Chapter 1 – Introduction

As with the process of observation, quality can be described in two steps: analytical and emotional quality. Analytical quality defines the product properties. Experience, education, price, availability, age and religion among others, are factors which influence an opinion or a judgement. Emotional quality describes the interpretation of product properties.

(A.B. Cramwinckel, 1990, p. 145)

1.1 Outline of the problem

Given (a) the significant growth of diet--related chronic diseases in Australia and other Western countries (National Health and Medical Research Council, 1996; Australian Bureau of Statistics – Causes of Death, 1995; Wardle, 1993; NSW Department of Health, 1985; Thompson, 1995), (b) the crucial role that fresh fruits and vegetables play in maintaining a healthy diet (Briggs, 1995; Australian United Fresh Fruit & Vegetable Association Australian Horticultural Yearbook, 1995; Kenyon, 1997; Fry, 1995; Carpenter, 1988; Duthie, Wahle & James, 1989; World Health Organisation (WHO), 1990), and (c) the large sums of money that are presently being spent on promotion of these products (Backlund, 1994; Commonwealth Scientific & Industrial Research Organisation (CSIRO), 1995; Knights, 1996; Australian United Fresh Fruit & Vegetable Association, 1996), there is a pressing need to conduct studies that will provide fundamental, descriptive data on the nature of consumer fresh fruit and vegetable preferences. It is the primary objective of the present thesis to investigate a part of the process, that is, how individuals process information relating to fresh fruits and vegetables, and to provide relatively comprehensive consumer knowledge structures for ten fruits and ten vegetables.

1.2 Limitations of existing fruit and vegetable studies

This thesis investigates Australian fresh fruit and vegetable cognitive knowledge structures at a deeper level of psychological analysis than has been the case in previous investigations. A recent and extensive literature search has uncovered a reasonable number of studies of a commercial nature in this area. These industry studies have an applied focus, and are largely used by industry bodies whose concern is with the successful marketing of fresh fruits and vegetables. Studies of this nature provide some descriptive data relating to demographic trends in fruit and vegetable consumption, however, they are not instructive in tapping complex cognitive structures and processes that have been found to underlie decision processes.

1.3 An understanding of the process of knowledge acquisition is important

It is argued in the present thesis that part of the process of forming a comprehensive understanding of fruit and vegetable preferences involves comprehension of the traditional theory of knowledge acquisition, which prescribes the use of particular research methodologies at various stages of the research agenda. A traditional theory of knowledge acquisition is presented, which provides a framework for critiquing existing consumer research methods. Given the view of knowledge acquisition proposed, it is concluded that, with respect to existing fruit and vegetable research, the hypothesis–testing stage of research is being undertaken in a somewhat premature manner, that is, in the absence of descriptive data which necessarily and properly informs this experimental work. A good deal more descriptive data, which can be obtained using an unstructured research methodology, such as the Word Association Method (Jung, 1919), is necessary as a prerequisite to testing specific hypotheses regarding possibly significant variables. This descriptive data is critical to an understanding of the psychological basis of fresh fruit and vegetable choice.

A program of research that is cognisant of the complexity of human cognitive processes is proposed and used in the present research. The program of research features use of the word association method, which, according to Szalay and Deese (cf. de Groot, 1989, 824), 'comprises a method of

retrieving information regarding the stimulus object via links in the memory network'. The word association method is used in the present thesis to provide relatively comprehensive fresh fruit and vegetable knowledge structures. The thesis then moves to a discussion of contemporary decision and cognitive information processing theory, which also prescribes the use of an unstructured research methodology that can capture the wide range of cognitive information that may impinge on the decision process.

