)=4.4, p<0.05$).

The males overall tended to rank items related to cooking requirements as less important. Younger males were significantly more likely to rank cooking time as unimportant ($\chi^2(3)=24.4, p<0.01$) than all other groups. Cooking knowledge also appeared in the top ten for unimportance in younger males but this association was not significant ($\chi^2(3)=3.0, ns.$). Older males were also significantly more likely to rank storage period at the most unimportant end of the continuum than all other groups ($\chi^2(3)=11.4, p<0.01$). This indicates that many of the procedural items dealing with food preparation issues were seen to be less important to these Korean males overall.

Sensory items including colour and smell were seen to be less important overall for older males than the other three groups (colour: $\chi^2(3)=10.7, p<0.05$; smell: $\chi^2(3)=10.5, p<0.05$). Tradition appeared in the top ten most unimportant items for younger females only but this difference was not statistically significant ($\chi^2(3)=3.2, ns.$).

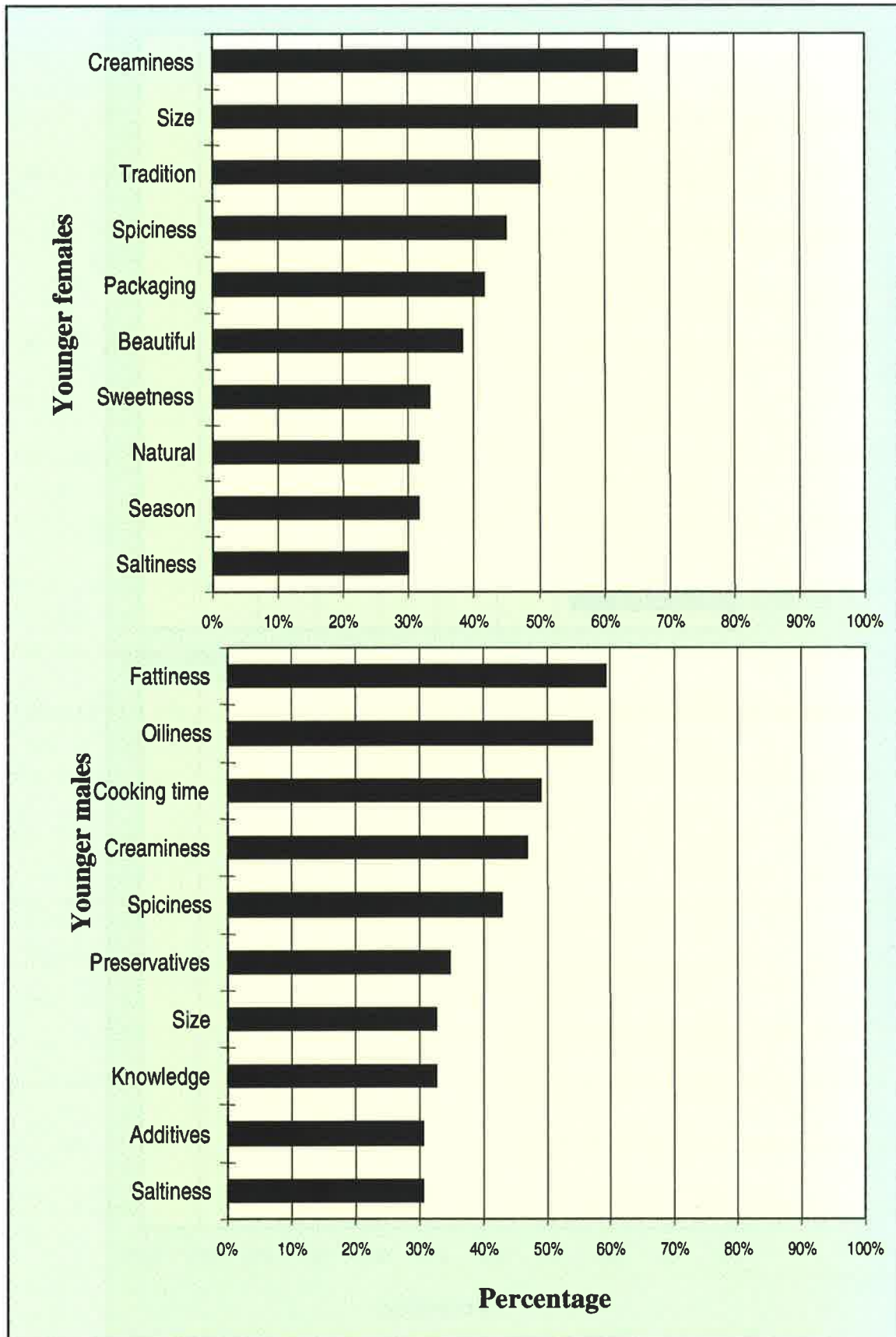


Figure 3.7. Top ten most unimportant food perception items as ranked by younger males and females.

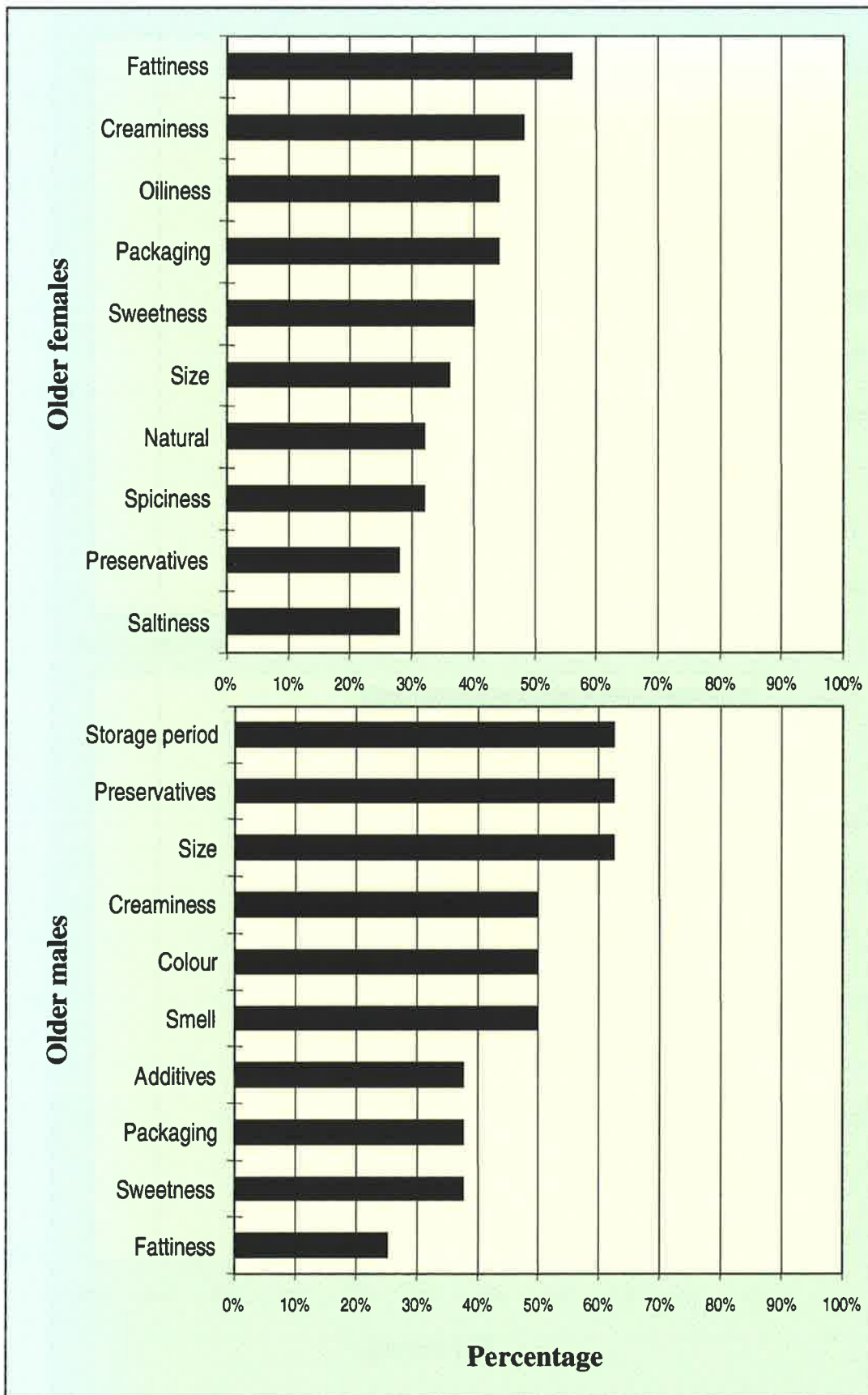


Figure 3.8. Top ten most unimportant food perception items as ranked by older males and females.

Multiple discriminant analyses

Multiple discriminant analysis generates a linear combination of independent variables which maximises the distance between the levels of a categorical dependent variable. If gender is used as the dependent variable, a combination of independent variables which best discriminates between males and females would be generated. Discriminant analysis tests the null hypothesis of equality of group means for a set of independent variables across two or more mutually exclusive groups (Hair et al, 1995). Multiple discriminant analysis calculates weights which indicate the discriminating power of each independent variable. Discriminant loadings are also generated which represent the correlation between each independent variable and the canonical discriminant function. Weights and loadings are used in the interpretation of the function.

The results listed above for relative importance and unimportance can be used to investigate which combinations of food perception items significantly discriminate between older and younger and male and female respondents. This will help to indicate which perceptions are the most relevant to these groups.

Age

The independent variables entered into the analysis were taste, enjoyment and tradition. The first two items were significantly different on importance between older (n=33) and younger (n=109) respondents and tradition was one of the top ten most unimportant responses for younger females. Tradition did not reach significance but younger people in general may consider this to be less important overall, including food selection situations. The number of variables chosen for the discriminant analysis satisfies the criterion of a ratio of at least 15-to-1 of observations to independent variables (Hair et al, 1995).

The stepwise method was used where univariate F ratio results determine which variable is entered into the linear equation first (see Hair et al, 1995) and the results are shown in Table 3.8. The discriminant function of taste and enjoyment significantly discriminated between younger and older respondents. Tradition was not entered into the equation even though it had a significant F ratio because of suspected collinearity. Subsequent analysis revealed a small but

significant negative correlation between taste and tradition ($r = -0.28$, $p < 0.01$) indicating that after the effects of taste have been removed, the relationship between tradition and the power to discriminate between older and younger respondents is below the entry criterion.

Table 3.8. Variables entered into the age multiple discriminant analysis.

Variable	Group means (SD)		F (1,140)	p	Step entered	Weight	Loading
	Younger	Older					
Taste	9.7 (1.7)	8.3 (2.0)	15.9	.01	1	0.82	0.87
Enjoyment	7.5 (2.5)	6.4 (2.3)	6.9	.01	2	0.50	0.57
Tradition	4.4 (2.2)	5.8 (2.3)	7.8	.01	NI	-	-0.20

NI refers to variables not included in the discriminant function

The canonical correlation for this discriminant function was $r = 0.36$ ($R^2 = 13\%$) and was statistically significant overall ($\chi^2(2) = 19.6$, $p < 0.01$). The purpose of the discriminant function is to use a combination of variables which will discriminate between categories within a group, that is it will maximise the accuracy of category membership prediction. This is assessed by the hit ratio (percentage of respondents correctly classified) which is compared to the criterion values of correct classification according to chance. In this case, the groups have unequal sample sizes so two criterion values are calculated: the maximum chance criterion (the proportion of the sample size of the largest group) and the proportional chance criterion (the average chance of classification based on all group sizes). The results are shown in Table 3.9.

Table 3.9. Classification table for age discriminant function of taste and enjoyment.

Group	n	Correctly classified	Classification errors
Younger	109	100	9
Older	33	27	6
Percent correctly classified:		74.7%	
Maximum chance criterion:		76.8%	
Proportional chance criterion:		64.4%	

The percentage correctly classified is just a little lower than the maximum chance criterion. This is the appropriate comparison criterion to use when the function is not tested against a holdout sample (Hair et al, 1995). These results show that while the discriminant function is statistically significant overall, its predictive validity may be low. The amount of variance in group

membership explained by the function is also low further limiting its predictive validity. However, the younger respondents place greater importance on taste and enjoyment in combination in food selection situations relative to older respondents.

Gender

A stepwise multiple discriminant analysis was also performed for males (n=57) and females (n=85) using those variables found to be significant on level of importance for males and females in the previous section. Cooking time, storage period, natural, sincerity, price, colour, additives and quality were the variables entered into the analysis. The results can be found in Table 3.10.

Table 3.10. Variables entered into the gender multiple discriminant analysis.

Variable	Group means (SD)		F (1,140)	p	Step entered	Weight	Loading
	Male	Female					
Cooking time	4.4 (2.2)	5.8 (2.0)	16.0	.01	1	-0.67	-0.57
Sincerity	8.0 (2.1)	6.5 (2.4)	15.3	.01	2	0.58	0.56
Price	7.2 (2.1)	6.6 (2.1)	2.5	.11	3	0.50	0.23
Natural	6.0 (2.0)	4.7 (2.4)	9.5	.01	4	0.39	0.44
Storage period	5.4 (2.6)	6.4 (2.2)	5.5	.05	NI	-	-0.14
Additives	4.8 (2.5)	5.9 (2.4)	7.1	.01	NI	-	-0.10
Quality	7.5 (1.8)	7.9 (1.9)	1.2	.28	NI	-	-0.04
Colour	5.3 (2.1)	5.9 (2.0)	3.1	.08	NI	-	-0.01

NI refers to variables not included in the discriminant function

Examination of the variables entered into the function indicated that males regarded cooking time as significantly less important and sincerity, price and 'natural' as significantly more important than females. The canonical correlation for the discriminant function was $r=0.51$ ($R^2=26\%$) and was statistically significant ($\chi^2(4)=41.1, p<0.01$). The percentage of males and females correctly classified by the discriminant function can be found in Table 3.11.

Table 3.11. Hit ratio values for gender discriminant function of cooking time, sincerity, price and natural.

Group	n	Correctly classified	Classification errors
Males	57	35	22
Females	85	71	14
Percent correctly classified:		74.7%	
Maximum chance criterion:		60.0%	
Proportional chance criterion:		52.0%	

These results show that this function is capable of discriminating between males and females suggesting that its predictive validity is high, although the discriminant function was better able to classify females than males overall.

The majority of males were younger which may help to explain why 'price' was more important to them. The univariate F ratio (2.5) was not significantly different between males and females initially but in combination with the other variables it contributed some unique factors which did discriminate between them. The food experience of most younger Korean males would extend to purchasing food for lunch or dinner and since many were students, price could be an important consideration.

Relative importance and unimportance according to cooking expertise (Figure 3.9 and Figure 3.10)

It may be expected that there would be some differences between those respondents who did cook at home (n=42) and those who did not (n=100) in the food perception items that they considered to be important. Two groups of respondents according to cooking expertise were generated and their characteristics are shown below in Table 3.12.

Table 3.12. Numbers of cooks and non-cooks and their gender and age characteristics.

Group	Total n	Gender (n)	Age (n)
Cooks	42	M: 5	Y: 5
		F: 37	Y:18
			O: 19
Non-cooks	48	M: 0	-
		F: 48	Y:42
			O: 6

It was decided to include only the females who did not cook in this analysis. In Korea, food preparation is predominantly the responsibility of females. However, these days, young women who live at home with their parents have a smaller responsibility for food preparation than in more traditional times. There were six older Korean women who did not cook. In four of these cases, cooking was the responsibility of other family members including their mothers and older sisters. Three of these women were between 33 and 35 and the other was aged 44. These women would have been unmarried and would still reside with the family. One woman was 52 and cooking was the responsibility of a friend. The last woman was 69 and in the highest income bracket and cooking was conducted by a housekeeper. Five of the cooks were males all of whom were in the younger age group which may be expected as all of the younger males were students and some may have had to cook for themselves while living away from home. However, analysis of the demographics for this group of younger males indicated that on average they cooked 4-6 meals each week usually dinner for themselves or one other person. These younger males therefore do appear to have a degree of expertise in cooking. There were equivalent numbers of older and younger females with cooking expertise.

Percentages of importance and unimportance were calculated using the same procedure outlined on page 116 and the results are shown in Figure 3.9 and Figure 3.10. Nine of the food perception items which were ranked at the most important end of the continuum were common to both cooks and to females who did not cook. These items were the same as those ranked as most

important by the complete older and younger female groups (see Figure 3.5 and Figure 3.6, pages 118 and 119). Enjoyment was listed by the females who did not cook and this may be expected as the majority of the females in this group were younger and this food perception item was found to be important to younger people. Sincerity was important to the cooking group and this had not been found in the top ten listed previously for females (older or younger), although it had for males. However, the frequency of ranking both enjoyment and sincerity at the most important end of the continuum did not differ significantly between cooking and non-cooking groups (enjoyment: $\chi^2(1)=0.4$, ns.; sincerity: $\chi^2(1)=3.3$, $p=0.07$, ns.).

These chi-square results indicate that these young females in both groups did not differ in their ranking of enjoyment, suggesting that their age more than their food preparation experience is influencing their food perception importance rankings here. Even though sincerity was important overall, the young males and some of the older females may have considered this to be important, the difference in the frequency of ranking sincerity at the most important end between cooks and non-cooks was not significantly greater than chance. Examination of the sincerity rankings by the cooking group indicated that 60% (3) of the young males, 28% (5) of the young females and 37% (7) of the older females thought that sincerity in cooking was important. However, Figure 3.4 shows that sincerity is more closely associated with males, younger males and older females, a medium association with non-cooks (all non-cooking respondents, $n=100$) and a lower association with cooks on importance. This indicates that overall, sincerity appears to be more important to non-cooking respondents.

Eight types of food perception items, common to both cooking and non-cooking groups, were ranked at the most unimportant end of the continuum. These included 'natural' which was previously noted to be less important to females overall and tradition which was seen to be less important to younger females. The two items of sweetness and saltiness were ranked as less important overall for the non-cooking group and oiliness and preservatives were found to be less important to the cooking group. The numbers of non-cooks who ranked saltiness and oiliness at

the most unimportant end of the continuum did not differ significantly from the cooking group (saltiness: $\chi^2(1)=1.4$, ns.; oiliness: $\chi^2(1)=0.4$, ns.). The results of the chi-square analyses for sweetness and preservatives were also not significant (sweetness: $\chi^2(1)=3.2$, $p=0.07$, ns.; preservatives: $\chi^2(1)=3.5$, $p=0.06$, ns.). Multiple discriminant analysis did not yield a function of sincerity, preservatives and sweetness, or any linear combinations, which significantly discriminated between cooks and non-cooks.

Overall, age and gender appear to be more significant factors in influencing food perceptions than degree of cooking expertise. This is not entirely unexpected in the light of the social situation in Korea and the Confucian value system where age and gender are so important. These influences will be explored further in subsequent chapters.

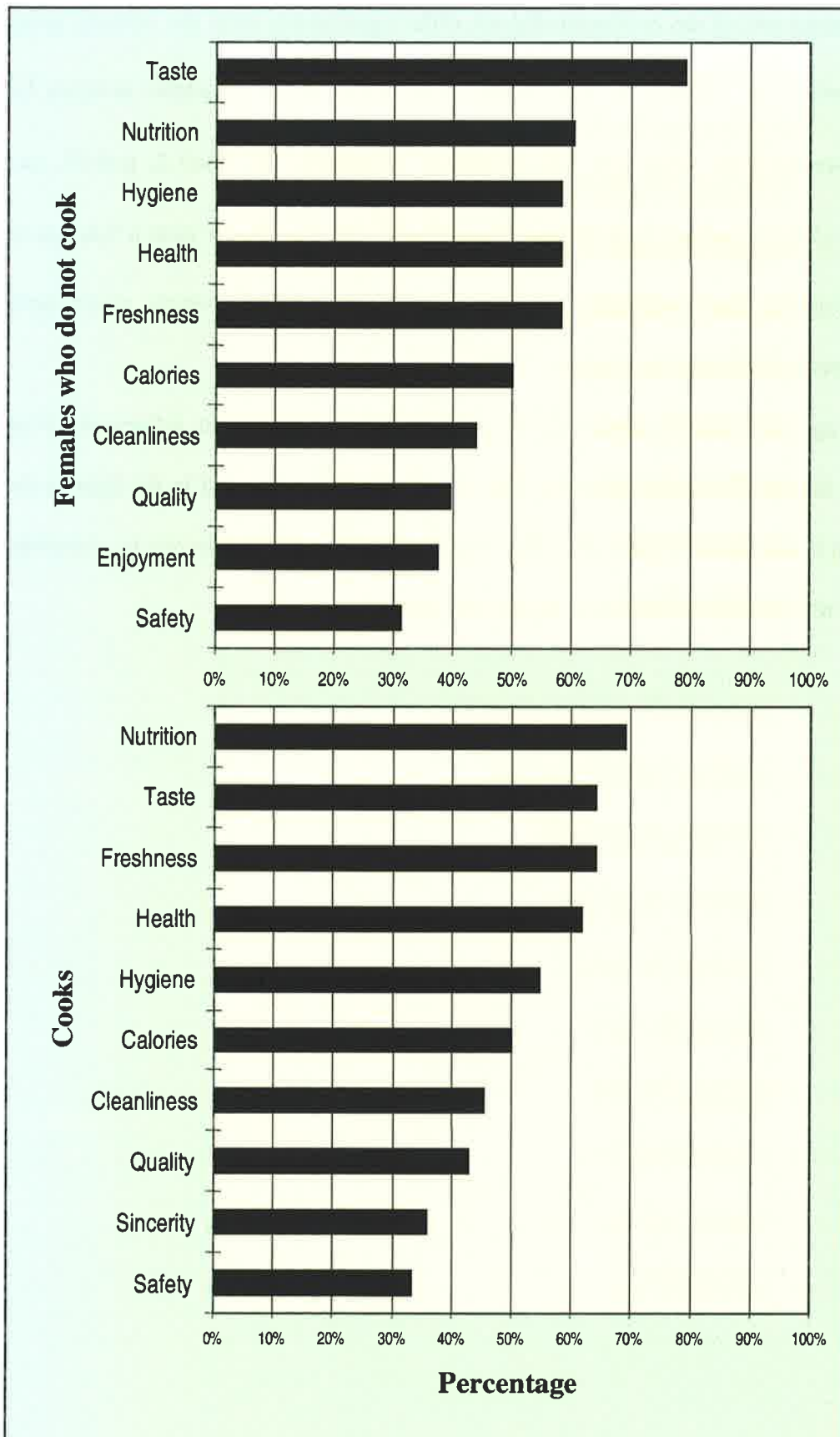


Figure 3.9. Top ten most important food perception items as ranked by those respondents with different levels of cooking expertise.

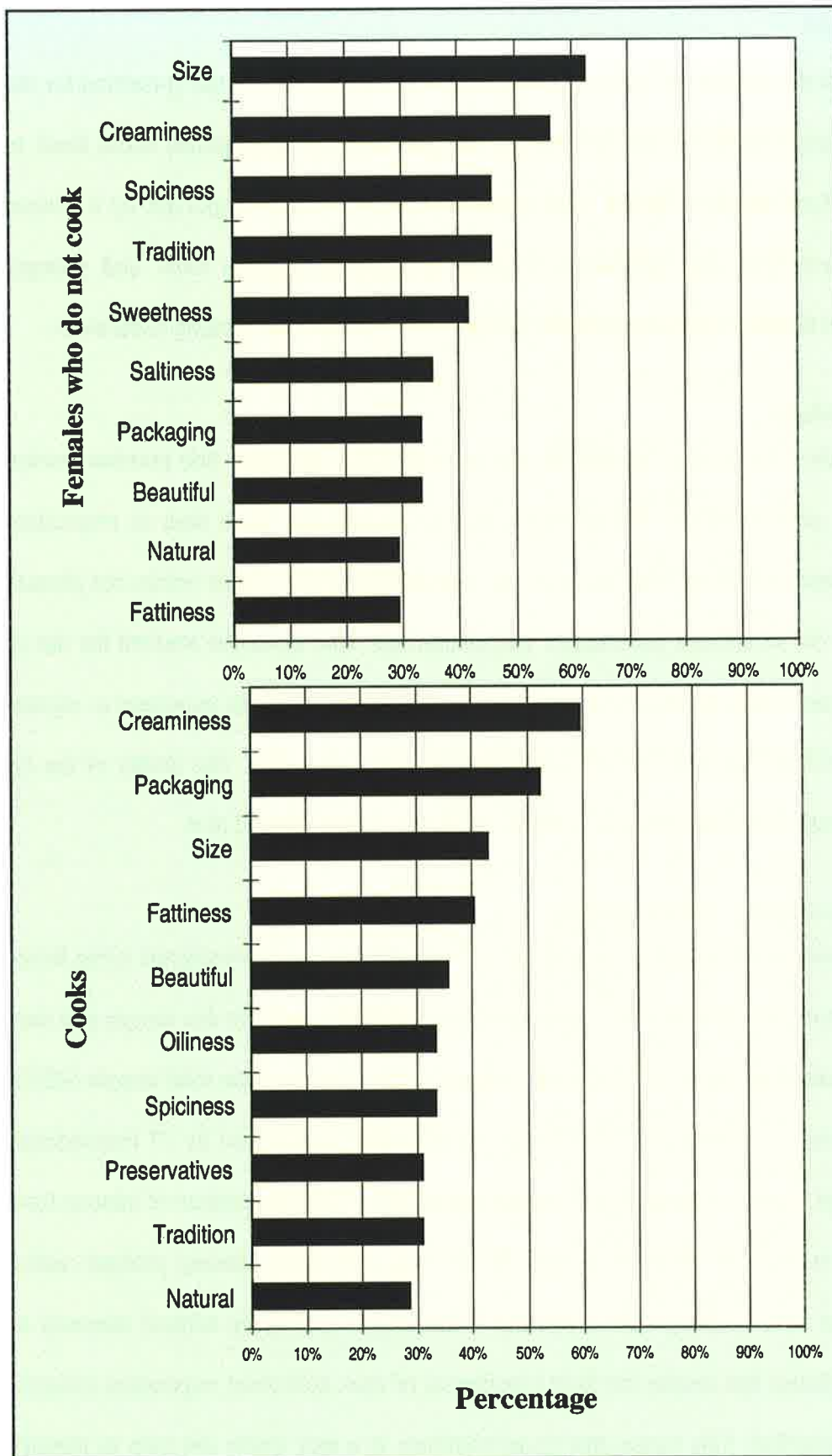


Figure 3.10. Top ten most unimportant food perception items as ranked by those respondents with different levels of cooking expertise.

6. Discussion

The aims of the pilot study were to investigate the appropriateness of the Q-method for use as a research technique in Korea and in assessing the prevalence of perceptions about food; to investigate which food selection factors were considered to be the most important by a Korean sample; and to investigate any differences in food perceptions between older and younger Koreans, males and females, and between those Koreans with and without cooking experience.

6.1. Q-methodology

The Q-method was easy to administer and the use of the magazine title practice session ensured technique comprehension. The procedure did not require too much time so respondent fatigue and compliance problems were not an issue. Translations of the simple words and phrases were easy to carry out so concept equivalence was maintained. This technique enabled the use of some of the perception items generated by the Koreans themselves, as it was important to capture as many aspects of thinking about the food selection process as possible. The ability of the Q-method to incorporate these concepts also validates its use as a cross-cultural tool.

Degree of consensus: Factor analysis

The relationships among the Q-sorts of the 142 respondents were investigated using factor analysis. Three factors were found to best summarise the perceptions held by this sample and they accounted for a reasonable degree of the shared variance of the Q-sorts of the total sample (42%). Factor A in particular accounted for 30% of total variance and was defined by 37 respondents. This indicates a high degree of consensus of shared subjectivity of the importance of various food perception factors in the food selection process. In this case, particularly among younger males, taste and enjoyment were defining factors and this could reflect underlying cultural elements of this group. This indicates that despite the food experiences of each individual respondent common themes could be identified. This means that Q-methodology is a tool which can help to identify perceptual structures of underlying commonality of shared ideas, beliefs, attitudes and

perceptions (depending on the Q-sample used). In this way the content of shared social representations of food perceptions can be examined further using Q-methodology.

6.2. Selection of food perception items for subsequent studies

The four most important food perception items overall were taste, health, freshness and nutrition. Taste was found to be more important to the younger Koreans, especially the younger females. However, the remaining three items were not seen to be significantly more important to any one group. The correspondence analysis (Figure 3.4, page 115) shows that freshness and hygiene were closely related. Freshness is really an intrinsic quality of the specific food itself where criteria are used in each food selection instance. For example, one may not choose to buy lettuce this week because it was not fresh, however this would not preclude them from considering the purchase of lettuce on another occasion. However, if they considered that lettuce was not nutritious and nutrition was important to them then this perception may preclude them from even considering the purchase initially (eg. McBride, 1994). This would make nutrition a more powerful perception than freshness generally.

Nutrition and health may have been seen to be relatively equivalent concepts because they were closely associated. In terms of an analysis of those perceptions to be more closely examined in subsequent studies, taste and nutrition were chosen as the most important global food perception items overall. A dichotomy has often been noted to exist between these two food perceptions: they may act in concert if there is agreement in the perception of foods according to taste and nutrition, but one may take precedence over the other when there is dissonance between the two perceptions (eg. Wardle, 1993). Age and gender effects are particularly notable in this dichotomy.

6.3. Age

Taste and enjoyment were significantly more important to the younger Koreans as found by correspondence- and multiple discriminant- analyses. The more immediate sensations, like taste, are thought to be more important to younger people when compared to considerations for

the future like nutrition and health for example (Kronl & Coleman, 1988). This does not mean that older Koreans are not concerned about taste but when compared to other factors like health for example, this is deemed to be more important and Q-methodology is based on relative comparisons. Older males believed that level of spiciness was important when selecting food and it has been noted previously that older Koreans do prefer spicier food (Kang, 1995).

6.4. Gender and cooking experience

In general, those food perception items that were concerned with cooking like cooking time for example, were less important overall to the males than to the females which may just be a reflection of Korean societal roles in general. However, males believed sincerity to be more important than females overall. It appears that the notions of cooking effort and appreciation are more important to those who are cooked for (usually Korean males), rather than those who do the cooking (usually Korean females). However, this may be an artefact of the methodology as females found other items to be relatively more important. When the groups with different levels of cooking expertise were compared, sincerity did emerge as slightly more important to the cooking group although the association did not achieve statistical significance. It may be a Korean belief to expect sincerity in those who prepare food although the food preparer may have other procedural issues in mind when preparing food everyday. Perhaps these issues become more salient when special food preparation occasions arise rather than for the everyday meal.

6.5. Conclusions

The Q-method was successful at elucidating how prevalent the importance of these specific food perception factors were among the Korean sample. Perceptions of a food's taste and nutrition value appeared to be the most important factors overall. The younger Koreans believed that taste was more important and the older Koreans that health and nutrition were the most important factors to consider when selecting food. Cooking experience appeared to be a less salient marker for food perception differences as this was generally subsumed under the effects of gender, where the food preparation roles of Korean men and women are more clearly defined.

Chapter 4ⁱ

Korean food perceptions

1. Introduction

The Korean Peninsula, divided into two countries at the 38th parallel following the truce of the Korean War (1950-1953), has been inhabited since before 2300 BC. Language structure and legend point to its settling by tribes from north-western Asia including Manchuria and Siberia, rather than China - although Chinese influence throughout history has been important (*Korea Annual*, 1997). Today, Korea is ethnically homogenous except for a minority (approximately 20,000) of Chinese (CIA World Factbook, 2000). The peninsula is located in a strategic position on the Asian continent, bordering the former Soviet Union and China in the north and Japan across the Sea of Japan to the East. The Korean Peninsula has been invaded hundreds of times throughout its history, often hosting wars between China and Japan on its own soil. These invasions have led to much rebuilding of Korean monuments and infrastructure which provide testament to the strength of the Korean culture and sense of patriotism and nationalism. In many ways these values have shaped the modern Korea, particularly their rapid economic recovery from devastation after the Korean War and their general overall preference for Korean goods (Lone & McCormack, 1993).

Buddhism and Confucianism each enjoyed periods of dominance as religious ideologies in Korea since they were introduced. Christianity and Buddhism represent the major religions in Korea today although the doctrines of Confucianism form the fabric of Korean society.

Confucianism provides a clear social hierarchy and the most important element is filial piety and the family is the most important social institution. Confucian teachings provide five essential human relationships in society: between father and son; ruler and subordinate; husband and wife; elder and younger brother; and between friends. Respect for those older than you is paramount (Park & Cho, 1995; Koh, 1996).

Korea has four distinct seasons, typified by a dry, cold winter and a monsoonal summer. These conditions impact the types of foods which are grown and harvested. Rice yields are among the highest in the world. However, 70% of the land is mountainous and non-arable indicating that agricultural efficiency supplemented with food imports are the norm for the food supply of the modern, highly populated South Korea. Surrounded by the sea on three sides many types of seafood and seagrasses form an important part of Korean cuisine. Their nomadic history has also meant a long history of eating beef. Kimchi, a highly-spiced and seasoned fermented cabbage-based dish, is probably the most famous Korean food (Y.C. Lee, 1991). It was developed as a way of combating the cold winter months when fresh vegetables were unavailable. (Hwan, 1987; Kim & Oh, 1996; *Korea Annual*, 1997).

A thorough history of Korean food and cuisine has been previously published in Western scientific literature by Kim and Oh (1996). Rice has been a major part of Korean cuisine and agriculture since the 13th century BC. However, it was very expensive and other cereals including millet, barley and wheat were commonly used by the poorer classes. Soy and red beans are the major legumes used in Korean cooking. Floods and droughts together with foreign invasions meant that wild mountain vegetables were sought to supplement the diet of most Koreans, although these are typically lower in energy content. Many of these are used today and include acorns, lotus root and chestnuts. Familiar seasonings include garlic, soy sauce, salt, red pepper and sesame oil. Red pepper, a common Korean flavouring agent, was introduced relatively recently together with tomatoes, sweet potatoes, peanuts and zucchini among others.

Many of the Confucian teachings have implications for the preservation of Korean cuisine. Hwan (1987) describes the way that the mother-in-law would teach the daughters-in-law how to make traditional types of kimchi in autumn and flavouring sauces in spring, including soy sauce. These recipes were “highly valued by young Korean wives who want to please their husband’s palates” (p. 12). Traditional Korean households were of the extended type where the young Korean married couple lived with the male’s parents. These young women were only accorded some prestige if they were the mother of a male child (Lone & McCormack, 1993). However, modern Korea, especially younger women, is challenging many of the doctrines of Confucianism (eg. H.K. Lee, 1996; Park & Cho, 1995; Sich, 1988).

1.1. Transitions in Western countries

Major transitions have been occurring throughout the world during the twentieth century as many countries have moved from a situation of food insecurity to food security (Gussow & Contento, 1984) with advances in agricultural technology and food production processes. These transitions have occurred in both developed and developing countries and at different rates. These transitions have occurred in the areas of economics, social systems and demographics, epidemiology and health, and nutrition and all are intertwined. Monteiro and colleagues (1995) define the nutrition transition as

“a sequence of dietary and nutritional patterns resulting from large shifts in the overall structure of diet correlated with changing economic, social, demographic and health factors” (p. 105).

In many Western countries, including the US and many European countries, the rate of change was gradual (Popkin, 1994). Earlier this century, poverty and malnutrition especially among children were major public health concerns in America and nutrition strategies were introduced to encourage weight gain (Gussow & Contento, 1984). The first half of this century was accompanied by a nutrition transition where cereal consumption decreased and sugar, dairy product and meat consumption increased together with a concomitant rise in overall affluence. More recently, there has been a further change in food consumption such that meat, dairy, egg and

sugar intakes have decreased. The epidemiology has also changed where stature and body size have increased and obesity rates are high, especially among low income groups, and the incidence of degenerative diseases is very high. The emergence of a 'health-conscious' upper income group with behaviour change in the lifestyle areas of diet and physical activity is also evident (Popkin, 1994). The existence of varying disease profiles among different socio-economic groups within a country are part of this transition phenomenon. This change within the United states has taken place over the space of approximately three-quarters of a century. The changes in Asia and South America, for example, have been much more rapid (Chen, 1994; Monteiro et al, 1995; Popkin, 1994).

1.2. Transitions in Asia

Economic growth in some Asian countries has been so great that countries at various positions along the development curve exist side by side geographically and the influence of this increasing affluence on the nutrition transition is substantial (Drewnowski & Popkin, 1997). The traditional diets of many Asian countries were characterised by a high intake of carbohydrates and a relatively low intake of fat and animal foods. However, the diets of many Asian countries are undergoing enormous changes such that their food intakes are beginning to resemble their Western counterparts with increases in total fat and animal foods, fruits and vegetables and decreases in cereal foods consumed or available for consumption (eg. Lands et al, 1990; Popkin et al, 1993; Posner et al, 1994; Tchaj, 1993).

However, this trend is also associated with an increase in dietary diversity where a limited number of foods high in starch and fibre are replaced with more eggs, fish, meat, vegetables and fruit (eg. Drewnowski & Popkin, 1997). As incomes increase the total number of foods included in the diet also increase so that the total amount of the traditional cereals and tubers consumed necessarily decreases, as has been found in China for example (Popkin et al, 1993). This may also have reflected a greater variety in the food supply generally as dietary diversity increased at all levels of income between 1989 and 1993 in China (Drewnowski & Popkin, 1997). It may be that

an increase in variety in the food supply, which is available to developing nations undergoing a positive economic transition, increases dietary diversity because a greater number of different foods can be purchased through a flow on to individual (or household unit) increases in income (eg. Sahn, 1988). The reverse trend does not appear to be the case however. When an economic downturn occurs, population diets do not appear to return to less dietary variety (Drewnowski & Popkin, 1997).

This increase in dietary variety has also been associated with a positive increase in health indicators including nutrient adequacy and blood lipid profiles (eg. Hsu-Hage & Wahlqvist, 1996) and an increase in eating pleasure (eg. Drewnowski, 1995). The concomitant change in epidemiology, where disease profiles change from infectious diseases to chronic degenerative diseases as a nation proceeds along the nutrition transition together with social and economic transitions, may include a complex interaction of diet quality, urbanisation and its effects on levels of physical activity and other lifestyle factors including smoking behaviour. Disease profiles and general health are affected by these factors. A level of fat intake of 30% of total energy appears to be becoming the global norm (Drewnowski & Popkin, 1997) and perhaps less healthy population diets are found in higher-income countries where intakes exceed this amount, but the gain in health from increased dietary diversity in lower income countries cannot be ignored. Cognitive perceptions of food and food intake and physical activity behaviours need to be identified and perhaps changed in developed countries and in higher income groups of developing countries through education strategies (eg. Drewnowski & Popkin, 1997; Popkin, 1994).

1.3. Evidence of the four transitions in Korea

The relationship between the four transitions is complex and intertwined but usually begins with an increase in the nation's affluence and economic output and growth which provides greater individual purchasing power (of food and other consumables). Social transition must occur at the same time as changes in the labour market and education must drive the economic

were classified as juvenile (0-14 years) decreased from 43% to 22%, productive (15-64 years) increased from 54% to 71%, and elderly (65+ years) increased from 3% to 7% (1960: The Korean Nutrition Society, 1989; 1996: CIA World Factbook, 2000; *Korea Annual*, 1997). The life expectancy at birth for Koreans in 2000 was 74 years - men: 71 years; women: 78 years (CIA World Factbook, 2000).

Korean family structure is also changing. Extended families where grand-parents lived with their eldest sons is a tradition which has become more flexible in modern Korea. Table 4.2 shows that the percentage of single-person and nuclear households (1 and 2 generation) has increased since 1960 (Kim et al, 1997). This means that many of the traditions of eating and food preparation are not being handed down through extended inter-generational contact as was previously the case in Korean society (Hwan, 1987). The differences between eating habits and food perceptions and preferences among the generations are likely to be greater in modern Korea.

Table 4.2. Percentage of household type from 1960 to 1990.

Year	Single-person	1 generation	2 generation	3 generation
1960	-	8	64	27
1990	9	11	66	12

The percentage of working women has increased during this period of economic expansion and rapid industrialisation (Kim et al, 1995; H.K. Lee, 1996). In 1963, 23% of women were part of the workforce and this had increased to 35% in 1990 (Kim et al, 1997). This has major implications for family life and food intake. As women are the primary meal preparers in Korean households, convenience and time-saving factors become more important, especially if traditional dishes involve a large amount of preparation time (eg. Drewnowski & Popkin, 1997). All types of Korean-style convenience foods can now be bought at wet-markets and supermarkets, including snack foods and ready-made side-dishes like kimchi and tofu (eg. *Korea Annual*, 1997).

Korea enjoys one of the highest literacy rates in the world where 98% of the population over 15 years of age can read and write (CIA World Factbook, 2000). Table 4.3 shows that the

Koreans are tending to eat out more often than had previously been the case, particularly among younger, urban Koreans who were part of nuclear family, rather than an extended family (Jang, 1988).

Social transition

Many social changes occur simultaneously with an economic transition and others are the result of changes in economic circumstances. An industrialising, export-oriented economy together with agricultural reforms leads to rapid urbanisation as employment opportunities in cities abound. Korea has experienced high population growth and rapid urbanisation as documented in Table 4.1.

Table 4.1. Population and urbanisation changes in Korea over time.

Year	Population (000)	Urban population (%)
1965	24,989	39.1
1970	31,435	50.1
1980	37,449	68.7
1988	42,014	76.3
1992	43,663	n/a
1996	45,707	n/a
2000	47,470	n/a

Sources: Kim et al, 1992; H.K. Lee, 1996; *Korea Annual*, 1997; CIA World Factbook, 2000. n/a: not available

Annual population growth was estimated at around 2% following the War to 1970 but has reduced to approximately 0.89% in 1997 (Kim et al, 1997). The percentage of urban residents increased by more than 40% in thirty-five years. It has been consistently found that urban residents usually consume more sweeteners and fat than their rural counterparts (Drewnowski & Popkin, 1997) and this coupled with a decrease in physical activity in urban areas can lead to a change in epidemiology (Popkin, 1994).

The age structure of the population is also changing. Improvements in health conditions has meant that the life expectancy for Koreans has improved dramatically since the end of the Korean War, and this, together with a decline in the birth rate, has seen the average age of the population increase. During the period from 1960 - 2000 the percentage of the population who

were classified as juvenile (0-14 years) decreased from 43% to 22%, productive (15-64 years) increased from 54% to 71%, and elderly (65+ years) increased from 3% to 7% (1960: The Korean Nutrition Society, 1989; 1996: CIA World Factbook, 2000; *Korea Annual*, 1997). The life expectancy at birth for Koreans in 2000 was 74 years - men: 71 years; women: 78 years (CIA World Factbook, 2000).

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rates of high-school (grades 10-12) and college attendance have improved for both males and females since the 1960s (Kim et al, 1997; Park & Cho, 1995). Education and diligent study are part of the Confucian doctrine and having an advanced education is seen as a way of securing a good job and social advancement (K.O. Kim, 1996). Competition for university and college positions is fierce (Lone & McCormack, 1993) and school students study long hours each day with before and after school classes.

Table 4.3. Percentages of males and females attending high school and college over time.

Year	High school attendance (%)		College attendance (%)	
	M	F	M	F
1966	35	20	8	1
1980	74	62	15	8
1996	99	n/a	52	24

n/a: not available

There appears to be a change in the social values of contemporary Koreans. H.K. Lee (1996) states that the enterprising spirit of the Koreans was largely responsible for their economic success in the 1960s and 1970s and individuals worked long hours for the greater collective good. However, a greater emphasis on individual well-being is generally pervading the conscience of the 1990s Korean. Material consumption is overtaking thrift and self-sacrifice. In general however, Koreans are more collectively oriented than either the United States or Australia and these values, including the sacrifice of the individual (little self) for the society (greater self), are emphasised in school texts (K.C. Lee, 1991) and advertising (Han & Shavitt, 1994).

The values of many younger Koreans are becoming less traditional and more Westernised which is often the fear of many of the older and more nationalistic Koreans (eg. Lee, 1991). Two grades of high school students in some schools in Seoul were asked to indicate how often they watched the American television network, a network which broadcasts from within Korea for the resident American military. Older students, particularly females, who watched more American television were more likely to hold more liberal views overall than their male counterparts. The males who watched more American television do endorse some non-traditional values but were

more likely to prefer the traditional Korean family system than their female colleagues (Kang & Morgan, 1988; Kang, 1992).

This slight Westernisation of values in younger Koreans is also seen in their food preferences and eating habits. Dairy product consumption was investigated in Koreans from the ages of 2 to 60 years. Daily dairy product consumption has increased dramatically from 2g per capita in 1967 to 49g in 1987 across all age groups. Consumption of yoghurts and fermented dairy foods does not differ between men and women across all age groups but younger Koreans are more likely to consume cheese, ice-cream and butter than older Koreans – dairy foods that are new to Korea (Wyne et al, 1993). Younger Koreans (aged less than 30 years) have been shown to consume Western-style and Korean-style fast foods twice as often as those aged over 30 years. Among the younger group, Korean-style fast foods were consumed three times more often than Western-style fast foods on average. Those who had a higher income tended to consume Western-style fast foods the most often. Fast foods are mainly consumed at lunch or for a snack (Wyne et al, 1994).

Urban and rural housewives were asked to indicate on a five point scale their preference for twenty foods including some Western-style foods. Among the rural sample, preference for traditional Korean foods and meals was rated lower by the younger housewives than older housewives (Kwon & Jang, 1994). This same age trend was seen among the urban women (Jang & Kwon, 1995a; 1995b). Urban housewives, particularly those who were younger and were part of a nuclear family (rather than an extended family), ate away from home with their family more frequently than their rural counterparts (Jang, 1988).

Despite the changes in the social way of life of Koreans, together with changing values and dietary habits, particularly among the younger Koreans, preference and demand for Korean goods is strong which is a manifestation of their strong sense of nationalism. Wyne and colleagues (1994) found a strong desire for the development of more Korean-style fast foods rather than Western-style fast foods. Market research studies have also found that Koreans prefer

domestically produced foods and goods over imported products (eg. D.H. Kim et al, 1993). However, when blind taste-tests are performed, Koreans rank some imported foods higher than the same domestic product on those characteristics which they believe are important (Booz et al, 1993). This has also been found in Japan (Scriven & Marketo, 1996). This provides further evidence for the importance of cognitive perceptions and how they influence food choice.