1.4 Contemporary decision theory

Contemporary decision theorists stress the need to view the decision process in a holistic manner. The work of these researchers points to the importance of a wide range of information that impacts on decisions, including a complex array of sensory stimuli as well as information from memory. Many cognitive psychologists discuss the notion of the interaction of rational and intuitive cognitive processes in a decision mode (see Hammond, 1996, for a review of research in this area). They posit that information relevant to a decision is likely to include, on the one hand, knowledge that is semantic/analytic/factual in nature and, on the other hand, knowledge that is episodic/experiential or personally meaningful to the individual decision maker. That is, it is the case that consumers' fruit and vegetable knowledge structures include factual knowledge regarding the healthiness of fruits and vegetables, cooking methods, and so forth, as well as personally meaningful information, for example, relating to a family tradition of eating creamed turnips at Christmas. There is a need to embrace decision models that are cognisant of the complex array of 'information gathered using their five major senses as well as upon information reconstructed from their memory systems' (Cooksey, 1996, xi).

The work of neuropsychologists and cognitive psychologists is leading to the construction of a template of the brain structures implicated in these processes, as well as a general theory of the way that knowledge is cognitively stored. It is only through a thorough investigation of these cognitive processes that researchers can begin to unpack the complexity of the decision making process, a process that is no less relevant to an

understanding of why Joe chooses to eat a banana than to why the space shuttle Challenger was launched under the circumstances that it was.

1.5 Fruits and vegetables are unique foodstuffs

A further reason for conducting research into fruit and vegetable decision making by obtaining fundamental, descriptive data for use in subsequent research, relates to the fact that fruits and vegetables are unlike other foodstuffs. Researchers might be tempted to extrapolate from research on ordinary, everyday consumer product to fresh fruits and vegetables. However, this may be inappropriate, given the fact that fresh fruits and vegetables differ from ordinary, everyday consumption items in terms of variability of quality–related characteristics. Owen (1996) discusses the inconsistent quality of fresh fruits and vegetables, which precludes the utility of a label in providing much valid information relating to consistency of product quality. Instead, consumers must look to the physical appearance in order to determine taste and quality and, for this reason, visual, olfactory and tactile cues are more likely to play a predominant role in fresh fruit and vegetable evaluation than in the evaluation of other ordinary, everyday products. Because of this unique feature of fresh fruits and vegetables, consumer models relating to other everyday consumption items, such as coffee and biscuits, are not able to be extrapolated for use within the realm of fresh fruit and vegetable preferences and, as stated above, it is suggested that a descriptive approach be undertaken regarding research on this topic.

1.6 The role of self–monitoring in consumer behaviour

The evaluation of existing marketing methods undertaken in this thesis includes a discussion of personality variables that may be important in the purchase decision. One concept that is potentially useful is the psychological construct of self–monitoring. Snyder (1974) describes two groups of people, low self–monitors (LSM) and high self–monitors (HSM), who differ in their self–presentation styles. LSM tend to behave in a uniform manner in most social situations, presenting their 'true selves' to others. Internal dispositions and personality characteristics drive their behaviour more than situational demands. HSM, on the other hand, tend to change their social behaviour depending upon the characteristics of a

particular situation. HSM are particularly adept at monitoring situational cues regarding what type of behaviour is appropriate in a given situation, and they adjust their behaviour accordingly (Snyder, 1974, 1987).

Self–monitoring has been posited by various researchers as a variable influencing consumer behaviour (Snyder, 1991; Johar & Sirgy, 199; Shavitt, 1992; Shavitt, Lowrey & Han, 1992; DeBono & Rubin, 1995). According to Snyder's self–monitoring theory (1987), individuals differing in their self–monitoring propensities focus on differential aspects of products in a purchase context. High self–monitors (HSM) are said to focus on attributes relating to the *image* (or form/appearance) of the product, whereas low self–monitors (LSM) attend to attributes signalling product *quality*, which is thought to be manifested in product function (Snyder, 1987; Shavitt, 1992).

The categories of attributes (form/image and function/quality) that have been used by researchers in the field of self–monitoring are very general, and it is the case that different researchers label these categories differently. For example, Snyder (1987) equates the term 'image' with the form, or exterior of a product, and the term 'quality' with the function, or performance of a product. These two terms are also linked conceptually with the 'hard–' and 'soft–sell' product advertisements (Snyder, 1987, 1991; Johar & Sirgy, 1991; DeBono & Packer, 1991), and with the terms 'utilitarian' and 'value–expressive' functions of attitude (Snyder, 1987; Johar & Sirgy, 1991; DeBono & Telesca, 1990). It is not clear that each of the labels is equivalent in meaning, which makes predictions difficult. Clearer definitions of these categories are needed.

An argument is postulated that concepts used in the literature on self–monitoring have not been defined in a manner sufficiently specific to allow hypotheses to be tested. In line with the basic tenets of the present research, that is, that fundamental, descriptive data are needed which can inform subsequent hypothesis–testing, the descriptive word association data obtained in the present research were analysed in order to provide specific descriptions of the concepts attended to selectively by persons differing in self–monitoring. The generation of these more specific definitions will assist future research on the relationship between self–monitoring and consumer behaviour, and will shed light on the cognitive processing styles adopted by individuals with particular personality types.

1.7 Data analysis

The large volume of qualitative and quantitative data obtained from the present research presented a challenge in terms of data analysis. An empirically–grounded method of qualitative data analysis of free–response data was used that minimises interpretative errors and allows tests of statistical significance to be conducted. This method is called Systemic Network Analysis (Bliss, Monk & Ogborn, 1983) and has been used successfully in a number of contexts, including analysing word association data, in recent years (Bliss et al., 1983; Monk, 1983; Cooksey, pers. comm., 1996).

1.8 Structure of thesis

Based on the above discussion, the present thesis assumes the following structure: in Chapter 2, a selected description of the literature on human knowledge acquisition highlights the specific stages occurring in the learning process, which include 'Simple Apprehension', 'Judgement', and 'Reasoning' (Spangler, 1986). It is argued that research into a phenomenon of interest should parallel these stages of learning, and that the first stage, simple apprehension, which consists of the *basic description* of an object of interest, is of fundamental importance to the research process. Subsequent (deductive) research stages, such as hypothesising relationships should not be undertaken in the absence of existing fundamental data that should properly inform these studies

Statistics from the Australian Bureau of Statistics are then presented which provide a view of the pattern of fresh fruit and vegetable consumption in Australia in recent years. This is compared with recommended daily intakes of these products to demonstrate a discrepancy between what is prescribed, and what is actually consumed. A comprehensive literature review follows, which illuminates the paucity of basic, descriptive research undertaken in this field, particularly relating to knowledge of fresh fruits and vegetables that is cognitively stored by individuals.

A theoretical discussion is then presented, wherein the primary issues of the thesis are introduced. It is argued that descriptive data relating to consumer product knowledge can be tapped using a word association methodology that allows for minimal individual biases to occur, thus ensuring that collected data are relatively free from experimenter– and participant–related biases.

The discussion then moves to the issue of cognitive information processing. In Chapter 3, contemporary theories dealing with unitary versus dual knowledge structures are described. This issue is important to a comprehensive understanding of consumer cognitions, and it is concluded that existing evidence supports a multiple memory model. Indeed, evidence suggests that individuals process information differently, depending upon the nature of the stimulus object. The word association study used in the present research, which is described and discussed in detail in Chapter 4, provides an opportunity to explore cognitive information processing theory. In particular, the effect of particular stimulus presentation modes on access to knowledge structures is investigated.

Chapter 5 introduces the concept of self–monitoring, and its effects on consumer attention to particular product attributes. The research conducted in the present thesis, which is discussed in detail in Chapter 6, provided descriptive information which was subsequently sorted into categories that emerged from an intensive analysis of the word association responses. Analysis of the categorical data obtained using various modes of stimulus presentation provided insightful data relating to the effects of stimulus modality, and self–monitoring on access to cognitive information. The findings were interpreted in terms of contemporary cognitive theory. The research findings are relevant to fruit and vegetable decision making in demonstrating the utility of embracing decision models that are cognisant of the complex array of 'information gathered using their five major senses as well as upon information reconstructed from their memory systems' (Cooksey, 1996, xi).

Data analyses also allowed a descriptive summary of each fruit and vegetable to be produced, which signals attributes, or product characteristics that are salient to consumers to be identified. These are presented in Chapter 7. The descriptive summaries afford an opportunity

to analyse individual fruits and vegetables to determine to what extent these products are considered individually, rather than as members of a product class.