Transition in epidemiology

The disease profiles of Korea (Table 4.4) have been changing from a state where infectious diseases were the most prevalent causes of death to one where chronic non-communicable diseases like hypertension, cardiovascular disease and certain cancers are the leading causes of death (eg. S.Y Kim et al, 1996). This situation has been labelled the epidemiologic transition by Omran (1977) and is also characterised by decreases in maternal and infant mortality and increasing rates of obesity particularly among children. The epidemiologic transition has been documented in several Asian countries including China (Campbell & Chen, 1994; Qi et al, 1994), Hong Kong (Yu et al, 1995), Malaysia (Arshad et al, 1996) and many countries of the Asia-Pacific (Beaglehole, 1993). All of these countries and others are at different points along the “nutrition-health transition line” (Florenco, 1997: 2). Lifestyle changes at the population level together with improvement in public health can account for these changes in a country’s disease profile (eg. Uemura & Pisa, 1985).

Table 4.4. The five major causes of death in Korea in 1960 and 1990.

1960	1990
Pneumonia	Circulatory/ cerebral diseases
Tuberculosis	Cancers
Respiratory diseases	Accidents
Infection	Gastrointestinal diseases
Cancers	Respiratory diseases

Source: Tchai (1997).

Gastric cancer represents the most prevalent cancer among male and female Koreans (eg. Kim et al, 1997) and dietary factors, including excess salt consumption appear to have important aetiological implications (Lee et al, 1995). Despite the rises in rates of cardiovascular disease in

Korea, the level of morbidity and mortality is much less than in many Western nations (Tchai, 1997). However, total serum cholesterol levels have increased substantially over time (Tchai, 1993) but they are still lower than other Western nations (eg. Cobbaert & Kesteloot, 1992; Kesteloot et al, 1982).

Rates of obesity are increasing in Korea, particularly among urban schoolchildren (Moon et al, 1992; Paik et al, 1992). Indeed, the weight and height of Koreans is increasing over time. Adolescent boys aged 15 years were 150 cm tall and weighed 44 kg in 1970 and this increased to 166 cm and 54 kg in 1992 on average (Kim et al, 1997). Urban pre-adolescent children tend to weigh more and to be taller than their rural counterparts (Kim et al, 1992).

Nutrition transition

All of these changes in health status and disease profile documented above have been linked to changes in food intake. Increases in global fat intake, even in low income countries, together with economic and social transitions have been implicated in these emerging trends in epidemiology (Drewnowski & Popkin, 1997). Korea has experienced the changes in food intake profiles documented in many other countries which are characterised by an increase in consumption of animal foods, fat and sugar and a decrease in consumption of cereal foods over time (eg. Chen & Xu, 1996; Kachondham et al 1992; Le et al, 1997). However, population fat intakes have not been as high as would be predicted by their level of per capita gross national product (Kim et al, 2000).

Annual national nutrition surveys have been carried out in Korea since 1969 (J.K. Kim et al, 1993) and the changes in food intake over time can be seen in Figure 4.1 (Ministry of Health and Social Affairs, 1990). An overall decline in cereal food consumption and a greater consumption of meat and meat products, seafood, eggs and fruit can be seen. Vegetable intake has remained stable. Meat intake has increased 7 fold from 6.6 g in 1969 to 47.3 g in 1990. This level of intake is still low by Western standards. The proportions of energy contributed by protein, fat and carbohydrate are shown in Figure 4.2. The percentage of energy from protein has remained

stable over the twenty year period however the contribution from animal foods has more than tripled during this time. The percentage of energy contributed by fat has doubled over this period but the level remains the envy of many Western health professionals who are aiming for a level of 30% of energy from fat (eg. Drewnowski & Popkin, 1997). Carbohydrate levels have decreased in line with the decrease in cereal food consumption.

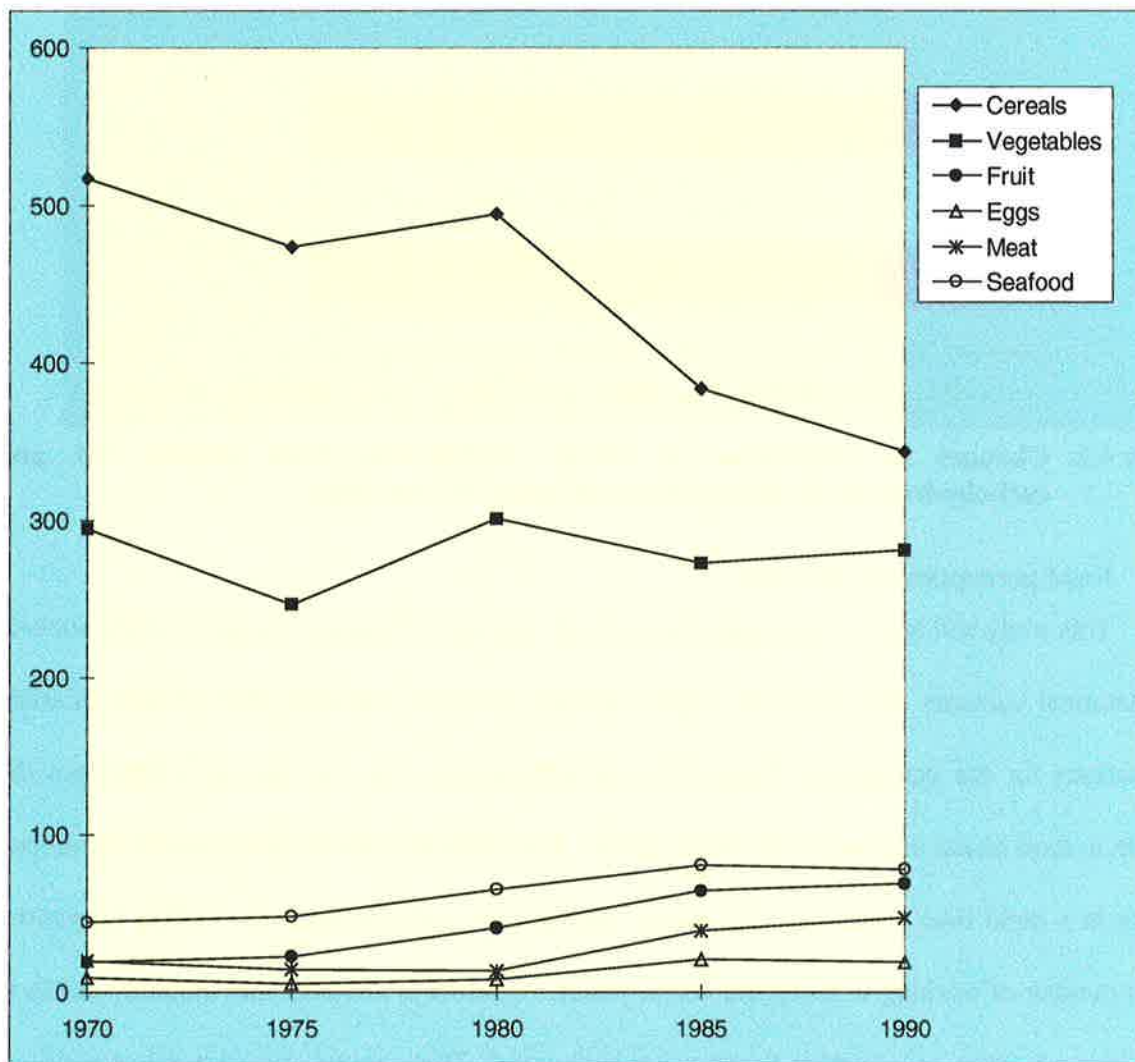


Figure 4.1. Changes in food groups intake from 1970 to 1990 in Korea (grams per capita per day, Nationwide).

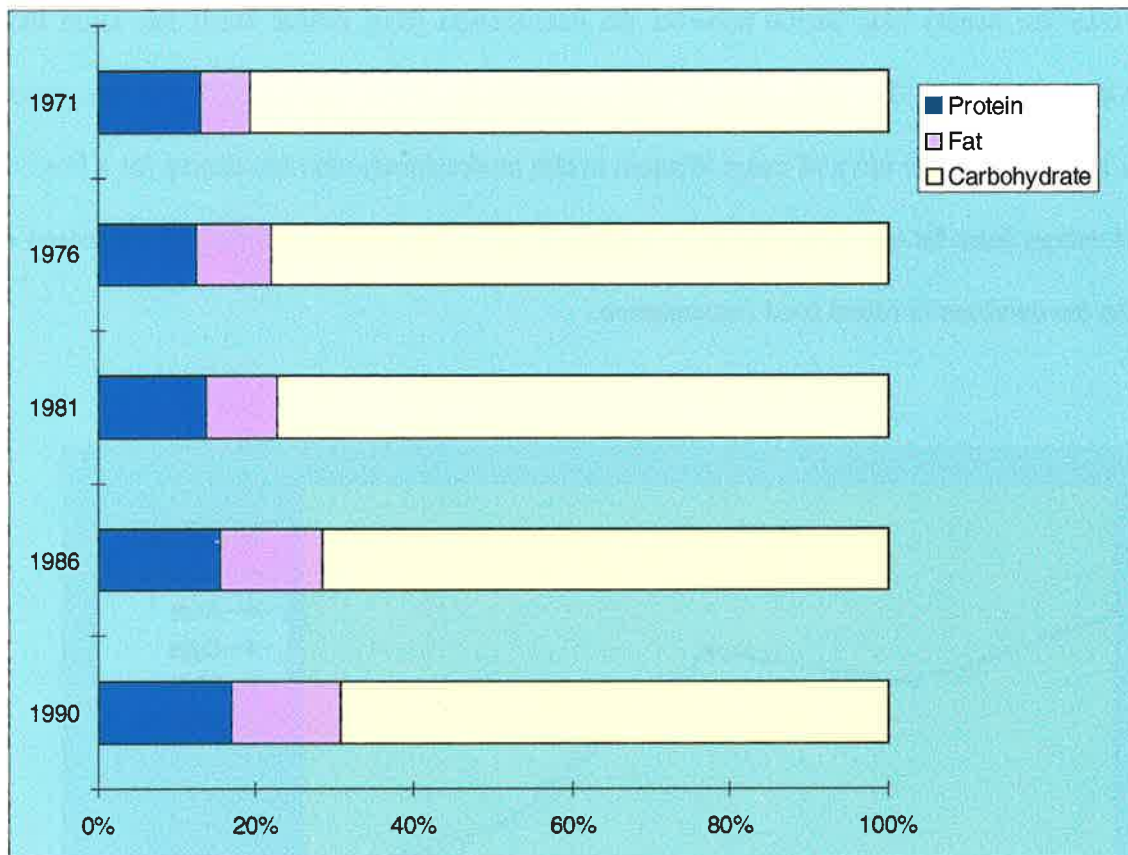


Figure 4.2. Changes in proportion of energy contributed from protein, fat and carbohydrate to the diets of Koreans from 1971 to 1990.

1.4. Food perceptions of Koreans

This study will aim to investigate the food perceptions of Koreans in light of wider societal and historical contexts and how they might impinge on food cognitions and provide possible explanations for the perceptions found. The perceptions may also provide an insight into the changes in food intake in Korea documented above. Korea has become an economically developed country in a rapid time which has necessitated changes in social infrastructure (urban migration, greater number of working women) and social values. Differences in values and attitudes and food intake between older and younger Koreans has been noted. These social and economic transitions have led to a society with a higher level of disposable income where they can afford a more varied diet (at the population level) which has led to better health of the population through a reduction in death from infectious diseases and a longer life expectancy. However, dietary adequacy has given way to dietary excess, which together with other lifestyle

changes (smoking and decreased physical activity) has been associated with the emergence of non-communicable degenerative diseases as the new public health issue for Korea.

Aims

The aims of this study were to investigate the content of Koreans' perceptions of Korean and Western-style food, according to how tasty and how nutritious they perceive the foods to be. These dimensions were found to be the most pertinent and important in the pilot study (Chapter 3). The technique of Q-methodology will be used which provides an indication of how shared the contents of these two food perceptions are within the Korean sample and allows an investigation of any age and gender differences in these perceptions. Differences between taste and nutrition perceptions of global food groups will be analysed. Links between the stages of transition (economic, social, epidemiological and nutrition) and historical factors in Korea and the content of these perceptions will also be examined. A further aim is to investigate whether these perceptions also hold for the meal context, using meals and dishes from Korean cuisine and Western-style meals found in Korea.

2. Method

2.1. Sample of respondents

This sample was age-stratified in the same way as in the pilot study and represented a convenience sample of 209 Koreans. Participants classified in the younger group were between the ages of 18 - 29 years and the older group was aged above 30 years. The characteristics of this sample are shown in Table 4.5.

Table 4.5. Number of respondents and average age of groups in the Korean Food Perception Study sample.

Group	N	Age (mean \pm SD)
YF	60	24.6 \pm 2.2
YM	60	23.7 \pm 2.8
OF	50	40.8 \pm 8.8
OM	39	42.9 \pm 11.2

The young females (YF) were selected from two universities in Seoul, Korea - Ewha Women's University, a private women's only university and Seoul National University, the most prestigious university in South Korea which is public and co-educational. All of the young females were taking their degrees in food and nutrition. The young males (YM) were selected from Seoul National University and all were studying generalist degrees.

Fifty participants were older females (OF) and had different backgrounds including those connected with the National Office of the Korean YWCA in Seoul, some of the ancillary staff of Ewha and Seoul National Universities, or housewives known to the author through friends. The older males (OM) were selected from ancillary staff of Seoul National University, middle-school teachers, or known to the author through friends.

2.2. Materials

All of the marker and stimulus cards measured 13cm by 10.5cm and were made from white, unruled index cards. Two Q-samples were generated and each set had a colour-coded border for easy identification. The first Q-sample consisted of fifty pictures of individual food items commonly used in Korea and the second Q-sample contained fifty pictures of common Korean meals and meal items. The Q-sort of the Korean magazine titles (Chapter 3, page 104) was also used to enable respondents to practice the Q-sort procedure before the main Food Perception Q-sample was administered. However, the words on the extreme marker cards of the practice set were changed to reflect those used in this main study. The (-3) marker card was changed to "liked the least". This would ensure complete comprehension of the Q-sort procedure.

Food Perceptions Q-sort

Marker cards

A row of eleven marker cards, marked according to the distribution presented in Figure 3.3 was placed at the top of a large desk. The extreme marker and middle cards were printed with the words "least tasty" (or least nutritious) (-5), "most tasty" (or most nutritious) (+5) and

“neutral” (0) in Korean (larger font) and English (smaller font). The cards were arranged in the same way as in the practice session, with the negative end on the left and the positive on the right.

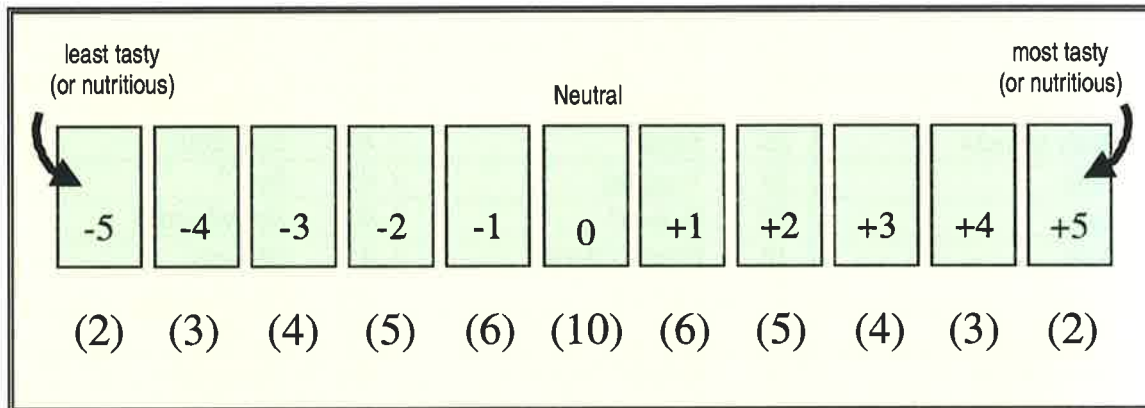


Figure 4.3. Distribution of marker cards and condition of instruction for the food perception test session.

Korean foods Q-sample

A list of the one hundred most frequently consumed foods per Korean household based on national data (The Korean Food Industry Association & The Korean Food Laboratory, 1991) formed the basis of the concourse from which the Q-sample was selected (Brown, 1980). This list was translated into English and fifty common foods were chosen including some common Western-style foods. Many of the Western-style foods were snack foods, however they are commonly consumed and available in Korea. The familiarity of the fifty foods was checked with two Korean nationals. The pictures of the foods were obtained either by taking photographs using foods from a local supermarket or using pictures cut from leaflets. All foods were depicted in their raw state. The pictures were cut to size and glued to the white index cards. The index cards had the Korean (larger font) and English (smaller font) words printed on them together with a randomly allocated identification number. Some examples are shown in Appendix G. The complete list of the fifty foods is shown in Table 4.6.

Table 4.6. The stimulus items used in the Korean food Q-sample.

1	Rice	18	Dry biscuits (savoury)*	35	Anchovies
2	Sweet biscuits *	19	Octopus	36	Processed ham *
3	Chinese cabbage	20	Spinach	37	Green peppers
4	Milk	21	Garlic	38	Eggplant
5	Apples	22	Chicken	39	Grapes
6	Radish	23	Chocolate *	40	Sweet bun *
7	Ice-cream *	24	Mandarins	41	Toasted seaweed
8	Bean sprouts	25	Squid	42	Zucchini
9	Tofu	26	Yoghurt	43	Jam *
10	Eggs	27	Bread *	44	Strawberries
11	Pork	28	Potato Chips *	45	Ginseng
12	Potato	29	Carrots	46	Mushrooms
13	Sponge cake *	30	Canned tuna *	47	Peanuts
14	Green onion	31	Korean lettuce	48	Tomatoes
15	Beef	32	Candies *	49	Noodles
16	White onion	33	Cucumber	50	Frankfurts *
17	Fish	34	Chestnuts		

* denotes Western-style food

Korean meals Q-sample

The second set of fifty pictures used were commonly consumed Korean meals and many of the pictures were based on those from a book by Hwan (1987) which is an English guide to Korean eating. Other pictures were either photographs of food taken of meals prepared by the author's *ajumah* (the lady who rents rooms in her house to students and where breakfast and dinner are included in the monthly board) or from pictures taken from food leaflets. All foods were depicted in their cooked state. The list of Korean meals included common side dishes, soups, traditional dishes and some Western-style meals. The familiarity of the final set of fifty Korean meals was checked with two Korean nationals. The pictures were cut to size and glued to the white index cards which also had the Korean and English equivalent, together with the randomly allocated identification number printed on it. The complete list of the fifty meals is shown in Table 4.7 and some examples can be found in Appendix H. A description of the Korean-style meals can be found in Appendix I.

Table 4.7. The stimulus items used in the Korean meal Q-sample.

1	Barbecued beef	18	Food in batter	35	Instant soup *
2	Fried bean curd	19	Spaghetti meal *	36	Grilled fish
3	Hamburger *	20	Kimchi stew	37	Green onion pancake
4	Dumplings in broth	21	Braised eggplant	38	Watercress salad
5	Spicy fish soup	22	Cold, cooked squid	39	Seasoned ark shell
6	Rice cakes	23	Mandoo snack	40	Instant cup meal *
7	Instant noodles *	24	Dried pollack stew	41	Sweet rice
8	Rice/vegetable mix	25	Bean curd soup	42	Fish stew/soy sauce
9	Mushroom salad	26	Pizza *	43	Hot radish salad
10	Radish kimchi	27	Grilled pork	44	Noodles in soup
11	Pork cutlets *	28	Seaweed/rice roll	45	Braised zucchini
12	Spicy meat soup	29	Seasoned bean sprouts	46	Ginseng salad
13	Fern shoot salad	30	Instant noodles in dish	47	Short ribs soup
14	Fish fingers *	31	Stir fried octopus	48	Cabbage kimchi
15	Kimchi pancake	32	Fried chips *	49	Stir fried rice
16	Fried chicken *	33	Cucumber kimchi	50	Acorn curd
17	Cooked rice	34	Vermicelli combo.		

* denotes Western-style food

2.3. Procedure

The instruction sheet for the test session was slightly modified from those used in the pilot study and was translated into Korean (Appendix J). The instructions were translated back into English and any discrepancies checked and corrected. Each respondent completed the practice session and was then seated individually at the test session desk. Each respondent completed four Q-sorts according to the diagram presented in Figure 4.4. There were four orders of sorting generated and these were randomly allocated across respondents to eliminate the effects of order and fatigue. Using the lettering from Figure 4.4 these were: ABDC, BACD, CDBA, DCAB. This meant that if the respondent ended the sorting of the first Q-sample (eg. food) with a nutrition sort, they began the next Q-sample (eg. meals) with the nutrition sort.

	Taste	Nutrition
Individual Foods	A	B
Korean Meals	C	D

Figure 4.4. The four Q-sorts completed by each respondent.

The set of instructions was shown to each respondent together with a verbal summary of the overall procedure emphasising the words ‘most tasty’, ‘least tasty’, ‘most nutritious’ and ‘least nutritious’. The respondents were instructed to sort the foods from most to least tasty and from most to least nutritious according to the condition they were completing at the time. It was further emphasised that there were no right or wrong answers and that their own opinions were sought. After each individual Q-sort the responses were recorded using a pro-forma (Appendix K) and the cards were shuffled for the next Q-sort. The cards were shuffled between each Q-sort and between each respondent. A short demographics questionnaire measured their year of birth, sex and whether they were the individual in charge of the cooking in their home. The overall procedure lasted for thirty minutes on average. Data were entered using a custom-made computer program which had in-built checking mechanisms to eliminate data entry errors (A. Beaumont-Smith, 1993b). There were no missing data.

2.4. Data analysis

The data from all 209 respondents for each of the four sorting conditions were factor analysed using SPSS-X version 6.1 where respondents were entered as variables following the method outlined in Chapter 3. The factoring method used was principal components with varimax rotation. The complete factor composites for all factors generated can be found in Appendix L.

3. Results

3.1. Korean foods: Taste

Three factors accounting for 47.1% of the total variance for all 209 respondents were selected through scree plot analysis. The number of respondents defining each factor, that is they loaded solely and significantly on that factor only, can be found in Table 4.8. The extreme ends of the factor composites can be found in Table 4.9.

Table 4.8. Percentages of variance, frequencies and percentages of age and gender characteristics of respondents defining each factor: Korean foods - taste.

	A		B		C	
	28.3%		12.8%		6.0%	
	n	%	n	%	n	%
YF	12	22	3	7	7	64
YM	29	54	8	18	2	18
OF	10	18	17	39	1	9
OM	3	6	16	36	1	9
TOTAL	54	100	44	100	11	100
Younger	41	76	11	25	9	82
Older	13	24	33	75	2	18
Males	32	59	24	54	3	27
Females	22	41	20	46	8	73

Factor A was predominantly defined by younger respondents (76%) and appeared to highlight a distinction between pleasant-tasting foods like strawberries, beef, apples and ice-cream and bitter foods like eggplant, spinach, onions (both green and white) and ginseng. It could be labelled *Pleasant flavours vs bitter flavours*.

Factor B contained traditional foods at the positive end including fish, octopus, chestnuts and ginseng with Western-style foods at the negative end including candies, biscuits (both sweet and savoury). It appeared to highlight cognitive elements as well as taste elements and was predominantly defined by older respondents (75%). This factor could be labelled *Traditional vs Western-style*. One of the most important distinctions between Factors A and B is the position of ginseng. It has a factor score of (-3) on A and (+3) on B indicating that it is one of the foods which provides most separation between A and B.

Factor C was only defined by 11 respondents who were predominantly young females (64%). However, it does provide an additional perspective on the perceptions of taste as it positively highlights some pleasant-tasting plant foods (apples, strawberries, carrots) while some animal foods (pork, frankfurts), confectionery and bitter plant foods (green onion, garlic) are placed at the negative end. Varieties of seafood received neutral rankings. It appears to contain some vegetarian elements as both beef and chicken also received negative rankings (-1: see Appendix L). It could be labelled *Sweet plant foods vs animal flesh foods*.

Table 4.9. Factor composites with scores greater than ± 3 for three factors: Korean foods - taste.

Score	A	B	C
+5	Beef	Fish	Apples
+5	Strawberries	Dried seaweed	Strawberries
+4	Apples	Beef	Mandarins
+4	Yoghurt	Octopus	Tomato
+4	Grapes	Chestnuts	Grapes
+3	Chicken	Apples	Potato
+3	Mandarins	Strawberries	Carrots
+3	Dried seaweed	Ginseng	Cucumber
+3	Ice-cream	Mushrooms	Dried seaweed
-3	Spinach	Chocolate	Green onion
-3	Anchovies	Bread	Chocolate
-3	Zucchini	Sweet bun	Candies
-3	Ginseng	Frankfurts	Jam
-4	Radish	Sweet biscuits	Pork
-4	White onion	Sponge cake	Garlic
-4	Garlic	Potato chips	Frankfurts
-5	Green onion	Dry biscuits	Processed ham
-5	Eggplant	Candies	Ginseng

Correspondence analysis

A two-dimensional graphic representation of percentages of placing each food at the most tasty end (+3, +4 and +5 or 9, 10, 11) for each of the ten groups (in the same way as presented in Chapter 3 page 114) can be found in Figure 4.5. The two-dimensional solution accounted for 87.5% of the variation in association scores. Many of the Western-style foods including snack foods are most closely associated with the younger respondents overall, particularly the younger males while many of the traditional foods (including tofu, fish, rice, chestnuts, ginseng) are

associated with the older respondents. This appears to replicate the findings from Factors A and B. Those who were mainly responsible for the food preparation (cooks) versus those who were not (non-cooks) appeared to be less associated with specific foods than the other demographic groups which corroborates with the results from Chapter 3.

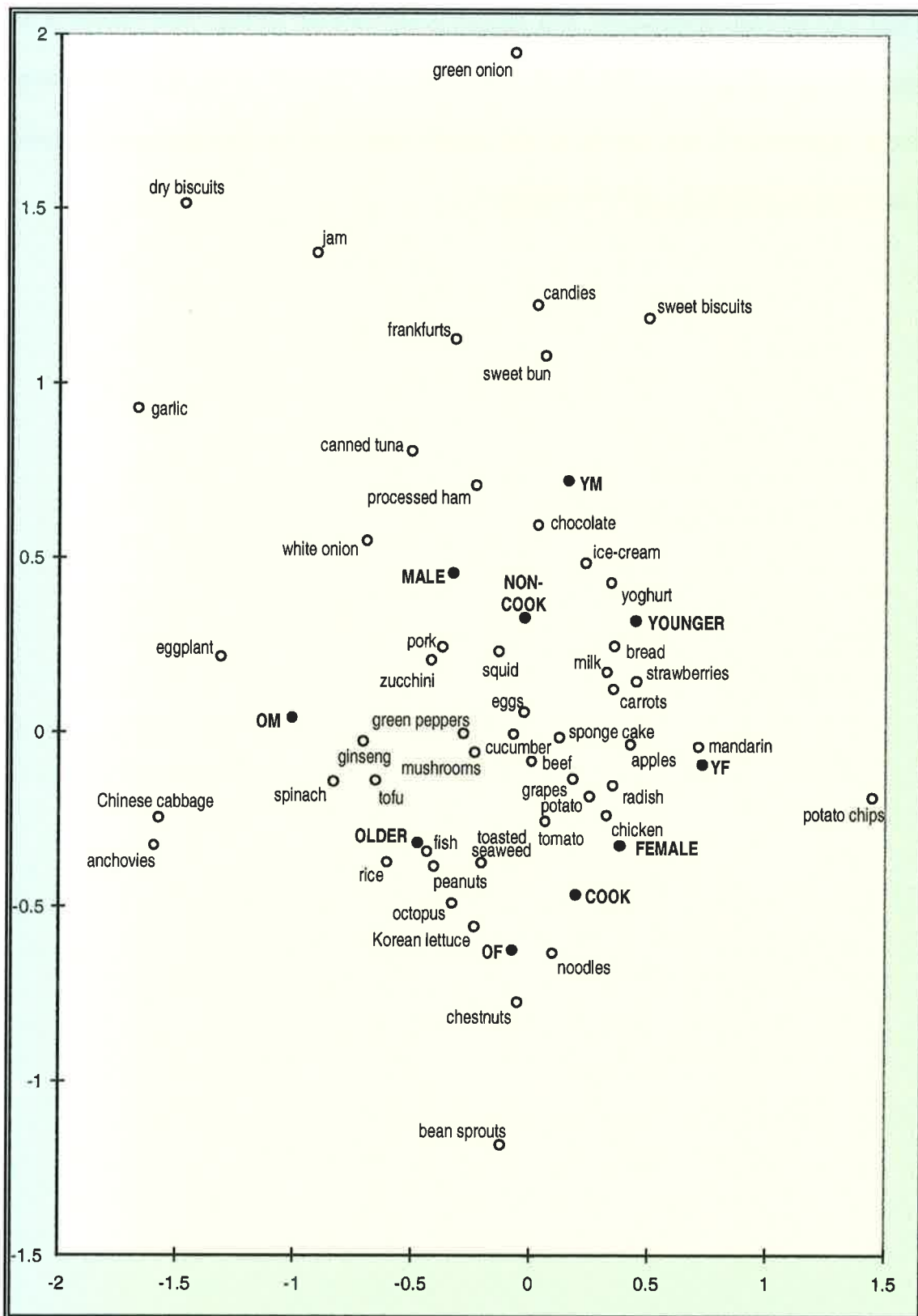


Figure 4.5. Correspondence analysis of percentage of most tasty rankings of Korean foods by ten respondent groups.

3.2. Korean foods: Nutrition

Factor analysis of the nutrition rankings of the individual food Q-sort yielded two factors which accounted for 59.4% of total variance in nutrition rankings from all respondents. Table 4.10 shows the total numbers of respondents defining each factor and their demographic profile. The extreme ends of the factor composites can be found in Table 4.11.

Table 4.10. Percentages of variance, frequencies and percentages of age and gender characteristics of respondents defining each factor: Korean foods - nutrition.

	D		E	
	45.0%		14.4%	
	n	%	n	%
YF	23	36	9	19
YM	10	16	17	35
OF	20	32	10	21
OM	10	16	12	25
TOTAL	63	100	48	100
Younger	30	52	26	54
Older	33	48	22	46
Males	20	32	29	60
Females	43	68	21	40

Factor D appeared to highlight a distinction between traditional and natural foods like fish, tofu, anchovies and ginseng and processed foods like chocolate, candies, frankfurts and ice-cream. This factor could be labelled *Traditional vs processed*. The importance of the negative perception of processed foods was exemplified as frankfurts and processed ham - sources of protein but processed foods, received negative rankings (-2). Age differences in the types of Koreans defining this factor were not apparent, however the majority of the respondents associated with this factor were female.

Factor E consisted of a positive regard for all forms of protein foods whether they were processed or natural forms while plant foods were placed at the negative end. This factor could be labelled *Protein vs vegetable*. This is further exemplified by the positive ranks attributed to peanuts, tofu and rice all of which contribute some plant protein. This indicates that protein was the major concept defining this factor. Males were slightly more likely to be associated with this factor.

Table 4.11. Factor composites with scores greater than ± 3 for three factors: Korean foods - nutrition.

Score	D	E
+5	Milk	Pork
+5	Fish	Beef
+4	Beef	Fish
+4	Tofu	Eggs
+4	Eggs	Chicken
+3	Chicken	Milk
+3	Carrots	Canned tuna
+3	Anchovies	Processed ham
+3	Ginseng	Frankfurts
-3	Sweet bun	White onion
-3	Ice-cream	Cucumber
-3	Jam	Green peppers
-3	Frankfurts	Eggplant
-4	Sweet biscuits	Chinese cabbage
-4	Dry biscuits	Garlic
-4	Potato chips	Korean lettuce
-5	Chocolate	Radish
-5	Candies	Green onion

Correspondence analysis

A correspondence analysis of the associations between the highest nutrition rankings (+3, +4 and +5 - 9, 10, 11) for the individual foods and ten respondent groups can be found in Figure 4.6. The two dimensional solution accounted for 83.5% of the variation in association scores. The distinction in associations between males and females is more evident than between older and younger respondents. Females are more clearly associated with tofu, fish, chicken, anchovies, eggs and milk - lighter forms of protein. The males are more clearly associated with frankfurts, processed ham and canned tuna and closer to the processed foods of bread, ice-cream and chocolate than the females. These findings corroborate the results from the Q-analysis. Older respondents are again more clearly associated with traditional foods including rice, garlic and toasted seaweed. None of the respondents ranked potato chips or dry biscuits at +3 or higher

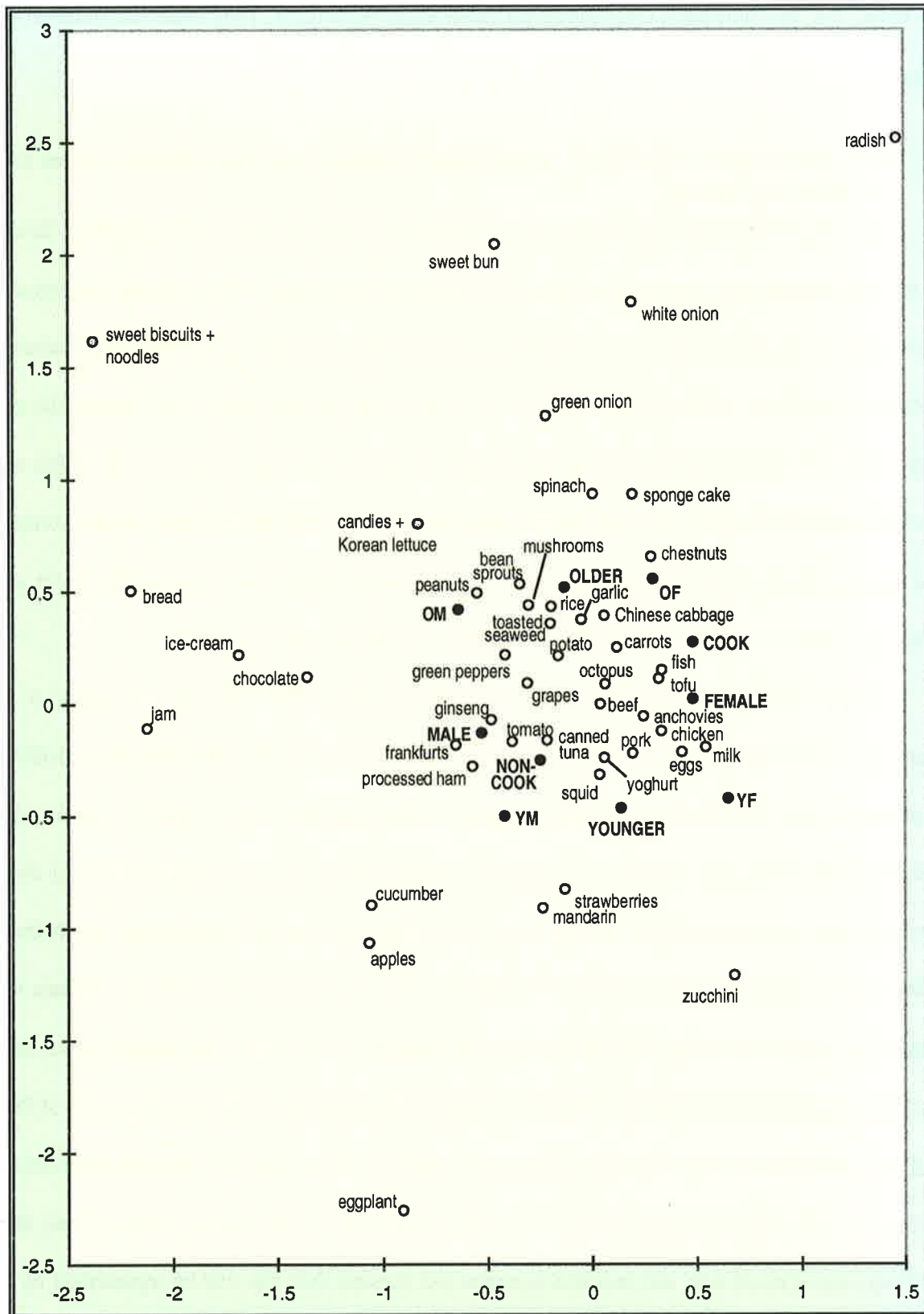


Figure 4.6. Correspondence analysis of percentage of most nutritious rankings of Korean foods by ten respondent groups.

which meant that the dimension coordinates for these foods were (0,0). They were not included in the figure.

3.3. Repeated measures MANOVA - relationships between taste and nutrition scores for individual food groups

Forty-two of the individual foods were grouped into nine common food groupings (from those used in Korean food composition tables, Rural Nutrition Institute, 1991) and the differences in the average taste and nutrition scores for these groups were analysed using repeated measures multivariate analysis of variance (MANOVA). It could be argued that these food classifications represent those of nutrition professionals rather than the lay Korean (eg. Axelson et al, 1986) so the overall standard deviation was checked to make sure that the average variation in the sorting scores for the whole sample did not become too large (more than 2.0). This would reflect an agreement in similar sortings for the component foods in each food group overall.

Repeated measures MANOVA performs two transformations, the first of which is a constant and represents the mean of both the taste and nutrition scores (Bryman & Cramer, 1990). The constant is used to evaluate any between-subjects differences according to age and gender (or their interaction) in this case. If there is a significant difference in age, for example, it means that the younger and older respondents did sort the foods differently overall, irrespective of whether they were sorting under the taste or nutrition condition. The second transformation corresponds to the change in scores when going from the taste to the nutrition condition, so differences across the two sorting conditions are calculated. If there is a significant difference in the average scores of the food group according to the sorting on taste and nutrition, there will be a significant within-subjects main effect of perception. If there is a large difference in the average scores across the two sorting conditions of taste and nutrition in males and females then this will be represented by a significant interaction between the food perception and sex. The repeated measures MANOVA results for the nine food groups can be found from Table 4.12 to Table 4.20.

Table 4.12. Mean scores and repeated measures MANOVA results for cereals on taste and nutrition as sorted by older and younger male and female Koreans.

CEREALS - taste		5.46 (1.25) *	younger	older
			5.38	5.57
male		5.32	5.22	5.49
female		5.59	5.55	5.63
CEREALS - nutrition		4.95 (1.29) *	younger	older
			5.01	4.88
male		4.91	4.89	4.93
female		5.00	5.13	4.84

* Within subjects main effect of cereals' perception $F_{(1,205)} = 22.79$, $p < 0.0005$

The cereals group (Table 4.12) was made up of rice, bread and noodles. The scores for taste were significantly higher for all respondents than the score for nutrition. However, both scores were below the mid-point value of 6 for both scales indicating that other foods were seen as being more tasty and nutritious overall than these cereal foods. There were no significant age or gender effects on taste or nutrition rankings of these cereal foods.

Table 4.13. Mean scores and repeated measures MANOVA results for green vegetables on taste and nutrition as sorted by older and younger male and female Koreans.

GREEN VEGETABLES - taste		5.41 (1.06) *	younger	older
			5.16 **	5.76 **
male		5.31	4.92	5.92
female		5.52	5.41	5.64
GREEN VEGETABLES - nutrition		5.18 (1.19) *	younger	older
			5.10 **	5.29 **
male		5.02	4.95	5.13
female		5.33	5.25	5.41

Between subjects main effect of age $F_{(1,205)} = 10.88$, $p < 0.005$

* Within subjects main effect of green vegetables' perception $F_{(1,205)} = 8.21$, $p < 0.01$

** Within subjects interaction between age and green vegetables' perception $F_{(1,205)} = 5.08$, $p < 0.05$

The green vegetables group (Table 4.13) was made up from the foods of Chinese cabbage, bean sprouts, green onion, spinach, Korean lettuce, cucumber and zucchini. There was a significant difference between older and younger respondents in sorting scores for the green vegetables group overall irrespective of sorting condition. The older Koreans tended to regard green vegetables more highly overall. The respondents as a whole believed green vegetables to be

more tasty than nutritious overall. Older Koreans also tended to perceive green vegetables to be more tasty than nutritious, while the younger respondents did not differ in their rankings for green vegetables on nutrition or taste. However, in the case of green vegetables, the effect size would be small so these results must be interpreted with caution.

Table 4.14. Mean scores and repeated measures MANOVA results for other vegetables on taste and nutrition as sorted by older and younger male and female Koreans.

OTHER VEGETABLES - taste		5.12 (1.14) *	younger	older
			4.92	5.39
male		5.04	4.64 **	5.66 **
female		5.19	5.20 **	5.19 **
OTHER VEGETABLES - nutrition		5.41 (1.25) *	younger	older
			5.33	5.52
male		5.24	5.15 **	5.37 **
female		5.56	5.50 **	5.63 **

Between subjects main effect of age $F_{(1,205)} = 6.47, p < 0.05$

Between subjects interaction between age and sex $F_{(1,205)} = 4.41, p < 0.05$

* Within subjects main effect of perception of other vegetables $F_{(1,205)} = 6.27, p < 0.05$

** Within subjects interaction between age, sex and perception $F_{(1,205)} = 5.59, p < 0.05$

The other vegetables group (Table 4.14) consisted of the average scores for radish, potato, white onion, garlic, carrots, green peppers and eggplant. Overall, older respondents, particularly older male, respondents gave higher scores to the vegetables in this group than all other respondent groups, irrespective of sorting condition. Overall, all respondents believed that these vegetables were also more nutritious than tasty. However, the older male group believed these vegetables were less nutritious than tasty whereas all other groups believed they were more nutritious than tasty.

Table 4.15. Mean scores and repeated measures MANOVA results for fruit on taste and nutrition as sorted by older and younger male and female Koreans.

FRUIT - taste		8.34 (1.34) *	younger	older
			8.68 **	7.88 **
male	8.05		8.45	7.43
female	8.60		8.90	8.24
FRUIT - nutrition		6.50 (1.14) *	younger	older
			6.58 **	6.40 **
male	6.41		6.63	6.09
female	6.58		6.53	6.64

Between subjects main effect of age $F_{(1,205)} = 18.26, p < 0.0005$

Between subjects main effect of sex $F_{(1,205)} = 12.11, p < 0.005$

Between subjects interaction between age and sex $F_{(1,205)} = 4.25, p < 0.05$

* Within subjects main effect of fruit perception $F_{(1,205)} = 246.40, p < 0.0001$

** Within subjects interaction between age and fruit perception $F_{(1,205)} = 7.81, p < 0.01$

The foods which made up the fruit group (Table 4.15) included apples, mandarins, grapes, strawberries and tomatoes. Tomatoes are included in this group as they are used as a dessert in Korean cuisine as a substitute for the other fruits listed. Overall, the older respondents gave lower scores than the younger respondents and the males gave lower scores than the females to the fruit in this group in both sorting conditions. However, the fruit was seen to be more tasty overall than nutritious, particularly by the younger Koreans who gave scores which were significantly higher on taste than nutrition.

Table 4.16. Mean scores and repeated measures MANOVA results for dairy products on taste and nutrition as sorted by older and younger male and female Koreans.

DAIRY PRODUCTS - taste		7.00 (1.62) *	younger	older
			7.45 **	6.39 **
male	7.08		7.54	6.36
female	6.93		7.35	6.42
DAIRY PRODUCTS - nutrition		6.70 (1.25) *	younger	older
			6.85 **	6.51 **
male	6.67		6.78	6.50
female	6.73		6.92	6.51

Between subjects main effect of age $F_{(1,205)} = 18.65, p < 0.0005$

* Within subjects main effect of dairy products' perception $F_{(1,205)} = 4.55, p < 0.05$

** Within subjects interaction between age and dairy products' perception $F_{(1,205)} = 10.15, p < 0.01$

The group of foods which made up the dairy product group (Table 4.16) included milk, ice-cream and yoghurt. Younger respondents gave higher scores to dairy products overall. Dairy products were also seen to be more tasty than nutritious overall, although the size of the effect would be small. However, younger respondents perceived dairy products to be significantly more tasty than nutritious.

Table 4.17. Mean scores and repeated measures MANOVA results for meat on taste and nutrition as sorted by older and younger male and female Koreans.

MEAT - taste		7.00 (1.82) *	younger	older
			6.95	7.07
male		7.19 **	7.27	7.06
female		6.84 **	6.63	7.08
MEAT - nutrition		8.69 (1.59) *	younger	older
			8.74	8.63
male		8.50 **	8.50	8.50
female		8.87 **	8.98	8.73

* Within subjects main effect of meat perception $F_{(1,205)} = 118.51, p < 0.0005$

** Within subjects interaction between sex and meat perception $F_{(1,205)} = 4.67, p < 0.05$

The meat group (Table 4.17) consisted of pork, beef, and chicken. The meat group was seen to be significantly more nutritious than tasty overall and the effect size is larger than for some of the other food groups. However, the meats were still ranked above the midpoint on average so they are still perceived to be tasty but just more nutritious. Korean females also believed it to be significantly more nutritious than tasty, giving it an average of two ranks higher for nutrition. The difference for the Korean males was not quite so large.

Table 4.18. Mean scores and repeated measures MANOVA results for seafood on taste and nutrition as sorted by older and younger male and female Koreans.

SEAFOOD - taste		6.28 (1.60) *	younger	older
			5.79 **	6.95 **
male	6.13		5.71	6.77
female	6.42		5.86	7.09
SEAFOOD - nutrition		7.51 (1.10) *	younger	older
			7.59 **	7.41 **
male	7.23		7.22	7.25
female	7.76		7.95	7.54

Between subjects main effect of age $F_{(1,205)} = 10.32, p < 0.01$

Between subjects main effect of sex $F_{(1,205)} = 6.24, p < 0.05$

* Within subjects main effect of seafood perception $F_{(1,205)} = 110.31, p < 0.0005$

** Within subjects interaction between age and seafood perception $F_{(1,205)} = 38.29, p < 0.0005$

The seafood group (Table 4.18) was made up from fish, octopus, squid and anchovies. Overall, the older respondents gave higher scores to the foods in this group than the younger Koreans. This was the same for the females, who saw seafood as more tasty and more nutritious overall. On examining the differences between the taste and nutrition scores, the Korean sample overall perceived seafood to be more nutritious than tasty. This was particularly the case for the younger Koreans who saw these foods as significantly more nutritious than tasty when compared to the older Koreans. This reflects some of the differences found between Factors A and B where the older respondents were more likely to be associated with the notion of the tastiness of traditional foods including seafood (Factor B).

Table 4.19. Mean scores and repeated measures MANOVA results for processed meat/fish on taste and nutrition as sorted by older and younger male and female Koreans.