The present thesis thus combines inductive and deductive research methods in the study of fresh fruit and vegetable perception and choice. Fundamental data is provided using the word association method (an inductive method), and this data is subsequently analysed, in a deductive sense, to provide insight into the proposed influences of self-monitoring, discussed in Chapter 5 and cognitive information processing (Chapter 3) on consumer behaviour.

Finally, to conclude the thesis, Chapter 8 provides a discussion of theoretical and practical implications of the findings generated in the above studies, with specific reference to their utility in increasing understanding of consumer fresh fruit and vegetable choice and consumption.

Chapter 2 – Previous fruit and vegetable research, the nature of knowledge acquisition, and the utility of existing marketing research methods in tapping knowledge structures.

2.1 Apparent consumption of fruits and vegetables – recent data

In 1993–4, the average Australian household spent approximately $111 per week on food and non–alcoholic beverages, which is approximately 19% of their total expenditure on household goods (Australian Bureau of Statistics – Household Expenditure Survey Australia, 1993–94). According to these statistics, Australian consumers spend more on food in each year than on any other single consumer good or service.

12% of money spent on food and non–alcoholic beverages was spent on fresh fruit and vegetables (Australian Bureau of Statistics Household Expenditure Survey Australia, 1993–94). This is in contrast to significantly more money being spent on take-away food and meals not cooked at home (26.6% of money spent on food and non–alcoholic beverages is spent on meals not cooked at home and take away food). Generally speaking, and as Figures 1 and 2 (below) show, although consumption rates for fruits and vegetables have increased since the earlier part of this century (fruits showing a 47% increase since the late 1960s, and a 56% increase since the late 1930s; vegetables showing a 12% increase since the late 1940s); in recent years, since the early 1990s, for example, these rates have actually fallen or remained relatively static (0.5% decrease for fruit; 6.1% decrease for vegetables (Australian Bureau of Statistics – Apparent Consumption of Foodstuffs and Nutrients, Australia, 1992–3; Curtis, Cosslett & McCall, pers. comm., 1997).

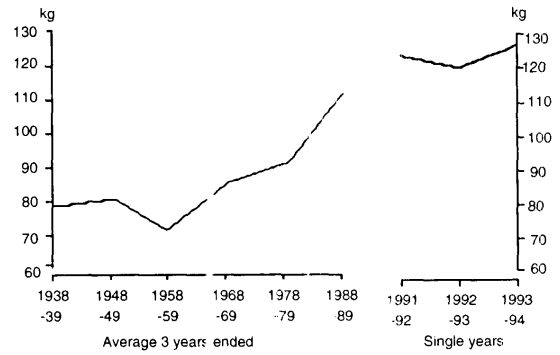

Figure 1: *Per Capita Fruit consumption in Australia from 1938-1994*
(Source: Australian Bureau of Statistics – Apparent Consumption of Foodstuffs and Nutrients, Australia, 1993-4)

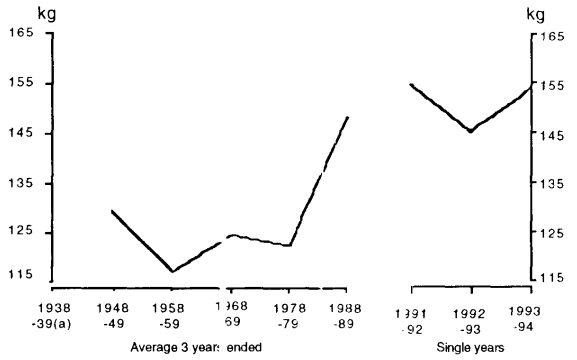

Figure 2: *Per Capita Vegetable consumption in Australia from 1938-1994*
(Source: Australian Bureau of Statistics – Apparent Consumption of Foodstuffs and Nutrients, Australia, 1993-4)

Although citrus consumption is up – it is at its highest since 1983–4 (Australian Bureau of Statistics - Apparent Consumption of Foodstuffs and Nutrients, Australia, 1992–3), this figure includes fruit juices, and it is the case that 60% of the Australian citrus crop is sold to processing factories, and only 28% sold on the domestic fresh fruit markets and 12% is exported (Australian Citrus Growers Federation, 1993; Australian United Fresh Fruit & Vegetable Association Australian Horticultural Yearbook, 1995). That is, although the consumption of citrus products has increased, much of this increase is due to the increased consumption of fruit juices, rather than of whole fruits, per se. Findings from the Food Team indicate a 10% increase in fruit juice consumption over the period 1993–1995 (Curtis, presenter at Foodweek Convention, 1995).

In summary, a substantial portion of the Australian weekly wage(s) is used to purchase foods and non–alcoholic beverages, yet fresh fruit and vegetable consumption has remained relatively static in recent years. This is occurring despite the fact that, during the last five years, consumers have become increasingly aware of the nutritional benefits of fresh fruits and vegetables, largely due to advertising campaigns and other marketing tools used by the horticultural industry (Backlund, 1994; Australian United Fresh Fruit & Vegetable Association Australian Horticultural Yearbook, 1995, p. 40; Miller – Western Australia Department of Health, pers. comm. 1997; Good Weekend, September 11, 1993). Many industry groups conduct regular advertising and marketing strategies and the Australian United

Fresh Fruit and Vegetable Association has recently undertaken a major collaborative promotion (Australian United Fresh Fruit & Vegetable Association Australian Horticultural Yearbook, 1995, p. 44), and established Produce for Health Promotion, the promotion division of Australian United Fresh Fruit and Vegetable Association, whose plan is to 'help increase the consumption of fruit and vegetables in Australia' through a variety of promotional campaigns (Australian United Fresh Fruit & Vegetable Association Australian Horticultural Yearbook, 1995, p. 44). For some reason, consumers are not responding rationally to health-based messages being sent to the community regarding healthy eating habits.

As stated in the introduction, consumer decision making is a complex process (Hammond, 1996; Epstein, 1994). In order to begin to explain the complexity of decision processes, an effort must be made to understand the knowledge structures that underlie consumer fresh fruit and vegetable preferences. However, there is a relative paucity of systematic research regarding consumer decision making involving fresh fruits and vegetables (Alexander, 1983).

The following selective literature review provides a critical analysis of the methodologies employed in existing fresh fruit and vegetables studies. The data produced in these studies are not specifically focussed upon; rather, a demonstration of the limited amount of descriptive data relating to fresh fruits and vegetables that exists, and that can be used to inform hypothesis testing in research, is the objective. It is argued that researchers of fruit and vegetable preferences may have been presumptive in testing the salience of product attributes without firstly establishing, in an empirical context, the existence of those attributes. However, before the literature review is undertaken, it is necessary to describe the traditional view of knowledge acquisition, a view that can usefully be extrapolated to prescribe an program of academic research. This is addressed in the next part of the thesis.

2.2 Systematic research – how to proceed?

In order to comprehensively critique existing fresh fruit and vegetable studies, we must pause to reflect on the learning phenomenon, that is, how does learning occur? It can be argued that research in a particular field is an instance of human learning That is, humans tend to learn in specific ways and, in many cases, this method of informal learning is intuitively extrapolated into research contexts. This next section of the present document provides a detailed discussion of the process of acquiring knowledge, and demonstrates that methodologies utilised in research into fresh fruit and vegetable preferences, and into consumer behaviour generally are limited in that they do not parallel the human learning process.

Acquisition of knowledge has occupied the minds of researchers since the time of Aristotle, and the theory of human reasoning first postulated by thinkers of this era has retained its validity to the present day. Most contemporary theories posit stages of information acquisition that follow the steps set out by Aristotle. These stages equate to Inductive and Deductive Reasoning, respectively (Johnson–Laird & Byrne, 1991). Induction is defined as:

> *a process whereby from sensible singulars, perceived by the senses, one arrives at universal concepts and principles held by the intellect. Thus, from the sense experience of even a single yellow tulip, the intellect grasps that it is a special kind, a kind found in every single tulip. The person proves not only that he sees the tulip but also that he knows what kind of thing the tulip is by the following. He is able to point out all the others of the same kind. If the individual did not know the essence or whatness existing in each tulip, he could not group them together.*
>
> (Johnson–Laird & Byrne, 1991, p. 16)