PROCESSED MEAT / FISH - taste		5.34 (1.91) *	younger	older
			5.74 **	4.81 **
male	5.93		6.44 ^a	5.14 ^a
female	4.82		5.03 ^a	4.56 ^a
PROCESSED MEAT / FISH - nutrition		6.67 (2.00) *	younger	older
			6.78 **	6.52 **
male	7.36		7.21 ^a	7.61 ^a
female	6.05		6.36 ^a	5.67 ^a

Between subjects main effect of age $F_{(1,205)} = 6.36, p < 0.05$

Between subjects main effect of sex $F_{(1,205)} = 33.70, p < 0.0005$

* Within subjects main effect of processed meat perception $F_{(1,205)} = 83.85, p < 0.0005$

** Within subjects interaction between age and processed meat perception $F_{(1,205)} = 5.78, p < 0.05$

^a Within subjects interaction between age, sex and processed meat perception $F_{(1,205)} = 9.73, p < 0.01$

The processed meat and fish group (Table 4.19) included canned tuna, processed ham and frankfurts. These were not included with the meat or seafood groups as they were viewed differently from the other foods making up these categories which was particularly evident in the correspondence analyses (Figure 4.5 and Figure 4.6). The standard deviations for this group were the highest for all food groups indicating that this may be less of a logical group than all others and interpretations must be made with caution. Older respondents overall, and female respondents overall gave much lower scores to this group on both taste and nutrition. The foods in this processed meat and fish group were seen to be significantly more nutritious than tasty, particularly by the older respondents. The older males perceived these foods to be significantly higher on nutrition than taste when compared to all other groups who were more moderate in their differences between taste and nutrition. This could reflect the findings from Factor E where the protein content of these foods rather than their 'processed' nature appeared to be more pertinent to some respondents.

Table 4.20. Mean scores and repeated measures MANOVA results for snack foods on taste and nutrition as sorted by older and younger male and female Koreans.

SNACK FOODS - taste		4.85 (1.58) *	younger	older
			5.34 **	4.18 **
male	4.94		5.49	4.10
female	4.76		5.19	4.25
SNACK FOODS - nutrition		3.70 (1.39) *	younger	older
			3.65 **	3.75 **
male	3.99		4.00	3.96
female	3.44		3.31	3.59

Between subjects main effect of age $F_{(1,205)} = 11.73, p < 0.005$

* Within subjects main effect of perception $F_{(1,205)} = 63.94, p < 0.0005$

** Within subjects interaction between age and snack foods perception $F_{(1,205)} = 24.39, p < 0.0005$

The snack food group (Table 4.20) consisted of sweet biscuits, sponge cake, dry biscuits, chocolate, potato chips, candies and sweet buns. The averages for this group were the lowest over all of the nine food groups. The younger respondents gave significantly higher scores overall to these foods than the older respondents. Snack foods were seen to be significantly more tasty than nutritious, particularly by the younger respondents.

Overall, cereals and green vegetables were perceived to be lower on nutrition than taste, while the other vegetables were seen to be slightly more nutritious than tasty. However, all of these averages were below the mid-point of the scale indicating that other foods were seen to be more tasty and nutritious overall. Dairy products were seen to be slightly more tasty than nutritious. Snack foods were seen to be the least tasty and nutritious overall, although the younger Koreans perceived them to be much more tasty than nutritious, while the older respondents believed them to be the least tasty and nutritious of all food groups. Fruit was seen to be more tasty than nutritious dropping nearly two scores on average between the taste and nutrition rankings. The three groups of meat, seafood and the processed meat and fish categories were all seen to be higher on nutrition than taste. However, both the seafood and particularly the meat groups had taste and nutrition scores above the midpoint of the scale. One interesting thing to note is that the females, particularly the young females, saw the foods in this meat group as the least tasty of all demographic groups. This could reflect the vegetarian issues found in Factor C.

Overall the protein foods were perceived very positively when compared to other food groups. Only some of the younger females were less positive.

3.4. Korean meals: Taste

Three factors of the taste rankings for the Korean meals Q-sort were found which accounted for 47.0% of the variation in these rankings for all respondents. The demographic profiles of those respondents who loaded significantly on only one of these three factors can be found in Table 4.21. The composite factors can be found in Table 4.22.

Table 4.21. Percentages of variance, frequencies and percentages of age and gender characteristics of respondents defining each factor: Korean meals - taste.

	F		G		H	
	34.0%		8.4%		4.6%	
	n	%	n	%	n	%
YF	8	15	17	55	3	25
YM	11	21	10	33	6	50
OF	14	26	2	6	2	17
OM	20	38	2	6	1	8
TOTAL	53	100	31	100	12	100
Younger	19	36	27	87	9	75
Older	34	64	4	13	3	25
Males	31	58	12	39	7	58
Females	22	42	19	61	5	42

Factor F features a clear distinction between foods that form a part of Korean cuisine, including kimchi stew, barbecued beef and bean curd soup and those which are Western-style, including spaghetti, fish fingers and hamburgers. However, traditional but processed forms of Korean meals also appear at the negative end with instant noodles and mandoo snacks (dumplings). Pizza and fried chicken also received negative rankings. This factor could be labelled *Traditional vs Western, processed* and was predominantly defined by older respondents (64%).

Factor G appeared to distinguish between foods which are perceived to be filling and foods which represent side dishes in Korean cuisine or snack foods. The positive end consisted of many meat and rice dishes including barbecued beef and kimchi stew and rice/vegetable mix. It

differed from Factor F because some Western-style dishes like pizza and fried chicken were given positive ranks. This factor could be labelled *High satiety vs low satiety*. It was primarily defined by younger respondents, particularly young females.

Factor H appeared to distinguish between meat dishes at the positive end and vegetable dishes at the negative end. It differed from Factor G in many of the rankings attributed to rice dishes. Plain cooked rice was given a ranking of (+2) in this factor but a ranking of (-2) in Factor G for example. Meat, seafood and some Western-style meals including pizza and hamburgers were given positive ranks here. This factor was mainly defined by younger respondents, particularly young males. This factor could be labelled *Meat vs vegetables*.

Table 4.22. Factor composites with scores greater than ± 3 for three factors: Korean meals - taste.

Score	F	G	H
+5	Kimchi stew	Fried chicken	Barbecued beef
+5	Barbecued beef	Pizza	Stir-fried octopus
+4	Grilled fish	Barbecued beef	Fried chicken
+4	Fish stew/soy sauce	Vermicelli combo	Short-ribs soup
+4	Spicy fish soup	Rice / vegetables	Vermicelli combo
+3	Rice / vegetables	Kimchi stew	Spicy meat soup
+3	Bean curd soup	Bean curd soup	Cooked squid
+3	Stir-fried octopus	Seaweed/rice roll	Pizza
+3	Cabbage kimchi	Short-ribs soup	Grilled fish
-3	Pork cutlets	Pork cutlets	Instant noodles
-3	Fish fingers	Fern-shoot salad	Fern-shoot salad
-3	Mandoo snack	Braised eggplant	Braised eggplant
-3	Instant soup	Mandoo snack	Braised zucchini
-4	Hamburger	Spaghetti	Bean sprout salad
-4	Instant noodles	Instant soup	Instant noodles (dish)
-4	Instant cup meal	Watercress salad	Watercress salad
-5	Spaghetti	Instant cup meal	Instant cup meal
-5	Instant noodles (dish)	Ginseng salad	Hot radish salad

Correspondence analysis

The correspondence analysis in Figure 4.7 accounted for 84.5% of the variation in association scores. The younger respondents were clearly associated with some of the Western-style and Korean convenience and snack foods including hamburgers, instant noodles and pizza

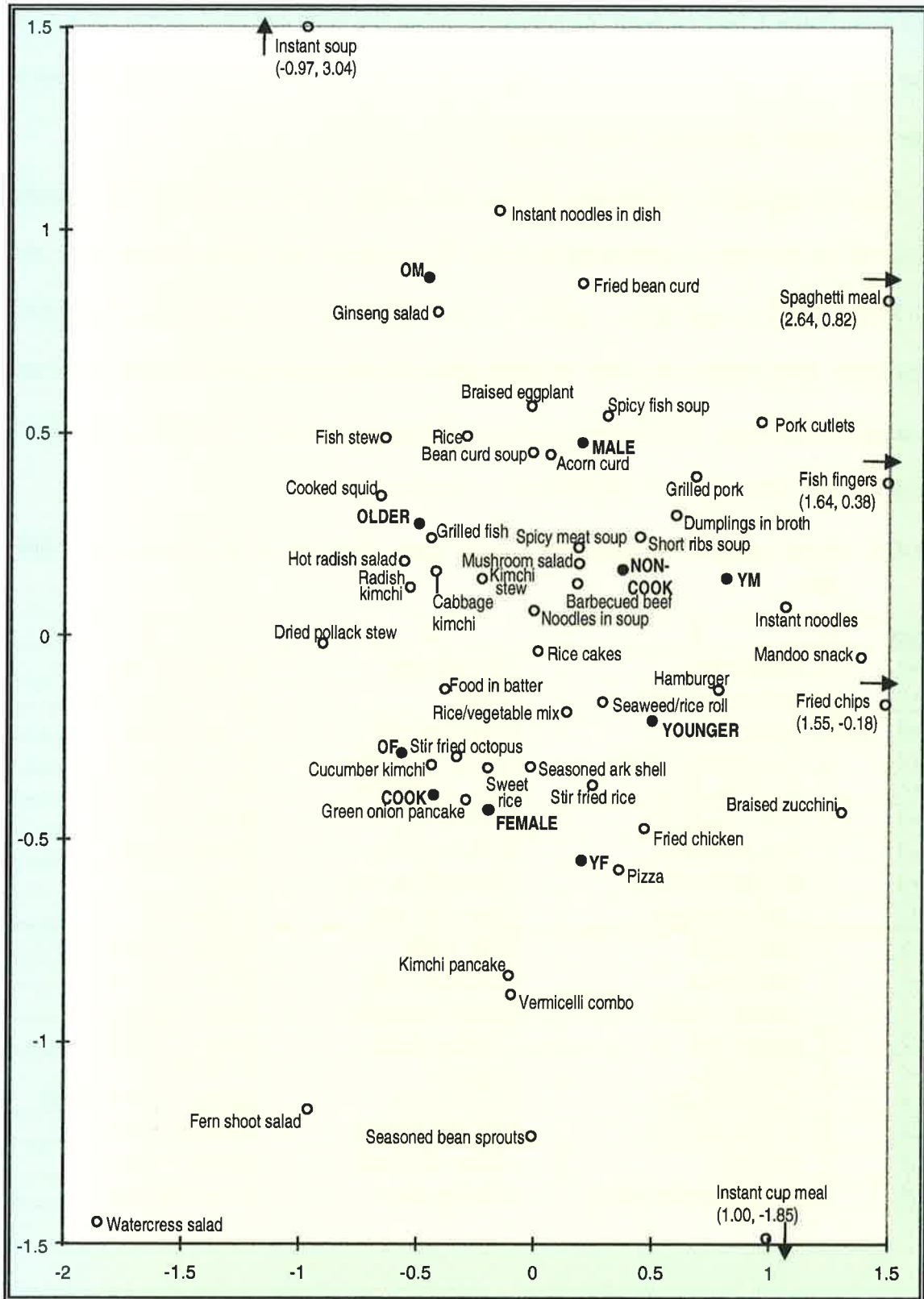


Figure 4.7. Correspondence analysis of percentage of most tasty rankings of Korean meals by ten respondent groups.

(particularly younger females). The older respondents perceived fish and kimchi dishes and other traditional meals to be tastier.

3.5. Korean meals: Nutrition

Two factors of the nutrition rankings for the Korean meals Q-sort were found which accounted for 59.4% of the variation in these rankings for all respondents. The demographic profiles of those respondents who loaded significantly on only one of these factors can be found in Table 4.23. The factor composites can be found in Table 4.24.

Table 4.23. Percentages of variance, frequencies and percentages of age and gender characteristics of respondents defining each factor: Korean meals - nutrition.

	I		J	
	50.1%		9.3%	
	n	%	n	%
YF	8	21	5	16
YM	10	26	14	44
OF	4	11	9	28
OM	16	42	4	12
TOTAL	38	100	32	100
Younger	18	57	19	59
Older	20	53	13	41
Males	26	68	18	56
Females	12	32	14	44

Meat dishes were located at the positive end of Factor I, which also included some Western-style meals including hamburgers, pizza (+2) and pork cutlets (+2). Vegetable, cereal and side dishes were found at the negative end which also included cooked rice (-1) and noodles with soup (-2). This factor may also contain elements of satiety in the overall perception of these foods according to nutrition. It could be labelled *Meat, satiating vs vegetable, non-satiating*. This factor was predominantly defined by males (68%) particularly older males.

Factor J was highlighted by a distinction between traditional meals at the positive end, including ginseng salad, grilled fish, and barbecued beef and Western-style and Korean snack, and processed foods at the negative end. The positive end also included braised mushrooms and fried bean curd which are traditional side dishes in Korean cuisine which demonstrates the

difference between this factor and Factor I, which positioned all side dishes at the negative end. Fried chicken also received a rank of (-2) on this factor but was positively regarded in Factor I (+4). This factor could be labelled *Traditional vs modern, processed*. It was predominately defined by younger males.

Table 4.24. Factor composites with scores greater than ± 3 for three factors: Korean meals - nutrition.

Score	I	J
+5	Barbecued beef	Ginseng salad
+5	Short-ribs soup	Grilled fish
+4	Fried chicken	Fish stew/soy sauce
+4	Grilled pork	Barbecued beef
+4	Grilled fish	Braised mushrooms
+3	Hamburger	Short-ribs soup
+3	Spicy fish soup	Fried bean curd
+3	Spicy meat soup	Spicy fish soup
+3	Fish stew/soy sauce	Stir-fried octopus
-3	Radish kimchi	Instant cup meal
-3	Braised eggplant	Hamburger
-3	Bean sprout salad	Fish fingers
-3	Cucumber kimchi	Instant soup
-4	Instant noodles	Mandoo snack
-4	Fern-shoot salad	Pork cutlets
-4	Instant noodles (dish)	Spaghetti
-5	Watercress salad	Instant noodles (dish)
-5	Hot radish salad	Instant noodles

Correspondence analysis

A two-dimensional graphic representation of associations between percentages of rankings as most nutritious and ten respondent groups can be found in Figure 4.8. This two dimensional solution accounted for 85.7% of the variation in associations. Instant noodles, spaghetti and mandoo snacks were never ranked at the +3 or higher position and were not included in the figure.

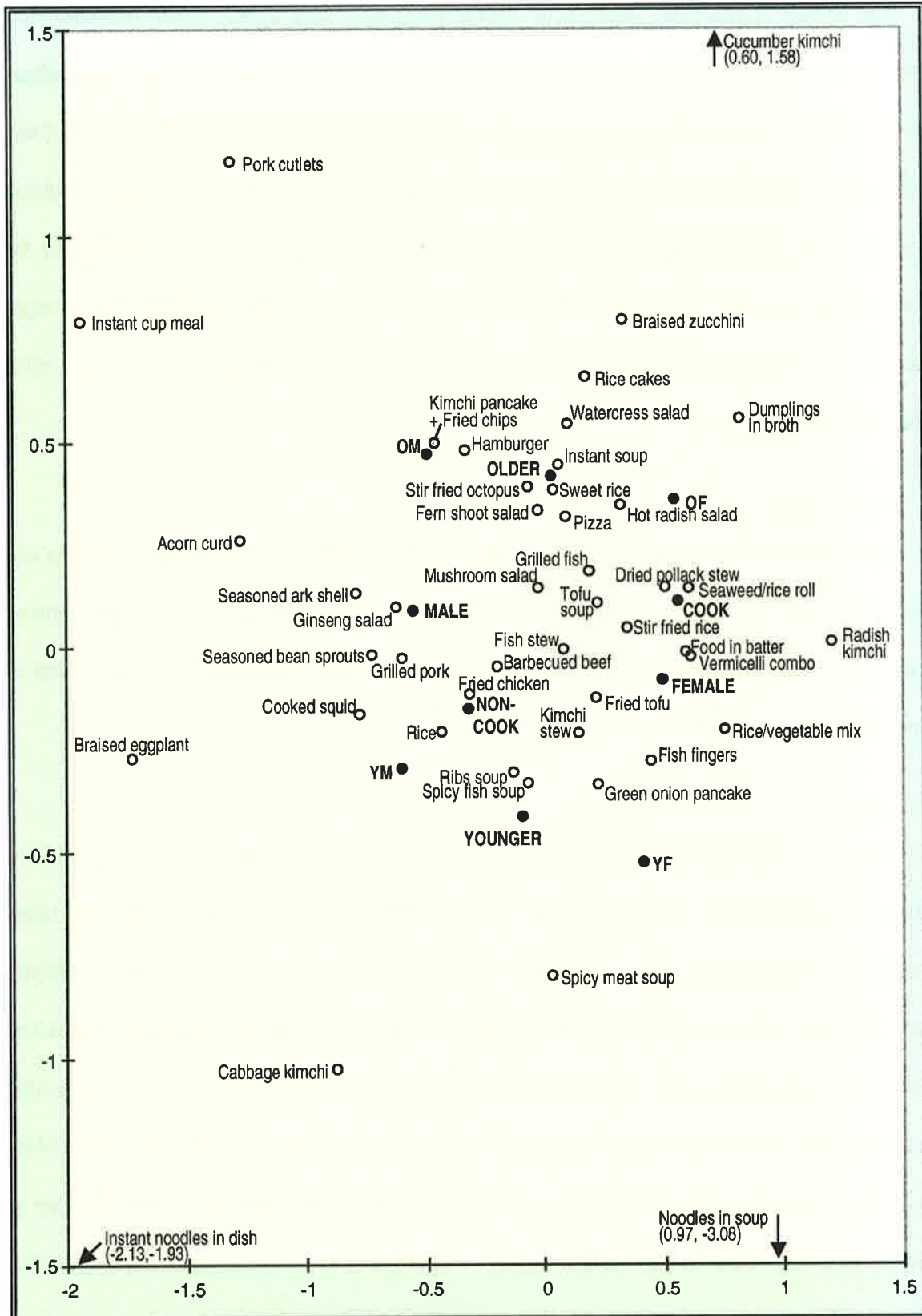


Figure 4.8. Correspondence analysis of percentage of most nutritious rankings of Korean meals by ten respondent groups.

The female respondents were more clearly associated with lighter meals including fish stew, fried bean curd, fish fingers, stir-fried rice and vermicelli combination. The male respondents were more clearly associated with some heavier meals including grilled pork, barbecued beef and fried chicken. Older respondents perceived stir-fried octopus and sweet rice to be most nutritious. Hamburgers were also positioned near the older male respondent group and examination of the data showed that one third of this group perceived hamburgers to be most nutritious. The younger respondents were more clearly associated with many of the soups including short-ribs soup, spicy fish soup and spicy meat soup.

4. Discussion

The aims of this study were to investigate the taste and nutrition perceptions of Korean and Western-style foods and meals, to indicate how prevalent these taste and nutrition perceptions were across the Korean sample and to investigate any age or gender differences in the content of these perceptions.

4.1. Taste

The factors for both individual foods and Korean meals accounted for more than 47% of the shared variance in food sortings of the 209 respondents. This is actually quite high when individual experiential factors are considered. Food likes and dislikes vary enormously within cultures, and even within social groups like gender and age (eg. Rozin & Vollmecke, 1986) and yet, despite this a high proportion of the shared variance in the taste sortings could be accounted for by three factors in both Q-samples. This indicates a high degree of consensus and shared ideas about which foods are perceived as tasty overall. This provides some evidence for the influence of cuisine on food cognitions as this sample shared a common overall cuisine and had consensual perceptions of how tasty those foods from that cuisine and the wider food environment were. There were differences however according to age as those who were associated with only one factor tended to divide themselves naturally according to their age group.

In the individual foods Q-sample sweet items featured prominently especially among the younger Koreans and these included both natural forms of sweetness like fruits and processed forms like confectionery. A negative response to bitter and more savoury items was also a feature of this perception. Previous research among young adult Australians and Malaysians has found that these groups prefer the same levels of sweetness (sucrose) in solution, orange juice and biscuits (Holt et al, 2000). This finding, in two cultures quite different from Korea lends further support to the notion that a preference for sweetness is probably genetic and highly adaptive for survival as sweetness usually provides a source of energy (eg. Rozin & Vollmecke, 1986). The level of sweetness preferred varies greatly within a culture, especially among older people, and most people have their own sensory "bliss points" (McBride, 1994: 115; 1990). The food groups of fruits and snacks were also regarded as much more tasty than nutritious, particularly by the younger respondents.

Meat was mainly positively perceived overall but there were some neutral and negative ranks indicating the existence of several perceptions of meat in general in Korean society. When meat was associated with tradition it received positive ranks, especially beef. This may be a reflection of the long association Koreans have had with meat and beef and this positive perception when associated with tradition was mainly held by older Koreans. Beef was of major importance historically, first as the prized food of nomadic tribes and then as a feasting food. This positive regard for meat was also reflected in the rankings of seafood, especially on Factor B, the factor associated with tradition. This may be a reflection of Korean cuisine in general which uses all types of seafood and seagrasses because of their easy availability due to Korea's geographic location on a peninsula, surrounded by the sea on three sides. The food groups of meat and seafood were ranked high on taste but even higher on nutrition indicating a general overall positive regard for these foods by most of the respondents.

It is expected that this preference for meat is a world-wide phenomenon as most cultures include meat somewhere in their cuisines, even if all members of that culture do not eat meat

(Harris, 1985). However, there does appear to be cogent vegetarian tendencies among younger females (Ryan, 1997; Worsley & Skrzypiec, 1997). Factor C could be interpreted to be associated with these ideals and the majority of respondents defining this factor were young females. However, cautious interpretation is needed as only 11 respondents were significantly and solely associated with Factor C but it may represent a sampling error in that it is representative of a group of young Korean tertiary students rather than a more general perception. However, these females may represent the type of person that all young female Koreans wish to aspire to so this perception may be more widespread, or become more prevalent.

Ginseng, a very traditional Korean food and medicinal herb, was ranked positively, especially by older respondents, even though it naturally has a very bitter taste. Research suggests that there is an innate rejection of bitter tastes, as they may be often associated with the presence of toxins (Rozin & Vollmecke, 1986). In Korea, ginseng is widely believed to have beneficial health and medicinal effects so there may be an advantage in its consumption (Hwan, 1987). This reversal of an innate rejection, so that bitter foods are consumed and actually enjoyed has been studied in the preference for eating chilli peppers (Rozin & Schiller, 1980). The knowledge that ginseng may be beneficial, not harmful could be enough to induce an affective shift from an avoidance based on dislike to a consumption (and enjoyment) based on positive associated consequences.

Traditional Korean foods were regarded as more tasty by older respondents overall and they were more likely to define Factor B which was associated with traditional elements. Traditional foods are familiar in many aspects including taste. Traditional flavours and foods are also a way of defining a cultural group through the ethnic markers of a cuisine (Rozin & Rozin, 1981). It is highly likely that these beliefs will be held by older people.

The Korean meals condition yielded factors that were similar to the individual foods condition. The strength of these perceptions in two food contexts provides further evidence for their degree of consensus. Traditional meals were regarded positively, especially by older

respondents. Meals that were perceived to be filling were regarded positively. Research suggests that both adults and children have a strong liking for flavours that are paired with foods that are filling. Positive post-ingestional cues conferred by a feeling of fullness can enhance preferences for that food so that it will be consumed again on another occasion (Booth, 1994; Booth et al, 1982).

Meat dishes were also regarded positively, especially those from traditional Korean cuisine. Many of the side dishes were regarded negatively, however this may just be a reflection of the structure of Korean meals and eating. Each person has their own rice bowl and often their own soup. Vegetable side dishes, together with the meat or seafood dish are placed in the middle for all to share and select from (Kim & Oh, 1996; Paik & Lee, 1990). Vegetable side dishes may be perceived to be less tasty and filling than meat dishes when they are compared.

Most spicy foods were ranked positively reflecting an important and distinctive aspect of Korean cuisine. Red pepper is one of the basic flavouring agents used in Korean meals and it is not unexpected that these meals will be preferred as the attachment to traditional flavourings is very strong (eg. E. Rozin, 1982).

4.2. Nutrition

The factors from both the individual foods and Korean meals each accounted for sixty percent of the shared variance of the sorting scores for the 209 respondents. Both conditions had two factors each which indicates that a small number of factors summarised the ideas of nutrition among the respondents. These perceptions were widely shared among the sample.

The individual food condition yielded two factors which highlighted the importance of protein, including animal and vegetable forms, and in Factor E, even processed forms. Most vegetables and carbohydrate foods were regarded negatively on nutrition. Processed foods also received negative rankings in Factor D and snack foods were generally regarded as much less nutritious than tasty, especially by the younger respondents. As stated previously and shown in Figure 4.1 (page 147) and Figure 4.2 (page 148) cereal food (carbohydrate) consumption has been

decreasing steadily and protein, particularly animal protein, intake has been increasing. Cereal foods and vegetable consumption still exceeds animal food consumption however.

This trend to regard meat positively was reflected in the factors found for Korean meals. Meals that were perceived to be filling were also regarded positively and many of these meals contained meat. Many of the males regarded meat dishes positively and this could reflect the traditions of Korean society. Males are the traditional workers and they or their wives or both, may believe that they require a higher level of meat in their diet to enable them to function adequately in their occupations.

These perceptions of the goodness of meat and animal foods (as both tasty and nutritious) and the relative negative perceptions of cereal foods and vegetables (as less tasty and nutritious) may be part of the reason for the shift in overall consumption trends aided by an increasing level of disposable income. If the trend of increasing animal food consumption and decreasing amount of energy from carbohydrates continues then this would appear to be contrary to the goals of nutrition educators. The nutrition educators of many Western nations are trying to reduce the percentage of energy from animal sources (eg. Popkin, 1994). Programs to make Koreans aware that their present national diet is highly adequate and currently the envy of many western nations have been successful particularly in promoting their traditional diet (Kim et al, 2000). This may be even more necessary if further research in food perceptions and continued shifts in food consumption reveal the same trends.

5. Conclusions

This study has confirmed that a small number of shared representations about food particularly ideas about nutrition do exist. A few factors were able to represent the often disparate individual tastes that people have which is a reflection of the underlying cuisine that they share. There were differences according to age and gender and these could be a reflection of cohort effects and the changing economic and social structure of Korean society. The

differences according to age may be over-emphasised in this study however, because of the nature of this sample. The younger respondents were primarily students at two prestigious universities in Seoul and it may represent the views of more liberal Koreans. However, the consensual nature of these food perceptions provides evidence that despite these sample differences, shared ideas about taste and nutrition are present. This study shows that situational factors, particularly the transitional factors of economics and nutrition can influence social representations about food.

Notes

A shorter version of this chapter has been published in the *Korean journal of nutrition* (1). A shorter version was also presented as a conference paper to the Food Choice Conference (2) held in Adelaide, Australia in September 1993 and was published in the proceedings in 1996.

(1) Beaumont-Smith, N.E. and Kim, S.H. (1994). The perceptions of food in Korea: An investigation of taste and nutrition. *Korean journal of nutrition*, 27: 292-303. (See Appendix M).

(2) Beaumont-Smith, N.E. (1996). Tasty foods: An investigation of Korean perceptions. In A. Worsley (ed). *Multidisciplinary approaches to food choice*. Adelaide, Australia: Food Choice Conference. (See Appendix N).

Chapter 5

Australian food perceptions

Chapter 4 presented the results from the food perception study conducted in Korea including information on economics, social factors, epidemiology and nutrition and how dietary changes may be affected by these structural factors. The results from the food perception study were then interpreted within this broader context. This chapter will duplicate the framework laid out in Chapter 4 but will present information about the Australian perspective.

1. History of Australian food

Australia is a wide, relatively flat land covering an area of around 7.7 million km² and is the driest continent apart from Antarctica. A large part of Australia is arid or semi-arid and 50% of the continent receives less than 300mm of rain annually. Australia has a wide range of climatic zones with tropical areas in the north, arid expanses in the centre and temperate regions in the south (Australian Bureau of Statistics, 1997). Six percent of the land in Australia is arable and 54% is suitable for grazing animals (CIA World Factbook, 2000).

The history of settlement in Australia is currently believed to have begun around 40,000 years ago and by 20,000 years ago it is maintained that Aboriginal tribes inhabited almost all areas of the continent (Australian Bureau of Statistics, 1986). Native flora and fauna which were often unique to the different climatic and geographic regions formed the diet of the hunter-gatherer Aboriginal people (A. Lee, 1996). White settlement began in Australia in 1788 when Australia was claimed as a British penal colony and British agricultural techniques together with

their different food habits and foodstuffs began to change the Australian landscape. The traditional Aboriginal way of life was severely disrupted, including access to traditional foods and their overall food habits (Kouros-Blazos & Wahlqvist, 2000; Smith, 2000). Migrants to Australia in the nineteenth century were predominantly from the British Isles although some Germans migrated to South Australia in the 1820s and Chinese migrated to the goldfields of Victoria in the 1850s (Jupp, 1990). These early British migrants were encouraged to emigrate as suitable labour was required to build colonial Australia's agricultural, pastoral and horticultural industries (Haines, 1997; Peel, 1973).

The European population in nineteenth century Australia numbered 3 million such that the majority of new 'Australians' were now eating a 'British diet' which was based primarily on meat, usually mutton or beef, bread and flour, and potatoes (Clements, 1986). The perception of meat was such that these new Australians believed that it should be eaten three times per day. The consumption of meat was a symbol of rising status and its abundance, together with the overall plentiful food supply, could be communicated to relatives and friends remaining in the British Isles. Indeed, Australians were reported to be eating 276 pounds of meat per head per year more than twice the amount of their counterparts in Britain. The abundant supply of meat from the mid-nineteenth century in Australia would ensure its primary place in the diets of Australians (Haines, 1997).

At the beginning of the twentieth century the diet of Australians was still basically British with their attendant foodstuffs and cooking techniques. Meat was usually baked, stewed, or fried and vegetables were either plainly boiled or roasted. The foods used were often limited by storage considerations and availability and the meal pattern was often unvaried week after week (Dupain, 1927). One hundred elderly Australian respondents were asked to recollect the types of foods eaten in their childhoods. Sheep meat, including lamb and mutton, was the meat most commonly consumed followed by beef and rabbit, where it was available. Chicken was consumed only on special occasions. Apples were the most popular fruits and root vegetables, including carrots,

parsnip and potatoes, were the staples. Seasonal variation did provide other fruits and vegetables which were often preserved as jams, chutneys and pickles. Breakfast was either oatmeal porridge or toast with jam, lunch was usually a sandwich with leftover cold meat from a roast and some fruit and cake. The evening meal was either soup or roast with vegetables. Snacks included bread, cake or fruit and tea was the most common hot beverage (Teow et al, 1988).

Migration to Australia changed after World War II such that people from Western -, Eastern - and Southern - European countries began to arrive in significant numbers. More recently, migrants, particularly refugees, from Asia and South - and Central - America have arrived so that contemporary Australia is a country with rich cultural diversity. In 1991 3.8 million Australians had been born overseas in one of 200 countries, a further 3.3 million were the children of migrants and many spoke a language other than English at home (Australian Bureau of Statistics, 1997). This ethnic diversity has further changed the food habits and food supply of Australians (Lester, 1994) such that all manners of foods are eaten in restaurants or prepared at home (Santich, 1996; Tenison & Mashiter, 1988).

The effect of these migration waves from countries other than those of the United Kingdom have had a profound effect on the cuisine of contemporary Australia. Food preparation styles began to move away from roasting or frying to grilling and stir-frying. Different foods, including an expanded range of vegetables, the use of margarines and oils in place of lard and butter, higher consumption of poultry and fish, and the greater consumption of wine have changed the food landscape of Australia. Immigration and the exposure of mainstream Australian culture to these different foods and cooking styles have been credited with much of these changes (Jamrozik et al, 1992). Apparent consumption data, as well as ethnographic results support this (Lester, 1994). There was also a concomitant change in the rates of coronary heart disease in the late 1960s and much of this has been credited to this change in diet (Dwyer & Hetzel, 1980).

The influence of migrants on the food habits of Australians has not been all one way. The diets of immigrants often change quite soon after migration, such that they tend to eat more meat

and less starchy foods, fruit and vegetables than before arriving in Australia. This appears to hold for migrants from many different regions (eg. Baghurst et al, 1991; Powles et al, 1990). This blending of food styles has led to the emergence of modern Australian cuisine often labelled 'East-West' cooking (eg. Symons, 1993).

2. Transitions

The country of Australia as we know it today is only a little over 200 years old and it has come a long way from its past as a penal colony to an industrialised country where standards of living and health status are generally high for most Australians. The food supply is regarded as safe and affordable and the different climatic zones mean that numerous types of foods can be produced (Lester, 1994). The nutrition transition in Australia appears to follow the Western high income model proposed by Popkin (1994) where there was a gradual shift in population dietary structure over the past century. This has also been characterised by a reversal in the consumption of sugar and animal fat in some sub-groups of the population as nutrition education campaigns broadly spread the healthy eating message.

2.1. Evidence of the four transitions in Australia

Economic transition

Agriculture, particularly sheep for meat and wool, cattle for meat and hides and wheat, formed the major part of the fledgling Australian economy in the nineteenth century (Peel, 1973). The early part of the twentieth century was characterised by periods of significant economic growth closely followed by periods of economic collapse. This was primarily because the economy was significantly based on agriculture. As the immediate markets became oversupplied with meat and wool, the prices collapsed. The government policy of the day was to continue agricultural expansion and development by opening up new regions for farming. However, the continent of Australia is often subjected to extreme drought conditions so that many farmers were forced from the land with unassailable debt levels (Peel, 1973).

Australian economic policy has always been export focussed. In the beginning the policy was to supply Britain with food, and trade agreements set up in 1932 ensured a market for much of Australian meat although better chilling practices raised its quality after 1935 (Watt, 1955). Agricultural products accounted for more than 80% of the value of Australia's exports until the 1950s (Australian Bureau of Statistics, 1997). In more recent times, the export culture has continued and other regions have presented export opportunities for Australian goods and produce. In the past thirty years, the contribution of agriculture to the overall economy has declined from 9.8% in 1965 to 2.9% in 1995 (Australian Bureau of Statistics, 1997). The number of people employed in the agricultural sector has also decreased from 6.8% in 1975 to 5.1% in 1995 as smaller farms are combined and there are advances in agricultural efficiencies and technology (Australian Bureau of Statistics, 1986; 1997). Australian agriculture is still an important component of the modern, diversified Australian economy and Australia remains a significant producer of wool, beef, wheat and sugar and an important source of dairy produce, fruit and rice (Australian Bureau of Statistics, 1997).

The overall economy has increased steadily in recent times. Table 5.1 shows the change in per capita US\$ GDP from 1951 to 1996. The figures are standardised at 1989-1990 prices using the US\$ exchange rate from the same fiscal year. Economic growth rates averaged 5.2% in the 1960s, 3.8% in the 1970s, 3.3% in the 1980s, and 2.7% in the 1990s to 1996 (Australian Bureau of Statistics, various years).

Table 5.1. Change in per capita GDP in \$US value from 1951 to 1996 (standardised at 1989-1990 prices).

Year	\$US GDP per capita
1951	7,337
1961	8,597
1971	11,683
1981	14,162
1991	16,395
1996	18,351

Source: Australian Bureau of Statistics, various years.

Food is relatively inexpensive in Australia and Engel's coefficient (food expenditure as a percentage of total expenditure) was 18.4% in 1994 averaged across all income groups and all household types. The rate of food expenditure for the lowest income groups was still around 18%. It is relatively easy to purchase good quality foods in Australia (Australian Bureau of Statistics, 1997). However, different regions and social status groups do have different food intakes (eg. Smith & Baghurst, 1992; Woodward, 1990).

Social transition

On average, population density is low but 84% of the population lives in only 1% of the land area (Australian Bureau of Statistics, 1997). This has given rise to the term the 'boomerang coast' (Blainey, 1966) as most Australians live in the south-eastern coastal strip which is approximately 320km wide and extends from Adelaide to Brisbane in an arc which resembles a boomerang. The absence of water is the main reason for the low population density in the central region of the continent. Pollution is generally low although larger urban areas are beginning to experience rises in air pollution levels. The soil is generally clean although some agricultural practices have lead to general degradation and raised salinity (Reeve, 1988).

Despite the prominent place of agriculture in the history of Australia, more than half of the population have always lived in urban areas. In the beginning the land settlement policy was to develop land close to urban centres because of the logistics in moving agricultural produce such large distances and because of water shortages (Peel, 1973). Table 5.2 shows the changes in population and urbanisation levels since 1915.

Table 5.2. Population and urbanisation changes in Australia over time.

Year	Population (000)	Year	Urban population (%)
1915	4,986	1911	57
1925	5,939	1921	62
1935	6,726	1931	64
1945	7,392	1941	66
1955	9,200	1951	75
1965	11,388	1961	82
1975	13,893	1971	86
1985	15,788	1981	86
1995	18,054	1991	84
1997	18,688	1997	85

Note: The population figures before 1965 exclude full-blooded Aborigines.
Sources: Australian Bureau of Statistics, various years; United Nations, 1997.

Annual population growth has been quite low for many years. The annual growth rate between 1986 and 1993 only averaged 1.4%. Net immigration has been a significant factor in keeping the population growth rate positive (Australian Bureau of Statistics, 1997).

The Australian population is also aging helped in part by a low fertility rate. Infant mortality was around 10% in the 1900s but in 2000 was 0.5% (Australian Bureau of Statistics, 1997; CIA World Factbook, 2000). Life expectancy from birth has increased significantly from the beginning of this century to the present time: 1905: male - 55 years and female - 58 years; 2000: male: 77 years and female: 83 years. This improvement in the first part of the twentieth century has been attributed to improvements in living conditions through better water supplies, waste disposal systems, quality of food and health education. Further increases in the latter part of this century have been attributed to improved social conditions through advances in medical technology, mass immunisation and antibiotics (Australian Bureau of Statistics, 1997; CIA World Factbook, 2000). The age profile of the population is also changing as shown in Figure 5.1. The effects of the World Wars on the numbers of young children can be seen in this figure. The percentage of 0-14 year olds dropped from 1933 to 1947. After this time the 'baby boom' can be clearly seen from 1954 to 1971. However, the percentages of 65+ show clear increases indicating that the percentage of those in the working population (15-64) is not static.

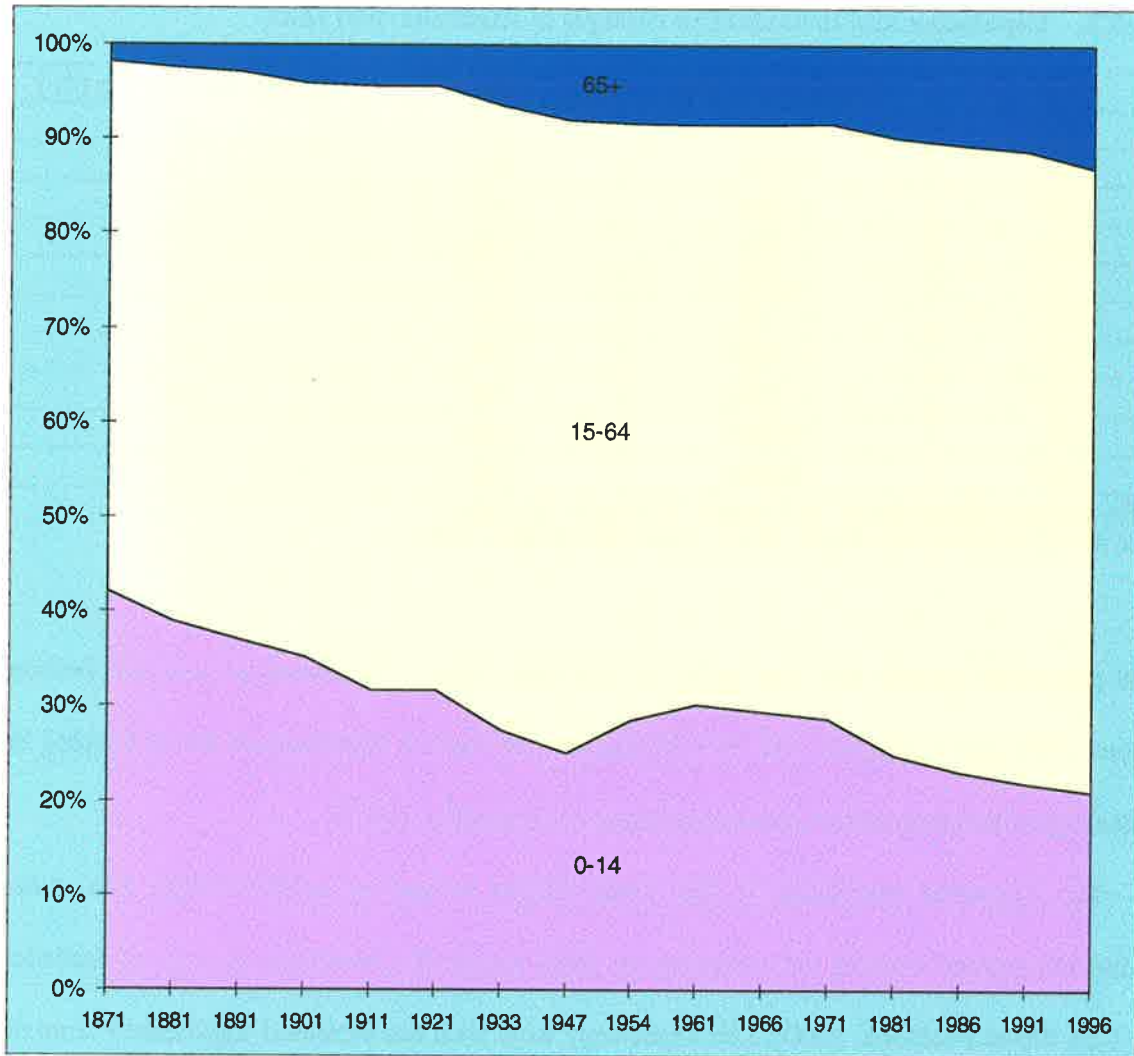


Figure 5.1. Changes in the age profile of the Australian population from 1871 to 1996.
(Sources: Australian Bureau of Statistics, 1997; CIA World Factbook, 1996).

The household structure of Australians is also changing. In the Australian state of Victoria in 1891 each household surveyed had more than five people residing there on average; in 1985 this number had halved to an average of 2.9 people per household unit. In the 1991 Census, 51% of all households had only one or two people residing there (Australian Bureau of Statistics, 1994; McDonald & Quiggin, 1985). Children are also remaining with their parents for longer as non-dependents. In 1981, 34% of 20-24 year olds lived with their parents and this had increased to 40% in 1991. Family type is also changing. In 1976, 48% of families were couples with dependent children but this had decreased to 41% in 1996 (Australian Bureau of Statistics, 1997). The current trend appears to indicate that Australian women are having their children later and

the percentage of the labour force who are women is increasing: 1980 - 37%; 1992: 42% (Australian Bureau of Statistics, 1994).

The types of foods available in Australia reflect many of these changes in society. Primary and secondary food producers are making foods which are value-added and designed to minimise food preparation time like ready-peeled, vacuum-sealed vegetables and pre-prepared frozen meals. Many food retail environments promote one-stop shopping and emphasise convenience by selling many of these convenience foods but also offering consumers pre-made salads and often pre-made fresh meals (Sanderson, 1995).

Transition in epidemiology

The Australian transition in epidemiology reflects the relatively slower rates of change in disease profiles from the US and Western Europe rather than the accelerated models of many Asian countries (Popkin, 1994). Infectious diseases were much more prevalent earlier this century than at present. Diseases of the circulatory system are still the leading cause of death although the rate has declined substantially in recent years (Table 5.3). Men were one and one-half times more likely to die from circulatory system diseases than women in 1992 (Bennet et al, 1994). The rate of death from all neoplasms (cancers) is still increasing.

The levels of overweight and obesity as indicated by the Body Mass Index (BMI) are increasing in Australian adults. The National Nutrition Survey conducted in 1995 measured the heights and weights of 13, 800 Australians aged over 2 years and found that 63% of adult men and 47% of adult women were overweight or obese (Australian Bureau of Statistics, 1997b).

Table 5.3. Rates of death from five general causes of death from 1921 to 1995 (per 100,000 population, averaged across men and women).

	1921	1941	1961	1981	1995
Infections	182	75	13	4	6
Neoplasms	154	167	164	184	190
Circulatory system	355	558	613	439	296
Respiratory system	178	128	74	62	52
Accidents/ injury	75	71	72	55	41

Sources: d'Espaignet et al, 1991; Australian Bureau of Statistics, 1995.

Popkin (1994) maintains that behaviour change at the population level through public health campaigns can help to change the disease profiles and rates of death from preventable diseases. It appears that organisations like the Heart Foundation, which are quite well respected by the Australian public, although they rank lower than the print media as a source of nutrition information (eg. Beaumont-Smith & Wahlqvist, 1996; Worsley, 1991), can take some credit for this slight decline in rate of deaths from circulatory diseases. It is expected that nutrition education campaigns will influence Australians' food perceptions as the information becomes part of the common food culture.

Nutrition education campaigns have typically been built around the messages of the Australian Dietary Guidelines which were formally designed in 1992, although these campaigns had been using the guideline content for many years previously. These guidelines promote a greater consumption of cereal foods, fruit and vegetables and a lower intake of fat, saturated fat, refined sugar salt and alcohol, together with a message on weight control (Commonwealth Department of Health, 1992; National Health and Medical Research Council, 1992).

Nutrition transition

Nutrition surveys which use directly comparable methodologies have not been carried out in Australia although a baseline for future national nutrition surveys has been set with the 1995 National Nutrition Survey (Australian Bureau of Statistics, 1997b). Reliable Australian data is only available from 1983 (Commonwealth Department of Health, 1986; Department of Community Services and Health, 1987), unlike the Korean data set which is based on comparable national dietary data available from 1969. Food intake data from 1983 and 1995 based on the 24-hour recall by interview method are presented which are shown separately from the national and state-based surveys from 1985 to 1993 which used a food frequency of consumption methodology (CSIRO Division of Human Nutrition, 1993; 1994; 1996). It is important to note that this comparison may not be truly valid but it will provide some background food and nutrient intake context for the illustration of the nutrition transition together with the emergence of any trends

measured by these distinct methodologies. Some of the surveys using the food frequency method were replicated in different Australian states in the same year and the data shown were averaged across the states. All of the data presented below is averaged across men and women to indicate overall dietary trends.

As indicated by Popkin (1994) changes in nutrition in advanced economies reflect dietary changes after education campaigns and behaviour change. This can be seen in the changes in food intake from 1983 to 1995 (Figure 5.2 and Figure 5.3). In general there has been an increase in the consumption of cereal foods while the consumption of fruit and vegetables has remained relatively stable. The consumption of meat and eggs has generally decreased over time while the consumption of seafood has increased. This would be in line with many of the recommendations to cut back on fat intake and increase the intake of plant foods.

It is generally recommended that fat intake should not exceed 30% of energy in many Western countries (eg. Drewnowski & Popkin, 1997) and in 1995 this percentage had decreased to 32% (Figure 5.4). The contribution of protein to energy remained stable from 1983 to 1995, while carbohydrates increased to 46% of energy. This would reflect the increases in cereal food intake over this time.