Deduction, by contrast, is defined as:

> *the human process of going from one thing to another, i.e., of moving from the known to the unknown..... Utilising what he knows, the human being is able to move to what he doesn't see directly. In other words, the rational person by means of what he already knows, is able to go beyond his immediate perception and solve very obscure problems. This is the nature of the reasoning process: to go from the known to the unknown.*
>
> (Spangler, 1986, p. 101)

Human reasoning proceeds sequentially through three distinct steps, namely Simple Apprehension, Judgement and Reasoning (Spangler, 1986). When seeking to solve a problem, which includes finding explanations for phenomena of interest, we must make our way through these three stages. Stage One, Simple Apprehension comprises an attempt to discover the 'whatness', or fundamental nature of an object. Stage Two, Judgement, combines and divides concepts inherent in the description of the nature of the object. It establishes general principles common to all instances of a given class of object, and these will enable us to combine information derived from Stage One to establish certain facts. Stage Three, Reason, moves us beyond what is known to the unknown. That is to say, we infer the existence of the unknown from what we do know about the object (Spangler, 1986).

Stage One (Simple Apprehension), therefore, is a crucial part of the problem-solving process, since we cannot hope to propose the combination of various concepts (Stage Two – Judgement), and to draw conclusions from these (Stage Three – Reasoning) unless these concepts, which comprise the nature of the object, have been previously identified in Stage One (Simple Apprehension).

As stated by Ghauri, Grønhaug and Kristianslund (1995):

> *....facts acquired through observations lead us to theories and hypotheses, while with deduction (logical reasoning) we accept or reject the hypotheses. This acceptance and rejection then helps us to explain or predict .....When we utilise observed facts in generating a theory which is consistent with these facts, we are doing induction. In other words, induction is the process of observing facts to generate a theory and is perhaps the first step in scientific methods....Most researchers in business studies go through this method, observing facts which lead them to propositions and later to theories.*
>
> (Ghauri et al., 1995, p. 9)

Human knowledge goes from perceiving the general to the specific characteristics inherent in an object. When first encountering an object, we perceive only certain characteristics, or attributes. As we become more familiar with the object, we gradually increase our knowledge base, by becoming aware of more specific characteristics. An analogy can be drawn between this process and an individual observing a moving object on the horizon, which gradually becomes clearer. At first, very little can be seen of

the object but, as it nears us, we perceive ever more characteristics, and link these cognitively, until we can finally identify the object (Spangler, 1986). In this sense, human knowledge moves from the general to the specific. This process of Reasoning, or acquiring knowledge, is called the Aristotelian Method, or Ampliative Inference (Trusted, 1979) and is widely accepted as a legitimate description of the human learning process (Spangler, 1986).

It is argued that research into a given area of interest, such as fresh fruit and vegetable preferences is a form of knowledge acquisition, albeit formal, and that as such, it should proceed systematically through the stages of learning, as described above. It follows that, within the context of scientific investigation, and during the initial stages of research, when there has not been an attempt to systematically research an area, it is crucial to gather descriptive information which is relatively free of the researcher's preconceived ideas, and which will provide a fundamental description of the area of interest. This parallels Stages One and Two, Simple Apprehension and Judgement, wherein we seek to become familiar with the fundamental nature, or 'whatness', of a phenomenon (Spangler, 1986, p. 16). In these processes, we seek to identify concepts inherent to an object (Stage One – Simple Apprehension) and to connect, or link these to gradually form a coherent image (Stage Two – Judgement).

After a relatively comprehensive body of information has been thus gathered, qualitative data analysis can be used to establish the presence of trends and consistencies of behaviour, that is, an identification of concepts comprising consumers' knowledge structures of particular products (in this case, fresh fruit and vegetables), which will direct subsequent hypothesis generation (Stage Three – Reasoning). These stages describe the movement from general to specific knowledge regarding an object's inherent characteristics. Researchers can thus begin to move from the known to the unknown, using inductive followed by deductive research methods. That is to say, once we become aware of additional conceptual connections (via research) we can integrate these into our existing information, and thereby know more about a particular phenomenon. We work from this to hypothesise yet more relationships. In summary, it is imperative to gather fundamental Stage One (Simple Apprehension) and Two (Judgement) (descriptive) information at the outset of research, so

that subsequent hypotheses can be generated in subsequent research attempts.

The following literature review highlights two things: (1) within the context of fresh fruit and vegetable research, there have been few attempts to undertake research that would provide fundamental, purely descriptive data which can inform subsequent hypothesis generation, and (2) that existing research in this area does provide some useful descriptive data, such as favourability, relative amounts consumed, and themes associated with a particular product, the pineapple. Information such as this can usefully be built into a developing framework of fresh fruit and vegetable knowledge structures, which is provided in the present research.

However, generally speaking, it is the case that in many of the studies reviewed below, a methodology has been utilised that is problematic in at least two ways. Firstly, assumptions of causal factors have not been proposed on the basis of existing (Stage One -- Simple Apprehension) data but, rather, have been suggested *a priori*. That is, researchers have investigated the effects of particular factors that they believe, intuitively, might be salient however these factors have not been identified in previous studies.

The second difficulty relates to the design of particular methodologies, such as surveys, interviews, and so on. These methods are relatively directed in nature, in that respondents are not asked to write down their answers in a free–response format, but are asked whether any of the listed, predetermined factors are relevant to them. Respondents are also directed toward a particular context such as the *purchase* decision, which can constrain responses that are relevant to fresh fruit and vegetable selection but that do not relate directly to the purchase context, such as personally meaningful, experiential knowledge (Epstein, 1994). In essence, the more structured, or directed research methodologies that have been used in fruit and vegetable studies are unlikely to provide the comprehensive descriptive data that is warranted in initial research efforts.

It is concluded that many studies contain metholodological difficulties and that, because fresh fruit and vegetable selection research is in its infancy (i.e., there is a paucity of descriptive [Stage One – Simple Apprehension] data), deductively–oriented methods are inappropriate. Furthermore, and

as stated in the introduction, it is suggested that fresh fruits and vegetables constitute a unique foodstuff, for which aspects of appearance present the primary cues regarding product quality. It is therefore important, in a research sense, to enable consumers to view fresh fruits and vegetables, and to record the thoughts that come to mind so that the full gamut of product cues can be tapped. A strong argument is mounted in favour of unstructured studies that provide basic, descriptive data as being most appropriate and relevant in the initial stages of research of a particular area.

2.3 Literature review – studies investigating fresh fruit and vegetable selection by consumers

2.3.1 General fruit and vegetable studies

A decade ago, a study was conducted by the Department of Community Services and Health in conjunction with the National Heart Foundation (1983), entitled 'National Dietary Survey of Adults: 1983'. This survey provided useful demographic data concerning fruit and vegetable consumption habits at that time, including the amounts of various products that are consumed by the population, and how these percentages break down amongst sub–groups based on age and sex.

More recently, the Horticultural Research and Development Corporation (1990) conducted an extensive survey concerning fruit and vegetable consumption patterns in Australia. Their results provided descriptive data regarding the impact on purchasing of fruit and vegetable attributes that are deemed both desirable (crispness, absence of blemishes, fragrance, firmness) and undesirable (flavourless, stringiness, difficulty in peeling). In addition, several 'types' of consumer were identified. The lack of pre–existing large scale studies on fresh fruit and vegetables was noted, and it was suggested by the author that this study could serve as a benchmark.

Face–to–face interviews with consumers from each Australian state capital were conducted. The specific methodology used in this study was not described, but an analysis of specific findings demonstrates that most questions contained predetermined categories of responses, to which consumers signalled their degree of agreement or disagreement. For example, one question was 'I'm concerned about my health and diet and

that of my family, and I'm increasing our intake of fruit and vegetables'. The possible responses to this question were 'strongly agree/agree', 'neither agree nor disagree', and strongly disagree/disagree'. Similarly, another question was framed 'Fruit and vegetables are important in the diet' to which consumers responded 'extremely important', 'important', or 'unimportant/undecided'.