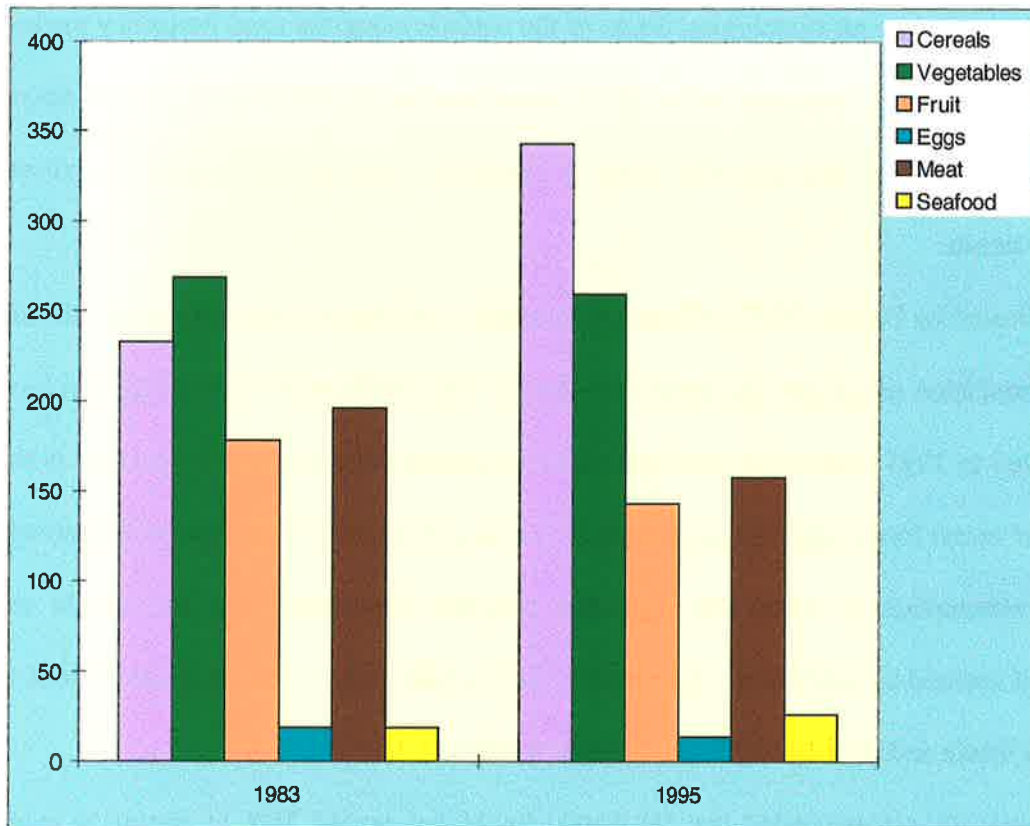


Figure 5.2. Changes in food groups intake from 1983 to 1995 in Australia using the 24-hour recall method (grams per day, national data).

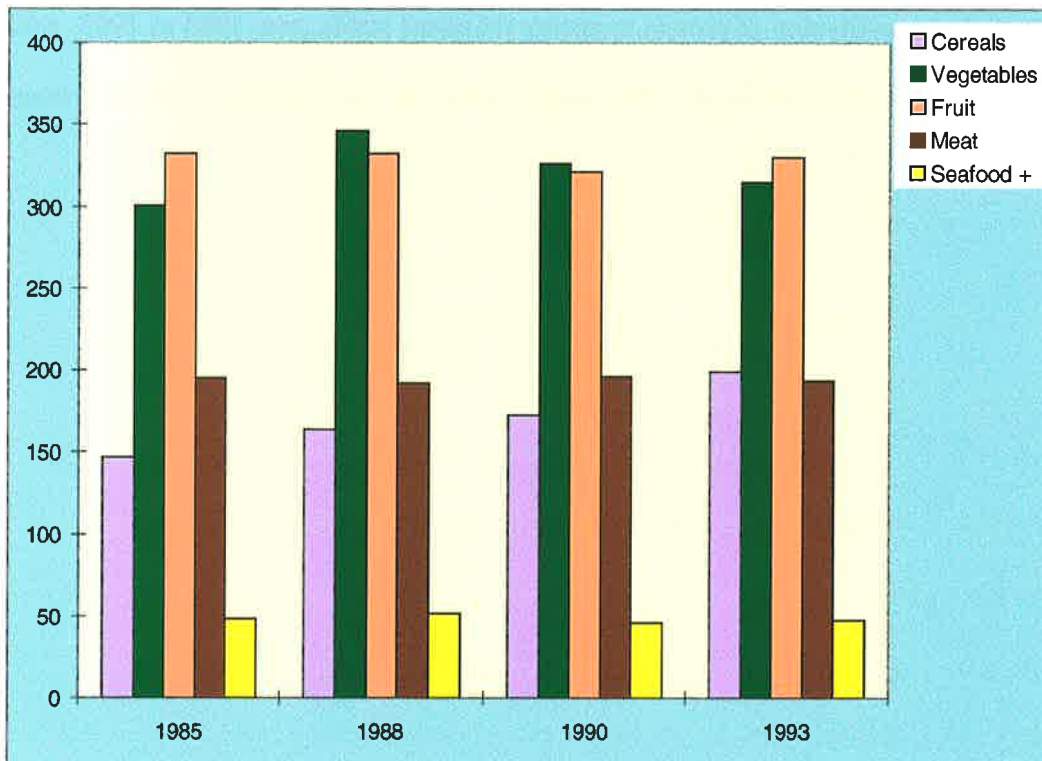


Figure 5.3. Changes in food groups intake from 1985 to 1993 in Australia using the food frequency of consumption method (grams per day, state and national data).
 Note that seafood+ includes poultry and eggs.

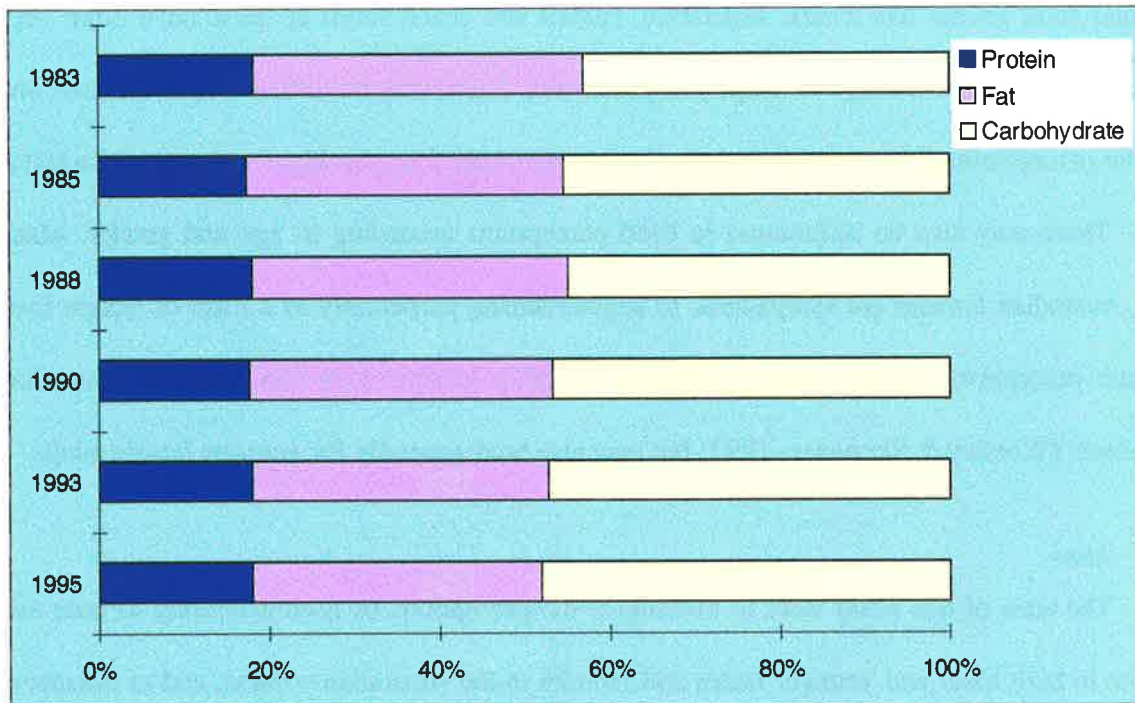


Figure 5.4. Changes in proportions of energy contributed from protein, fat and carbohydrate to the diets of Australians, 1983 to 1995.

(Note that alcohol is excluded to allow direct comparison with the Korean data).

Overall, it appears that many of the messages of the nutrition education campaigns are contributing to the decline in the amount of fat consumed and the increases in the level of cereal food consumption. It has been shown that it may be more expensive to follow some of these healthy diet recommendations indicating that differences in health between social groups may arise (McAllister et al, 1994).

2.2. Food perceptions of Australians

It could be expected that differences in taste and nutrition perceptions between older and younger respondents will exist. This is a reflection of the work by Garcia and colleagues (1975) documented earlier and the results found in the Korean study. The changing nature of Australia's food culture may also lead to age differences in food perceptions of both foods and meals.

Some of the nutrition perceptions which may be present in the Australian community, particularly the Anglo-Australian community, could reflect the changing perceptions of food perpetuated by the nutrition education movement active since the late 1960s. This could apply to

particular food groups like meats, vegetables, cereals and snack foods as these have often been targeted as part of the strategy to adopt a healthier diet. There may be differences in the taste and nutrition perceptions of these foods as there is a common belief that healthy food may not be tasty.

There may also be differences in food perceptions according to age and gender. Many young Australian females are sympathetic to vegetarianism, particularly as a form of weight loss, and their perceptions of meat may be different to other groups. This was found in Australian adolescents (Worsley & Skrzypiec, 1997) but may also hold generally for younger female adults.

Aims

The aims of this study were to investigate the perceptions of food according to taste and nutrition in both older and younger males and females in the Australian context, and to document how prevalent they are within the sample. These perceptions will be investigated in both individual foods and meals in an Anglo-Australian sample. Differences in rankings between taste and nutrition on global food groups will also be examined. The content of these taste and nutrition perceptions will be interpreted within the stages of nutrition transition in Australia.

3. Method

3.1. Sample of respondents

The Australian sample was age-stratified to allow for direct comparisons with the sub-groups from the Korean sample and from the findings of Garcia and colleagues (1975), and represented a convenience sample of 135 Australians. The respondents were either born in Australia or had Anglo-Australian parents so that the sample could approximate the ethnic and cultural homogeneity of the Korean sample. All respondents were drawn from Adelaide, South Australia. The YF and YM respondents were students at the University of Adelaide, studying generalist degrees. The older respondents included a small percentage of ancillary university staff,

but were mainly drawn from various community groups from different socio-economic areas of metropolitan Adelaide. The characteristics of this sample are shown in Table 5.4.

Table 5.4. Number of respondents and average age of groups in the Australian Food Perception Study sample.

Group	N	Age (mean \pm SD)
YF	40	21.4 \pm 3.8
YM	29	22.6 \pm 3.2
OF	40	48.2 \pm 11.6
OM	26	49.0 \pm 14.0

3.2. Materials

All of the marker and stimulus cards measured 13cm by 10.5cm and were made from white, unruled index cards just as those used in the previous two studies reported in Chapters 3 and 4. Two Q-samples were generated and each set had a colour-coded border for easy identification. The first Q-sample consisted of fifty pictures of individual food items commonly used in Australia and the second Q-sample contained fifty pictures of common Australian meals and meal items.

Food Perceptions Q-sort

Marker cards

A row of eleven marker cards, marked according to the distribution used in the Korean study (Figure 4.3, page 151) was placed at the top of a large desk. The extreme marker and middle cards were printed with the words “least tasty” (or least nutritious) (-5), “most tasty” (or most nutritious) (+5) and “neutral” (0) in English. The cards were arranged with the negative end on the left and the positive on the right.

Australian foods Q-sample

Many of the individual foods were kept the same as those from the Korean sample but using Australian pictures. These included foods like beef, bread, apples and milk but others were unique to the Australian study including foods like lamb and cheese. Twelve of the foods chosen were highly processed and snack foods to match the proportions of these foods used in the Korean

Q-sample. It is important to note that direct individual food comparisons between the Australian and Korean data are not appropriate because of the nature of Q-methodology. The sorting of each food is referenced only to those other 49 foods in the sample. If other foods were included the ranking may well change. However, global food group comparisons can be made. The complete list was checked for familiarity with two adult Australians, one younger and one older.

Photographs of foods taken in a local supermarket or pictures cut from leaflets were used. All foods were depicted in their raw state. The pictures were cut to size and glued to the white index cards. The index cards had the English words printed on them together with a randomly allocated identification number. Some examples are shown in Appendix O. The complete list of the fifty foods is shown in Table 5.5.

Table 5.5. The stimulus items used in the Australian food Q-sample.

1	Rice	18	Chocolate *	35	Tomatoes
2	Sweet biscuits *	19	Mandarins	36	Lettuce
3	Cabbage	20	Yoghurt	37	Pasta
4	Milk	21	White bread	38	Lentils
5	Apples	22	Potato Chips *	39	Bananas
6	Ice-cream	23	Carrots	40	Baked beans *
7	Eggs	24	Canned tuna *	41	Cream
8	Pork	25	Lollies *	42	Peas
9	Potatoes	26	Cucumber	43	Lamb
10	Cake *	27	Processed ham *	44	Watermelon
11	Beef	28	Grapes	45	Frankfurts *
12	White onions	29	Sweet bun *	46	Capsicum
13	Fish	30	Zucchini	47	Cheese
14	Dry biscuits (savoury)*	31	Jam *	48	Brown bread
15	Cauliflower	32	Strawberries	49	Canned fruit *
16	Garlic	33	Mushrooms	50	Sausages
17	Chicken	34	Peanuts		

* denotes highly processed / snack food

Australian meals Q-sample

Ten separate Australian respondents were asked to list their favourite meals. A list of fifty meals likely to be familiar to Anglo-Australians was generated from this, together with those itemised in recipe books targeted at the everyday meal (Fulton, 1991; 1989a, b, c, d, e). The complete list was shown to two other adult Australians, one younger and one older, to verify the

familiarity of the meals listed. Twelve of the foods were processed or take-away style meals to match the proportions of these meal types used in the Korean sample.

The pictures used were those taken from the cookbooks or meals prepared by the author according to standard recipes and then photographed. The pictures were cut to size and glued to the white index cards which also had the meal name in English, together with the printed, randomly allocated identification number. The complete list of the fifty foods is shown in Table 5.6 and some examples can be found in Appendix P. A description of the Australian-style meals can be found in Appendix Q.

Table 5.6. The stimulus items used in the Australian meal Q-sample.

1	Steak	18	Instant soup *	35	Apricot chicken
2	Hamburger *	19	Grilled fish	36	Roast beef
3	Pumpkin soup	20	Tossed salad	37	Kebabs
4	Fruit salad	21	Battered fish *	38	Cooked vegetables
5	Instant noodles *	22	Chocolate mousse	39	Pasty *
6	Meatloaf	23	Coleslaw	40	Beef / blackbean sauce
7	French onion soup	24	Mashed potato	41	Leg of lamb
8	Fish fingers *	25	Fried rice	42	Cheesecake
9	Pancakes	26	Chicken satay	43	Tuna mornay
10	Fried chicken *	27	Hot dog *	44	Apple pie
11	Cooked rice	28	Pavlova	45	BBQ sausages
12	Frozen meal *	29	Grilled lamb	46	Quiche
13	Beef casserole	30	Macaroni/ cheese	47	Veal parmigana
14	Pizza *	31	Chilli con carne	48	Rissoles
15	Grilled pork	32	Potato salad	49	Spare ribs
16	Fried chips *	33	Meat pie *	50	Stir-fried chicken
17	Spaghetti bolognese	34	Stir-fried vegetables		

* denotes take-away or processed food

3.3. Procedure

Each respondent was seated individually at the test session desk. Each respondent completed four Q-sorts according to the method used in the Korean study depicted in Figure 4.4, page 154. There were four orders of sorting generated and these were randomly allocated across respondents to eliminate the effects of order and fatigue.

The set of instructions (Appendix R) was shown to each respondent together with a verbal summary of the overall procedure emphasising the words 'most tasty', 'least tasty', 'most nutritious' and 'least nutritious'. The respondents were instructed to sort the foods from most to least tasty and from most to least nutritious according to the condition they were completing at the time. It was further emphasised that there were no right or wrong answers and that their own opinions were sought. After each individual Q-sort the responses were recorded using a pro-forma (Appendix S) and the cards were shuffled for the next Q-sort. The cards were shuffled between each Q-sort and between each respondent. A short demographics questionnaire asked for the respondent's age, sex, the country of birth of their mother and father and whether they were the individual in charge of the cooking in their home. The overall procedure lasted for thirty minutes on average. Data were entered using a custom-made computer program which had in-built checking mechanisms to eliminate data entry errors (A. Beaumont-Smith, 1994). There were no missing data.

3.4. Interpretation of factor composites

The resulting factor composites found were shown to ten of the respondents, three each of YF and OF and two each of YM and OM. This would provide some more validity to the factor interpretations as other perspectives, together with the language of lay people in describing taste and nutrition concepts, would be used. Firstly, two questions were asked about nutrition: 1) what words are associated with 'nutrition' in the minds of these respondents; and 2) how would they define nutrition. The factor composites were then shown to the respondents and they were asked to provide a label for the positive and negative end of each dimension. These were recorded on a pro-forma (Appendix T).

3.5. Data analysis

The data from all 135 respondents for each of the four sorting conditions were factor analysed using SPSS-X version 6.1 where respondents were entered as variables following the method outlined in Chapter 3. The factoring method used was principal components with varimax

rotation. The numbers of factors chosen depended on the interpretation of the scree plot of eigen values and the numbers found in the analysis of the Korean data. The complete factor composites for all factors generated can be found in Appendix U.

4. Results

4.1. Australian foods: Taste

Three factors accounted for 40% of the total variance for all 135 respondents. The number of respondents defining each factor, that is they loaded solely and significantly on that factor only, can be found in Table 5.7. The extreme ends of the factor composites can be found in Table 5.8.

Table 5.7. Percentage of variance, frequencies and percentages of age and gender characteristics of respondents for each factor: Australian foods - taste.

	A		B		C	
	18.5%		14.6%		6.6%	
	n	%	n	%	n	%
YF	1	3	11	35	17	52
YM	4	15	9	29	7	21
OF	14	48	4	13	8	24
OM	10	34	7	23	1	3
TOTAL	29	100	31	100	33	100
Younger	5	17	20	64	24	73
Older	24	83	11	36	9	27
Males	14	48	16	52	8	24
Females	15	52	15	48	25	76

Factor A was predominantly defined by older respondents (83%) and appeared to highlight a distinction between natural foods like chicken, beef, brown bread and bananas and more highly processed foods like lollies, frankfurts and white bread. This factor appears to contain some cognitive elements as the types of foods at the positive end could be more familiar to these older respondents. There were two labels given to this factor by the older respondents used in the post-analysis interpretation. These included an overall savoury vs sweetness and natural vs processed. It could be labelled *Natural vs processed* for two reasons. Firstly, some of the foods at the positive end were also sweet (eg. bananas) and secondly, the minor rankings also

revealed a general trend to place more processed forms of foods at the negative end including processed ham and canned fruit (-2).

Factor B contained strong-flavoured foods at the positive end including strawberries, beef and chocolate and bland foods at the negative end including rice, lettuce and lentils, according to the majority of respondents asked (80%). It was predominantly defined by younger respondents (64%). One important note is that all foods at the negative end were plant foods including many vegetables and rice and lentils. This factor could be labelled *Flavoursome vs bland*. Two of the most important distinctions between Factors A and B were the positions of potato chips (A: -4; B: +4) and brown bread (A: +3; B:-3). These foods provide the most separation between Factors A and B.

Factor C was defined by 33 respondents who were predominantly younger and female and more than half were in the YF group (52%) although it only accounted for 7% of the sorting variation for all respondents. The negative end contained many fatty meats including lamb and pork together with processed meats (frankfurts, processed ham and sausages). Beef was ranked at (-1). Only chicken, which represents a white meat and can be lean when the skin is removed, received a positive rank. The negative end also contained some vegetables. The positive end contained many sweet foods. A consensus was not reached among the respondents in the post-analysis interpretation. However, one respondent stated that the positive end contained mainly quick, ready to eat foods, while the foods at the negative end were meal-based and would require preparation. Another remarked that many of the foods at the negative end were fatty. It appears to contain some vegetarian elements together with quick, pleasure (sweet) foods at the positive end. It could be labelled *Sweet pleasure foods vs animal fatty foods*.

Table 5.8. Factor composites with scores greater than ± 3 for three factors: Australian foods - taste.

Score	A	B	C
+5	Fish	Beef	Chocolate
+5	Chicken	Chocolate	Strawberries
+4	Potatoes	Ice-cream	Pasta
+4	Beef	Cake	Bananas
+4	Mushrooms	Potato Chips	Watermelon
+3	Eggs	Chicken	Milk
+3	Pork	Lollies	Ice-cream
+3	Bananas	Strawberries	Chicken
+3	Brown bread	Lamb	Cheese
-3	Cake	Rice	Cabbage
-3	Dry biscuits	Cucumber	Garlic
-3	White bread	Baked beans	Zucchini
-3	Jam	Brown bread	Lamb
-4	Sweet biscuits	Cabbage	Pork
-4	Potato Chips	Cauliflower	Lentils
-4	Sweet bun	Lettuce	Frankfurts
-5	Lollies	Zucchini	Processed ham
-5	Frankfurts	Lentils	Sausages

Correspondence analysis

A two-dimensional graphic representation of percentages of placing each food at the most tasty end (+3, +4 and +5 or 9, 10, 11) for each of the ten groups (in the same way as presented in Chapter 3 page 114) can be found in Figure 5.5. The two-dimensional solution accounted for 85.1% of the variation in association scores.

The two-dimensional solution in Figure 5.5 shows a general distinction between meats, including beef, lamb and pork, which are more closely associated with the males, particularly the older males and most vegetables which are more closely associated with the females, particularly the older females. Many of the snack foods are more closely associated with the younger male group. Brown bread, eggs and fish were more closely associated with the older respondents while lollies, milk and grapes were more closely associated with the younger respondents.

4.2. Definitions of nutrition

Ten respondents were used in the post-analysis follow-up detailed in Section 3.4, page 200 so the results are only exploratory but provide the concepts and terms used by this lay sample to define and express nutrition. The words and phrases associated with 'nutrition' included notions of health and healthy (40%), good food (20%), vitamins and minerals (20%), nourishing (10%) and protein and meat (10%). The definitions of nutrition included notions of a balanced diet and eating the right balance of foods (60%), foods that are good for the body (20%), and foods that help the body to function correctly (20%).

4.3. Australian foods: Nutrition

Factor analysis of the nutrition rankings of the individual food Q-sort yielded two factors which accounted for 65.5% of total variance in nutrition rankings from all respondents. Table 5.9 shows the total numbers of respondents defining each factor and their demographic profile. The extreme ends of the factor composites can be found in Table 5.10.

Table 5.9. Percentage of variance, frequencies and percentages of age and gender characteristics of respondents for each factor: Australian foods - nutrition.

	D		E	
	58.2%		7.3%	
	n	%	n	%
YF	16	47	0	0
YM	10	29	5	26
OF	5	15	4	21
OM	3	9	10	53
TOTAL	34	100	19	100
Younger	26	76	5	26
Older	8	24	14	74
Males	13	38	15	79
Females	21	62	4	21

Factor D was the strongest factor accounting for 58% of the variation in nutrition sorts for all respondents. It was predominantly defined by younger respondents. It appeared to highlight a distinction between natural, plant foods like carrots, bananas and lentils and processed foods like chocolate, lollies and potato chips which are higher in fat and sugar. The foods at the positive end all appeared to be low in fat and fish, which is often perceived to be a low-fat, light food, was the

only animal food to make it into the positive end (+2). Many of the post-analysis respondents believed the foods at the negative end were higher in fat, salt and sugar (60%). This factor could be labelled *Natural, plant foods (low in fat) vs processed, animal foods (high in fat)*.

Factor E was predominantly defined by older and male respondents, particularly by the OM group (53%). None of the younger females were solely and significantly associated with this factor. It consisted of a positive regard for many protein foods including fish, chicken and beef. The (+1) and (+2) foods were mainly fruit and non-green leafy vegetables. The extreme negative end contained many forms of processed foods including potato chips, lollies and cake, while the (-1) and (-2) foods included white bread and some green vegetables. Some of the post-analysis respondents remarked that the positive end contained nutrient-dense foods, while the negative end had foods that were empty of nutrition and were “junk” foods (60%). Indeed, one older female said that there was nothing in watermelon (-3). This factor could be labelled *Wholesome, substantial vs processed, unsubstantial foods*. The main foods separating Factors D and E were pork (D: -1; E: +3), lamb (D: -1; E: +3) and the positions of many of the vegetables.

Table 5.10. Factor composites with scores greater than ± 3 for three factors: Australian foods - nutrition.

Score	D	E
+5	Carrots	Fish
+5	Mushrooms	Chicken
+4	Apples	Eggs
+4	Cauliflower	Beef
+4	Bananas	Brown bread
+3	Cabbage	Milk
+3	Tomatoes	Pork
+3	Lentils	Lamb
+3	Peas	Cheese
-3	Sweet biscuits	Sweet biscuits
-3	Ice-cream	Chocolate
-3	Cream	Jam
-3	Frankfurts	Watermelon
-4	Cake	Cake
-4	Chocolate	Dry biscuits
-4	Sweet bun	Sweet bun
-5	Potato Chips	Potato Chips
-5	Lollies	Lollies

Correspondence analysis

A correspondence analysis of the associations between the highest nutrition rankings (+3, +4 and +5 - 9, 10, 11) for the individual foods and ten respondent groups can be found in Figure 5.6. The two dimensional solution accounted for 84.1% of the variation in association scores.

Eight individual foods were not placed in the 'most nutritious' area by any of the ten respondent groups and these included sweet biscuits, sponge cake, potato chips, lollies, sweet bun, jam, cream and sausages. This indicates a consensus among respondents that none of these foods was perceived to be nutritious overall. This provides further evidence that the small number of nutrition perceptions which exist in this sample were widely shared.

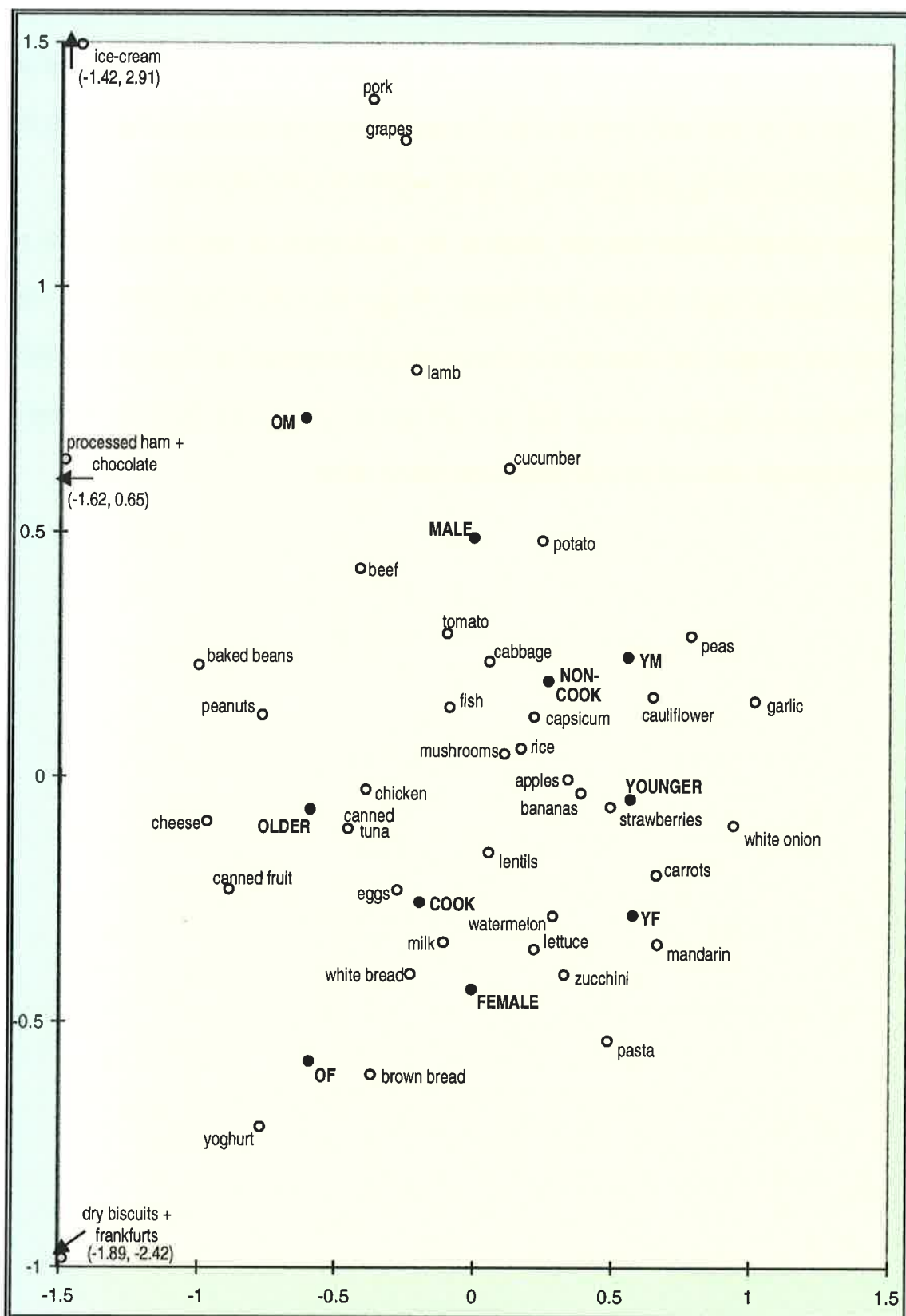


Figure 5.6. Correspondence analysis of percentage of most nutritious rankings of Australian foods by ten respondent groups.

Pork, lamb, beef and potatoes were clearly associated with the male group particularly the older males. This reflects the findings from Factor E. The fruits of strawberries, bananas and apples were more closely aligned with the younger group. Lettuce, watermelon and carrots were associated with the younger females and a great distance from the older males also reflecting the differences between Factors D and E.

4.4. Repeated measures MANOVA - relationships between taste and nutrition scores for Australian food groups

Forty-three of the individual foods were grouped into eight common food groupings and the differences in the average taste and nutrition scores for these groups were analysed using repeated measures multivariate analysis of variance (MANOVA). The repeated measures MANOVA results for the eight food groups can be found from Table 5.11 to Table 5.18.

Table 5.11. Mean scores and repeated measures MANOVA results for cereals on taste and nutrition as sorted by older and younger Australian male and female respondents.

CEREALS - taste		6.08 (1.35) *	younger	older
			6.16	5.99
male	5.74		5.88	5.58
female	6.31		6.36	6.26
CEREALS - nutrition		7.11 (1.23) *	younger	older
			7.15	7.06
male	7.00		7.21	6.77
female	7.18		7.11	7.25

Between subjects main effect of sex $F_{(1,131)} = 4.71, p < 0.05$

* Within subjects main effect of cereal perception $F_{(1,131)} = 73.93, p < 0.0005$

The cereals group (Table 5.11) was made up of rice, brown bread, white bread and pasta. In general, all respondents perceived the cereal foods to be more nutritious than tasty. The females ranked these foods higher on both nutrition and taste than the males.

Table 5.12. Mean scores and repeated measures MANOVA results for green vegetables on taste and nutrition as sorted by older and younger Australian male and female respondents.

GREEN VEGETABLES - taste		4.92 (1.18) *	younger	older
			4.54 **	5.30 **
male	4.70		4.49	4.93
female	5.06		4.58	5.54
GREEN VEGETABLES - nutrition		6.55 (1.17) *	younger	older
			6.87 **	6.21 **
male	6.37		6.59	6.12
female	6.67		7.07	6.28

Between subjects main effect of sex $F_{(1,131)} = 5.55, p < 0.05$

* Within subjects main effect of green vegetables' perception $F_{(1,131)} = 146.72, p < 0.0005$

** Within subjects interaction between age and green vegetables' perception $F_{(1,131)} = 24.80, p < 0.0005$

The green vegetables group (Table 5.12) contained cabbage, cucumber, zucchini, lettuce and peas. Females ranked these foods higher on both taste and nutrition overall when compared to the males. These foods were perceived to be significantly more nutritious than tasty overall and this was particularly the case for the younger respondents who placed these foods two ranks higher on average when evaluating them on the nutrition rather than the taste dimension.

Table 5.13. Mean scores and repeated measures MANOVA results for other vegetables on taste and nutrition as sorted by older and younger Australian male and female respondents.

OTHER VEGETABLES - taste		5.94 (1.20) *	younger	older
			5.47	6.43
male	5.76		5.38 ^a	6.19 ^a
female	6.06		5.53 ^a	6.58 ^a
OTHER VEGETABLES - nutrition		7.12 (0.84) *	younger	older
			7.43	6.80
male	7.17		7.51 ^a	6.78 ^a
female	7.10		7.38 ^a	6.82 ^a

* Within subjects main effect of perception of other vegetables $F_{(1,131)} = 141.17, p < 0.0005$

^a Within subjects interaction between age, sex and perception $F_{(1,131)} = 60.53, p < 0.0005$

The other vegetables group (Table 5.13) consisted of the average scores for potato, white onion, cauliflower, garlic, carrots, tomato and capsicum. The respondents overall, regarded these vegetables to be significantly more nutritious than tasty. Indeed, the standard deviation in the sorting scores for the nutrition sorting condition was quite small indicating less variation and strong agreement in the placement of these vegetables. Younger males showed the most

discrepancy in their rankings of these vegetables perceiving them to be significantly more nutritious than tasty, averaging a sorting difference of more than two ranks. Younger females also showed a reasonable difference in their rankings. The older respondents did not show as much difference in their taste and nutrition rankings for this food group. This reflects the differences found between the taste and nutrition factors highlighted in previous sections. The factors defined by the older group overall tended to perceive the same foods as tasty and nutritious, while the younger respondents provided markedly different rankings for many of the vegetables believing them to be much more nutritious than tasty.

Table 5.14. Mean scores and repeated measures MANOVA results for fruit on taste and nutrition as sorted by older and younger Australian male and female respondents.

FRUIT - taste		6.85 (1.25) *	younger	older
			7.01	6.68
male	6.86	7.38 ^a	6.28 ^a	
female	6.84	6.74 ^a	6.94 ^a	
FRUIT - nutrition		6.59 (0.89) *	younger	older
			6.80	6.37
male	6.59	6.72 ^a	6.23 ^a	
female	6.66	6.86 ^a	6.46 ^a	

Between subjects main effect of age $F_{(1,131)} = 10.31, p < 0.005$

Between subjects interaction between age and sex $F_{(1,131)} = 6.21, p < 0.05$

* Within subjects main effect of fruit perception $F_{(1,131)} = 4.84, p < 0.05$

^a Within subjects interaction between age, sex and fruit perception $F_{(1,131)} = 6.27, p < 0.05$

The foods which made up the fruit group (Table 5.14) included apples, mandarins, grapes, strawberries, bananas, watermelon and canned fruit. Over both sorting conditions, younger respondents gave significantly higher rankings to these fruits. Indeed, the older male group gave significantly lower rankings to these fruits on average irrespective of sorting condition. All respondents believed that these foods were significantly more tasty than nutritious, although the effect size would be small. The standard deviation in the average sorting scores for nutrition was small, indicating wide agreement overall on the placement of the fruit in this group. The younger females perceived the fruit to be slightly more nutritious than tasty, while all other respondent groups perceived them to be more tasty than nutritious.

Table 5.15. Mean scores and repeated measures MANOVA results for dairy products on taste and nutrition as sorted by older and younger Australian male and female respondents.

DAIRY PRODUCTS - taste		6.54 (1.14) *	younger	older
			6.92 **	6.14 **
male		6.42	6.82	5.98
female		6.62	6.99	6.25
DAIRY PRODUCTS - nutrition		5.76 (1.08) *	younger	older
			5.40 **	6.14 **
male		5.65	5.36	5.97
female		5.84	5.44	6.24

* Within subjects main effect of dairy products' perception $F_{(1,131)} = 44.73, p < 0.0005$

** Within subjects interaction between age and dairy products' perception $F_{(1,131)} = 43.53, p < 0.0005$

The group of foods which made up the dairy product group (Table 5.15) included milk, ice-cream and yoghurt, cream and cheese. The fat content of these foods varies greatly among the foods, with cream, ice-cream and cheese the highest while milk and yoghurt are much lower. However, the average deviation in sorting scores around the mean was only one rank indicating that not much difference in nutrition was perceived within this group of foods. Indeed, all respondents perceived dairy products to be much more tasty than nutritious overall. This was especially true for the younger respondents. The older respondents did not differ at all in their rankings assigned to these dairy products on taste or nutrition on average, which was in the neutral range of the scale.

Table 5.16. Mean scores and repeated measures MANOVA results for meat on taste and nutrition as sorted by older and younger Australian male and female respondents.

MEAT - taste		6.90 (1.73)	younger	older
			6.46	7.36
male		7.36	6.74	8.07
female		6.58	6.26	6.91
MEAT - nutrition		7.02 (1.46)	younger	older
			6.75	7.30
male		7.24	6.83	7.70
female		6.87	6.69	7.04

Between subjects main effect of age $F_{(1,131)} = 13.42, p < 0.0005$

Between subjects main effect of sex $F_{(1,131)} = 7.69, p < 0.01$

The meat group (Table 5.16) consisted of pork, beef, lamb and chicken. There were no significant differences in the rankings of the foods in this group on either the taste or nutrition sorting condition. However, irrespective of sorting condition, the younger respondents and the female respondents assigned these meats lower rankings, perceiving them to be less tasty and less nutritious. This corroborates the findings from the correspondence analyses for the males where, if any respondent placed these meats in the most nutritious and most tasty end of the Q-distribution, they were significantly less likely to be female, indicating a higher preference for meat overall among the males. The older respondents, in general, also had a more positive regard for meat as exemplified by Factors A and E.

This tendency toward vegetarianism among the females can also be noted in the positions of the animal foods on the taste correspondence analysis in Figure 5.5. Canned tuna and chicken were the only animal foods located near the female groups. The red meats of pork, beef and lamb were located nearest to the male and older male groups. The MANOVA was re-run with the red meats of beef, lamb and pork only and the results were the same except that there was a significant sex by red meat perception interaction ($F_{(1,131)}=5.83$, $p<0.05$) where the females overall saw these red meats as much less tasty and slightly less nutritious than the males.

Table 5.17. Mean scores and repeated measures MANOVA results for processed meat / fish on taste and nutrition as sorted by older and younger Australian male and female respondents.

PROCESSED MEAT / FISH - taste		4.74 (1.45)	younger	older
			4.86	4.62
male	5.00		4.85	5.16
female	4.56		4.86	4.26
PROCESSED MEAT / FISH - nutrition		4.62 (0.96)	younger	older
			4.57	4.68
male	4.91		4.84	4.98
female	4.43		4.37	4.49

Between subjects main effect of sex $F_{(1,131)} = 8.71$, $p<0.005$

The processed meat and fish group (Table 5.17) included canned tuna, processed ham, sausages and frankfurts. These were not included with the meat group as they were viewed differently from the other foods making up these categories which was particularly evident in the

correspondence analyses (Figure 5.5 and Figure 5.6). There was no significant difference of perception of these foods and the scores averaged approximately 4.5 indicating that they were viewed as less tasty and less nutritious than many other foods in the Q-sample. The female respondents significantly ranked these foods lower than the males irrespective of sorting condition. The females appeared to regard these foods quite negatively.

Table 5.18. Mean scores and repeated measures MANOVA results for snack foods on taste and nutrition as sorted by older and younger Australian male and female respondents.

SNACK FOODS - taste	6.05 (1.77) *	younger	older
		6.91 **	5.14 **
male	6.21	6.70 ^a	5.66 ^a
female	5.93	7.06 ^a	4.81 ^a
SNACK FOODS - nutrition	2.69 (0.68) *	younger	older
		2.56 **	2.82 **
male	2.73	2.60 ^a	2.87 ^a
female	2.66	2.53 ^a	2.79 ^a

Between subjects main effect of age $F_{(1,131)} = 20.97, p < 0.0005$

Between subjects interaction between age and sex $F_{(1,131)} = 4.15, p < 0.05$

* Within subjects main effect of snack foods perception $F_{(1,131)} = 574.84, p < 0.0001$

** Within subjects interaction between age and snack foods perception $F_{(1,131)} = 46.50, p < 0.0005$

^a Within subjects interaction between age, sex and snack foods perception $F_{(1,131)} = 4.57, p < 0.05$

The snack food group (Table 5.18) consisted of sweet biscuits, cake, dry biscuits, chocolate, potato chips, lollies and sweet buns. The averages for this group on nutrition were the lowest over all of the eight food groups. The average deviation of the scores around the mean on the nutrition condition for all respondents was only ± 0.68 which is quite low. This means that all respondents regarded these seven foods as the least nutritious when compared to the other foods indicating widespread agreement. It is important to note that the average score for taste was 6.0 which is in the neutral range indicating that other foods were seen to be both more and less tasty overall. The standard deviation for the taste scores for this food group was higher than in other food groups indicating less agreement in taste across the respondents.

The older respondents, particularly the older females, gave significantly lower scores overall to these snack foods than the younger respondents. Snack foods were seen to be significantly more tasty than nutritious, particularly by the younger respondents. The older

respondents, particularly the older females, perceived these foods to be significantly less tasty and slightly more nutritious (average rank still less than -3) than all other respondent groups. This means that there was less difference in the rankings of these foods on taste and nutrition among the older females than for all other groups.

Overall, there were differences in perceptions between taste and nutrition for six of the eight food groups, excepting meat and processed meat and fish groups. The plant food groups including cereals, green and other vegetables were assigned significantly higher scores on nutrition than on taste, and this was often expressed more extremely by the younger respondents. This is of particular concern as Australian health professionals are trying to encourage a greater consumption of foods from these groups (National Health and Medical Research Council, 1992).

Dairy products and snack foods were seen to be more tasty than nutritious overall, particularly the snack food group. This was predominantly the case for the younger respondents. There were few differences overall for the animal foods group except that the younger and female respondents gave lower scores overall to these foods irrespective of sorting condition.

4.5. Australian meals: Taste

Three factors of the taste rankings for the Australian meals Q-sort were found which accounted for 42.8% of the variation in these rankings for all respondents. The demographic profiles of those respondents who loaded significantly on only one of these three factors can be found in Table 5.19. The composite factors can be found in Table 5.20.

Table 5.19. Percentage of variance, frequencies and percentages of age and gender characteristics of respondents for each factor: Australian meals - taste.

	F		G		H	
	26.3%		8.7%		7.8%	
	n	%	n	%	n	%
YF	5	17	5	21	10	53
YM	5	17	6	25	7	37
OF	17	57	5	21	0	0
OM	3	9	8	33	2	10
TOTAL	30	100	24	100	19	100
Younger	10	33	11	46	17	71
Older	20	67	13	54	2	29
Males	8	27	14	58	9	47
Females	22	73	10	42	10	53

Factor F features a clear distinction between meals that are unprocessed and those that are processed as noted by 80% of the post-analysis respondents. The meals at the positive end were regarded as wholesome, home-cooked and unprocessed, while those at the negative end were regarded as convenient and processed. The meals at the positive end could also be regarded as light meals as they centred around stir-fries, vegetables and salads together with grilled fish and chicken dishes. This was also seen in some of the minor rankings (Appendix U). All dessert and heavier meat dishes were regarded negatively, while other salad and rice dishes were regarded positively. It could be labelled *Light, unprocessed vs heavier, processed*. This factor appears to contain some cognitive as well as sensory elements as it was predominantly defined by older females (57%), many of whom may be interested in weight control and lighter eating.

Factor G appeared to distinguish between meals that were regarded as tasty and bland as highlighted by 70% of the post-analysis group. Two of these respondents also mentioned that the meals at the positive end were more substantial, including roast beef and lamb, than those at the negative end which were snack or side-dish varieties, including salads and instant foods. The meals at the positive end were also all meat-based, while the negative end were vegetable-based. This was supported by the minor rankings (Appendix U). This factor could be labelled *Meat,*

substantial dishes vs vegetable, side-dishes and was not predominantly defined by any group although older males were slightly more prolific in this factor (33%).

Factor H appeared to distinguish between sweeter dishes at the positive end and savoury dishes at the negative end as noted by 80% of the post-analysis respondents. Many dessert dishes formed the base of the positive end together with many of the sweeter main meals including pizza (often served with pineapple) and chicken satay (often served with peanut satay sauce). This factor was mainly defined by younger respondents, particularly young females (53%). This factor could be labelled *Sweet vs savoury*.

Table 5.20. Factor composites with scores greater than ± 3 for three factors: Australian meals - taste.

Score	F	G	H
+5	Stir-fried vegetables	Pizza	Chocolate mousse
+5	Stir-fried chicken	Leg of lamb	Cheesecake
+4	Tossed salad	Steak	Fruit salad
+4	Chicken satay	Chicken satay	Pancakes
+4	Cooked vegetables	Roast beef	Pavlova
+3	Pumpkin soup	Fried chicken	Pizza
+3	Fruit salad	Apricot chicken	Fried rice
+3	Grilled fish	Veal parmigana	Chicken satay
+3	Beef / blackbean sauce	Spare ribs	Apple pie
-3	Hamburger	Tossed salad	Meatloaf
-3	Fish fingers	Coleslaw	Fish fingers
-3	Pasty	Mashed potato	Grilled pork
-3	BBQ sausages	Potato salad	Chilli con carne
-4	Instant noodles	Fish fingers	Instant noodles
-4	Instant soup	Cooked rice	French onion soup
-4	Hot dog	Frozen meal	Instant soup
-5	Frozen meal	Instant noodles	Frozen meal
-5	Meat pie	Instant soup	Grilled fish

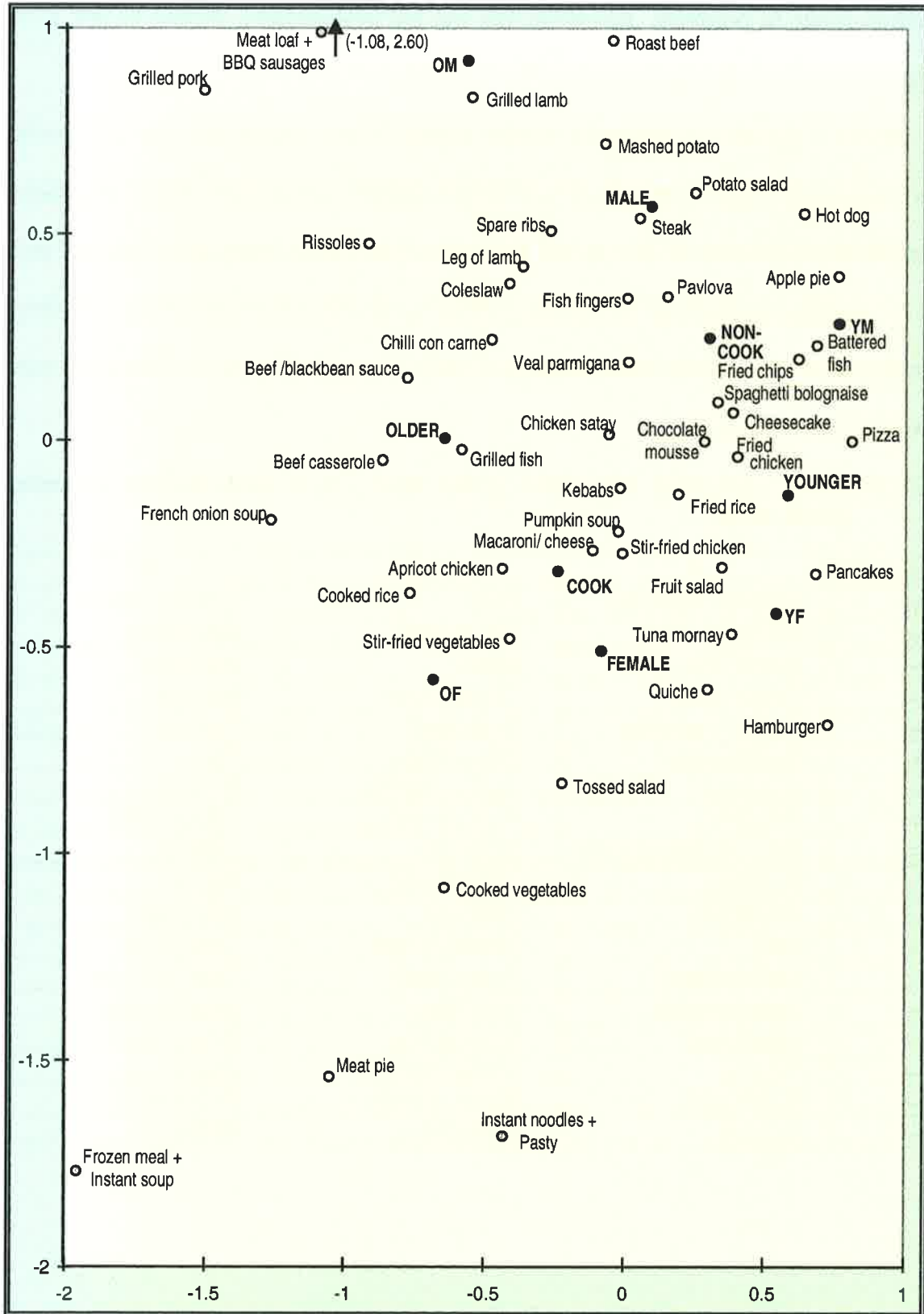


Figure 5.7. Correspondence analysis of percentage of most tasty rankings of Australian meals by ten respondent groups.

Correspondence analysis

The correspondence analysis in Figure 5.7 accounted for 87.3% of the variation in association scores. The female respondents were clearly associated with some of the lighter, vegetable based meals while the male respondents, particularly the older males, regarded the roasts, and heavier meat based dishes the most positively. The older respondents appeared to favour traditional meals like grilled fish and beef casserole while the younger respondents regarded dessert dishes and fried foods as very tasty.

4.6. Australian meals: Nutrition

Two factors of the nutrition rankings for the Australian meals Q-sort were found which accounted for 64.8% of the variation in these rankings for all respondents. The demographic profiles of those respondents who loaded significantly on only one of these factors can be found in Table 5.21. The factor composites can be found in Table 5.22.

Table 5.21. Percentage of variance, frequencies and percentages of age and gender characteristics of respondents for each factor: Australian meals - nutrition.

	I		J	
	59.4%		5.4%	
	n	%	n	%
YF	10	34	1	7
YM	12	41	1	7
OF	5	17	3	20
OM	2	8	10	68
TOTAL	29	100	15	100
Younger	22	76	2	14
Older	7	24	13	86
Males	14	48	11	75
Females	15	52	4	25

Factor I provided a clear distinction between vegetable and lighter dishes at the positive end and dessert and meat dishes at the negative end. This was highlighted by 50% of the post-analysis respondents who also mentioned a distinction between low-fat and high-fat and natural and processed. This was also supported by many of the minor rankings including positive ranks for soups and negative ranks for roasts. This factor accounted for most of the variance and could

be labelled *Low-fat vs high-fat*. This factor was predominantly defined by younger respondents (76%).

Ninety percent of the post-analysis respondents believed that Factor J highlighted a distinction between wholesome, home cooked meals at the positive end, including beef casserole, grilled fish, and leg of lamb and processed, convenience, take-away meals at the negative end. The negative end appears to be quite similar for both factors; the distinction appears to be in the differences between the neutral and positive rankings for the vegetable and meat dishes. Tossed salad (I: +5; J: +1) and fruit salad (I: +4; J: 0) are placed four positions further down on nutrition for Factor J than on Factor I. Some of the substantial meat-based dishes are placed higher on nutrition on Factor J including beef casserole (+1; +4), leg of lamb (0; +3) and roast beef (0; +2). Many of the dishes regarded positively in Factor J are filling meals. This factor could be labelled *High-satiety, wholesome vs low-satiety, processed*. This factor was predominantly defined by older respondents, particularly older males (68%).

Table 5.22. Factor composites with scores greater than ± 3 for three factors: Australian meals - nutrition.

Score	I	J
+5	Tossed salad	Grilled fish
+5	Cooked vegetables	Beef /blackbean sauce
+4	Fruit salad	Beef casserole
+4	Cooked rice	Spaghetti bolognese
+4	Grilled fish	Stir-fried chicken
+3	Pumpkin soup	Stir-fried vegetables
+3	Mashed potato	Cooked vegetables
+3	Potato salad	Leg of lamb
+3	Stir-fried vegetables	Veal parmigana
-3	Fried chicken	French onion soup
-3	Pizza	Fried chips
-3	Meat pie	Hot dog
-3	Cheesecake	Apple pie
-4	Hamburger	Chocolate mousse
-4	Hot dog	Pavlova
-4	Pavlova	Cheesecake
-5	Fried chips	Instant noodles
-5	Chocolate mousse	Instant soup

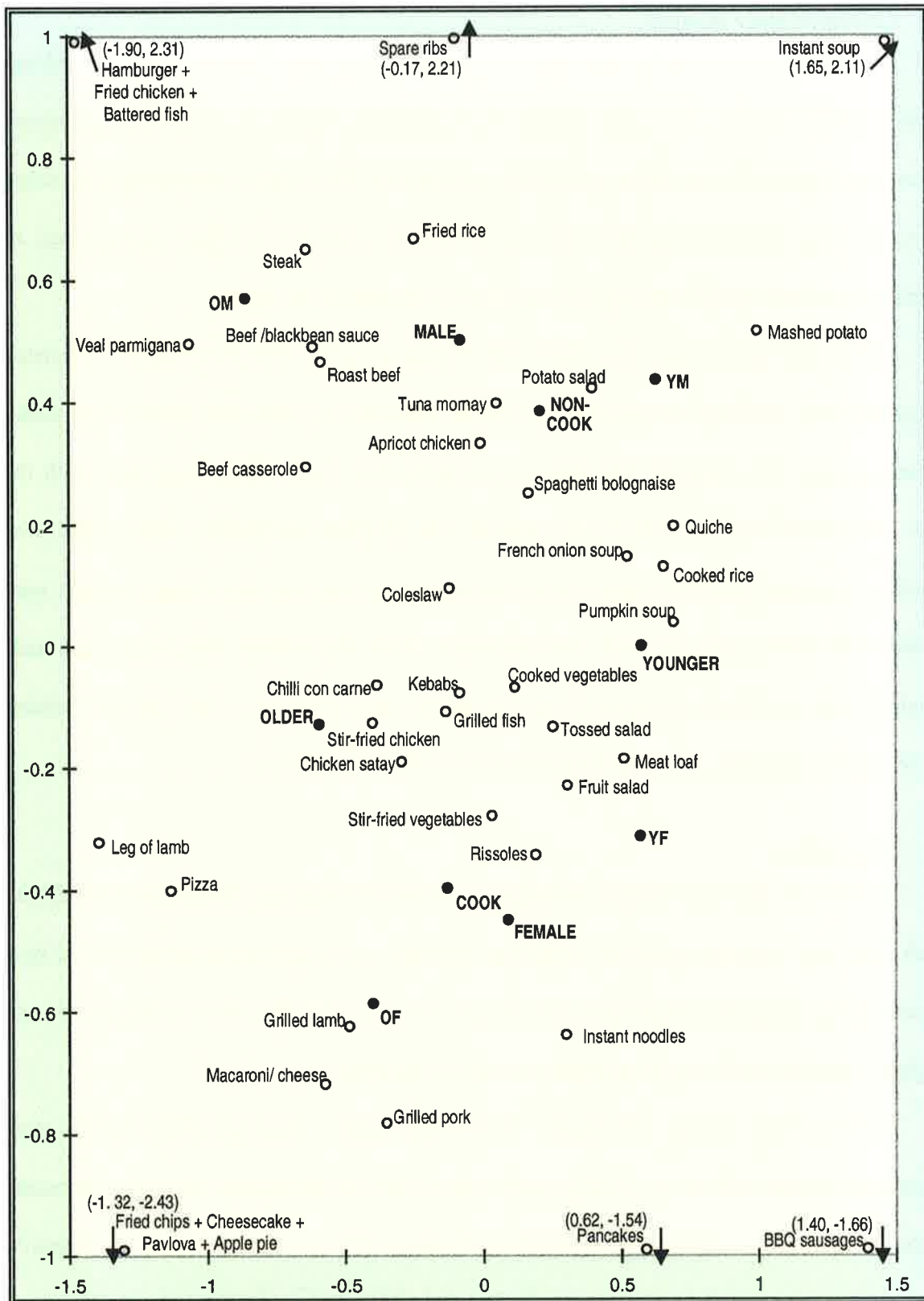


Figure 5.8. Correspondence analysis of percentage of most nutritious rankings of Australian meals by ten respondent groups.

Correspondence analysis

A two-dimensional graphic representation of associations between percentages of rankings as most nutritious and ten respondent groups can be found in Figure 5.8. This two dimensional solution accounted for 86.9% of the variation in associations. Fish fingers, frozen meal, chocolate mousse, hot dog, meat pie and pasty were never ranked at the +3 or higher position and all received dimensional coordinates of (0,0) and were not included in the figure.

The female respondents, particularly the younger females, were more clearly associated with lighter meals including fruit salad and stir-fried vegetables together with lighter meat dishes including rissoles and meatloaf. The male respondents were more clearly associated with the heavier meat-based meals including beef casserole and spaghetti bolognese. Older males were particularly associated with meat-based meals including steak and roast beef. Older females were associated with grilled lamb and pork. This appears to show that overall, older female and male respondents perceived many meat-based dishes to be the most nutritious, where younger females perceived lighter vegetable and salad based meals to be the most nutritious.

5. Discussion

The aims of this study were to investigate the taste and nutrition perceptions of food held by both older and younger Australian males and females, and to provide an indication of how consensual these perceptions were within this sample. These perceptions were investigated in both individual foods and meals that were familiar to Anglo-Australians.

The two taste sorting procedures (foods and meals) generated three factors each accounting for around 40% of the variance among all of the 135 participants. This, like the results from the Korean study, is quite high considering the large within-culture variation that exists in individual food likes and dislikes (Rozin & Vollmecke, 1986). There appears to be some overall agreement on which foods are believed to be tasty and these can be represented by a small number of shared perceptions.

The two nutrition Q-sorts each generated two factors which accounted for around 65% of the shared variation in sorts from the 135 respondents. This again shows that a small number of shared perceptions meaningfully represent the ideas of nutrition held by this sample. Much agreement exists among the sample in which foods are perceived to be nutritious and which foods are tasty, to a lesser extent. Nutrition education may play a role in shaping the nutrition perceptions of foods and modern Australian cuisine may play a role in shaping taste perceptions. However, differences, particularly in taste perceptions, exist between older and younger respondents which may reflect the different eras in food socialisation and the evolution of Australia's cuisine.

5.1. Taste

Older respondents generally perceived natural foods to be more tasty than more highly processed foods, while younger respondents tended to distinguish foods according to perceived flavour intensity, placing many vegetables, rice and lentils at the negative end. This was also supported by the meals condition where sweeter dishes were regarded positively by the younger respondents. It may be that the more highly processed foods, commonly regarded as junk foods, are less familiar to many of the older respondents. It is often stated that older people require a stronger taste sensation, as their taste sensitivity decreases with age (eg. Booth et al, 1989) but they could be looking for this increased taste sensation in foods which are familiar. This was also generally the case with the meals condition, where traditional and wholesome meals were generally preferred by older respondents, particularly the older males. Some of the older females however, tended to prefer lighter dishes and meals.

Semi-vegetarian perceptions were also seen among a group of females, especially younger females. This negative perception of meat and other animal foods by females has also been noted in some adolescent Australian females (eg. Worsley & Skrzypiec, 1997). This may reflect a trend of rejecting red meats and preferring white meats, although pork, often marketed as a white meat, was also regarded negatively. The perception of meals also reflected this tendency for some of the

younger females who preferred lighter and sweeter dishes to heavier and savoury foods (Factors F and G). This was also found in the correspondence analyses and MANOVA results for meat. This rejection of meat is often a concern among nutritionists as females require higher amounts of dietary iron each day, of which red meat is a rich source (Cobiac & Baghurst, 1993). This perception and semi-vegetarian tendencies may also tap into a more fundamental belief that red meat, particularly beef, is a masculine food which provides energy and power. This has been documented in other cultures (Baghurst et al, 1997).

5.2. Nutrition

The younger respondents tended to perceive plant foods, including many vegetables, cereals and fruits as most nutritious while meats and processed snack foods were viewed as low in nutrition. Older respondents also viewed these snack foods negatively but placed foods high in protein and foods that are more substantial and filling at the positive end, particularly older males. This is also represented in the correspondence analysis.

The younger respondents appear to be more responsive to the messages of nutrition education, rejecting overly processed foods as unhealthy and low in nutrition and favouring fruit and vegetables which the Australian Dietary Guidelines recommend (National Health and Medical Research Council, 1992). The older respondents seem to hold more traditional perceptions of nutrition which emphasised body building protein foods (eg. Clements, 1986). This was generally also seen in the meal condition, especially among older males. It could be expected that older males would believe that wholesome, traditional meat-based meals are more nutritious than many vegetable dishes and take-away foods as these foods would be very familiar and are what many would have been brought up eating. It may be that the older males are the least susceptible to the nutrition education culture because they are often not the ones responsible for food preparation (eg. Harnack et al, 1998). Women also often appear to be more attuned to the 'latest' food and nutrition information and information of this type abounds in women's magazines (eg. Lester, 1994; Reilly et al, 1993; Turner, 1974). Older men, however, are the most

susceptible to many of the non-communicable diseases which are linked to diet and other lifestyle factors (eg. d'Espaignet et al, 1991). Older men may also tend to feel less responsible for their health overall and it has been found that those older males who do feel less control over their own health tend to exhibit dietary practices believed not to be conducive to good health (Falconer et al, 1993).

There appears to be a paradox in the relationships between taste and nutrition perceptions. The foods regarded as tasty and nutritious tended to be the same for the older respondents in general. However, in general the younger respondents regarded vegetables, and some cereal and legume foods as high in nutrition but low in taste; and some meats and snack foods as high in taste but low in nutrition. This is important information for nutrition educators and food marketers who are trying to position their products within these markets. Nutrition educators need to emphasise ways that vegetables and cereal foods can be made to be more appealing to young people to improve their perceptions of these foods.

Popkin (1994) maintains that nutrition education and behaviour change represent the last stage in a nation's nutrition transition. Nutrition education has been practiced in Australia in some form since 1918 (Lester, 1994) but was formalised in response to the 1986 Ottawa Charter (National Health and Medical Research Council, 1989). This approach does appear to be working at the population level at least with increases in plant food intake and decreases in fat as a percentage of energy. The 1995 National Nutrition Survey shows that the proportions of young people aged 19-25 years consuming these types of foods in the previous 24 hours were: cereals (M: 91.4%, F: 90.2%), fruit (M: 31.9%, F: 41.4%) and vegetables (M: 84.7%, F: 86.5%). So the levels of young people consuming cereals and vegetables are quite encouraging and in amounts (grams) that would be conducive to good health. Fruit consumption however, leaves much room for improvement (Australian Bureau of Statistics, 1997b). It may be that people of this age eat what the family eats, particularly as young people are tending to remain at home for longer. When

they are responsible for their own food choices less healthy snack alternatives may predominate. Fruit is generally eaten as a snack which may reflect the low levels of consumption.

6. Conclusions

The Australian results reflect the Korean results where a small number of highly shared perceptions of food appear to exist among the sample. There were differences according to gender and also among older and younger Australians indicating the influences of the timing of food socialisation. These taste and nutrition representations of food seem to be informed by the wider societal context particularly by nutrition education campaigns which have been conducted in Australia for some time. The perception of meat provides a good example of this. Historically meat played an important part in Australia's emerging economy and cuisine but it has received some negative press in recent times. Older respondents tended to view meat positively while the younger respondents, particularly the younger females, held more negative perceptions about meat. How these general representations and perceptions of food affect food intake was not assessed here and this information would provide further validation of the utility of the concept of food perceptions.

Chapter 6

Food perceptions and food intake

Chapters 4 and 5 detailed the measurement of food perceptions in Korea and Australia at one point in time using both individual and meal contexts and provided a description of their content. The content was related to the structural factors of these two diverse nations and more generally to the food habits of these countries as a whole as reported in national food intake data. These economic, social and nutritional circumstances may provide insight into the development of these food perceptions generally. However the relation of these socially-shared food perceptions to food intake at the individual level was not conducted and this would provide a validation of the utility of the construct of food perceptions. In other words how do perceptions of food, the content of which develops through communication and social interaction, influence the food intake behaviour of individuals who hold them? This chapter will describe a small exploratory study investigating the relationships between food perceptions as measured by the Q-sort procedure and food intake as measured by a food frequency questionnaire.

1. Prediction of food behaviour

The social sciences, particularly social psychology, have been interested in identifying the relationships between cognitive, social and demographic variables and a particular behaviour often with the aim of predicting that behaviour. The models and methodology used in social psychology have been applied relatively recently in the nutrition sciences in an attempt to explore some of the social and cognitive variables related to food intake behaviour. This has been instead

of relying solely on the demographic segmentation of a population with variables that tend to be easier to measure (eg. Axelson & Brinberg, 1989). The nutrition community have been interested in identifying the antecedents of food behaviour so that more successful programs can be developed to change errant dietary habits (eg. Larsson & Lissner, 1996). Many of these programs had been unsuccessful at maintaining dietary changes at the individual or population level as they were often based on the premise that knowledge was one of the most important factors driving eating behaviour and if 'correct' knowledge was given through education then dietary change would naturally follow (eg. Johnson & Johnson, 1985; Lewis, 1989). While knowledge is important, Kayman (1989) points out that there are many other variables which influence food consumption and hence social nutrition researchers are looking to the social and behavioural sciences for theories and methodologies to elucidate these variables.

1.1. Social psychological models of behaviour used by the nutrition sciences

Knowledge - attitudes - practice

The general model of knowledge – attitudes – practice has been used extensively in the nutrition sciences with varying degrees of success. Axelson and colleagues (1985) conducted a meta-analysis of nine studies relating nutrition knowledge and nutrition attitudes to dietary intake and found significant correlations between these variables although the effect sizes were small (knowledge – behaviour: 0.101; attitudes – behaviour: 0.178). One criticism of these types of studies has been the measurement of 'nutrition knowledge' (Wardle, 1993). Often specific questions are asked, for example 'Which of the following foods contain fibre?' (Shepherd & Stockley, 1987) and the average person may not achieve a high score even though they have a general idea of which foods are healthy and then act upon these perceptions. These types of studies often do not assess the general notions of which foods are healthy held by the community.

Wardle and colleagues (2000) conducted a representative postal survey in England measuring nutrition knowledge using a prevalidated scale (Parmenter & Wardle, 1999) and investigating the links between general nutrition knowledge and intake of fruits, vegetables and

fat. They found that there were significant relationships between nutrition knowledge and the intakes of fruits and vegetables, and to a lesser extent fat among the 1040 participants. Nutrition knowledge also mediated the relationship between healthy eating and the standard demographics of education and occupational class. Those in the highest quintile of nutrition knowledge were 25 times more likely to be consuming foods at the recommended levels than those in the lowest quintile. This means that when nutrition knowledge is measured using more appropriate questions and subscales, a modest relationship does exist between this knowledge and dietary behaviour such that knowledge is able to account for up to 20% of the variation in food intake.

The Theory of Reasoned Action (TORA)

Many of the models used in social psychology extend the basic model of the relationships between knowledge, attitudes and behaviour and this includes the Fishbein and Ajzen 'Theory of Reasoned Action' (Fishbein & Ajzen, 1975) which has also been used extensively in the nutrition sciences. This methodology is quite rigid in its measurement and application and tends to be used with specific dietary behaviours rather than overall dietary practices. Briefly, the TORA assumes that people behave in a rational manner using all information available to them. A person performing an act (or not) is immediately preceded by their 'intention' to perform that behaviour and that intention is a function of an attitudinal and a normative component. Attitudes to performing that behaviour will be positive or negative depending upon the individual's beliefs about that behaviour and their evaluations of those beliefs. For example, those individuals who believe that sun exposure causes skin cancer and that using sunscreen can reduce skin cancer risk are more likely to have a positive attitude to sunscreen use. The subjective norm component refers to the modifying effects of other people who are important to the individual (eg. family, peers, experts) and the individual's perceptions of how these others feel about them performing the behaviour. For example, an individual may perceive pressure from peers about achieving a suntanned look. These two components will be weighted differently by the individual and influence their intention to perform the behaviour. In the above example, an individual may hold

positive attitudes to sunscreen use but not intend to use sunscreen (and hence not actually use sunscreen) because their peers' opinions are more important to them at that point in time. The TORA was extended to include the concept of 'perceived control' over the behaviour and was called the 'Theory of Planned Behaviour' (TPB: Ajzen, 1985; 1988; 1991).

These models have been used in many studies of specific food behaviour including the consumption of different types of milk (Brewer et al, 1999; Tuorila, 1987), meat (Zey & McIntosh, 1992), starchy foods (Stubenitsky & Mela, 2000) and foods chosen for breakfast (Berg et al, 2000). The TORA has also been used to investigate the stability and resemblance of beliefs, attitudes and intentions to consume twenty foods across three generations of Dutch women (Stafleu et al, 1995).

Zey and McIntosh (1992) investigated the attitudinal and normative components underlying intention to consume beef in lesser or greater amounts in the following year among 400 Texan women. They found that beliefs were independently linked to intention to consume beef. Those who believed that beef was unhealthy, less satisfying to the appetite and that consuming beef was unsafe intended to consume less beef in the future. The first two beliefs were linked to an attitudinal component 'consuming beef has bad consequences' but this attitude was not linked directly to intent to consume beef. The normative component comprising the perceived beliefs of husbands and friends to consuming less beef was more strongly related to intent to consume. Demographic variables also contributed little explanatory power to the model. They also noted that a dichotomy existed between the importance of health and taste and attitude towards beef. Those for whom health was important viewed beef negatively and those who regarded taste as important viewed beef positively. This study demonstrates the importance of beliefs and perceptions in predicting food choices directly.

The relation of intention to consume beef to actual consumption of beef was not assessed in the Zey and McIntosh (1992) study and Ajzen and Fishbein (1980) maintain that this relationship always exists. However, food use is influenced by so many factors at the food choice

and food procurement stages that the proposed relationship between intention and behaviour may be weakened. A further criticism of this study is one which can be more widely directed at the use of these types of models to explain food behaviour. The models require a high degree of correspondence between the questions assessing beliefs, importance of beliefs, attitudes, perceptions of important others' beliefs and motivation to comply with these others and the food under investigation, meaning that the questions are very specific in nature (Axelson & Brinberg, 1989). This means that relationships between these factors and use of one or a few foods can be assessed often with good statistical power but how these relate to the diet as a whole and wider food habits cannot be determined.

Triandis' model of social behaviour

This model for predicting behaviour was developed by Triandis (1977, 1980) and has been used by a few studies in the nutrition sciences. It also includes beliefs and evaluations of those beliefs and normative components but includes an habitual component. Briefly it postulates that behaviour is influenced by facilitating conditions (how easy the behaviour is to perform, an individual's knowledge about the behaviour and how motivated they are to perform the behaviour), habit (frequency of past performances of the behaviour) and intention to perform the behaviour (affect associated with the behaviour, consequences of the behaviour, ie. the beliefs and evaluations associated with the behaviour, and social factors including norms). This model predicts that new behaviours are more under the influence of intention but as they are performed more frequently they are more subject to the influence of habit. Measurement and validity criticisms have been made of this model as the use of its components have been less clearly delineated than the TORA (eg. Axelson & Brinberg, 1989) but the inclusion of the concept of habitual influences may make it used more widely in the investigation of food behaviour specifically.

Tuorila and Pangborn (1988) investigated both the TORA and Triandis models in investigating the use of milk, cheese, ice cream, chocolate and regular and 'diet' soft drinks

among 100 female students. Multiple correlations (R) for both models for all foods and beverages ranged from 0.45 to 0.88 and the Triandis model had the higher R value in each instance. Adjusted R² values were not provided however. The addition of habit appeared to add a little more predictive power to the model but their measure of habit was a measure of how much they ate that food 'out of habit' rather than frequency of use in the past which was their measure of food consumption. Tuorila and Pangborn (1988) explain that their operational definition of 'habit' encompasses a behaviour that has become automatic and not requiring active self-instruction which fits with part of the Triandis definition. They conclude by stating that the concept of habit is perhaps so complex that the development of questions to measure it may make the use of the Triandis model of limited value in the food domain.

Attitudes, social influences and self-efficacy – the ASE model

Many of the notions in this model have been based on social cognitive theory, formerly social learning theory, as developed by Bandura (1977a,b; 1986; 1997). It also has attitudinal and normative components but includes self-efficacy, an individual's belief that they are able to perform a particular behaviour. The concept of self-efficacy has been used quite frequently in the nutrition sciences (eg. van der Veen et al, 1999) and often in studies of dietary change (eg. Brug et al, 1995; Baranowski, et al, 2000).

Brug and colleagues (1995) investigated the utility of the ASE model on the prediction of consumption of fruit, salads and cooked vegetables using a telephone survey of 367 randomly selected Dutch residents. Consumption of salads was predicted by self-efficacy, attitudes and social influences; use of cooked vegetables was significantly related to self-efficacy and attitudes, and fruit consumption was related only to self-efficacy. The explanatory power was strongest for consumption of salads (R²=0.37) and fruit (R²=0.21) and quite low for cooked vegetables (R²=0.12). The use of this model again requires a high degree of correspondence (specificity) between questions asked and the foods of interest as noted in the TORA model. The results cannot be generalised to the diet as a whole, a point acknowledged by the authors. The

researchers also found that beliefs about the health and taste of fruit and raw and cooked vegetables were more positive among those who consumed these foods in the greatest amounts.

Other models

Other models used less frequently in investigating the antecedents of food behaviour have included the Transtheoretical Model, the Health Belief Model and Health Locus of Control. The Transtheoretical Model classifies individuals according to which stage they are at (out of 5 stages) regarding readiness to adopt a particular health behaviour (eg. Laforge et al, 1994). It is used more like a demographic variable where individuals are grouped and differences between groups noted rather than as a direct influence on food behaviour. Its utility for investigating more general food behaviour is limited.

The Health Belief Model based on that developed by Becker (Becker, 1974; Janz & Becker, 1984) assesses an individual's perceived ability to choose from alternative health behaviours. It is made up of a number of components and 'general health concern' and 'perceived susceptibility' to disease or illness are often the most predictive of adoption of healthy behaviours. Kloebler (1999) found that intention to use folate among a sample of low-income pregnant American women was predicted by the 'perceived benefits' of having a diet high in folate on pregnancy outcome, the 'perceived barriers' to having a diet high in folate and self-efficacy.

Health locus of control (Wallston & Wallston, 1978) has been used to determine whether individuals perceive that they are in control of their health (internal) or whether their health is controlled by factors not under their influence (external) including fate (chance) or others like doctors (powerful others). Falconer and colleagues (1993) found that those individuals who were more external in orientation ate more foods contributing to higher fat and refined sugar intakes indicating that those individuals who believed that they did not have control over their own health had less healthy diets.

Summary

The more frequently used social psychological models to predict food intake tend to encompass an attitudinal component based on evaluations of food beliefs, a normative component based on the perceptions of significant others' beliefs and a control component based on the belief about the control one has over eating a particular food. The combinations of these components in the prediction of a specific food behaviour are investigated often using multiple regression techniques and path analysis and most have shown considerable statistical relationship between the components and behavioural intention and often behaviour (eg. Sheppard et al, 1988).

However, the questions used to measure the components involved are very specifically related to the food in question generating very good statistical power for those few foods but the relationship would be weakened considerably if the diet as a whole were investigated. The relevance of having a single food component or a few foods under investigation may be of limited ecological value. These models have been useful in determining the psychographic factors relating to specific food habits but not to the complete diet. Indeed, Shepherd (1999) states that while attitudes play an important and demonstrable role in food behaviour, food in general can conjure feelings of ambivalence where an individual can hold both positive (tastes good) and negative (unhealthy) feelings about a food weakening the overall relationship between attitude and behaviour.

A more general criticism of these types of models is that they approach attitudes from a primarily individual perspective, unlike social representations theory which asserts that even attitudes are socially constructed (Moscovici, 1998). These models proceed from the basis of individual cognitions about food and how these relate to individual food intake but say nothing about where these attitudes come from. Many studies using these models have also found that taste and health beliefs (measured as part of the attitude component) contribute independently to specific food use (eg. Saba et al, 1998), giving added weight to the utility of food perceptions or beliefs in predicting intake directly. The food beliefs used to make up the attitudinal component are often generated by the researchers themselves and may not equate entirely with those held by

the respondents. Indeed, the findings from Chapters 4 and 5 suggest that similar people do hold different perceptions or beliefs about foods. The relations of those shared perceptions of food generated by the respondents (data driven) to food intake need to be investigated.

1.2. Food perceptions and intake

In addition to the research of Krongl and colleagues outlined in Chapter 1 (page 31), other studies linking food perceptions to food use have found strong relationships between perceptions and behaviour. Krongl and Coleman (1988), in a review of their research, noted that perceptions of prestige, value and convenience of foods were often of limited relationship to food use while taste and health perceptions significantly accounted for consumption of foods. This finding was related to age where the use of foods by younger respondents was more often affected by taste perceptions than health (George & Krongl, 1983) while both perceptions were important for more elderly respondents (Krongl et al, 1982). This effect was moderated by gender in the younger respondents where females were more influenced in their food use by health perceptions than their male peers.

Williams and colleagues (1993) investigated the relationships between perceived liking and health and use of 22 foods in 2082 Australian adolescents. Liking and health perceptions were measured on 5-point scales and use was measured as days of usage in an average week. Liking was related to the use of 19 of the foods and healthiness to 9 foods although the relative importance of the two perceptions to food use was not reported in this study. Woodward and colleagues (1996) extended the results using this same dataset and reported that liking positively predicted consumption of every food investigated with coefficients ranging from 0.16 to 0.55. Health, however, was only significantly associated with the use of five foods - soft drinks, hot chips, cake, full-fat milk and ice cream. Those adolescents who thought that these foods were healthy tended to consume them more often. In general liking was associated with perceived usage of these foods by their peers while health was associated with perceived parental usage.

Pollard and others (1998) tested the validity of the Food Choice Questionnaire (FCQ) in predicting food use among 241 London residents including 103 students. The FCQ (Stephoe et al, 1995) assesses the importance of factors influencing food choice including price, convenience, health and sensory appeal (including taste). The factors of sensory appeal, price, health and convenience were rated as the most important overall to the respondents' food choices with price and convenience perhaps reflecting the specific needs of this student group. The health factor comprised of the following statements: the food I eat should - contain vitamins and minerals, be healthy, be nutritious, be high in protein, be good for my body and be high in fibre. This health factor was significantly related to the more frequent use of brown bread, fresh fruit and the less frequent use of hot chips and red meat. This indicates that the perceptions that these foods were healthy was related to their consumption. Sensory appeal comprised the importance of food having a nice smell, good appearance, good taste and a pleasant texture. This factor was not significantly related to the use of any of the foods reported although it was rated the most important factor overall. The authors maintain that the perception of which foods have high sensory appeal is an individual matter and that the importance of sensory appeal overall may not be related to the intake of any particular food. The findings documented in Chapters 4 and 5 of this thesis do provide evidence for the consensual nature of some tastes however.

Wardle (1993) had 86 adult respondents indicate how frequently they consumed 31 foods and then rate how healthy and how much they liked each of these foods. Correlations for each respondent were calculated between health perception and food use and taste perception and food use. The intra-individual correlations for health and use ranged from $r=-0.42$ to $+0.88$ with younger males showing almost no relationship between health perception and intake ($r=0.07$) on average while older females showed the greatest relationship ($r=0.34$) on average. The intra-individual correlations for liking and use ranged from $r=+0.11$ to $+0.96$ and were consistently high across all age/sex groups. These results suggest strong relationships between taste perception

and food use with more variable relationships for health perception and food use depending on demographics.

Roininen and colleagues (1999) developed a Health and Taste Attitudes Questionnaire and examined differences in its subscales and food choices between healthy–less pleasant and unhealthy–more pleasant food pairs which had previously been rated on health and pleasantness. They assessed these differences among 1005 Finnish adults. Those respondents who scored higher on the ‘general health interest’ subscale rated low-fat milk and reduced-fat cheese as healthier and full-fat - milk, - cheese and - chocolate, and soft drinks as less healthy, and they chose more ‘healthful-not pleasant’ choices among the food pairs. Those respondents who scored higher on the ‘craving for sweet foods’ and ‘using food as a reward’ subscales rated full-fat chocolate, reduced-fat chocolate, full-fat cheese, soft drinks and ‘diet’ soft drinks higher on pleasantness, and they chose more ‘pleasant-not healthful’ choices among the food pairs. The researchers did not assess the effects of health and taste perceptions on intake directly, however their results suggest that these perceptions did influence potential choices.

Many studies have investigated the effects of the expectations of foods on subsequent consumption and response to those foods (eg. Bowen et al, 1992; Polivy, 1976). Westcombe and Wardle (1997) had 36 subjects taste and rate the pleasantness and likelihood of buying three foods - yoghurt, cheese and koerrta, a novel tofu and prune mixture. These foods were chosen because pilot testing had confirmed that yoghurt was perceived to be a low-fat food and cheese a high-fat food while perceptions would not have existed for koerrta. Three versions of each food were made and labelled ‘normal fat’, ‘lower fat’ and ‘higher fat’ although these versions did not actually differ on fat content at all and only slightly differed on taste to mask that each version was the same. Subjects perceived that there were differences in fat level in each of the three foods presented indicating that the manipulation had worked. The normal-fat labelled cheese and koerrta and the high-fat labelled yoghurt were rated as the most pleasant of the three versions of the same food presented. This preference was related directly to likelihood of buying for cheese

while the low-fat labelled yoghurt was rated highest on likelihood to buy. Those subjects who indicated that health influenced their food choices to a lesser extent rated all foods with the higher-fat label as more pleasant and the lower-fat labels as less pleasant than those for whom health was more important in their food choices. These results indicate that knowledge of the fat level did affect the expectations of the taste of the food and this affected likelihood of purchase for cheese only but not for yoghurt.

1.3. Summary and aims

The studies reported above show the variety of ways that food perceptions have been measured but all show that they have a direct influence on food consumption. The perceptions of food according to liking or taste and health or nutrition appear to be the most important factors in determining intake (eg. Drewnowski, 1997; Shepherd, 1988). The social psychological models reported measure food beliefs and make use of these, together with the evaluation of these beliefs by the individual, in deriving the attitudinal component which has then been successfully related to intention to consume that food and actual food consumption (behaviour).

However, these models were often limited by the specificity of their measurement related to the few foods under investigation. Indeed, when nutrition knowledge (related to beliefs) is measured more generally it is significantly related to intake from food groups - rather than just individual foods (Wardle et al, 2000). Q-sort methodology allows food perceptions of a large number of foods to be elucidated and these can then be related to intakes of a larger number of foods. These models also conceptualise and measure food beliefs and attitudes entirely at the individual level without reference to the social and cultural nature of these food beliefs.

This study will investigate the relationships between the taste and nutrition perceptions generated by a Q-sort and food intake as measured using a food frequency questionnaire. This will be attempted using global taste and nutrition perceptions and intake from generic food groups. The relationships between the perceptions of individual foods and intake from food

groups together with intakes of those individual foods will also be investigated. In this way the relationship between socially shared ideas about food and food intake can be assessed.

2. Method

2.1. Sample of respondents

Thirty individuals who were known personally to the author or were introduced through friends participated in the study. All resided in Adelaide, Australia and were classified as Anglo-Australian. They ranged in age from 20 to 70 years (Mean: 39.4 ± 13.1 years) and most (84%) were born in Australia or had spent a significant proportion of their lives in Australia. Table 6.1 shows the average ages and body mass indices (BMI) of the respondents in the groupings used in previous chapters. The YF and YM are a little older on average than those from the Australian study reported in Chapter 5.

Table 6.1. Numbers of respondents average age (in years) and BMI of each age/sex group.

Group	N	Age (mean \pm SD)	BMI (mean \pm SD)
YF	7	29.8 ± 1.7	22.7 ± 3.9
YM	8	29.1 ± 4.1	26.7 ± 3.3
OF	8	49.8 ± 9.6	24.4 ± 4.2
OM	7	49.0 ± 14.3	25.9 ± 3.9

2.2. Materials

Q-sort cards

The individual food Q-sample and marker cards were the same sets as those used in the study outlined in Chapter 5. The meal Q-sample was not employed in this study.

Dietary survey

The dietary survey instrument used was a self-completed, quantified food frequency questionnaire (FFQ) containing over 180 different food and beverage items commonly consumed in Australia. This FFQ has been developed by CSIRO Health Sciences and Nutrition and the 1998 version of this was used. Earlier versions of this instrument have been used in a number of large

random surveys of the adult Australian population conducted over the last twenty years (eg. CSIRO Division of Human Nutrition, 1996) and the intake results have shown good reliability with biochemical indices (Baghurst & Baghurst, 1981). Questions pertaining to seasonal usage and food preparation and purchasing habits were also included and where appropriate this information was used to modify food and nutrient intake. Intake of nutrients from dietary supplements was not assessed. Demographic information about gender, age, height, weight, education level, family status, country of birth and duration of residence in Australia was also collected.

Standard portions of each of the food and beverage items were described in the survey instrument and respondents indicated how frequently they consumed that item using an alpha-numeric scale, eg. 2W (twice per week), 3D (three times each day), 3M (three times per month), R (rarely) or N (never). Extensive completion instructions, together with examples were part of the instrument. Respondents could modify the standard portion consumed on each usual occasion if the given description did not reflect their behaviour. For example, the standard portion attributed to soft drink consumption was defined as a medium glass (230ml), if respondents usually consumed a can of soft drink on each occasion they could indicate this in space provided. Their consumption frequency was thus altered upon data coding. The copyright of the entire FFQ instrument is held by CSIRO Health Sciences and Nutrition, however a few examples of the questions and format can be found in Appendix V. It is beyond the scope of this thesis to review the reliability and validity concerns with using data obtained from a FFQ but acknowledgement is made of these potential biases to the intake data (see Horwath, 1990). However, several steps were undertaken to minimise respondents presenting their diets in a nutritionally favourable manner.

2.3. Procedure and data entry

Q-sort

A face-to-face appointment was made with each respondent during which time they completed two Q-sorts where the condition of instruction (taste or nutrition) was assigned randomly - half of the sample began with the taste sort and the other half the nutrition sort. The sorting procedure used was the same as that previously outlined in Chapter 4. The overall procedure lasted for twenty minutes on average. Data were entered using a custom-made computer program which had in-built checking mechanisms to eliminate data entry errors (A. Beaumont-Smith, 1999). There were no missing data.

Dietary survey

The FFQ booklet was mailed to each respondent and they completed the survey at their leisure. When the booklet was completed the face-to-face appointment was made to conduct the Q-sort procedure. The completion of the FFQ booklet was checked at this time to ensure completeness. Respondents received a complete dietary analysis of their food and nutrient intake as feedback. This achieved two objectives: firstly, to ensure that the survey was completed as accurately as possible so that a complete picture of their own diet could be provided and, secondly, to show appreciation of the efforts of each respondent. Data were entered into a Scientific Information Retrieval (SIR version 4.0) database using a pre-designed data entry scheme that allows pre-coded data to be entered in two phases – the initial and the verification phases. This eliminates data entry errors. Files of data can then be generated in a format recognised by the SPSS-X program.

2.4. Data analysis

Q-sort

The data from all 30 respondents were factor analysed for the two sorting conditions separately using SPSS-X version 6.1 where respondents were entered as variables following the method outlined in Chapter 3. The factoring method used was principal components with varimax

rotation. The complete factor composites for all factors generated can be found in Appendix W. Correspondence analyses were also conducted using the procedure outlined previously in Chapter 4 using the following groups: males, females, those older and younger than thirty years, young males and females (YM, YF), and older males and females (OM, OF).

Dietary survey

Food composition information and weights of standard servings from the Australian nutrient database (Department of Community Services and Health, 1992) together with frequency of use were used to calculate daily food and nutrient intake data for each respondent using the FREQUAN dietary analysis program (Baghurst & Record, 1984). Nutrient information from British databases was used where Australian data did not exist (Paul & Southgate, 1978). Daily intakes of standard serves of 18 groups of food (food behaviours) were also generated using FREQUAN and these were used as the dependent variables in the multiple regression analyses. Two sets of regression analyses were carried out: 1) an investigation of whether the food perceptions reflecting the whole diet (using those derived from the factor analysis) could predict food intake; and 2) whether rankings of individual foods on both taste and nutrition Q-sorts could predict food intake. Both sets of analyses also included the demographics of sex, age and BMI as independent variables.

3. Results

3.1. Australian foods: Taste

Three factors accounted for 45.4% of the total variance for all 30 respondents. The number of respondents defining each factor, that is they loaded solely and significantly on that factor only, can be found in Table 6.2. The extreme ends of the factor composites can be found in Table 6.3.

Table 6.2. Percentage of variance, frequencies and percentages of age and gender characteristics of respondents for each factor: individual foods - taste.

	A		B		C	
	24.5%		12.0%		8.9%	
	n	%	n	%	n	%
YF	2	18	4	67	0	0
YM	4	36	2	33	0	0
OF	2	18	0	0	3	50
OM	3	28	0	0	3	50
TOTAL	11	100	6	100	6	100
Younger	6	54	6	100	0	0
Older	5	46	0	0	6	100
Males	7	64	2	33	3	50
Females	4	36	4	67	3	50

Factor A was not predominantly defined by any one group although there were slightly more younger males and more males overall who loaded on this factor. Many more processed foods appeared at the positive end of this factor together with cheese, beef and strawberries indicating that strong tasting foods were important. Vegetables, lentils and brown bread were at the negative end. This factor could be labelled *Sweet, strong-tasting vs bland, vegetable*.

Factor B was only defined by younger respondents, particularly young females. Many of the sweeter foods were ranked at the positive end but the types of foods differ from those in Factor A as they are foods which have much less processing overall. The negative end appears to be characterised by processed meats, legumes and foods that tend to be classified as fattening (cream and jam). This factor could be labelled *Natural sweet fruits vs processed meats*.

Factor C was only defined by older respondents. The positive end was characterised by all protein foods which tend to be solid, filling foods. Those foods at the negative end could be thought of as less filling, empty foods including sweet biscuits, watermelon and lollies. This food could be labelled *Filling foods vs non-filling foods*.

Table 6.3. Factor composites with scores greater than ± 3 for three factors: Australian foods - taste.

Score	A	B	C
+5	Chocolate	Chocolate	Beef
+5	Ice-cream	Strawberries	Pork
+4	Cheese	Bananas	Chicken
+4	Lollies	Grapes	Fish
+4	Sweet bun	Tomatoes	Lamb
+3	Beef	Apples	Cheese
+3	Cake	Mandarins	Eggs
+3	Potato Chips	Milk	Peanuts
+3	Strawberries	Yoghurt	Processed ham
-3	Brown bread	Baked beans	Cake
-3	Carrots	Cream	Lentils
-3	Lettuce	Jam	Lollies
-3	Potatoes	Cauliflower	Watermelon
-4	Cabbage	Lentils	Baked beans
-4	Cauliflower	Pork	Sweet bun
-4	Cucumber	Sausages	Zucchini
-5	Lentils	Frankfurts	Jam
-5	Zucchini	Processed ham	Sweet biscuits

Correspondence analysis (Figure 6.1)

The two-dimensional solution accounted for 84.4% of the variation in association scores. The letter A at the origin (0,0) represents six foods: cabbage, cauliflower, zucchini, lettuce, lentils and frankfurts. The origin value indicates that none of the thirty respondents gave these foods a ranking of +3 or higher for taste.

The first thing that is immediately noticeable about Figure 6.1 is that the females overall appear to be more closely aligned in their perceptions than the males and that the older respondents hold more congruent taste perceptions than the younger respondents. The younger males appear to hold quite different views about the taste of food than the remaining three groups in general. The foods of chicken, fish and eggs appear to be close to the older respondent groups which reflect the findings from Factor C and the YF group appears to be associated with bananas and grapes reflecting the findings from Factor B. The YM group is located close to the foods of

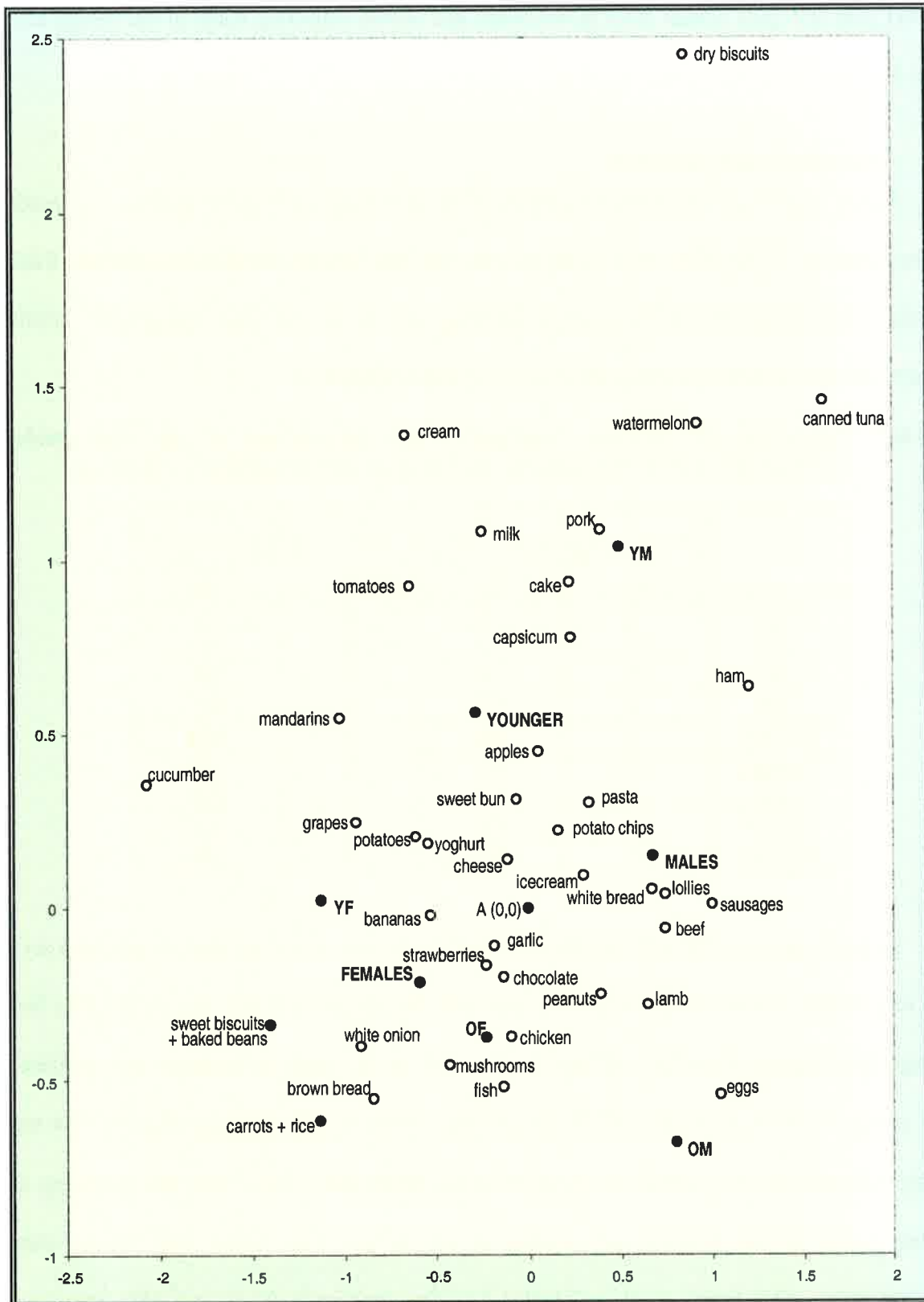


Figure 6.1. Correspondence analysis of percentage of most tasty rankings of Australian foods by eight respondent groups.

pork and cake and quite distant from brown bread and carrots reflecting some of the results from Factor A.

3.2. Australian foods: Nutrition

Factor analysis of the nutrition rankings of the individual food Q-sort yielded two factors that accounted for 70.6% of the total variance in the nutrition rankings from all respondents. Table 6.4 shows the total numbers of respondents defining each factor and their demographic profile. The extreme ends of the factor composites can be found in Table 6.5.

Table 6.4. Percentage of variance, frequencies and percentages of age and gender characteristics of respondents for each factor: Australian foods - nutrition.

	D		E	
	62.4%		8.2%	
	n	%	n	%
YF	3	43	0	0
YM	0	0	0	0
OF	0	0	3	60
OM	4	57	2	40
TOTAL	7	100	5	100
Younger	3	43	0	0
Older	4	57	5	100
Males	4	43	2	40
Females	3	57	3	60

Factor D was the strongest factor accounting for 62.4% of the variation in nutrition sorts for all respondents. It was only defined by YF and OM. The positive end was characterised by fruit and vegetables together with fish - all perceived as low in fat, while the negative end contained highly processed foods. On inspection of the complete factor composite (Appendix W), fish was the only animal food to be ranked at the positive end while plant foods filled the remaining 19 positions. Other animal products were ranked at (0) or (-1). This factor may contain some vegetarian issues. This factor could be labelled *Low-fat, vegetarian foods vs highly processed, fattening foods*.

Factor E was only defined by older respondents. The negative end was similar to the negative end of Factor D containing many highly processed foods but also contained watermelon

a food often regarded as an 'empty' food. The positive end of this factor contained filling, protein foods. It is similar in content and idea to Factor C from the taste analysis which was also defined only by older respondents. Indeed, on further investigation three respondents are common to both factors from the taste and nutrition analyses loading solely and significantly on both Factors C and E. Factor E could also be labelled *Filling foods vs non-filling foods*.

Table 6.5. Factor composites with scores greater than ± 3 for three factors: Australian foods - nutrition.

Score	D	E
+5	Fish	Eggs
+5	Lentils	Fish
+4	Apples	Beef
+4	Bananas	Chicken
+4	Mushrooms	Yoghurt
+3	Carrots	Cheese
+3	Cauliflower	Lamb
+3	Mandarins	Milk
+3	Tomatoes	Pork
-3	Frankfurts	Jam
-3	Sausages	Lettuce
-3	Sweet biscuits	Sweet bun
-3	Sweet bun	Watermelon
-4	Cake	Chocolate
-4	Chocolate	Potato Chips
-4	Ice-cream	Sweet biscuits
-5	Lollies	Cake
-5	Potato Chips	Lollies

Correspondence analysis (Figure 6.2)

The two-dimensional solution accounted for 81.8% of the variation in association scores. The letter A at the origin (0,0) represents sixteen foods that were not placed higher than +3 by any of the thirty respondents on nutrition. These foods included: frankfurts, sweet biscuits, ice cream, cake, dry biscuits, white bread, potato chips, lollies, processed ham, sweet bun, jam, cream, sausages, canned fruit, lettuce and watermelon. This reflects the negative ends of both Factors D and E. Watermelon appears to be perceived quite poorly overall.

The results from the nutrition correspondence analysis also reflect vast differences between the food perceptions of older and younger males. However, the nutrition perceptions of

the younger respondents are much more similar than their taste perceptions. The older respondents appear to hold much wider differences reflecting many of the differences between Factors D and E where these respondents predominated. Older males were associated with carrots, mandarins and yoghurt reflecting the findings from Factor D while older females were associated with chicken, cheese, lamb and baked beans reflecting the findings from Factor E. The younger respondents tended to be associated with apples, bananas, rice and brown bread indicating that they believed these foods to be highly nutritious.

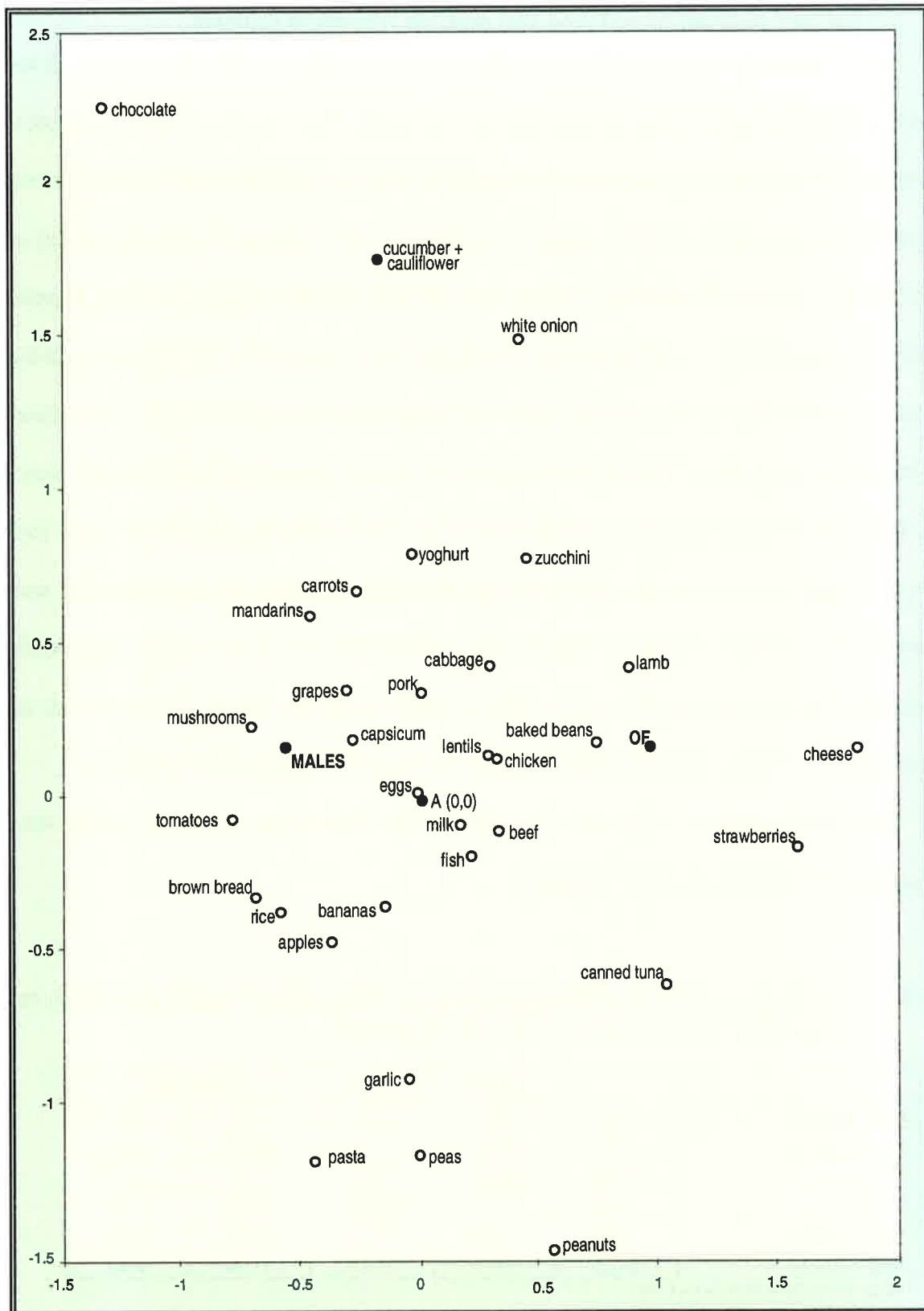


Figure 6.2. Correspondence analysis of percentage of most nutritious rankings of Australian foods by eight respondent groups.

3.3. Global food perceptions and food use: multiple regression analyses

The relationship between daily food intake and the five factors from the two Q-sort procedures was investigated using multiple regression analyses. This will provide an assessment of whether food intake behaviours are related to consensual food perceptions overall. In other words, do general food perceptions confer a general eating style? The loadings of each respondent on each of the three factors for taste (A, B and C) and the two nutrition factors (D and E) together with the three demographic variables of age, sex and BMI were used as the independent variables. A maximum of three food intake variables were used to represent the major differences as outlined in the interpretation of each of the five factors and these were the dependent variables used. Snack foods, fruit and red meat appeared to be the major foods discriminating between the three taste factors (A, B and C) and red meat, white meat and dairy foods appeared to discriminate the most between the two nutrition factors (D and E). This generated a list of five food group intake variables (red meat was in both lists) and the unit of intake was serves per day. These analyses are only exploratory in nature so the chance probability criterion values were relaxed ($p < 0.10$).

Correlation matrices of the five food perception factors and the food groups were investigated in the first instance (see Table 6.6).

Table 6.6. Correlations of five food perception factors and intake of snack foods, fruit, red meat, white meat and dairy foods (serves per day).

Food group	<i>Taste</i>			<i>Nutrition</i>	
	A	B	C	D	E
Snack foods	0.09	-0.04	0.14	-0.36	0.31
Fruit	-0.43	0.43	-0.02	0.10	-0.17
Red meat	0.06	-0.14	0.43	-0.28	0.23
White meat	0.27	-0.24	-0.17	-0.32	0.26
Dairy foods	0.29	-0.04	-0.28	-0.05	0.25

Note: bolding indicates $p < 0.10$

It is expected that when two factors from the same Q-sort condition are related to intake from a single food group they will be oppositely related because these factors result from varimax rotation. This can be seen in snack foods and nutrition and fruit and taste.

Those individuals who showed a greater association with Factor A tended to consume fruit less often and those who loaded highly on Factor B consumed fruit more frequently. Those individuals who were more strongly associated with Factor C tended to consume red meat more frequently. Those respondents who perceived fruit and red meat as good tasting tend to consume foods from these groups more often.

Those respondents who were less associated with Factor D and those who were more closely aligned with Factor E tended to consume snack foods more frequently. Those respondents who were less closely associated with Factor D tended to consume white meat (chicken, fish and seafood) more often.

Multiple regression analysis will help to elucidate any relationships among the taste and nutrition food perception factors and demographic variables in predicting the intakes from these five food groups. Each of the predictor variables were entered into a stepwise multiple regression model and the resulting predictive power of each model assessed.

Snack foods

The intake of snack foods was assessed through the daily use of nuts, potato chips, chocolate and chocolate bars, lollies, jams and spreads, plain and sweet biscuits and cakes. The resulting model accounted for around 10% of the variation in snack food consumption (Table 6.7). The demographic variables of age, BMI and sex did not feature in this model indicating that nutrition perceptions were more important in predicting intake of this food group. Factor D, the first nutrition factor, was the only significant predictor of snack food consumption. Factor E did not significantly add to the model despite its univariate relationship with snack food consumption as shown in Table 6.6.

Table 6.7. One-step regression model results for general taste and nutrition perceptions and snack food intake (serves per day).

Variables	<i>In equation</i>						<i>Not in equation</i>	
	Step	B	SE(B)	β	t	p	Partial r	t
Factor D	1	-1.68	0.83	-0.36	-2.04	0.05		
(Constant)		2.28	0.51		4.45	<0.01		
Factor A							0.11	0.57
Factor B							-0.0006	-0.01
Factor C							0.09	0.46
Factor E							0.05	0.15
Age							-0.12	-0.64
BMI							-0.07	-0.36
Sex							0.10	0.57

Adjusted $R^2=0.10$; $F_{(1,28)}=4.14$, $p=0.05$

Those respondents who were more closely aligned with the sentiments of Factor D tended to consume snack foods less often. Snack foods are not perceived as very nutritious in this factor as they feature prominently at the negative end. Those who do consume snack foods more often obviously do so for reasons other than nutrition. None of the taste perceptions featured in this model however so perhaps global perceptions of the tastiness of foods do not influence consumption of snack foods specifically. Those who tend to consume snack foods less often could be doing so for reasons of nutrition and health.

Fruit

Seasonally adjusted daily intake of 14 fresh fruits together with other fresh fruits listed by each respondent and dried, canned or fruit used as an ingredient was assessed. Only one taste factor (Factor B) and none of the demographic variables were successful at predicting fruit intake (Table 6.8). This one variable accounted for 16% of the variation in fruit intake which is quite high.

Table 6.8. One-step regression model results for general taste and nutrition perceptions and fruit intake (serves per day).

Variables	<i>In equation</i>						<i>Not in equation</i>	
	Step	B	SE(B)	β	t	p	Partial r	t
Factor B	1	2.01	0.78	0.43	2.56	0.02		
(Constant)		1.60	0.29		5.50	<0.01		
Factor A							-0.30	-1.63
Factor C							0.09	0.48
Factor D							0.06	0.34
Factor E							-0.14	-0.84
Age							0.17	0.92
BMI							0.12	0.63
Sex							-0.06	-0.31

Adjusted $R^2=0.16$; $F_{(1,28)}=6.53$, $p=0.02$

Those respondents who loaded highly on Factor B tended to consume fruit more often. Fruit features prominently in Factor B as it fills 5 out of the possible 9 places at the extreme positive end of this factor. Those who perceived fruit to be tasty and processed meats and pork as less tasty tended to consume fruit more frequently. Fruit appears to be consumed for reasons of taste by these respondents and nutrition perceptions appear not to feature in their consumption patterns.

Red meat

The daily intake of red meat was determined through the use of beef, pork or lamb in various guises like steaks or chops or as an ingredient in dishes. The consumption of red meat was related to high factor loadings on Factors A and C (Table 6.9); demographic variables and nutrition factors did not feature in this model. This two-factor model accounted for 27% of the variation in red meat consumption indicating that its predictive validity is quite high. Examining the factor structure of C, it can be seen that beef, pork and lamb occupy rankings of at least (+4) in this factor for taste (Table 6.5, page 247) while many less filling foods appear at the negative end. Factor A is associated with more strong-tasting foods including beef (+3) while many vegetables appear at the negative end. Those individuals who value

foods that are filling and not bland tend to consume red meat more often overall. Nutrition perceptions appeared not to influence the consumption of red meat.

Table 6.9. Two-step regression model results for general taste and nutrition perceptions and red meat intake (serves per day).

Variables	<i>In equation</i>						<i>Not in equation</i>	
	Step	B	SE(B)	β	t	p	Partial r	t
Factor C	1	0.38	0.11	0.67	3.52	<0.01		
Factor A	2	0.23	0.10	0.43	2.26	0.03		
(Constant)		0.08	0.06		1.32	ns		
Factor B							0.31	1.65
Factor D							-0.22	-1.16
Factor E							0.13	0.66
Age							0.55	-1.0
BMI							-0.28	-1.52
Sex							0.25	1.35

Adjusted $R^2=0.27$; $F_{(2,27)}=6.27$, $p=0.006$

Dairy foods

The intake of milk (as added to beverages, taken as a drink or used in foods like custard), yoghurt, ice cream, cream and various types of cheese was calculated. Those individuals who were younger and more closely associated with Factor E tended to consume all dairy foods more frequently (Table 6.10). Factor E highlights the positive nutritious value of many protein foods including yoghurt, cheese and milk and foods often regarded as 'empty' of nutrition including lettuce, watermelon and many snack foods comprised the negative end. It appears that those who are younger and perceive that dairy foods are high in protein and therefore nutritious tend to have a higher intake of dairy foods.

Table 6.10. Two-step regression model results for general taste and nutrition perceptions and dairy food intake (serves per day).

Variables	<i>In equation</i>						<i>Not in equation</i>	
	Step	B	SE(B)	β	t	p	Partial r	t
Age	1	-0.03	0.01	-0.38	-2.19	0.04		
Factor E	2	1.38	0.78	0.31	1.78	0.09		
(Constant)		2.07	0.63		3.30	<0.01		
Factor A							0.14	0.71
Factor B							-0.09	-0.46
Factor C							-0.14	-0.74
Factor D							0.18	0.95
BMI							-0.16	-0.84
Sex							-0.14	-0.73

Adjusted $R^2=0.15$; $F_{(2,27)}=3.48$, $p=0.04$

White meat

The intake of chicken, fish and seafood (whole or as ingredients) was computed. The resulting four-step model accounted for over 37% of the variation in the intake of white meat and comprised of both demographic and food perception factors (Table 6.11). This means that the explanatory power of this model is very high. Those who were less closely aligned with Factor D, had a higher BMI, had lower loadings on Factor C and were female tended to consume white meat more often.

Table 6.11. Four-step regression model results for general taste and nutrition perceptions and white meat intake (serves per day).

Variables	<i>In equation</i>						<i>Not in equation</i>	
	Step	B	SE(B)	β	t	p	Partial r	t
Factor D	1	-0.53	0.17	-0.49	-3.13	<0.01		
BMI	2	0.04	0.01	0.61	3.67	<0.01		
Factor C	3	-0.31	0.13	-0.38	-2.45	0.02		
Sex	4	0.14	0.07	0.30	1.92	0.07		
(Constant)		-0.35	0.29		-1.21	ns		
Factor A							0.07	0.33
Factor B							-0.21	-1.04
Factor E							-0.04	-0.22
Age							0.23	1.17

Adjusted $R^2=0.37$; $F_{(4,25)}=5.32$, $p=0.003$

Factor D appeared to distinguish between low-fat, vegetarian-style foods (positive) and high-fat processed foods (negative), and although fish was placed at (+5), chicken was placed at (-1). These results mean that those who ate more chicken and fish identified less with Factor D, the factor which contains some ambivalence about animal foods. It is worth investigating this result further to assess its validity. The loadings on Factor D were grouped into tertiles and the differences in the intakes of white meat between these groups examined using Analysis of Variance (Table 6.12). This table shows that those who did have lower loadings on Factor D did consume white meat more often.

Table 6.12. Differences in white meat intake (serves per day) according to strength of association with Factor D

Factor D loading group	Mean white meat intake \pm SD (serves per day)
Low (<0.51)	0.51 \pm 0.25 ^a
Medium	0.21 \pm 0.13 ^b
High (>0.72)	0.37 \pm 0.20

$F_{(2,27)}=5.45$, $p=0.01$; ^{a,b}: Means significantly different at $p<0.05$ using Scheffé test.

Factor C highlighted a distinction between filling and non-filling foods. Those respondents who were less interested in lighter, vegetarian-style eating, had a higher BMI, were less concerned with the filling nature of foods and were female tended to consume white meat more often. Perhaps these female respondents were less interested in any weight-control issues associated with foods.

3.4. Individual food perception rankings and food use: multiple regression analyses

The perception of taste and nutrition of individual foods may be thought to be equally important at the food choice decision and thus at intake. They may act in concert if these perceptions contain congruent elements about a particular food or one may take precedence over the other if they are dissonant depending on the food choice situation. The relative importance of

these perceptions together with the more traditional demographic variables of sex, age and BMI in predicting food intake will be assessed. Serves per day of groups of food like cereals, vegetables and fruit and individual foods like eggs, bread and milk and the effects of food perceptions and demographic variables on their use will be investigated using multiple regression. These analyses are only exploratory in nature so the chance probability criterion values were relaxed ($p < 0.10$). Correlation matrices of individual food perceptions and the food groups were investigated in the first instance. Any correlations with a $p < 0.10$ were included in the multiple regression analyses together with the three demographic variables.

Cereals

The use of pasta, rice, bread and breakfast cereals was combined to generate a daily intake of cereals. The correlation matrix of the taste and nutrition perception ranking scores of rice, pasta and white and brown breads with the cereal intake variable is shown in Table 6.13.

Table 6.13. Correlations of food perception scores for nutrition and taste with cereal intake (serves per day).

Food and perception	r	p
Rice – nutrition	0.07	ns
Rice – taste	0.09	ns
Brown bread – nutrition	-0.30	0.10
Brown bread – taste	0.21	ns
Pasta – nutrition	-0.04	ns
Pasta – taste	0.10	ns
White bread – nutrition	0.17	ns
White bread – taste	0.14	ns

The nutrition perception of brown bread was negatively related to cereal consumption overall although the p value was bordering on the cutoff criterion value. This variable together with the demographic variables were entered into a stepwise regression model to investigate prediction of cereal intake (Table 6.14).

Table 6.14. Two-step regression model results for cereal intake (serves per day).

Variables	<i>In equation</i>						<i>Not in equation</i>	
	Step	B	SE(B)	β	t	p	Partial r	t
Sex	1	-0.62	0.33	-0.33	-1.90	0.07		
Brown bread – N	2	-0.19	0.10	-0.32	-1.88	0.07		
(Constant)		4.26	0.97		4.40	<0.01		
Age							-0.19	-1.01
BMI							-0.27	-1.45

Adjusted $R^2=0.14$; $F_{(2,27)}=3.38$, $p=0.049$

The overall model of cereal intake is significant. However, the individual predictors did not achieve statistical significance and the model only accounted for 14% of the variation in cereal intake. This indicates that the predictive validity of the model is low. If you were male and you did not rank brown bread high on nutrition you tended to consume cereals more often overall.

Vegetables

Daily serves of 22 vegetables seasonally adjusted and consumed in different forms (eg. potatoes as mashed or as hot chips) were calculated and correlations with 13 vegetables used in the food perception Q-sort can be found in Table 6.15. The rankings of cucumber and tomato on taste and capsicum on nutrition were significantly related to the intake of vegetables each day. These were used as predictor variables in the stepwise regression analysis of vegetable intake (Table 6.16).

The model accounted for 22% of the variation in overall vegetable intake indicating that the predictive validity of this model is quite high. Those individuals who thought that capsicums were nutritious and cucumbers were tasty tended to eat vegetables more often. The demographic variables did not feature in this model perhaps indicating that food perceptions were more important than sex, age or BMI in predicting vegetable intake.

Table 6.15. Correlations of food perception scores for nutrition and taste with vegetable intake (serves per day).

Food and perception	r	p
Cabbage – nutrition	0.09	ns
Cabbage – taste	0.18	ns
Capsicum – nutrition	0.40	0.03
Capsicum – taste	0.19	ns
Carrots – nutrition	-0.06	ns
Carrots – taste	0.17	ns
Cauliflower – nutrition	0.07	ns
Cauliflower – taste	0.04	ns
Cucumber – nutrition	-0.07	ns
Cucumber – taste	0.40	0.03
Garlic – nutrition	0.25	ns
Garlic – taste	0.22	ns
Lettuce – nutrition	0.23	ns
Lettuce – taste	0.22	ns
Mushrooms – nutrition	-0.14	ns
Mushrooms – taste	0.03	ns
Onions – nutrition	0.01	ns
Onions – taste	0.12	ns
Peas – nutrition	0.19	ns
Peas – taste	-0.06	ns
Potatoes – nutrition	-0.04	ns
Potatoes – taste	-0.07	ns
Tomatoes – nutrition	0.18	ns
Tomatoes – taste	0.37	0.04
Zucchini – nutrition	-0.07	ns
Zucchini – taste	0.28	ns

Table 6.16. Two-step regression model results for vegetable intake (serves per day).

Variables	<i>In equation</i>						<i>Not in equation</i>	
	Step	B	SE(B)	β	t	p	Partial r	t
Cucumber -T	1	0.46	0.22	0.34	2.06	<0.05		
Capsicum - N	2	0.61	0.30	0.34	2.06	<0.05		
(Constant)		-1.81	2.18		-0.83	ns		
Tomato - T							0.25	1.32
Sex							0.08	0.39
Age							0.002	0.01
BMI							0.001	0.006

Adjusted $R^2=0.22$; $F_{(2,27)}=5.04$, $p=0.01$

Fruit

The correlation of fruit intake with seven fruits used in the food perception Q-sort were calculated (Table 6.17). Scores on nutrition for grapes, mandarins and strawberries were related to fruit intake and these were entered into a stepwise regression analysis (Table 6.18).

Table 6.17. Correlations of food perception scores for nutrition and taste with fruit intake (serves per day).

Food and perception	r	p
Apples – nutrition	0.13	ns
Apples – taste	0.25	ns
Bananas – nutrition	-0.12	ns
Bananas – taste	0.05	ns
Canned fruit – nutrition	-0.09	ns
Canned fruit – taste	-0.28	ns
Grapes – nutrition	0.34	0.07
Grapes – taste	0.11	ns
Mandarins – nutrition	-0.36	0.05
Mandarins – taste	0.21	ns
Strawberries – nutrition	0.35	0.06
Strawberries – taste	0.05	ns
Watermelon – nutrition	0.07	ns
Watermelon – taste	0.14	ns

Table 6.18. Two-step regression model results for fruit intake (serves per day).

Variables	<i>In equation</i>						<i>Not in equation</i>	
	Step	B	SE(B)	β	t	p	Partial r	t
Mandarins -N	1	-0.40	0.14	-0.46	-2.80	<0.01		
Strawberries - N	2	0.38	0.14	0.44	2.76	0.01		
(Constant)		2.67	1.20		2.22	0.04		
Grapes - N							0.16	0.84
Sex							-0.11	-0.56
Age							0.15	0.77
BMI							0.04	0.22

Adjusted $R^2=0.27$; $F_{(2,27)}=6.32$, $p<0.01$

This model was able to explain 27% of the variation in fruit intake which is high. Those individuals who ranked mandarins lower but strawberries higher on nutrition tended to consume fruit more often. The average ranking on nutrition for mandarins was 7.25 ± 1.45 (range 5-11) and for strawberries was 6.13 ± 1.50 (range 3-10) indicating that most respondents gave these fruits a

neutral ranking on nutrition. Those respondents who considered the nutrition aspects of fruits tended to consume fruits more often. Demographic variables again did not feature in this model.

Dairy foods

Correlations of the intake of dairy foods and the nutrition and taste perceptions of five dairy foods were calculated (Table 6.19). The taste and nutrition scores for cheese were related to dairy intake and these were entered into a stepwise regression analysis (Table 6.20).

Table 6.19. Correlations of food perception scores for nutrition and taste with dairy food intake (serves per day).

Food and perception	r	p
Cheese – nutrition	0.31	0.09
Cheese – taste	0.34	0.07
Cream – nutrition	-0.01	ns
Cream – taste	0.19	ns
Icecream – nutrition	-0.09	ns
Icecream – taste	0.26	ns
Milk – nutrition	0.27	ns
Milk – taste	0.17	ns
Yoghurt – nutrition	0.06	ns
Yoghurt – taste	0.26	ns

Table 6.20. Four-step regression model results for dairy food intake (serves per day).

Variables	<i>In equation</i>						<i>Not in equation</i>	
	Step	B	SE(B)	β	t	p	Partial r	t
Age	2	-0.04	0.01	-0.58	-3.42	<0.01		
Cheese - N	3	0.29	0.09	0.56	3.33	<0.01		
(Constant)		1.48	0.59		2.52	0.02		
Cheese - T							0.03	0.18
Sex							-0.28	-1.46
BMI							-0.09	-0.46

Adjusted $R^2=0.32$; $F_{(2,27)}=7.97$, $p<0.01$

The regression model reached its entry and exit criterion limits after four steps. Taste perception of cheese was the variable entered on step one but removed on step four after the nutrition perception of cheese was entered in step three. This indicates that there is a high degree of collinearity between the scores for cheese on taste and nutrition ($r=0.61$, $p<0.0005$) and when

age was controlled for ($r=0.65$, $p<0.0005$). The tastiness of cheese did not provide any further explanatory power to the model when the nutrition perception of cheese was included.

The overall model accounted for 32% of the variation in the daily use of dairy foods which is very high. Those individuals who are younger and believe that cheese is nutritious tended to consume dairy foods more frequently each day.

Red meat

The relationships of the daily intake of red meat and the taste and nutrition perceptions of beef, pork and lamb were assessed and the correlations can be found in Table 6.21. The taste perceptions of the three meats were significantly related to red meat consumption and these were entered into a stepwise regression model (Table 6.22).

Table 6.21. Correlations of food perception scores for nutrition and taste with red meat consumption (serves per day).

Food and perception	r	p
Beef – nutrition	0.14	ns
Beef – taste	0.37	0.046
Lamb – nutrition	0.11	ns
Lamb – taste	0.53	0.003
Pork – nutrition	0.29	ns
Pork – taste	0.37	0.044

Table 6.22. One-step regression model results for red meat consumption.

Variables	<i>In equation</i>						<i>Not in equation</i>	
	Step	B	SE(B)	β	t	p	Partial r	t
Lamb - T	1	0.03	0.01	0.53	3.30	<0.01		
(Constant)		0.02	0.07		0.24	ns		
Beef - T							0.19	0.99
Pork - T							0.07	0.39
Age							-0.21	-1.14
Sex							0.12	0.65
BMI							0.05	0.28

Adjusted $R^2=0.25$; $F_{(1,28)}=10.91$, $p<0.005$

The model accounted for 25% of the variation in red meat intake which is quite high for one food perception variable. Demographic variables did not feature in this model. Those individuals who believed that lamb was tasty tended to consume more red meat overall each day.

White meat

There were no significant relationships between the use of chicken or fish (whole or as an ingredient) and the perceptions of chicken and fish according to taste and nutrition (Table 6.23).

A regression analysis was not conducted.

Table 6.23. Correlations of food perception scores for nutrition and taste with white meat consumption (serves per day).

Food and perception	r	p
Chicken – nutrition	0.14	ns
Chicken – taste	-0.03	ns
Fish – nutrition	-0.20	ns
Fish – taste	0.001	ns
Canned tuna – nutrition	0.28	ns
Canned tuna – taste	0.24	ns

Processed meat

Intake of processed meats each day was assessed through the use of foods like ham, luncheon meat and sausages. This was related to the perceptions of frankfurts, ham and sausages and the correlation results can be found in Table 6.24. The taste of sausages was significantly related to processed meat use and this was entered into a stepwise regression analysis (Table 6.25).

Table 6.24. Correlations of food perception scores for nutrition and taste with processed meat use (serves per day).

Food and perception	r	p
Frankfurts – nutrition	0.18	ns
Frankfurts – taste	0.27	ns
Ham – nutrition	0.30	ns
Ham – taste	0.23	ns
Sausages – nutrition	-0.02	ns
Sausages – taste	0.46	0.01

Table 6.25. Two-step regression model results for processed meat use.

Variables	<i>In equation</i>						<i>Not in equation</i>	
	Step	B	SE(B)	β	t	p	Partial r	t
Sausages - T	1	0.06	0.03	0.34	1.97	0.06		
Sex	2	-0.26	0.14	-0.32	-1.18	0.08		
(Constant)		0.54	0.33		1.65	ns		
Age							0.17	0.89
BMI							-0.10	-0.50

Adjusted $R^2=0.24$; $F_{(2,27)}=5.69$, $p<0.01$

The model of sex and the tastiness of sausages was able to account for 24% of the variation in processed meat use. Those respondents who were male and believed that sausages were tasty tended to consume processed meats more frequently overall.

Snack foods

The correlations of snack food intake with the rankings of nine snack foods on taste and nutrition were calculated (Table 6.26). The nutrition perception of cake was the only variable to be related to snack food intake and this was entered into a stepwise regression model with the three demographic variables (Table 6.27).

Table 6.26. Correlations of food perception scores for nutrition and taste with snack food intake (serves per day).

Food and perception	r	p
Bun – nutrition	0.16	ns
Bun – taste	0.04	ns
Cake – nutrition	0.38	0.04
Cake – taste	0.05	ns
Crisps – nutrition	-0.24	ns
Crisps – taste	-0.01	ns
Chocolate – nutrition	0.27	ns
Chocolate – taste	-0.004	ns
Dry biscuits – nutrition	0.08	ns
Dry biscuits – taste	0.17	ns
Jam – nutrition	-0.18	ns
Jam – taste	-0.08	ns
Lollies – nutrition	0.13	ns
Lollies – taste	0.09	ns
Peanuts - nutrition	-0.13	ns
Peanuts - taste	0.14	ns
Sweet biscuits – nutrition	0.24	ns
Sweet biscuits – taste	-0.04	ns

Table 6.27. One-step regression model results for snack food intake (serves per day).

Variables	<i>In equation</i>						<i>Not in equation</i>	
	Step	B	SE(B)	β	t	p	Partial r	t
Cake - N	1	0.37	0.17	0.38	2.17	0.04		
(Constant)		0.34	0.48		0.71	ns		
Sex							0.27	1.44
Age							0.09	0.45
BMI							-0.12	-0.61

Adjusted $R^2=0.11$; $F_{(1,28)}=4.72$, $p=0.04$

This model only accounted for 11% of the variation in snack food use so its predictive validity is quite low. Those individuals who believed that cake was nutritious tended to consume snack foods more frequently overall.

Legumes

Legume intake was assessed through the use of dried or canned beans. Three quarters of the respondents indicated that they usually did not consume any legumes (77%) while a few maintained that they consumed dried or canned beans only once or twice a month. Lentils were a

food used in the food perception Q-sort but there were no significant relationships between perceptions of lentils and intake of dried or canned beans (lentils - nutrition $r=0.26$; lentils - taste $r=0.03$).

The analyses so far have used intakes from 'food groups' rather than individual foods and many perception variables have been important predictors of general food use. The following three foods assess the utility of taste and nutrition perceptions of individual foods with the use of that particular food.

Bread

The number of serves of bread consumed each day was calculated and the relationship of bread use with taste and nutrition perceptions of white and brown bread assessed (Table 6.28). There were no significant relationships between bread perception and use. The demographic variables of age, sex and BMI were entered into a stepwise regression analysis and none of these were below the criterion limit of $p=0.10$.

Table 6.28. Correlations of food perception scores for nutrition and taste with bread use (serves per day).

Food and perception	r	p
Brown bread – nutrition	-0.06	ns
Brown bread – taste	-0.08	ns
White bread – nutrition	0.06	ns
White bread – taste	0.05	ns

Milk use in beverages

The use of milk in hot and cold beverages was assessed and daily intake calculated. This was related to the nutrition perception of milk only (milk – nutrition $r=-0.43$, $p<0.05$; milk – taste $r=0.06$, ns) and this, together with the three demographic variables, was entered into a stepwise regression analysis (Table 6.29).

Table 6.29. Two-step regression model results for the use of milk in beverages (serves per day).

Variables	<i>In equation</i>						<i>Not in equation</i>	
	Step	B	SE(B)	β	t	p	Partial r	t
Sex	1	-2.70	0.84	-0.48	-3.20	<0.01		
Milk - N	2	-0.57	0.23	-0.36	-2.45	0.02		
(Constant)		10.60	2.09		5.07	<0.01		
Age							0.25	1.33
BMI							-0.02	-0.13

Adjusted $R^2=0.36$; $F_{(2,27)}=9.26$, $p<0.001$

The use of milk in beverages appeared to be predicted by those respondents who were male and those who did not rank milk as high on nutrition as other foods. The model accounted for 36% of the variation in milk use in beverages which is very high indicating that the model has good predictive validity. The use of dairy foods generally had been predicted successfully by nutrition perceptions as reported earlier (see Table 6.10, page 255 and Table 6.20, page 261) so this needs further investigation. An analysis of covariance was conducted on use of milk in beverages and a median split of the nutrition rankings of milk, with sex as a covariate. The result was significant ($F_{(1,27)}=5.49$, $p<0.05$: low nutrition ranking – 3.64 serves of milk per day; high nutrition ranking – 1.08 serves of milk per day).

Eggs

Egg use was assessed as the use of whole eggs or if eggs were used as a major ingredient in dishes like quiche and this was related to the taste perception of eggs ($r=0.32$, $p<0.10$) but not the nutrition perception ($r=0.24$, ns). The perception of eggs according to taste was the only predictor of egg use as the demographic variables did not significantly add to the predictive power of the model (Table 6.30). The model only accounted for 6% of the variation in egg use so its predictive validity is low. Those respondents who thought that eggs were tasty tended to consume eggs more often.

Table 6.30. One-step regression model results for the use of eggs (serves per day).

Variables	<i>In equation</i>						<i>Not in equation</i>	
	Step	B	SE(B)	β	t	p	Partial r	t
Eggs - T	1	0.03	0.02	0.32	1.78	<0.10		
(Constant)		-0.08	0.14		-0.59	ns		
Sex							0.18	0.98
Age							0.08	0.44
BMI							0.18	0.93

Adjusted $R^2=0.06$; $F_{(1,28)}=3.17$, $p=0.086$

4. Discussion

The purpose of this study was to investigate the relationships between food perceptions and food intake. How are the socially shared perceptions of a food according to taste and nutrition related to actual food behaviour? Five general, consensual perceptions of food were identified (three taste and two nutrition perceptions) based on the arrangement of 50 individual food items along a scale from 'most tasty' to 'least tasty' and 'most nutritious' to 'least nutritious'. The level of how strongly each respondent identified with these consensual perceptions of food was able to predict intake of food from a generic food group, often with reasonable amounts of variance explained. These relationships continued when taste and nutrition perceptions of individual foods were included in analyses of intake from groups of food and individual food items. Many of these taste and nutrition perceptions both general and food-specific were better able to predict food intake than demographic indicators.

4.1. Food perception identification – factor analysis

Taste

Three factors emerged which accounted for 45% of the variation in all individual Q-sorts which is quite high for a sorting of foods on the taste dimension. This study provides additional evidence on the consensual nature of some tastes, despite the individual experiences that each respondent would have had with foods over their lifetime.

It appeared that many respondents, especially younger males, perceived foods according to how strong-tasting they were with bland tasting foods perceived negatively. This theme was also found in the larger Australian sample reported in Chapter 5 where younger respondents tended to perceive foods according to how flavoursome they were. This perception must have some ecological validity because it has been found in two separate samples at two different points in time in Australia.

The younger respondents, particularly the younger females, in this sample tended to regard sweeter, natural foods like fruit as the most tasty. Drewnowski (1997) noted that children tend to prefer sweeter foods but this strong preference is usually moderated by adulthood (de Graaf & Zandstra, 1999). This factor was only defined by younger adults in this sample so the older respondents may have less preference for these sweet foods. The older respondents tended to rank satiating foods more positively indicating that cognitive elements were important in this taste perception. Booth (Booth, 1994; Booth et al, 1982) has found that foods that are filling provide positive post-ingestional feelings which enhance preferences for that food.

Nutrition

Over 70% of the variation in individual Q-sorts was explained by two factors indicating a high degree of consensus and that two factors can adequately contain the ideas that these respondents had about nutrition. Only 12 respondents out of 30 loaded solely and significantly on either factor indicating that many other respondents were in agreement with the sentiments expressed in both factors. Highly processed foods were common elements to the negative ends of both factors indicating that virtually all respondents regarded these as low in nutrition. These foods are often referred to pejoratively as 'junk' foods indicating that they do not contain anything of substance.

The first factor accounted for 62% of the variance and highlighted a distinction between low-fat, vegetarian foods (positive) and high-fat processed foods and was defined by younger females and older males. It has been found previously that females often characterise

foods according to their perceived fat level (eg. Sobal and Cassidy, 1990; Fraser et al, 2000) and that younger females tend to have sympathy with vegetarian issues but often for weight control reasons (Worsley & Skrzypiec, 1997). However, unlike the study reported in Chapter 5 this 'vegetarian' factor did not appear among the taste perception factors perhaps indicating that this style of eating may be thought of as nutritious but not tasty.

Perceived fat level also appears to be important to some of the older males indicating that messages about low-fat eating are being attended to by this sector of the community. Older males tend to be the most at risk from chronic diseases such as cardio-vascular disease and stroke (eg. Risk Factor Prevalence Study Management Committee, 1990). However, as has been noted earlier knowledge of good nutrition does not always translate into healthy eating behaviours. Older respondents also regarded filling foods as high on nutrition with these protein foods placed at the extreme positive end of Factor E. The satiating nature of protein foods has been previously demonstrated (eg. Poppitt et al, 1998). This was similar in content to the third taste factor and some respondents were part of the defining group for both factors. This indicates that satiating foods that are high in protein are viewed positively on both taste and nutrition by many of the older respondents.

4.2. Food perceptions and food intake

General food perception factors and intake from food groups

One criticism of many of the popular models for investigating the antecedents of food intake behaviour outlined earlier was that these models typically only assess one or a few foods and generate specific questions to achieve this. The relevance of studying only a few foods is questionable when eating behaviour can cover a multitude of food types. This study was able to demonstrate that food perception factors generated from many foods are in fact related to intake from generic groups of foods. This indicates that consensual representations of which foods are nutritious and good tasting, rather than individual beliefs and attitudes, do predict food intake.

The predictive power in some instances was very high and often without the additional effects of demographic variables contributing to the models.

The intake of white meats was more common among those respondents who were less concerned with a lighter, vegetarian style of eating and had a higher BMI. These respondents were also less concerned with the filling nature of foods and were female. These respondents may be consuming these meats because they do not consider themselves to be vegetarian and are less concerned with low-fat dining. Taste perceptions did not feature as significant predictors of the consumption of white meat. Red meat intake however, was significantly predicted by two taste perception factors. Perception of satiety and foods that are not bland were important in the consumption of red meat. Worsley and colleagues (1996) found that the major predictor of red meat consumption was a factor labelled 'appreciation' which comprised aspects of liking and sensory and social enjoyment. It appears that when red meat is consumed taste, appreciation and satiety factors are evoked.

Fruit consumption appears to be related to taste among these respondents and those who appreciate the naturally, sweet taste of fruits tend to consume them more often. This single taste perception accounted for 16% of the variance in intake and demographic factors did not add to the model. This indicates that among all consumers the taste of fruit is paramount to intake and nutrition perceptions feature less prominently. Campaigns that highlight the tastiness of fruit may encourage wider consumption. Dairy foods however, were predicted by a younger age and the protein nutrition perception. Dairy foods are obviously thought of in terms of their nutrition content rather than their taste by these respondents.

Snack foods were consumed more often by those who did not associate these foods with poor nutrition. Demographics did not feature in this model indicating that they tend to be consumed by those from different backgrounds. Taste perceptions, particularly Factor A, did not add to the predictive power of this model. Wardle (1993) has stated that global perceptions of the tastiness of foods do not tend to be associated with the intake of specific foods. These results

indicate that this may depend on the food context as global perceptions have shown prediction of intake of some food groups (red meat and fruit) but not in the case of snack foods.

Perceptions of individual foods and intake from food groups

The rankings of individual foods according to taste and nutrition were also able to predict intake from food groups. This indicates that intake of foods from a food group may often be related to perceptions of indicator foods from that food group. This further validates the utility of food perceptions in predicting food intake.

The intake of vegetables in general was predicted by the perception that cucumber is tasty and capsicum is nutritious. These vegetables are commonly used in salads in Australia so that perhaps the use of salad vegetables is indicative of higher vegetable consumption overall. Fruit intake was predicted by nutrition rankings on strawberries and mandarins. This was contrary to the analysis of the general food perceptions as fruit intake was predicted only by taste perceptions. Perhaps fruit is generally thought of as tasty but if some individual fruits are thought of as nutritious this adds to the reasons for their consumption.

Intake of dairy foods was predicted by a younger age and the perception that cheese is nutritious. This was also found in the general food perception analysis. A younger age is obviously important for dairy consumption and the perception that they are both nutritious overall and that cheese is nutritious specifically. Cheese can be perceived to be a high fat food (eg. Westcombe & Wardle, 1997) so if other nutrition aspects of cheese specifically and dairy foods in general are highlighted, like its protein content for example, dairy consumption may be able to be raised overall, particularly among older Australians.

Red meat consumption was predicted only by the perception that lamb is tasty demonstrating that lamb can be an indicator food for red meat intake overall. Taste perceptions generally also predicted red meat consumption. Lamb is a traditional red meat in Australia and its production formed part of the Australian economic and cultural identity (Peel, 1973). However, it does have a distinctive taste so perhaps familiarity with lamb and therefore greater consumption

is a marker for consumption of other red meats. This importance of indicator foods may also be the case for processed meats which were predicted by the taste perception of sausages and being male. The nutrition perception of cake was also the only food perception variable to be associated with snack food consumption. If cake is thought of as nutritious many other snack foods tend to be consumed more frequently. There are many versions of cakes including fruit and nut varieties. Consumption of these may be rationalised because of the perception that these ingredients are better for you.

Legumes are not particularly popular in Australia and the growers' council (GRDC) has been trying to increase intake with campaigns for a number of years. Indeed, only 7.3% of adults consumed any legume product or dish in the previous day when interviewed for the National Nutrition Survey in 1995 (McLennan & Podger, 1999). An investigation of the perceptions of legumes and their relationship to intake may provide some insight into the reasons for this relatively low intake. However there was no relationship between lentil perception rankings and legume intake (mainly forms of beans). Lentils are obviously not equivalent to beans in the minds of these respondents and a 'legume' food group contains such a variety of pulses that one is not likely to be related to the other particularly to Anglo-Australians who tend to be less familiar with many of them.

Perceptions of individual foods and intake

This analysis of a small number of individual foods is similar to analyses conducted by researchers using some of the more popular models with origins in social psychology. The foods reported here were bread, milk and eggs. Only milk and egg use was significantly related to perceptions of these foods. Bread is such a staple food in Australia, particularly among Anglo-Australians, that intake may not be related to any variable. Indeed, 80% of adults had consumed regular bread or rolls in the previous 24 hours as measured in 1995 during the National Nutrition Survey (McLennan & Podger, 1999).

Milk use in beverages was found to be predicted by being male and a lower ranking of milk on nutrition. This model accounted for 36% of the variance in milk use. Males tend to consume milk as a flavoured beverage and there are several television advertisements for coffee-flavoured milk depicting men enticed by cartons of this milk. These male respondents are obviously consuming milk for reasons other than nutrition.

5. Conclusions

This third, small exploratory study was again able to demonstrate that shared representations about food exist in the wider community. A small number of ideas were able to summarise these notions, particularly in the case of nutrition perceptions which may be more under the influence of 'common sense' knowledge than taste which appears to contain both individual and consensual elements. This again demonstrates the value of social representations theory to the study of food perceptions and intake, rather than individually-based attitude-behaviour models. Food perceptions appear to mediate between the structural factors of a society, through the social processes outlined in the theory of social representations, and food intake.

In general the utility of food perceptions in determining intake has been demonstrated, particularly in the food group case where general and indicator food perceptions helped to explain use of a group of foods. Both taste and nutrition perceptions were important in the use of different foods indicating that both are important in the food choice process and often act independently of demographic factors.

This was based on a small sample size however, and these findings need to be replicated in a larger sample. The exploratory nature of this study has provided important preliminary indications of strong relationships between food perceptions and use.

Chapter 7

General discussion and conclusions

This thesis investigated the content of taste and nutrition perceptions in the diverse cultures of Korea and Australia and demonstrated that these were shared within the societies under study. These studies have shown that a small number of factors are able to meaningfully represent the perceptions of taste and nutrition in these two countries. This content was coupled to the historical and structural factors of the stages of nutrition transition within each country. There were differences between older and younger people and males and females within each country and these were related to differences in food socialisation. Links between food intake and these taste and nutrition perceptions were also successfully demonstrated often without the addition of demographic factors.

This study of the content of taste and nutrition food perceptions was undertaken within the broader conceptual theory of social representations which provides an important social dimension to social psychological research. Within this theoretical framework the important notions of social interaction and communication are paramount where individual food knowledge structures (food perceptions) are linked to broader societal and collective processes. Food is an essential part of the social lives of almost all peoples and it is rare that this topic of conversation does not arise in any extended social gathering in one form or another. It does not even need to be expressly talked about to be part of the gathering because food and beverages are offered and consumed, and the types chosen (and offered) convey much information about individuals and social and cultural groups. Cuisines provide the structure for food socialisation, definitions of

food edibility, food preparation techniques and overall food familiarity. Social representations theory provides an important epistemological approach to the study of food perceptions because collective processes provide the key to the structure and content of these perceptions through the socially shared cuisine of a group and culture which is based on structural factors within that society. The broad economic and social factors that define a society are linked to the food intake and health of that society and all of these factors impinge upon a group's food perceptions while these knowledge structures in turn influence food intake and health.

1. Critique of methodology

It was demonstrated in this thesis that consensual perceptions about food do exist and this was found in three separate studies – in the two diverse cultures of Korea and Australia, and at two points in time in Australia and using two food contexts - individual foods and meals. The aims of this thesis were to identify the content of food perceptions according to taste and nutrition; to demonstrate a degree of consensuality of these food perceptions among the sample; to relate these food perception factors to various structural factors of the society under investigation; and to investigate how these food perception factors may relate to food use. The methodology and overall approach taken in this thesis was able to provide data which could fulfil these research aims.

1.1. Content of food perceptions

The Q-method was chosen as the methodology to elucidate the content and structure of food perceptions because of its ability to be used in different cultural settings. Q-methodology provides a technique for quantifying the subjective so that the perceptions of the individual can be measured and compared with other individuals. It also has the advantage of involving a smaller number of overall comparisons to yield the same type of data as multi-dimensional scaling. Factor analysis is used and factor composites generated which are essentially a weighted average of those respondents' Q-sorts who load solely and significantly on that factor after rotation. This

factor composite provides the content and structure of the food perception. Researcher interpretation of the resulting factor structures could limit the validity and reliability of the findings. However, the use of the post-sort interview and respondent interpretation of the factor composites can help to overcome this. The generation of factor composites also allows for some generalisability of the resulting perceptual content and structure because it is not reliant on the Q-sort of any one respondent.

This methodology provided further reinforcement of the salience of the taste and nutrition perceptions as the dominant food perceptions in the food choice process. These two perceptions have been investigated extensively in social nutrition often under the guise of 'liking' and 'health' but the underlying concepts are the same. Their structure and content may be congruent or dissonant often depending on one's age and gender such that older people can be more reliant on their nutrition perceptions which may not differ from their taste perceptions, and that males, particularly younger males, are sometimes more reliant on their taste perceptions at the food choice situation.

1.2. Consensuality of food perceptions

Q-methodology was able to provide an indication of how consensual the food perceptions were among the groups studied while also providing data for subsequent analyses pertinent to the investigation. The three separate studies, detailed in Chapters 4, 5 and 6, yielded similar amounts of variance explained in both the taste and nutrition Q-sorts providing a degree of validity for how consensual these perceptions are across cultures and over time. The three taste factors accounted for around 45% of the shared variance of all respondents and two nutrition factors accounted for around 65% of the variance on average. This was despite a large number of respondents in the two major studies in Korea and Australia and two food contexts – individual foods and meals. It could be argued that the samples were highly homogeneous (ethnically) and it is a *fait accompli* to find consensuality: however, the consistency of the findings across the three studies contradicts this. If other ethnic groups were included, particularly in the Australian

studies, other factor structures could have emerged especially in the taste condition but it is precisely the argument of this thesis that it is the cuisines of the respondents and their social and food world which are informing their perceptions. The nutrition perceptions may have had a similar degree of consensuality as that found in the three studies because this information tends to be negotiated more by people through social communication and what is portrayed in the media. If the respondents were sorting the foods randomly there would be minimal relations found in the factor analysis however this was not the case. Underlying consensual ideas about taste and nutrition were informing the respondents during the sorting process.

One threat to internal validity using Q-methodology would be differing respondent interpretation of the items in the Q-sample. However, the use of pictures of foods and meals in this case (together with the words) rather than only words and phrases would have limited this. This has yet to be tested empirically. Perhaps this method was able to provide a more accurate indication of the degree of consensuality of food perceptions because of the use of pictures.

1.3. Structural factors of a society

The approach taken in this thesis related the content and structure of food perceptions generated through Q-methodology to the structural factors of the societies of Korea and Australia. The structural factors were presented within the framework of the nutrition transitions of these two countries, particularly the influences of historical, economic, social and health factors on population food use and nutrition. It has been the tenet of this thesis that these broad societal factors provide the information for the social processes underpinning the genesis of social representations of food and hence inform food perceptions.

However, any study of the factors influencing a society even at the broadest level is limited and perhaps the presentations outlined in the introductions to Chapters 4 and 5 were similarly limited. The Korean instance is really one of 'an outsider looking in' and the author cannot claim to fully understand Korean society intimately. It is often difficult to even understand and convey information about one's own society as in the Australian case. As social

representations theory maintains, societies are continually evolving and the findings reflect a single point in time. This is especially true in the case of food for which reports abound in the media. As Moscovici maintains this leads to new knowledge, often transformed from the scientific arena, leading to changes in social representations and hence food perceptions.

1.4. Food perceptions and food use

Chapter 6 detailed the relationship between food perceptions and food use. However, factors other than food perceptions and simple demographics not measured in this study may be better predictors of food use. These may include price and habit for example. However, strong relationships were found between perceptions and use particularly in the cases of white meats, fruit and snack foods.

Generally, Q-methodology, particularly the use of a forced sorting distribution as was employed in the studies reported in this thesis, has some advantages over the use of rating scales as it forces the response scores to change in a systematic way. Rather than a respondent rating all foods as high on taste, the method challenges the respondent to make more fine-grained distinctions in analysing their own taste perceptions of different foods. This may artificially introduce more negative taste perception rankings than would otherwise be the case for the respondent. However, the relative nature of the comparisons should overcome this where the respondent accordingly ranks some foods as more tasty than others. The interpretation is also concentrated at the extreme ends of the factor composite (outside ± 3 in this case) such that highly positive and negative rankings are evaluated.

2. Taste perceptions

Three factors were able to account for 45% of the shared variance in the taste sorts of all respondents in the three studies using individual foods and in the two major studies using meals. This indicates that there are consensual perceptions about food according to taste and that these are often shared within age and gender groups. Individual tastes were also informing these

perceptions to a certain degree because a large amount of variance was unaccounted for. This is not surprising in the taste perception area because food experiences of individuals do shape their own perceptions. One individual may not like carrots where another one does and this would equate with the different placement position of carrots on the food sorting continuum. However, despite this, overall consensual perceptions about the taste of food do exist which tend to differ between social groups.

The food Q-samples used in Korea (Chapter 4) and Australia (Chapters 5 and 6) were unique to each country because of their different cuisines. This means that direct comparisons of specific foods common to both Q-samples is not appropriate. However comparisons can be made of perceptions of food groups and the overall factors which emerged. Comparisons between Korea and Australia show the unique nature of these taste perceptions and how cuisines and food histories do inform these food perceptions. However, elements common to both countries' taste perceptions could also be seen. Taste perceptions of individual foods were also studied in the two Australian samples (Chapters 5 and 6) at different points in time allowing longitudinal assessments to be made.

Older respondents in both Korea and Australia appeared to favour traditional and natural foods versus processed foods. These taste perceptions also seemed to contain cognitive as well as taste elements. This was found in both the individual food and meal contexts. Traditional foods usually encompass foods and meals which are familiar in many aspects including taste. Traditional foods can also function as a way of expressing cultural and social identity through the ethnic markers of a cuisine. It is highly likely that older people will hold these beliefs about traditionality and food.

Filling foods were also regarded positively and this was particularly evident in the meals context. Younger Koreans regarded these meals positively which may reflect the student character of the young Korean sample. It could be expected that this group of people would value foods which are satiating. Older Australian males also regarded more substantial foods and meals

positively. Many of these meals also tended to be traditional meals including roasted meats and other meat-based stews and dishes.

The younger respondents from both countries appeared to favour flavoursome and pleasant foods against bland and bitter foods. This was also seen in the meals condition among the younger Australians. In both countries this sweet preference was for natural forms of sweetness including fruits and for processed forms including confectionery. This positive regard for sweetness has also been found in sensory studies of young Australians and Malaysians (Holt et al, 2000). It has been noted that sweetness is usually associated with a source of dietary energy and that a preference for sweetness is highly adaptive ensuring survival in an evolutionary sense (eg. Rozin & Vollmecke, 1986). The level of sweetness preferred tends to vary greatly within a culture especially among older people and most people have their own sensory preference levels (McBride, 1994).

Consonant with this positive regard for sweet foods and meals was a negative perception of bitter foods in both countries by many of the younger respondents. Many of the vegetable foods and dishes were regarded negatively. Some classes of vegetables do contain bitter elements or are bland in flavour. Many nutrition educators are trying to encourage a greater consumption of vegetable and other plant foods by younger people. More work needs to be done to address these perceptions of vegetables among young people.

Meat was regarded positively on taste by many of the Korean and Australian respondents. However, taste perceptions which appeared to be based on vegetarian ideologies were also found in the two countries particularly among some of the younger females. This has been noted in adolescent females (Worsley & Skrzypies, 1997) and may often present as a rejection of red meats and a preference for white meats including fish and seafood. This may reflect a more fundamental belief that red meat is a masculine food as has been documented in other cultures (Baghurst et al, 1997). However this vegetarian taste perception was not found among the first three factors of the respondents from the smaller study but the average ages of the younger

respondents in the two Australian studies were different and this may be a reflection of these age differences. If the second study had included more people and particularly more younger female students, this perception may have emerged naturally.

It appears that despite the different food samples used in each study (reflecting their own cuisine and food history), general food perceptions that differ across age groups do exist. Food socialisation and cohort effects appear to inform taste perceptions the most as evidenced by these cross-cultural results. Older Koreans and Australians are more familiar with their traditional foodstuffs and hence prefer them. Younger Koreans and Australians appear to favour more flavour-filled foods whether they are of traditional or more highly-processed forms. This may reflect a general age difference globally, particularly in societies undergoing social and nutrition transitions.

3. Nutrition perceptions

The perceptions of foods according to nutrition appear to be very consensual particularly as the major Korean and Australian studies were based on larger sample sizes where each respondent could sort the foods according to their own ideas about nutrition. Ideas about nutrition and health would tend to be more social in nature leading to their high degree of consensuality because this information is learned from society, whether from nutrition experts and the media or from families and social groups or the 'collective wisdom' of traditional societies. People have to learn about the nutrition and health aspects of food as this is not something that one tends to experience directly or with short-term effects after consumption. This means that it should be expected that shared ideas will exist, however, the high degree of variance accounted for by only two factors indicates that these ideas are highly prevalent. The social nature of these perceptions would emphasise the degree of communication and negotiation among individuals that occurs about food.

There were some differences between those nutrition perceptions found in Korea and Australia and also among the types of groups associated with each perceptual factor. In Australia, clear differences between age and gender groups were found to a greater extent than among the Korean sample. Plant and vegetable foods were regarded differently by Koreans and Australians on nutrition. In Korea, vegetables were perceived negatively while Australians, particularly younger Australians, perceived them positively. Protein foods were regarded positively by many of the Koreans and older Australians. The meals condition also yielded perceptions that distinguished among the satiating or filling value of meals among both Korean and Australian older respondents. In general meat was regarded by Koreans as both tasty and nutritious where in Australia it was viewed as tasty but not nutritious, especially by the younger respondents. Both countries have had a relatively long history of the positive role of meat in the diet. Australians tend to consume meat at much higher levels than Koreans, however. Australia is also at the 'nutrition program' stage of the nutrition transition where decreasing intake of animal foods is encouraged and negative reports about the health value of meat abound.

Nutrition perceptions were found to be similar in the two Australian studies. Younger respondents perceived plant foods positively and processed and fattening foods negatively, while older Australians perceived foods along a protein and filling versus highly processed foods dimension. In general the older respondents tended to regard the same foods as both tasty and nutritious, particularly the protein foods including meats and dairy foods. The younger respondents tended to hold dissonant perceptions in general where foods that were regarded as tasty tended to be regarded as less nutritious. Krongl and colleagues have also found this age difference (eg. Krongl et al, 1982). Dissonant views of foods according to taste and nutrition can lead to ambivalent feelings about that food (eg. Shepherd, 1999) or one may take precedence over the other in the food choice situation.

4. Taste and nutrition perceptions

The Korean and major Australian studies also investigated the relationships between taste and nutrition perceptions for groups of food among the four age and gender groups using repeated measures MANOVA. There tended to be ambivalent perceptions about cereal foods on both taste and nutrition in Korea and Australia with these foods ranking around the mid-point of the continuum on average. Korea has a much higher intake of cereals than Australia although the rate of intake has been declining annually for some years. Nutrition educators emphasise the need for a good intake of cereals in the diet but they do tend to require additions to make the more palatable.

Vegetables (green and other) were also regarded ambivalently on both taste and nutrition in Korea and Australia. Younger Australians were the most negative in their taste perceptions although more positive in their nutrition perceptions. In Korea, older respondents tended to hold more positive views on both taste and nutrition when compared to younger Koreans. Fruit was perceived by Koreans to be much more tasty than nutritious, particularly by younger Koreans. Australians were much more ambivalent in their reactions to fruit overall and the older males appeared to hold much more negative perceptions of fruit on both taste and nutrition than any other group. Nutrition educators are encouraging people to base their diets on plant foods (cereals and fruits and vegetables) but they were perceived to be neither particularly tasty nor nutritious and were only perceived more positively than snack foods on nutrition. Some age and gender groups were more favourable in their perceptions in general but nutrition marketers and educators need to emphasise the tastiness and nutritional worth of these plant foods.

Protein foods including dairy, meat, fish, and processed meat and seafood were held in positive regard by the Koreans although they were perceived to be more nutritious than tasty overall, especially by the younger Korean females. Australians appeared to have more ambivalent perceptions of these protein foods overall and tended to regard processed forms quite negatively. However, large differences emerged among the groups. Younger Australians regarded dairy foods

to be more nutritious than tasty indicating dissonant perceptions. Meat perceptions tended to be more congruent; younger and female Australians were more negative on both taste and nutrition while older and male Australians tended to be more positive on both perceptions. This may be a reflection of the vegetarianism evident in some of the perceptions of meat held by the younger females, and the special place that meat has held in the diets of older Australians.

Snack foods were regarded negatively overall by both Koreans and Australians although the younger Koreans regarded them as significantly more tasty than nutritious while older female Australians exhibited the most negative perceptions overall. This perhaps reflects the role of older females as the food gatekeeper.

5. Food perceptions and food intake

The small, exploratory Australian study investigated the relationship between taste and nutrition perceptions and food intake at the general food group level and the specific food level. Significant predictive relationships between taste and nutrition perceptions and food intake were found and often with much more predictive power than demographic indicators. This has extended the concept of food perceptions as they relate to wider societal factors to their use in food behaviour at the food choice situation. Evaluation of a food according to its perceived level of taste and nutrition relates to its use overall, whether that food is an indicator food for a general food group, like lamb for red meat, or whether the perception is of the individual food specifically. This confirms earlier studies linking individual food perceptions to individual food use (eg. Kronl & Coleman, 1988) but extends the link to include broader food perceptions and generic food groups. This was based on a small study however, and while these findings provide important indicators, they need to be replicated in a sample which is much larger.

6. Implications for future research

One extension of this research would be to investigate relationships among socially shared food perceptions, food intake and societal values using the values' scales of Schwartz for

example (Schwartz, 1992). Many age and gender differences in food behaviour can be explained by identification with certain value structures and it would be expected that these would add explanatory power to the relationship between food perceptions and food intake. Many of the themes generated in these studies could be confirmed with the use of a measure of the importance of value principles to individuals. For example, many of the older respondents tended to perceive more traditional foods as tasty. Is the value of 'tradition' important to them and if it is, would it also contribute independent explanatory power to the relationship between food perceptions and intake of more traditional foods? The work of Worsley and colleagues (1996) would suggest that this would be the case. This would also extend the analysis of food perceptions within the social representations tradition and confirm the relationships between wider social forces and processes and the content and structure of food perceptions themselves.

The evaluative nature of food perceptions could also be investigated. Social representations theory holds that these structures exist to organise information negotiated through communication processes but that they also function as evaluative structures. Food is an inherently evaluative domain and perceptions of food may flow to perceptions of people. For example, stereotypes and attributions of the foods eaten by people at either end of the weight spectrum abound even if this is not the case in reality. Social psychology could extend research on stereotypes of the eating styles of these individuals to include food perceptions.

Food biotechnology is a fairly recent phenomenon and public opinions about genetically-modified foods are currently under development. Researchers, government, industry and the general community appear to hold different opinions on the perceptions of risk from these technologies and the moral and ethical components of 'manipulating' the genetic make-up of organisms. Social representations theory, food perceptions research, and Q-methodology have much to offer in the elucidation of these opinions and the assessment of their prevalence.

Q-methodology has been used successfully in this thesis in two diverse cultures and in a language other than English. It has been used previously among even younger groups including

children and adolescents. Differences in perceptual structures between adults and adolescents, and even children could help to track the development of these food perceptions to early and later adulthood. Food perceptions of people from other ethnic groups, particularly in multicultural societies like Australia, could also be investigated and differences and similarities in host and ethnic perceptions noted. Food perceptions according to migration status (migrant, first generation, second generation and so on) could also be investigated to determine when, and if, perceptions change along with changes in diets.

7. Conclusions

This research represents the interface between social and nutritional sciences and the demands and expectations in each discipline are often very different. It is often difficult to structure university training around obtaining knowledge in both areas. Researchers at this interface tend to have specialised in one of the disciplines and then borrow terms and methodologies from the other (usually nutrition specialists borrowing from the social sciences) without a thorough understanding of the assumptions and limitations of methodologies and appropriate use of existing scales. Or they may be social psychologists extending their research into the food and nutrition area without a good grounding in biological and physiological processes and an understanding of nutrition. The education of social nutrition researchers needs to address this, particularly in Australia.

This thesis has attempted to expand food perceptions research to include the theory of social representations which takes account of wider societal processes. Food perceptions were found to be linked to the structural factors of Korea and Australia which informs the content of taste and nutrition perceptions and who holds them. Food perceptions were also found to be linked to food intake at both the general food perception level and the perceptions of individual foods. The utility of the concept of food perceptions in understanding the aetiology of eating behaviour has thus been demonstrated. Food perceptions appear to play a modifying role between

the structural factors of a society, through the social processes outlined in the theory of social representations, and food behaviour.

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Appendix A. Pilot study – practice Q-sample: Korean magazine titles.

1	Stereo Music	13	Leather Fashion
2	Photography	14	Architectural Culture
3	Golf	15	Hot Music
4	TIME	16	Korean Traditional Clothes
5	Fashion Magazine	17	New World
6	Newsweek	18	Car Journal
7	Auto	19	Better Homes
8	Monthly Interiors	20	Readers' Digest
9	Woman Sense	21	Elle
10	Music Sound	22	Design
11	Observer	23	Korean Culture and Art Journal
12	TV Guide		

Examples of cards from the Korean Magazine Q-sample.



Appendix B. Pilot study: Question used to generate food perception characteristics for Korean Q-sample.

When thinking about food, what characteristics, or properties, of food are important to you?

식품에 대해 생각한다면 당신에게는
식품의 어떤 특성이 중요합니까?

Appendix C. Pilot study: Examples of the food perception factors.

<p>1</p> <p>영양</p> <p>Nutrition</p>	<p>3</p> <p>맛</p> <p>Taste</p>
<p>8</p> <p>정성</p> <p>Sincerity</p>	<p>29</p> <p>요리된음식의 조화</p> <p>Harmony of Cooked Food</p>

Appendix D. Pilot study: English and Korean Q-sort instructions.

Instructions for participants.

I want you to think about food. A set of cards is in front of you that have food-related words printed on them. I want you to sort these cards according to how important they are to you when you choose food.

A row of marker cards is located in front of you. These are numbered from (-5) 'most unimportant' to (+5) 'most important'. Each card has a number in brackets and this shows the number of items that are to be placed under each of these cards. For example (+5) has (2) written on it, so only two items should be placed underneath it.

1. Please read through the items to become familiar with them. As you are reading sort the items into two rough piles, those that are important to you (right-hand side) and those that are unimportant to you (left-hand side).
2. Spread the pile of cards out that you have chosen as important to you (right-hand side) and choose the two items that are the most important to you. Place them underneath the (+5) card.
3. Continue choosing cards and placing the correct number underneath each marker card until your pile is finished.
4. Return to the 'unimportant' card pile, spread them out and choose the two most unimportant cards and place them underneath the (-5) card.
5. Continue choosing cards and placing the correct number underneath each marker card until your pile is finished.
6. All cards should now be sorted. Make any adjustments you wish and when you are happy with the final sorting of the cards, the assistant will copy your results.

Thank you for your help.

(Appendix D continued...)

응답 방법

음식에 대해 생각해 봅시다. 당신의 앞에는 식품에 관련된 말들이 적혀있는 한세트의 카드가 놓여있습니다. 식품을 고를 때 본인에게 중요한 순에 따라 그 카드들을 분류하시기 바랍니다.

마찬가지로 표시카드들도 한 줄 앞에 놓여있습니다. 이 카드에는 번호들이 (-5) '가장 중요하지 않다'에서 (+5) '가장 중요하다'까지 매겨져 있습니다. 각 카드에는 괄호 안에 그 카드 아래 놓을 수 있는 식품의 개수를 한정하는 번호도 적혀 있습니다. 예를 들어 (+5)의 경우에는 (2)가 함께 적혀 있으므로 그 카드 아래는 두 개의 식품만 놓일 수 있습니다.

1. 각 항목이 잘 이해되도록 모두 읽어주시기 바랍니다. 읽으면서 카드들 두 부류로 오른쪽으로는 본인이 중요하게 느끼는 항목들을, 왼쪽으로는 중요시하지 않는 항목들을 놓으시면 됩니다.

2. 그 다음 오른쪽으로 중요하다고 생각되어 분류한 카드들중 흠어놓은 후에, 가장 중요하다고 느끼는 카드 둘을 골라 (+5) 아래에 놓습니다.

3. 같은 요령으로 계속 카드를 고르면서 중요도 분류가 끝날 때까지 각 표시 카드 밑에 정해진 개수대로 카드를 놓습니다.

4. 이젠 '중요하지 않음' 카드 분류를 시작합니다. 먼저 카드를 흠어놓은 후 가장 덜 중요하다고 생각되는 카드 둘을 골라 (-5) 아래 놓습니다.

5. 계속 같은 요령으로 카드를 고르면서 분류가 끝날 때까지 각 표시 카드 아래로 정해진 개수대로 카드를 놓습니다.

6. 카드 분류작업을 마치셨습니까? 분류를 마친 카드를 다시 보시고 본인이 그 분류결과에 만족하실 수 있도록 재조정하실 수 있습니다. 그 후 결과를 검사원이 기록할 것입니다.

협조해 주셔서 감사합니다.

(Appendix E continued....)

5. Are you the one who usually cooks for your household?
 Yes (go to Question 6)
 No (go to Question 7)
6. If yes, how many meals do you normally cook between Monday and Friday?
 1 – 3 meals
 4 – 6 meals
 7 – 9 meals
 10 – 12 meals
 13 – 15 meals
- Which meals do you normally cook?
 Breakfast
 Lunch
 Dinner
- How many people do you usually cook for?
 people.

Thank you for your time.

7. If not, who does the cooking for you?
 Mother
 Wife
 Restaurant
 Other
 (please specify)
- How many family members do you live with?
 people.

Thank you for your time.

(Appendix E continued....)

대단히 중요하지 않다				그저 그렇다			대단히 중요하다			
-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
(2)	(3)	(4)	(5)	(6)	(10)	(6)	(5)	(4)	(3)	(2)
—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	
		—	—	—	—	—	—	—		
			—	—	—	—	—			
				—	—	—				
					—	—				
						—				
							—			
								—		
									—	
										—

1. 생년월일: _____

2. 성별: 남성 _____
 여성 _____

3. 교육정도: 고등 학교 _____
 대학 재학중 _____
 대졸 _____

4. 평균적인 가족의 한달 소득: 오십만원 이하 _____
 오십만원 이상 - 백만원미만 _____
 백만원 이상 _____

(Appendix E continued....)

5. 당신은 당신의 집에서 주로 요리를 담당하십니까?

예 _____ (6번 질문으로 가세요)

아니오 _____ (7번 질문으로 가세요)

6. 예라면, 당신은 보통 월요일부터 금요일까지 몇번 요리하십니까?

1-3 번 _____

4-6 번 _____

7-9 번 _____

10-12 번 _____

13-15 번 _____

당신은 하루중 어떤 때 식사를 요리하십니까?

아침 _____

점심 _____

저녁 _____

당신은 보통 몇 명을 위해 요리하십니까?

_____ (명)

감사합니다.

7. 아니라면, 당신은 누가 요리한 음식을 좋아하십니까?

어머니 _____

아내 _____

음식점 _____

기타 _____

(기타 적어주세요) _____

같이 살고 있는 당신의 가족 수는 몇 명입니까?

감사합니다.

Appendix F. Pilot study: Factor composites A-C.

	Food Perception Factors		
	A	B	C
+5	Taste Freshness	Taste Health	Hygiene Health
+4	Cleanliness Sincerity Health	Nutrition Hygiene Freshness	Nutrition Taste Freshness
+3	Nutrition Hygiene Calories Enjoyment	Cleanliness Calories Price Quality	Cleanliness Sincerity Calories Safety
+2	Harmony of cooked food Price Flavour Quality Appreciation	Fattiness Convenience Preservatives Flavour Enjoyment	Fattiness Preservatives Tradition Quality Saltiness
+1	Familiarity Convenience Appearance Safety Smell Source/Origin	Cooking time Colour Safety Cooking method Smell Ease of cooking	Storage period Cuisine Ripeness Habit Additives Enjoyment
0	Storage period Natural Cuisine Texture Habit Colour Beautiful Shape Ease of cooking Smoothness	Storage period Texture Availability Oiliness Harmony of cooked food Additives Shape Saltiness Temperature Appreciation	Familiarity Natural Juiciness Oiliness Cooking method Smell Beautiful Cooking knowledge Source/Origin Smoothness
-1	Ripeness Season Availability Cooking method Tradition Packaging	Familiarity Cuisine Habit Appearance Crispness Sweetness	Convenience Season Harmony of cooked food Price Flavour Temperature
-2	Cooking time Crispness Size Cooking knowledge Temperature	Sincerity Season Packaging Cooking knowledge Source/Origin	Texture Availability Spiciness Shape Appreciation
-3	Creaminess Juiciness Additives Sweetness	Ripeness Juiciness Spiciness Smoothness	Colour Crispness Size Ease of cooking
-4	Oiliness Spiciness Saltiness	Natural Beautiful Size	Cooking time Appearance Sweetness
-5	Fattiness Preservatives	Creaminess Tradition	Creaminess Packaging

Appendix G. Korean Q-study: Korean foods examples.



당근
29

Carrots



참치
30

Canned Tuna



상치
31

Korean Lettuce



사탕
32

Lollies

Appendix H. Korean Q-study: Korean meals examples.



불고기

1

Barbecued Beef



두부 부침

2

Fried Bean Curd



햄버거

3

Hamburger



만두국

4

Dumplings in Meat Soup

Appendix I. Korean Q-study: Description of Korean meals.

1	Barbecued beef	Beef marinated in garlic, sugar, sesame oil, soy sauce, black pepper and grilled over flame
2	Fried bean curd	Sliced bean curd which is pan-fried. Served with soy sauce.
4	Dumplings in broth	Dumplings stuffed with bean curd, ground meat and vegetables. Cooked in meat broth.
5	Spicy fish soup	Fish boiled with bean curd, red pepper sauce, soy sauce and vegetables
6	Rice cakes	Boiled rice is pounded and made into dough. The rolled dough is cut into squares and coated with sesame seeds, for example.
8	Rice/vegetable mix	Rice, with raw and cooked vegetables, cooked beef and an egg served together in a bowl. Red pepper sauce can be added.
9	Mushroom salad	Dried or fresh mushrooms sautéed with vegetables and seasoned.
10	Radish kimchi	Asian radishes are diced and seasoned with salt. Red pepper powder, garlic, ginger and green onions are added.
12	Spicy meat soup	A clear meat soup which has a sauce made from red pepper powder fried in oil added to it.
13	Fern shoot salad	Young shoots of fern are boiled and seasoned.
15	Kimchi pancake	Old kimchi is soaked, rinsed and added to a flour batter.
18	Food in batter	Peppers, bean curd, zucchini, eggplant are dipped in batter and fried.
20	Kimchi stew	Kimchi is sautéed and added to bean curd, vegetables and meat.
21	Braised eggplant	Eggplant is steamed and seasoned with soy sauce, sesame seeds and oil.
24	Dried pollack stew	Dried pollacks (fish) are soaked and then sliced. They are then steamed with seasonings.
25	Bean curd soup	Raw bean curd (resembling poached eggs) is seasoned with hot pepper sauce and made into a soup.
27	Grilled pork	A side cut of pork is thinly sliced and cooked over a grill.
28	Seaweed/rice roll	Dried seaweed is rolled with steamed rice, cooked egg and meat.
29	Seasoned bean sprouts	Steamed bean sprouts are seasoned with sesame seeds and oil, soy sauce and red pepper powder.
31	Stir fried octopus	Carrots, octopus, green onions are cut into pieces and cooked in a wok. Red pepper powder is added.
33	Cucumber kimchi	Cucumbers are salted and seasoned with red pepper powder and sesame seeds and oil.
34	Vermicelli combo.	Vermicelli noodles are cooked and tossed with meat, spinach, carrots and mushrooms. Seasoned with soy sauce, oil and sugar
36	Grilled fish	Fish is seasoned and grilled over an open flame.
37	Green onion pancake	Green onions, water cress and meats are added to frying batter.
38	Watercress salad	Watercress is parboiled and seasoned with soy sauce, sesame seeds and oil, and vinegar.
39	Seasoned ark shell	Ark shells are boiled and the meats seasoned with soy sauce, oil, sesame seeds and red pepper powder.
41	Sweet rice	Steamed glutinous rice is blended with cooked chestnuts, Chinese dates, sugar and caramel syrup. It is often served as a health food.
42	Fish stew/soy sauce	Fish is simmered in soy sauce and seasoned.
43	Hot radish salad	Shredded Asian radish is seasoned with salt, vinegar, red pepper powder, sesame seeds and oil and some sugar.
44	Noodles in soup	Noodles are boiled in broth.
45	Braised zucchini	Zucchini (summer squash) are dipped in beaten egg and pan fried.
46	Ginseng salad	Ginseng roots are thinly sliced and seasoned with vinegar, sugar and red pepper sauce.
47	Short ribs soup	Short beef ribs are boiled with diced radishes and green onions.
48	Cabbage kimchi	Chinese cabbages are seasoned with salt until they wilt. After washing they are packed with radish, garlic, ginger, and red pepper powder and allowed to ferment.
50	Acorn curd	Acorn starch is boiled and allowed to form a curd. It is sliced and seasoned with soy sauce, sesame seeds and oil.

Adapted from Hwan (1987)

Appendix J. Korean Q-study: English and Korean Q-sort instructions.

Instructions for participants.

I want you to think about food. There are two sets of cards: one with pictures of Korean foods and the other with pictures of Korean meals and snacks. You will sort each set of foods according to how tasty and how nutritious you think those foods are. This means that there will be four separate sorting sessions altogether.

A row of marker cards is located in front of you. These are numbered from (-5) 'least tasty' or 'least nutritious' to (+5) 'most tasty' or 'most nutritious'. Each card has a number in brackets and this shows the number of items that are to be placed under each of these cards. For example (+5) has (2) written on it, so only two items should be placed underneath it.

For those beginning with the 'taste' sort:

1. Please read through the items to become familiar with them. As you are reading sort the items into two rough piles, those that are tasty to you (positive end) and those that are not tasty to you.
2. Spread the pile of cards out that you have chosen as tasty to you (right-hand side) and choose the two foods that are the most tasty to you. Place them underneath the (+5) card.
3. Continue choosing cards and placing the correct number underneath each marker card until your pile is finished.
4. Return to the 'not tasty' card pile, spread them out and choose the two least tasty cards and place them underneath the (-5) card.
5. Continue choosing cards and placing the correct number underneath each marker card until your pile is finished.
6. All cards should now be sorted. Make any adjustments you wish and when you are happy with the final sorting of the cards, the assistant will copy your results.

When instructed to do so, sort the cards again according to how nutritious you think the foods are.

Thank you for your help.

(Appendix J continued....)

Instructions for participants.

I want you to think about food. There are two sets of cards: one with pictures of Korean foods and the other with pictures of Korean meals and snacks. You will sort each set of foods according to how tasty and how nutritious you think those foods are. This means that there will be four separate sorting sessions altogether.

A row of marker cards is located in front of you. These are numbered from (-5) 'least tasty' or 'least nutritious' to (+5) 'most tasty' or 'most nutritious'. Each card has a number in brackets and this shows the number of items that are to be placed under each of these cards. For example (+5) has (2) written on it, so only two items should be placed underneath it.

For those beginning with the 'nutrition' sort:

1. Please read through the items to become familiar with them. As you are reading sort the items into two rough piles, those that you think are nutritious (positive end) and those that you think are not nutritious.
2. Spread the pile of cards out that you have chosen as nutritious to you (right-hand side) and choose the two foods that you think are the most nutritious. Place them underneath the (+5) card.
3. Continue choosing cards and placing the correct number underneath each marker card until your pile is finished.
4. Return to the 'not nutritious' card pile, spread them out and choose the two foods you think are the least nutritious and place them underneath the (-5) card.
5. Continue choosing cards and placing the correct number underneath each marker card until your pile is finished.
6. All cards should now be sorted. Make any adjustments you wish and when you are happy with the final sorting of the cards, the assistant will copy your results.

When instructed to do so, sort the cards again according to how tasty you think the foods are.

Thank you for your help.

(Appendix J continued....)

응답 방법

음식에 대해 생각해 봅시다. 당신의 앞에는 한국 요리의 사진이 있는 카드 한 세트와 다른 한국 식품과 간식 사진들이 있는 또 한 세트의 카드가 놓여있습니다. 당신은 본인이 생각하는 맛있는 정도와 영양가가 있는 정도에 따라 각 세트의 카드들을 분류하시게 됩니다. 따라서 총 4회의 분류작업을 하시게 되는 것입니다.

마찬가지로 표시카드들도 한 줄 앞에 놓여있습니다. 이 카드에는 번호들이 (-5) "가장 맛없다 '가장 영양가가 없다'에서, (+5) '가장 맛있다'나 '가장 영양가가 있다'까지 매겨져 있습니다. 각 카드에는 괄호 안에 그 카드 아래 놓을 수 있는 식품의 개수를 한정하는 번호도 적혀 있습니다. 예를 들에 (+5)의 경우에는 (2)가 함께 적혀 있으므로 그 카드 아래는 두 개의 식품만 놓일 수 있습니다.

먼저 '맛'에 대한 분류로부터 시작하신 분들은:

1. 각 항목이 잘 이해되도록 모두 읽어주시기 바랍니다. 읽으면서 카드를 두 부류로 오른 쪽으로는 본인이 중요하게 느끼는 항목들을, 두 종류로 한 쪽은 맛있다고 느끼는 것들을, 다른 쪽은 본인이 맛없다고 생각되는 것들을 놓으시면 됩니다.
2. 그 다음 오른 쪽으로, 맛있다고 생각되어 분류한 카드들을 흠어놓은 후에, 가장 맛있다고 느끼는 카드 둘을 골라 (+5) 아래에 놓습니다.
3. 같은 요령으로 계속 카드를 고르면서 분류가 끝날 때까지 각 표시 카드 밑에 정해진 개수대로 카드를 놓습니다.
4. 이번에는 '맛없다' 카드 종류를 시작합니다. 먼저 카드를 흠어놓은 후 가장 맛없다고 생각되는 카드 둘을 골라 (-5) 아래 놓습니다.
5. 계속 같은 요령으로 카드를 고르면서 분류가 끝날 때까지 각 표시 카드 아래로 정해진 개수대로 카드를 놓습니다.
6. 카드 분류작업을 마치셨습니까? 분류를 마치신 카드를 다시 보시고 본인이 그 분류결과에 만족하실 수 있도록 재조정하실 수 있습니다. 그 후 결과를 검사원이 기록할 것입니다.

지시가 있으면, 본인이 느낄 때 영양가가 있고 없는 종류로 다시 카드 분류를 하십시오.

협조해 주셔서 감사합니다.

(Appendix J continued....)

응답 방법

음식에 대해 생각해 봅시다. 당신의 앞에는 한국 요리의 사진이 있는 카드 한 세트와 다른 한국 식품과 간식 사진들이 있는 또 한 세트의 카드가 놓여있습니다. 당신은 본인이 생각하는 맛있는 정도와 영양가가 있는 정도에 따라 각 세트의 카드들을 분류하시게 됩니다. 따라서 총 4회의 분류작업을 하시게 되는 것입니다.

마찬가지로 표시카드들도 한 줄 앞에 놓여있습니다. 이 카드에는 번호들이 (-5) "가장 맛있다 '가장 영양가가 없다'에서, (+5) '가장 맛있다'나 '가장 영양가가 있다'까지 매겨져 있습니다. 각 카드에는 괄호 안에 그 카드 아래 놓을 수 있는 식품의 개수를 한정하는 번호도 적혀 있습니다. 예를 들어 (+5)의 경우에는 (2)가 함께 적혀 있으므로 그 카드 아래는 두 개의 식품만 놓일 수 있습니다.

먼저 '영양가'에 대한 분류로부터 시작하신 분들은:

1. 각 항목이 잘 이해되도록 모두 읽어주시기 바랍니다. 읽으시면서 카드를 두 부류로 오른 쪽으로는 본인이 중요하게 느끼는 항목들을, 두 종류로 한 쪽은 영양가 있다고 느끼는 것들을, 다른 쪽은 본인이 영양가 없다고 생각되는 것들을 놓으시면 됩니다.
2. 그 다음 오른 쪽으로, 영양가 있다고 생각되어 분류한 카드들을 훌어놓은 후에, 가장 맛 있다고 느끼는 카드 들을 골라 (+5) 아래에 놓습니다.
3. 같은 요령으로 계속 카드를 고르면서 분류가 끝날 때까지 각 표시 카드 밑에 정해진 개수대로 카드를 놓습니다.
4. 이번에는 '영양가 없다' 카드 종류를 시작합니다. 먼저 카드를 훌어놓으신 후 가장 영양가 없다 라고 생각되는 카드 들을 골라 (-5) 아래 놓습니다.
5. 계속 같은 요령으로 카드를 고르면서 분류가 끝날 때까지 각 표시 카드 아래로 정해진 개수대로 카드를 놓습니다.
6. 카드 분류작업을 마치셨습니까? 분류를 마치신 카드를 다시 보시고 본인이 그 분류결과에 만족하실 수 있도록 재조정하실 수 있습니다. 그 후 결과를 검사원이 기록할 것입니다.

지시가 있으면, 본인이 느낄 때 맛이 있고 없는 종류로 다시 카드 분류를 하십시오.

협조해 주셔서 감사합니다.

(Appendix K continued...)

1. Year of Birth: _____

2. Sex: (1) Male _____

(2) Female _____

3. Are you the person in charge of the cooking in your home?

(1) Yes _____

(2) No _____

Thankyou for your time.

1. 상년: _____

2. 성별: (1) 남성 _____

(2) 여성 _____

3. 당신은 당신의 집에서 주로 요리를 담당하십니까?

(1) 예 _____

(2) 아니오 _____

감사합니다.

Appendix L. Korean Q-study: Factor composites A-J.

	Korean foods: Taste		
	A	B	C
+5	Beef Strawberries	Fish Toasted seaweed	Apples Strawberries
+4	Apples Grapes Yoghurt	Beef Grapes Octopus	Grapes Mandarins Tomatoes
+3	Chicken Ice-cream Mandarins Toasted seaweed	Apples Mandarins Mushrooms Strawberries	Carrots Cucumber Potato Toasted seaweed
+2	Chocolate Fish Milk Pork Processed ham	Chestnuts Eggs Ginseng Green peppers Tofu	Chestnuts Milk Spinach Sweet bun Tofu
+1	Canned tuna Chestnuts Eggs Frankfurts Sponge cake Squid	Anchovies Cucumber Pork Rice Squid Tomatoes	Bread Green peppers Ice-cream Korean lettuce Mushrooms Zucchini
0	Bread Dry biscuits Jam Octopus Peanuts Potato Potato Chips Sweet biscuits Sweet bun Tomatoes	Bean sprouts Chicken Chinese cabbage Garlic Korean lettuce Milk Potato Spinach Yoghurt Zucchini	Chinese cabbage Eggplant Eggs Fish Octopus Peanuts Radish Rice Squid Yoghurt
-1	Candies Cucumber Korean lettuce Mushrooms Rice Tofu	Carrots Eggplant Green onion Peanuts Radish White onion	Bean sprouts Beef Chicken Noodles Potato Chips Sponge cake
-2	Bean sprouts Carrots Chinese cabbage Green peppers Noodles	Canned tuna Frankfurts Ice-cream Noodles Processed ham	Anchovies Canned tuna Dry biscuits Sweet biscuits White onion
-3	Anchovies Ginseng Spinach Zucchini	Bread Chocolate Jam Sweet bun	Candies Chocolate Green onion Jam
-4	Garlic Radish White onion	Potato Chips Sponge cake Sweet biscuits	Frankfurts Garlic Pork
-5	Eggplant Green onion	Candies Dry biscuits	Ginseng Processed ham

(Appendix L continued....)

Korean foods: Nutrition		
	D	E
+5	Fish Milk	Beef Pork
+4	Beef Eggs Tofu	Chicken Eggs Fish
+3	Anchovies Carrots Chicken Ginseng	Canned tuna Frankfurts Milk Processed ham
+2	Mushrooms Pork Spinach Toasted seaweed Tomatoes	Chocolate Octopus Peanuts Squid Tofu
+1	Apples Green peppers Mandarins Potato Rice Strawberries	Anchovies Ginseng Ice-cream Rice Sweet bun Yoghurt
0	Bean sprouts Canned tuna Chestnuts Cucumber Garlic Grapes Octopus Squid White onion Zucchini	Bread Chestnuts Grapes Jam Mushrooms Potato Sponge cake Strawberries Sweet biscuits Toasted seaweed
-1	Chinese cabbage Eggplant Green onion Korean lettuce Radish Yoghurt	Apples Candies Dry biscuits Mandarins Potato Chips Tomatoes
-2	Bread Noodles Peanuts Processed ham Sponge cake	Bean sprouts Carrots Noodles Spinach Zucchini
-3	Frankfurts Ice-cream Jam Sweet bun	Cucumber Eggplant Green peppers White onion
-4	Dry biscuits Potato Chips Sweet biscuits	Chinese cabbage Garlic Korean lettuce
-5	Candies Chocolate	Green onion Radish

(Appendix L continued....)

	Korean meals: Taste		
	F	G	H
+5	Barbecued beef Kimchi stew	Fried chicken Pizza	Barbecued beef Stir fried octopus
+4	Fish stew/soy sauce Grilled fish Spicy fish soup	Barbecued beef Rice/vegetable mix Vermicelli combo.	Fried chicken Short ribs soup Vermicelli combo.
+3	Bean curd soup Cabbage kimchi Rice/vegetable mix Stir fried octopus	Bean curd soup Kimchi stew Seaweed/rice roll Short ribs soup	Cold, cooked squid Grilled fish Pizza Spicy meat soup
+2	Cooked rice Cucumber kimchi Dried pollack stew Mushroom salad Spicy meat soup	Cabbage kimchi Cooked rice Green onion pancake Hamburger Stir fried rice	Green onion pancake Grilled pork Hamburger Mushroom salad Spicy fish soup
+1	Acorn curd Green onion pancake Grilled pork Seasoned ark shell Short ribs soup Stir fried rice	Dumplings in broth Fried chips Grilled pork Noodles in soup Spicy meat soup Stir fried octopus	Dried pollack stew Fish stew/soy sauce Food in batter Ginseng salad Seasoned ark shell Seaweed/rice roll
0	Braised zucchini Cold, cooked squid Dumplings in broth Food in batter Fried bean curd Ginseng salad Radish kimchi Seaweed/rice roll Sweet rice Vermicelli combo.	Acorn curd Cucumber kimchi Food in batter Grilled fish Instant noodles Kimchi pancake Radish kimchi Rice cakes Seasoned ark shell Sweet rice	Acorn curd Dumplings in broth Fish fingers Fried bean curd Kimchi pancake Kimchi stew Pork cutlets Rice/vegetable mix Stir fried rice Sweet rice
-1	Braised eggplant Fern shoot salad Kimchi pancake Noodles in soup Rice cakes Seasoned bean sprouts	Cold, cooked squid Fish fingers Fish stew/soy sauce Mushroom salad Seasoned bean sprouts Spicy fish soup	Bean curd soup Cabbage kimchi Fried chips Mandoo snack Noodles in soup Rice cakes
-2	Fried chicken Fried chips Hot radish salad Pizza Watercress salad	Braised zucchini Dried pollack stew Fried bean curd Hot radish salad Instant noodles in dish	Cooked rice Cucumber kimchi Instant soup Radish kimchi Spaghetti meal
-3	Fish fingers Instant soup Mandoo snack Pork cutlets	Braised eggplant Fern shoot salad Mandoo snack Pork cutlets	Braised eggplant Braised zucchini Fern shoot salad Instant noodles
-4	Hamburger Instant cup meal Instant noodles	Instant soup Spaghetti meal Watercress salad	Instant noodles in dish Seasoned bean sprouts Watercress salad
-5	Instant noodles in dish Spaghetti meal	Ginseng salad Instant cup meal	Hot radish salad Instant cup meal

(Appendix L continued....)

	Korean meals: Nutrition	
	I	J
+5	Barbecued beef Short ribs soup	Ginseng salad Grilled fish
+4	Fried chicken Grilled fish Grilled pork	Barbecued beef Fish stew/soy sauce Mushroom salad
+3	Fish stew/soy sauce Hamburger Spicy fish soup Spicy meat soup	Fried bean curd Short ribs soup Spicy fish soup Stir fried octopus
+2	Food in batter Pizza Pork cutlets Rice/vegetable mix Stir fried octopus	Acorn curd Bean curd soup Dried pollack stew Grilled pork Seasoned ark shell
+1	Bean curd soup Fried bean curd Ginseng salad Mushroom salad Stir fried rice Vermicelli combo.	Braised eggplant Braised zucchini Cabbage kimchi Cold, cooked squid Food in batter Green onion pancake
0	Cold, cooked squid Dried pollack stew Dumplings in broth Fish fingers Fried chips Green onion pancake Kimchi stew Seasoned ark shell Seaweed/rice roll Sweet rice	Cooked rice Cucumber kimchi Fern shoot salad Kimchi stew Rice/vegetable mix Spicy meat soup Stir fried rice Sweet rice Vermicelli combo. Watercress salad
-1	Cooked rice Instant cup meal Instant soup Kimchi pancake Mandoo snack Rice cakes	Dumplings in broth Hot radish salad Kimchi pancake Radish kimchi Seasoned bean sprouts Seaweed/rice roll
-2	Acorn curd Braised zucchini Cabbage kimchi Noodles in soup Spaghetti meal	Fried chicken Fried chips Noodles in soup Pizza Rice cakes
-3	Braised eggplant Cucumber kimchi Radish kimchi Seasoned bean sprouts	Fish fingers Hamburger Instant cup meal Instant soup
-4	Fern shoot salad Instant noodles Instant noodles in dish	Mandoo snack Pork cutlets Spaghetti meal
-5	Hot radish salad Watercress salad	Instant noodles Instant noodles in dish

Beaumont-Smith, N. & Kim, S.H. (1993) The perceptions of food in Korea: an investigation of taste and nutrition.

Korean Journal of Nutrition, October, pp. 292-303

NOTE:

This publication is included on pages 346-357 in the print copy of the thesis held in the University of Adelaide Library.

Appendix N. Paper published in Proceedings of the Food Choice Conference, Adelaide; 1996.

Sociological and Social Psychological Approaches

93

TASTY FOODS: AN INVESTIGATION OF KOREAN PERCEPTIONS

Natalie E Beaumont-Smith

Introduction

Food choice often depends on personal preference. This can be influenced by the taste of the food, and whether it is liked or not, although other factors (including economics and convenience) may all affect food choice (Booth et al 1989, Bowen 1992, Rozin and Vollmecke 1968). Food choice can be influenced by cultural and individual perceptions and preferences. Cultures provide definitions of which foods are acceptable to eat, and those that are not (Rozin 1990). Individuals' food choices reflect the experiences that each person has with individual foods. However, there are stable tastes which define a culture that are independent of the variation in tastes among individual members.

Perceptions of food are influenced by culture. This influence extends to which potential foods are defined as edible, the styles of preparation, the flavouring ingredients used, and when certain foods should be consumed (Rozin and Rozin 1981, Rozin and Vollmecke 1986). The food preferences and choices of a cultural group are determined by their cuisine. This means that each individual does not have to learn which foods are edible as cuisines and culture provide the framework of knowledge for this. This knowledge is shared by members of that culture, and transmitted through socialisation.

Shared perceptions of food can be associated with social representations theory. Social representations (Moscovici 1984) refer to ideas and knowledge that are shared by a subgroup, society or culture, depending on their function and content (Augoustinos and Innes 1990). Members of a culture may share knowledge or a general idea of the tastes that are acceptable (reflecting their cuisine), and which foods make up a meal or a particular dish. Augoustinos and Innes (1990) maintain that even novices (including novices in food preparation in this case) will have knowledge consistent with a shared representation of a meal and its taste as they are members of a culture with its own particular cuisine.

Fischler (1988) maintained that cuisines consist of knowledge about food that is shared by individual members of a culture which confer "... culture-specific taxonomies and complex sets of rules about how to collect, prepare, combine and consume foods" (p. 196). Fischler (1980, 1988) believed that the purpose of cuisines was to offer both familiarity and variety to the diet. Cuisines offered 'flavour principles' (Rozin and Rozin 1981) which were familiar to the cultural group so new foods could be prepared in familiar ways. The flavour principles common to a culture and expressed through a cuisine can influence the tastes that are enjoyed by the members of that culture.

The origins of different cuisines worldwide are thought to be due to the accessibility of particular raw foods that were available in the environment of the cultural

group, including the flavouring ingredients. This food knowledge also included various processing techniques required to convert the raw foodstuffs into an edible form (Katz 1987). The implication is that cuisines are quite dynamic, and can be subject to the influences of a changing food supply. Korea is undergoing a period of rapid urbanisation and economic development, and experiencing the influence of Western ideals, which are all affecting their dietary patterns and food experiences (Paik et al 1992).

Axelson (1986) maintains that differences in food consumption patterns between age groups can arise through social changes in that society. Garcia et al (1975) conducted a longitudinal study of dietary patterns, and found that the food patterns of adults remained quite stable after the age of 30 years. This implies that, once adults are accustomed to the flavours of foods of a cuisine, they are more likely to prefer this familiarity rather than unfamiliar ones. It could be expected that, because of the appearance of many Western foods in Korea, younger Koreans will enjoy the tastes of Western foods more than older Koreans.

One aim of this study was to investigate which foods Koreans think are tasty, and to provide an indication of how shared these perceptions are within the general population of Korea. These shared perceptions could reflect the state of Korea's cuisine at the present time. Another aim of this study was to investigate the interaction of the effects due to age, food type and food status on the taste rankings of these foods. This could reflect the degree of change in the cuisine of Korea as younger Koreans explore different tastes. These taste rankings may reflect the food choices of Koreans.

This study employed the Q-method, where subjects sorted pictures of individual foods and meals according to how tasty and nutritious they believed the foods were. The results from the taste dimension only are reported here.¹ The Q-method has two advantages over using a questionnaire design: (1) it was an effective method in overcoming any language barrier as both pictures and words, in both Korean and English, were used; and (2) the subjects' own viewpoints can be assessed rather than restricting the responses by using a questionnaire based upon the researcher's own viewpoint (Brown 1980). Shared perceptions of taste were identified through factor analysis by grouping subjects together according to the similarity of their responses.

¹Refer to Beaumont-Smith and Kim (in press) for a more detailed report of the complete study. Requests for reprints of this paper should be addressed to the first author.

Multidisciplinary Approaches to Food Choice

Method

Subjects

Two hundred and nine Korean subjects, ranging in age from 18 to 64 years, were selected. Please refer to Table 1 for the demographics of the sample. Young females (YF) were students selected from two universities in Seoul—Ewha Women's University and Seoul National University. All were taking their degrees in Food and Nutrition. The young male (YM) students were selected from Seoul National University, and all were studying generalist degrees. Older females (OF) were selected from diverse backgrounds, including those connected with the National Office of the Korean YWCA, some of the ancillary staff of Ewha and Seoul National Universities, or housewives known to the author through friends. The older males (OM) were ancillary staff of Seoul National University, Middle-school teachers, or known to the author through friends.

Table 1. Average ages and numbers of subjects in each of the four subgroups

Group	Number Subjects	Mean Age (years)	SD (years)
YF	60	24.6	02.2
YM	60	23.7	02.8
OF	50	40.8	08.8
OM	39	42.9	11.2

Materials

Marker cards. A row of eleven marker cards, marked and placed, according to the distribution presented in Figure 1, was placed at the top of a large desk. The (+5), (0) and (-5) marker cards had the appropriate words printed on them in Korean and English.

Stimulus cards. The Q-samples consisted of two sets of fifty pictures of foods. The pictures were either photographs or pictures from books. The first was a set depicting individual foods only. These foods were selected from a list of 100 of the most frequently consumed

foods per household, based on national data (The Korean Food Industry Association and The Korean Food Laboratory 1991). This set contained some Western foods, and is listed in Table 2.

Table 2. Individual food items used in the Q-sample

rice ^K	pork	garlic ^K
sweet biscuits ^W	potato	chicken
Chinese cabbage ^K	sponge cake ^W	chocolate ^W
milk	green onion ^K	mandarins
apples	beef	squid
radish ^K	white onion	yoghurt ^W
ice-cream ^W	fish ^K	bread ^W
bean sprouts ^K	dry biscuits ^W	potato chips ^W
tofu ^K	octopus ^K	carrots
eggs	spinach	canned tuna
Korean lettuce	toasted seaweed ^K	
candies ^W	zucchini	
cucumber	jam ^W	
chestnuts	strawberries	
anchovies ^K	ginseng ^K	
processed ham ^W	mushrooms	
green peppers ^K	peanuts	
eggplant	tomatoes	
grapes	noodles	
sweet bun	frankfurts ^W	

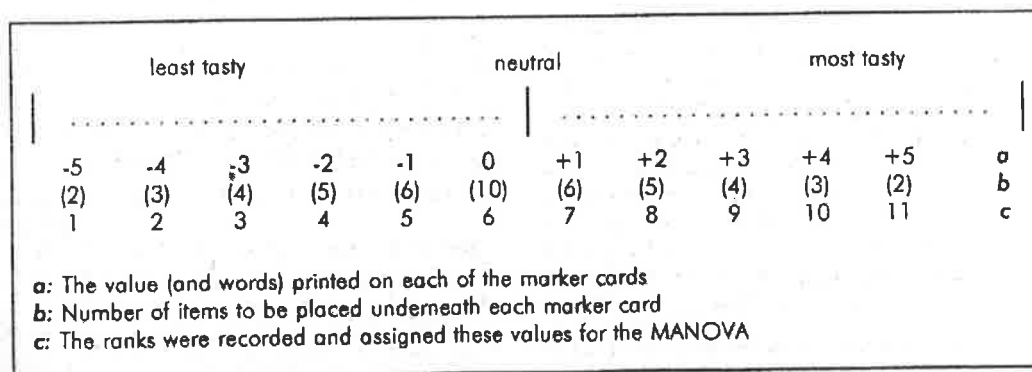
K: Individual Korean foods W: Individual Western foods

The second set of pictures were commonly consumed Korean meals (this was checked by several Korean nationals), and the pictures were based on those in a book by Hwan (1987). This set also contained some Western meals (Table 3). The cards in both sets were numbered from 1 to 50, and had the Korean and English equivalent printed on them underneath the photograph.

Procedure

The instructions for the session were modified from those presented in McKeown and Thomas (1988). The set of instructions, written in Korean, were shown to each subject, together with a verbal summary explaining the overall procedure, emphasising the words 'most tasty' and 'least tasty.' The subjects completed the two

Figure 1: Q-Distribution for the Test Session



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Table 3. Korean meals used in the Q-sample

barbecued beef ^K	grilled pork ^K
fried bean curd ^K	seaweed/rice roll
hamburgers ^W	seasoned bean sprouts
dumplings in broth	instant noodle/dish ^W
spicy fish soup	stir fried octopus
rice cakes	fried chips ^W
Instant noodles ^W	cucumber kimchi
rice/vegetable mix ^K	vermicelli combo
mushroom salad	instant soup ^W
radish kimchi	grilled fish ^K
frozen pork cutlets ^W	green onion pancake
spicy meat soup ^K	watercress salad
fern shoot salad	seasoned ark shell
fish fingers ^W	instant cup meal ^W
kimchi pancake	braised eggplant
fried chicken ^W	cold, cooked squid
cooked rice	mandoo snack ^W
food in batter	dried pollack stew ^K
spaghetti meal ^W	bean curd soup ^K
kimchi stew	pizzo ^W
sweet rice	ginseng salad
fish stew/soy sauce ^K	short ribs soup ^K
hot radish salad	cabbage kimchi
noodles in soup	stir fried rice ^K
braised zucchini	acorn curd

K: Korean meals W: Western meals

Q-sorts in an order that was randomly allocated. The subjects were asked to complete a short background questionnaire, asking for their age, sex, and whether they were the individual in charge of the cooking in their home. The cards were shuffled after each completion of the Q-sort, and between subjects. The overall procedure lasted for twenty minutes on average.

Data analysis

The data from all 209 subjects for the two sorting conditions were factor analysed using SPSS-X Version 4.0, following the method for Q-sort analysis (Brown 1980, McKeown and Thomas 1988). The subjects were entered as variables, and the interrelationships between them investigated. The factoring method used was principal components with varimax rotation.

Four food subgroups were created using the individual foods and meals highlighted in Tables 2 and 3. A MANOVA was performed using these subgroups to investigate the effects of age (young, old), food type (Western, Korean) and food status (individual foods, meals) on the rankings of these selected foods, according to how tasty the subjects thought they were. Each group of foods was entered as a separate variable into the MANOVA.

Results

The number of factors relevant to each of the sorting conditions was determined subjectively by analysing the scree plots produced. The subjects who loaded solely and significantly on only one factor are said to define that factor (McKeown and Thomas 1988) as they all essentially sorted the food items in the same way. Factor loadings in excess of 2.58 (SE) = ± 0.36 were regard-

ed as significant ($p < 0.01$, two-tailed). Following Brown's (1980) recommendations, only those factors with more than ten subjects loading significantly on each one were interpreted as their reliability is quite high. The factors were interpreted by amalgamating all of the defining subjects' Q-sorts into an average of the way the foods were sorted. The foods that were ranked ± 3 or greater in this amalgamation were used in the interpretation.

Factor analysis

Individual foods. Three factors accounted for 47.1% of total variance (Table 4).

Table 4. Individual foods associated with each factor listed in order from +5 to -5

A	B	C
beef	fish	apples
strawberries	dried seaweed	strawberries
apples	beef	mandarins
yoghurt	octopus	tomato
grapes	chestnuts	grapes
chicken	apples	potato
mandarins	strawberries	carrots
dried seaweed	ginseng	cucumber
ice-cream	mushrooms	dried seaweed
spinach	chocolate	green onion
anchovies	bread	chocolate
zucchini	sweet bun	candies
ginseng	frankfurts	jam
radish	sweet biscuits	pork
white onion	sponge cake	garlic
garlic	potato chips	frankfurts
green onion	dry biscuits	processed ham
eggplant	candies	ginseng

Factor A: $n = 54$ subjects—12YF, 29YM, 10OF, 3OM
(76% young, 24% older)

Factor B: $n = 44$ subjects—3YF, 8YM, 17OF, 16OM
(25% young, 75% older)

Factor C: $n = 11$ subjects—7YF, 2YM, 1OF, 1OM
(82% young, 18% older)

Factor A was associated with some meat and sweet fruits, together with some sweet, fatty confections like ice-cream, indicating that it could be labelled "Sweet and/or fatty vs. Bitter." It was interesting to note that more young people defined this factor (76%).

Factor B could be labelled "Traditional, natural vs. Modern, processed," and appeared to contain cognitive rather than taste elements only. Seventy-five percent of the subjects defining this factor were older, and were likely to prefer the taste of traditional foods, including ginseng, which is naturally bitter. This indicated that older people preferred the tastes of traditional foods.

Factor B emphasised sweet plant foods, while regarding meats, confectionery, and some bitter plant foods, including ginseng, negatively. Varieties of seafood received neutral rankings. This factor could be labelled "Sweet plant foods vs. Animal flesh foods." The majority of subjects defining this factor were younger (82%).

Multidisciplinary Approaches to Food Choice

Factor C emphasised sweet plant foods, while regarding meats, confectionery, and some bitter plant foods, including ginseng, negatively. Varieties of seafood received neutral rankings. This factor could be labelled "Sweet plant foods vs. Animal flash foods." The majority of subjects defining this factor were younger (82%).

Meals. Three factors accounted for 74% of total variance (Table 5).

Table 5. Meals associated with each factor listed in order from +5 to -5

D	E	F
kimchi stew grilled fish barbecued beef fish stew in soy sauce spicy fish soup rice with veg. bean curd soup stir-fried octopus cabbage kimchi	fried chicken pizza barbecued beef vermicelli combo rice with veg. kimchi stew bean curd soup seaweed/rice roll short-ribs soup	barbecued beef stir-fried octopus fried chicken short-ribs soup vermicelli combo spicy meat soup cold, cooked squid pizza grilled fish
frozen pork cutlets fish fingers mandoo snack instant soup hamburger instant noodles instant cup meal spaghetti meal instant noodles (dish)	frozen pork cutlets fern-shoot salad braised eggplant mandoo snack spaghetti meal Instant soup watercress salad instant cup meal ginseng salad	instant noodles fern-shoot salad braised eggplant braised zucchini bean sprouts instant noodles (dish) watercress salad Instant cup meal hot radish salad

Factor D: n = 53 subjects—8YF, 11YM, 14OF, 20OM (36% young, 64% older)
 Factor E: n = 31 subjects—17YF, 10YM, 2OF, 2OM (87% young, 13% older)
 Factor F: n = 12 subjects—3YF, 6YM, 2OF, 1OM (75% young, 25% older)

Factor E could be interpreted to distinguish between "High satiety vs. Low satiety," indicating how filling a particular meal may be. Positive rankings were given to many meat and rice dishes, while negative rankings were attributed mainly to side dishes and snack foods—meals that may be regarded as non-filling.

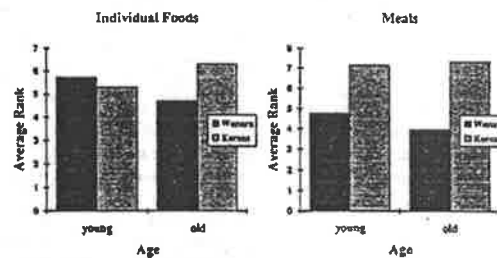
The last factor (Factor F) highlighted the differences between "Meat vs. Vegetable" dishes. Meat, seafood and 'fast foods,' including hamburgers, fried chicken and pizza, were regarded positively, while many noodle, rice and side dishes received negative ranks.

Multivariate analysis of variance

The main effect of food type was significant ($F_{(1,207)} = 316.02, p < 0.001$). This indicated that, overall, Western foods ($\bar{X} = 4.85, s = 1.19$) were ranked more negatively than Korean foods ($\bar{X} = 6.47, s = 0.85$). The $2 \times 2 \times 2$ interaction between age (young, old), food type (Western, Korean) and food status (individual foods, meals) was significant ($F_{(1,207)} = 15.18, p < 0.001$). Figure 2 shows that, with individual foods and

meals, the younger people ranked Western foods and meals more highly than older subjects. However, the Korean meals were ranked more highly on taste than the Western meals.

Figure 2: Average ranks of Western and Korean foods and meal by young and old subjects (Please refer to Figure 1 for and explanation of the scale of the y-axis)



Discussion

The factors for both individual foods and meals accounted for more than 47% of the shared variance of the 209 subjects. There were taste elements in common between subjects that surpassed each individual's own experiences with the foods.

In the individual foods condition, sweet items were ranked more highly by younger subjects. Rozin and Vollmecke (1986) state that the liking for sweet tastes represents an innate human taste bias which is adaptive because sweetness is almost always associated with a source of calories. However, among older people the level of sweetness preferred varies greatly. In this study, the younger subjects were associated with the sweetness factor more than the older subjects.

Meat was mainly regarded positively on the taste dimension, while vegetables were not. When meat was associated with tradition, it received positive ranks, especially beef, but, when associated with notions of animal flesh (Factor C), meat received negative rankings. Koreans originated from nomadic tribes, and traditionally beef was of major importance both for their farms as work animals and as a source of prized food (Hwan 1987). This positive regard for meat was also reflected in the rankings of seafood, especially in Factor B, the factor associated with tradition. The Korean peninsula is surrounded by the sea on three sides, and provides a rich abundance of all seafood and seagrasses (Hwan 1987), of which both received positive rankings. It is expected that the preference for meat is a worldwide phenomenon as most cultures include meat somewhere in their cuisines, even if all members of that culture do not eat meat (Harris 1985). It has also been suggested that there may be an in-built tendency for humans to eat meat (Rozin and Vollmecke 1986).

Traditional foods that were ranked positively included ginseng, which is a naturally bitter food. However,

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many older subjects regarded ginseng as being quite tasty. Research has suggested that there is an innate taste bias against consuming bitter substances (Rozin and Vollmecke 1986), which also has adaptive implications as bitterness is often associated with the presence of toxins. Ginseng is thought to have beneficial health and medicinal effects, so there is an advantage in its consumption (Hwan 1987). This affective component of reversing an innate rejection has been studied in the preference for eating chilli peppers (Rozin and Schiller 1980). The knowledge that ginseng may be beneficial, not harmful, may be enough to convince some people to consume it, despite its taste. This may produce an affective shift from an avoidance based on dislike to a consumption based on positive associated consequences (Rozin and Schiller 1980, Rozin and Vollmecke 1986). Indeed, older people were more likely to be associated with the traditional ideas of Factor B. Traditional foods are familiar in many aspects, including taste. Traditional flavours and foods are also a way of defining a cultural group through the ethnic markers of a cuisine (Rozin and Rozin 1981). It is highly likely that all of these beliefs will be held by older people.

The Korean meals condition provided factors that were similar to the individual foods condition. Traditional meals were regarded positively, especially by the older subjects. Meals regarded as filling were assigned positive rankings. Booth et al (1982) have demonstrated an enhanced liking for flavours paired with filling foods, in both adults and children. The positive post-ingestional cues conferred by a filling of fullness can enhance preferences for that food such that it will be consumed again on another occasion. Meat dishes were also regarded positively, especially those from traditional Korean cuisine. Most spicy foods were ranked positively, reflecting an important aspect of Korean cuisine. Red pepper is one of the basic flavouring agents used in Korean meals, and it is not unexpected that these meals will be preferred as the attachment to traditional flavourings is very strong (Rozin and Rozin 1981).

The hypothesis that the younger subjects would rank Western foods more highly than older people was confirmed in the individual foods condition. The individual Western foods included snacks, and food that could be eaten quickly without any preparation. This may be an advantage to busy young people, especially students. The Western foods included sugar, salt and fat, the taste elements that were highlighted in Factors A and C. These factors were predominantly defined by younger subjects. The older subjects, however, ranked the traditional Korean foods more highly. This was also supported by Factor B (and D for meals), which were mostly defined by older subjects, and contained elements of traditional perceptions.

There were no differences in the rankings of Korean meals by younger and older subjects, although younger subjects did rank Western meals as more tasty, but these ranks were still much lower than the Korean

meals. The nature of the Western foods used in this Q-sample represented packaged meals or 'fast foods,' which are quick to eat. However, these types of food are not likely to be filling or sustaining, a factor highlighted by the younger as being important (Factor E). The Korean family unit is quite strong (Beaumont-Smith, personal observation), and meals eaten together are an important part of family life, where traditional Korean cuisine is the main fare and likely to be enjoyed because of this. Traditional Korean meals are also quite filling.

Conclusions

There appear to be tastes that are shared by members of a culture that reflect their cuisine. The tastes preferred by many Koreans include sweet and fatty foods with younger Koreans and traditional flavours with older Koreans. The tastes preferred in meals included traditional flavours, meals that were filling, and meals containing meat.

The cuisine of Korea appears to be undergoing some changes as younger people start enjoying the tastes of Western snacks that are higher in sugar, salt and fat than traditional Korean foods. However, the traditional Korean meal appears to hold a stable place in the cuisine according to both younger and older Koreans. The food choices of younger Koreans may include Western snacks, but it is expected that the traditional meal will be chosen over pre-packaged meals and 'fast foods' as the main source of food consumption for the day.

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Appendix O. Australian Q-study: Australian foods examples.



Lollies
25



Cucumbers
26



Processed Ham
27

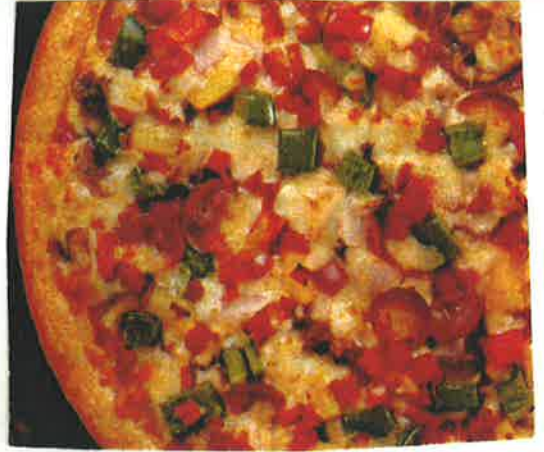


Grapes
28

Appendix P. Australian Q-study: Australian meals examples.



Beef Casserole
13



Pizza
14



Grilled Pork
15



Fried Chips
16

Appendix Q. Australian Q-study: Description of Australian meals.

	Steak	Cuts of beef, grilled or fried.
	Pumpkin soup	Cooked pumpkin is pureed and seasoned.
	Fruit salad	Different types of seasonal fruit are diced.
	Meatloaf	Minced beef, breadcrumbs, an egg, onions, garlic and black pepper are mixed, shaped into a sausage, wrapped in alfoil and cooked.
	French onion soup	Sliced onions are sautéed and then boiled in beef broth.
	Pancakes	Sweet or savoury batter is poured thinly into pan and fried.
3	Beef casserole	Stewing beef is sautéed with onions, vegetables are added together with beef stock and other seasonings. Cooked for several hours.
7	Spaghetti bolognaise	Minced beef is cooked with onions and other herbs and seasonings. Vegetables and tomato puree are added and the mixture is cooked slowly. Served with pasta.
0	Tossed salad	Fresh vegetables including lettuce, tomato, capsicum, cucumber are sliced and tossed together.
1	Battered fish	Fillets of fish are coated in batter and deep fried.
2	Chocolate mousse	Chocolate is melted and mixed with butter and egg yolks. Whipped cream and whisked egg white are added and chilled.
3	Coleslaw	Fresh cabbage, onion, capsicum and carrots are shredded and mixed with mayonnaise.
4	Mashed potato	Potatoes are boiled and then mashed with butter and milk. Black pepper is sometimes added.
6	Chicken satay	Chicken is diced and threaded onto skewers. Usually served with a peanut sauce.
8	Pavlova	Egg whites are whisked with sugar and cornflour and baked.
0	Macaroni with cheese	A cheese sauce is made from butter, flour milk and cheese and boiled until thickened. This is mixed with cooked macaroni and baked in a dish with grated cheese on top.
1	Chilli con carne	Minced beef is sautéed with onions. Tomato puree, chilli powder and kidney beans are added and mixture is cooked slowly.
2	Potato salad	Potatoes are diced and boiled until just tender. When cold they are mixed with onion, herbs and mayonnaise.
5	Apricot chicken	Pieces of chicken are panfried with onions until cooked. Beef stock and apricot pieces are added and cooked slowly.
7	Kebabs	Pieces of meat are threaded onto skewers together with vegetables.
0	Beef/blackbean sauce	Pieces of beef are cooked with onions, carrots and other vegetables. Blackbean sauce and other seasonings are added.
2	Cheesecake	Creamed cheese, honey, sugar and eggs are mixed and added to a pastry shell.
3	Tuna mornay	A white sauce is made from butter, flour, spices and milk and boiled until thickened. Flaked tuna and seasonings are added and baked.
6	Quiche	Egg yolks, eggs and cream are combined with vegetables and seasonings and added to a pastry shell and baked.
7	Veal parmigana	Thin fillets of veal are coated in breadcrumbs and grilled. Tomato puree and cheese are added to one side and grilled.
8	Rissoles	Minced beef is mixed with onions, herbs, breadcrumbs and an egg, shaped into small balls and fried.
9	Spare ribs	Pork ribs are grilled and a savoury sauce added.
0	Stir-fried chicken	Pieces of chicken are quickly cooked with onions, carrots, celery and herbs and spices in a wok.

Appendix R. Australian Q-study: Instructions for Q-sort

Instructions for participants.

I want you to think about food. There are two sets of cards: one with pictures of Australian foods and the other with pictures of Australian meals and snacks. You will sort each set of foods according to how tasty and how nutritious you think those foods are. This means that there will be four separate sorting sessions altogether.

A row of marker cards is located in front of you. These are numbered from (-5) 'least tasty' or 'least nutritious' to (+5) 'most tasty' or 'most nutritious'. Each card has a number in brackets and this shows the number of items that are to be placed under each of these cards. For example (+5) has (2) written on it, so only two items should be placed underneath it.

For those beginning with the 'taste' sort:

1. Please read through the items to become familiar with them. As you are reading sort the items into two rough piles, those that are tasty to you (positive end) and those that are not tasty to you.
2. Spread the pile of cards out that you have chosen as tasty to you (right-hand side) and choose the two foods that are the most tasty to you. Place them underneath the (+5) card.
3. Continue choosing cards and placing the correct number underneath each marker card until your pile is finished.
4. Return to the 'not tasty' card pile, spread them out and choose the two least tasty cards and place them underneath the (-5) card.
5. Continue choosing cards and placing the correct number underneath each marker card until your pile is finished.
6. All cards should now be sorted. Make any adjustments you wish and when you are happy with the final sorting of the cards, the assistant will copy your results.

When instructed to do so, sort the cards again according to how nutritious you think the foods are.

Thank you for your help.

(Appendix R continued....)

Instructions for participants.

I want you to think about food. There are two sets of cards: one with pictures of Australian foods and the other with pictures of Australian meals and snacks. You will sort each set of foods according to how tasty and how nutritious you think those foods are. This means that there will be four separate sorting sessions altogether.

A row of marker cards is located in front of you. These are numbered from (-5) 'least tasty' or 'least nutritious' to (+5) 'most tasty' or 'most nutritious'. Each card has a number in brackets and this shows the number of items that are to be placed under each of these cards. For example (+5) has (2) written on it, so only two items should be placed underneath it.

For those beginning with the 'nutrition' sort:

1. Please read through the items to become familiar with them. As you are reading sort the items into two rough piles, those that you think are nutritious (positive end) and those that you think are not nutritious.
2. Spread the pile of cards out that you have chosen as nutritious to you (right-hand side) and choose the two foods that you think are the most nutritious. Place them underneath the (+5) card.
3. Continue choosing cards and placing the correct number underneath each marker card until your pile is finished.
4. Return to the 'not nutritious' card pile, spread them out and choose the two foods you think are the least nutritious and place them underneath the (-5) card.
5. Continue choosing cards and placing the correct number underneath each marker card until your pile is finished.
6. All cards should now be sorted. Make any adjustments you wish and when you are happy with the final sorting of the cards, the assistant will copy your results.

When instructed to do so, sort the cards again according to how tasty you think the foods are.

Thank you for your help.

Appendix T. Australian Q-study: Post-study interview proforma.

Post-study Questionnaire: Food Perception Study

1. When I say 'nutrition' to you, what is the first thing that you think of?

.....
.....

2. How would you define nutrition?

.....
.....
.....

3. How would you categorise these foods, ie. how would you group them together?

Factor A +ve.....
 -ve.....

Factor B +ve.....
 -ve.....

Factor C +ve.....
 -ve.....

Factor D +ve.....
 -ve.....

Factor E +ve.....
 -ve.....

Factor F +ve.....
 -ve.....

Factor G +ve.....
 -ve.....

Factor H +ve.....
 -ve.....

Factor I +ve.....
 -ve.....

Factor J +ve.....
 -ve.....

Appendix U. Australian Q-study: Factor composites A-J.

	Australian foods: Taste		
	A	B	C
+5	Chicken Fish	Beef Chocolate	Chocolate Strawberries
+4	Beef Mushrooms Potatoes	Cake Ice-cream Potato Chips	Bananas Pasta Watermelon
+3	Bananas Brown bread Eggs Pork	Chicken Lamb Lollies Strawberries	Cheese Chicken Ice-cream Milk
+2	Cheese Pasta Strawberries Tomatoes White onions	Cheese Peanuts Pork Sweet biscuits Sweet bun	Apples Grapes Potatoes Tomatoes Yoghurt
+1	Apples Capsicum Cauliflower Garlic Lamb Rice	Bananas Canned fruit Fish Grapes Jam Processed ham	Brown bread Cake Canned fruit Mandarins Potato Chips Rice
0	Carrots Cucumber Grapes Lentils Mandarins Milk Peas Watermelon Yoghurt Zucchini	Apples Cream Eggs Frankfurts Mandarins Milk Mushrooms Pasta Sausages Yoghurt	Canned tuna Capsicum Carrots Cucumber Eggs Jam Lettuce Lollies Peanuts Sweet bun
-1	Baked beans Cabbage Canned tuna Chocolate Lettuce Peanuts	Garlic Potatoes Tomatoes Watermelon White bread White onions	Beef Cream Dry biscuits Fish Sweet biscuits White bread
-2	Canned fruit Cream Ice-cream Processed ham Sausages	Canned tuna Capsicum Carrots Dry biscuits Peas	Baked beans Cauliflower Mushrooms Peas White onions
-3	Cake Dry biscuits Jam White bread	Baked beans Brown bread Cucumber Rice	Cabbage Garlic Lamb Zucchini
-4	Potato Chips Sweet biscuits Sweet bun	Cabbage Cauliflower Lettuce	Frankfurts Lentils Pork
-5	Frankfurts Lollies	Lentils Zucchini	Processed ham Sausages

(Appendix U cont....)

	Australian foods: Nutrition	
	D	E
+5	Carrots Mushrooms	Chicken Fish
+4	Apples Bananas Cauliflower	Beef Brown bread Eggs
+3	Cabbage Lentils Peas Tomatoes	Cheese Lamb Milk Pork
+2	Capsicum Fish Mandarins Rice Zucchini	Baked beans Canned tuna Peanuts Potatoes Rice
+1	Cucumber Garlic Lettuce Pasta Potatoes Strawberries	Apples Bananas Carrots Lentils Mushrooms Yoghurt
0	Beef Brown bread Canned tuna Chicken Eggs Grapes Milk Watermelon White onions Yoghurt	Cabbage Canned fruit Cauliflower Cream Mandarins Pasta Processed ham Strawberries Tomatoes Zucchini
-1	Baked beans Canned fruit Cheese Lamb Pork White bread	Capsicum Grapes Peas Sausages White bread White onions
-2	Dry biscuits Jam Peanuts Processed ham Sausages	Cucumber Frankfurts Garlic Ice-cream Lettuce
-3	Cream Frankfurts Ice-cream Sweet biscuits	Chocolate Jam Sweet biscuits Watermelon
-4	Cake Chocolate Sweet bun	Cake Dry biscuits Sweet bun
-5	Lollies Potato Chips	Lollies Potato Chips

(Appendix U cont....)

	Australian meals: Taste		
	F	G	H
+5	Stir-fried chicken Stir-fried vegetables	Leg of lamb Pizza	Cheesecake Chocolate mousse
+4	Chicken satay Cooked vegetables Tossed salad	Chicken satay Roast beef Steak	Fruit salad Pancakes Pavlova
+3	Beef / blackbean sauce Fruit salad Grilled fish Pumpkin soup	Apricot chicken Fried chicken Spare ribs Veal parmigana	Apple pie Chicken satay Fried rice Pizza
+2	Coleslaw Fried rice Kebabs Spaghetti bolognaise Veal parmigana	Beef / blackbean sauce Chocolate mousse Grilled lamb Spaghetti bolognaise Stir-fried chicken	Fried chips Potato salad Quiche Spaghetti bolognaise Stir-fried chicken
+1	Apricot chicken Beef casserole Cooked rice Leg of lamb Potato salad Quiche	Battered fish Beef casserole Chilli con carne Grilled pork Kebabs Pavlova	Beef / blackbean sauce Fried chicken Hamburger Macaroni/ cheese Tossed salad Veal parmigana
0	Chilli con carne Fried chicken Grilled lamb Grilled pork Macaroni/ cheese Pancakes Pizza Roast beef Steak Tuna mornay	Cheesecake Fried chips Fried rice Grilled fish Hamburger Macaroni/ cheese Pancakes Quiche Stir-fried vegetables Tuna mornay	Apricot chicken Beef casserole Coleslaw Hot dog Kebabs Mashed potato Pumpkin soup Spare ribs Steak Stir-fried vegetables
-1	Cheesecake Chocolate mousse French onion soup Mashed potato Rissoles Spare ribs	Apple pie BBQ sausages Fruit salad Meat pie Pumpkin soup Rissoles	Cooked rice Cooked vegetables Pasty Rissoles Roast beef Tuna mornay
-2	Apple pie Battered fish Fried chips Meatloaf Pavlova	Cooked vegetables French onion soup Hot dog Meatloaf Pasty	Battered fish BBQ sausages Grilled lamb Leg of lamb Meat pie
-3	BBQ sausages Fish fingers Hamburger Pasty	Coleslaw Mashed potato Potato salad Tossed salad	Chilli con carne Fish fingers Grilled pork Meatloaf
-4	Hot dog Instant noodles Instant soup	Cooked rice Fish fingers Frozen meal	French onion soup Instant noodles Instant soup
-5	Frozen meal Meat pie	Instant noodles Instant soup	Frozen meal Grilled fish

(Appendix U cont....)

	Australian meals: Nutrition	
	I	J
+5	Cooked vegetables Tossed salad	Beef / blackbean sauce Grilled fish
+4	Cooked rice Fruit salad Grilled fish	Beef casserole Spaghetti bolognaise Stir-fried chicken
+3	Mashed potato Potato salad Pumpkin soup Stir-fried vegetables	Cooked vegetables Leg of lamb Stir-fried vegetables Veal parmigana
+2	Chicken satay Coleslaw French onion soup Kebabs Tuna mornay	Fried rice Macaroni/ cheese Roast beef Steak Tuna mornay
+1	Beef casserole Grilled lamb Quiche Spaghetti bolognaise Steak Stir-fried chicken	Chicken satay Chilli con carne Grilled lamb Grilled pork Spare ribs Tossed salad
0	Apricot chicken Beef / blackbean sauce Chilli con carne Fried rice Grilled pork Instant noodles Leg of lamb Macaroni/ cheese Meatloaf Roast beef	Apricot chicken Coleslaw Cooked rice Fried chicken Fruit salad Kebabs Mashed potato Meatloaf Pizza Quiche
-1	Apple pie Fish fingers Instant soup Rissoles Spare ribs Veal parmigana	Battered fish Fish fingers Hamburger Potato salad Pumpkin soup Rissoles
-2	Battered fish BBQ sausages Frozen meal Pancakes Pasty	BBQ sausages Frozen meal Meat pie Pancakes Pasty
-3	Cheesecake Fried chicken Meat pie Pizza	Apple pie French onion soup Fried chips Hot dog
-4	Hamburger Hot dog Pavlova	Cheesecake Chocolate mousse Pavlova
-5	Chocolate mousse Fried chips	Instant noodles Instant soup

Appendix V. Australian Food Perception and Intake Study: Examples of FFQ questions and formatting.

HOW TO ANSWER				
NEVER	RARELY	Times a MONTH	Times a WEEK	Times a DAY
N	R	1 2 3 M	1 2 3 W and so on	1 2 3 D and so on

HERE ARE SOME EXAMPLES

		COMMENTS
Custard	1/2 cup	3W
Boiled egg	1 egg	3M two eggs
Cucumber	3 slices (each 0.5 cm thick)	R
Tea	1 cup	4D
Beetroot - canned	2 slices	2M one slice

The person above has, on average :-

- A standard serve of custard three times a week
- Two boiled eggs three times a month
- Rarely eats cucumber
- Four cups of tea every day
- Half a standard serve (1 slice) of beetroot - canned, twice a month

We realise that some people have an exact idea of how often they eat particular foods, whilst others only have an approximate idea. Be as accurate as you can but do not spend too much time choosing your answers.

PLEASE GIVE AN ANSWER FOR EVERY FOOD.

(Appendix V continued...)

HOW TO ANSWER				
NEVER	RARELY	Times a MONTH	Times a WEEK	Times a DAY
N	R	¹ ₂ ₃ M	¹ ₂ ₃ W and so on	¹ ₂ ₃ D and so on

ABOUT HOW OFTEN DO YOU USUALLY EAT THESE FOODS?

<u>CEREALS</u>		<u>COMMENTS</u>
Porridge/Oatmeal	1 cup (cooked)	.....
Muesli	1/2 cup	.....
Other breakfast cereal	1 cup	.....
Bran (raw), wheat, rice, oat etc.	1 tablespoon	.....
Wheatgerm	1 tablespoon	.....
Bread roll	1 roll	.....
Boiled rice	1 cup (cooked)	.....
Fried rice	1 cup (cooked)	.....
Packet Pasta and Sauce (eg San Remo La Pasta)	1/4 of a packet (cooked)	.....
Instant Noodles (Maggi etc)	1/2 of a packet (cooked)	.....
Pasta (spaghetti, macaroni etc.)	1 cup (cooked) (not including the sauce)	.....

Q-1 What types of breakfast cereals do you most commonly eat?
Please name :

I don't eat breakfast cereals (Please tick(✓))

Q-2 How many slices of bread do you usually eat? Remember the bread in toast and sandwiches.
If you do not eat bread, write 'none' or '0'.
.....slices/day ORslices/week ...

Q-3 What type of bread do you usually eat? (Circle the number beside one answer)

- 1 Wholemeal or mixed grain
- 2 White
- 3 About half the time wholemeal and half white
- 4 Other breads (e.g. rye, Hy-Fibe)
(please specify type).....
- 5 I do not eat bread

Appendix W. Australian Food Perception and Intake Study: Factor composites A-E.

	Australian foods: Taste		
	A	B	C
+5	Chocolate Ice-cream	Chocolate Strawberries	Beef Pork
+4	Cheese Lollies Sweet bun	Bananas Grapes Tomatoes	Chicken Fish Lamb
+3	Beef Cake Potato Chips Strawberries	Apples Mandarins Milk Yoghurt	Cheese Eggs Peanuts Processed ham
+2	Bananas Chicken Eggs Jam Sausages	Beef Brown bread Chicken Fish Watermelon	Garlic Rice Strawberries White bread White onions
+1	Apples Cream Peanuts Pork Sweet biscuits White bread	Carrots Cheese Mushrooms Pasta Potatoes White bread	Bananas Capsicum Peas Potato Chips Potatoes Sausages
0	Canned fruit Dry biscuits Grapes Lamb Mandarins Pasta Processed ham Rice Watermelon Yoghurt	Cabbage Cake Capsicum Cucumber Dry biscuits Garlic Ice-cream Potato Chips Rice Zucchini	Apples Cabbage Canned fruit Canned tuna Carrots Grapes Mandarins Mushrooms Pasta Tomatoes
-1	Baked beans Capsicum Fish Garlic Mushrooms White onions	Eggs Lamb Lettuce Peanuts Sweet bun White onions	Brown bread Cauliflower Cream Dry biscuits Lettuce Milk
-2	Canned tuna Frankfurts Milk Peas Tomatoes	Canned fruit Canned tuna Lollies Peas Sweet biscuits	Chocolate Cucumber Frankfurts Ice-cream Yoghurt
-3	Brown bread Carrots Lettuce Potatoes	Baked beans Cauliflower Cream Jam	Cake Lentils Lollies Watermelon
-4	Cabbage Cauliflower Cucumber	Lentils Pork Sausages	Baked beans Sweet bun Zucchini
-5	Lentils Zucchini	Frankfurts Processed ham	Jam Sweet biscuits

(Appendix W cont....)

	Australian foods: Nutrition	
	D	E
+5	Fish Lentils	Eggs Fish
+4	Apples Bananas Mushrooms	Beef Chicken Yoghurt
+3	Carrots Cauliflower Mandarins Tomatoes	Cheese Lamb Milk Pork
+2	Capsicum Cucumber Potatoes Rice Zucchini	Baked beans Brown bread Canned tuna Lentils Rice
+1	Brown bread Cabbage Garlic Grapes Peas Strawberries	Bananas Carrots Pasta Peanuts Potatoes Processed ham
0	Beef Canned tuna Eggs Lamb Lettuce Milk Pasta Watermelon White onions Yoghurt	Apples Canned fruit Cauliflower Cucumber Mandarins Mushrooms Peas Tomatoes White bread Zucchini
-1	Baked beans Canned fruit Cheese Chicken Pork White bread	Capsicum Frankfurts Grapes Ice-cream Sausages White onions
-2	Cream Dry biscuits Jam Peanuts Processed ham	Cabbage Cream Dry biscuits Garlic Strawberries
-3	Frankfurts Sausages Sweet biscuits Sweet bun	Jam Lettuce Sweet bun Watermelon
-4	Cake Chocolate Ice-cream	Chocolate Potato Chips Sweet biscuits
-5	Lollies Potato Chips	Cake Lollies