It can be concluded that the interpretation of some of the findings of this study is problematic, in that consumers were directed towards predetermined attributes, and positive response bias, or 'prestige bias' (Oppenheim, 1966, p. 62) was not allowed for. That is, many consumers would say that they are concerned about their family's health and were increasing intakes of fruits and vegetables, simply because this is deemed to be socially desirable. However, those findings listing the most commonly consumed fruits and vegetables are more robust in this regard since positive response bias may have influenced *stated* amounts eaten (that is, consumers stating they had eaten more than they actually had), but is less likely to have influenced respondents' reports of *relative* amounts eaten. That is, consumers might wish to overstate the total amounts of fruits and vegetables consumed, but would be less likely to feel the need to state that, in a within–fruit or within–vegetable sense, they consumed more of one type of fruit or vegetable than another.

The results indicated that most commonly consumed vegetables (in descending order of frequency) were: potatoes, carrots, tomatoes, onions, lettuce, pumpkin, cauliflower, cabbage, celery and broccoli. The most commonly consumed fruits (again in descending order of frequency) were: apples, bananas, oranges, grapes strawberries, pears, rockmelon, peaches, watermelon and mandarins. These findings are of relevance to the present research in the following way: in the present thesis, respondents were asked to rate a variety of fresh fruits and vegetables in relation to their relative commonality, that is, respondents were asked to rate a list of fresh fruits and vegetables in terms of how often they are consumed by Australians. This was done to test the accuracy of consumer perceptions of relative commonality of various fresh fruits and vegetables and to identify a manageable number of fresh fruits and vegetables to use in the present research. The results of the present study were compared with Australian Bureau of Statistics figures and the findings of the Horticultural Research

and Development Corporation (1990) in order to test their validity. This part of the thesis is discussed in Chapter 6.

The Horticultural Research and Development Corporation (1990) findings indicate that product attributes of importance to consumers, such as (for apples) crunchy/crisp, no blemishes; (for pears) no blemishes, juicy (for potatoes) no greening, no sprouting, no blemishes; (for tomatoes) firm, no blemishes, red, flavoursome were noted but, as mentioned earlier, precisely how these attributes were determined was not stated. It can be suggested, however, that judging from the similarity of attributes given for many of the fruits and vegetables, such as 'no blemishes', 'juicy', and the particular terminology used, for example, 'no greening', 'no sprouting', that predetermined attributes were provided by the researcher, to which consumers signalled degree of importance.

Another Australian study was conducted by The Food Team, an Australian food marketing consultancy. They conducted a large-scale survey (Curtis, 1995) designed to identify Australians' food consumption habits. It proved impossible to access the primary data sources, however, a summary of the findings of this group (1995; and Rob Mason, pers. comm., 1997) provided information regarding weekly consumption patterns, percentages of respondents who ate specific meals (breakfast, lunch, dinner), and food products that were commonly consumed. Respondents filled in an open-response, in-home diary which provided researchers with a detailed account of what was consumed over a weekly period. The 1993 data were then compared with the 1995 data to provide an overview of how consumption patterns might have changed over time.

The diary method can provide a researcher with rich illustrative material, providing that interpretations of the data are not overgeneralised. Conclusions drawn from the data must be carefully qualified - since researchers cannot be certain that the week sampled is typical, that is, that the behaviours performed are typical of those performed in any given week. Conclusions drawn refer only to the week sampled and cannot be extrapolated to other times (Oppenheim, 1966).

Additionally, the tendency for selective recall (of foods eaten) must be minimised. For example, respondents might selectively recall their behaviour over the study period for purposes of 'vetting' their behaviour

for social desirability purposes, or simply because the memory is fallible. This can occur particularly when respondents choose to fill in their diary only once per day (at night before they retire, for example).

Despite these methodological limitations, the results provided by Curtis (pers. comm., 1995) are instructive in highlighting the types (variety) of foods consumed each day, trends in consumption of particular foods across the week, and food preparation methods. Frequency of take–away food consumption was also provided. Their results suggest that, in the week sampled, fruits and vegetables were consumed regularly by the majority of respondents, and that potatoes, carrots, peas, and beans were most frequently consumed vegetables, and that apples, bananas, grapes, oranges and pears were the most commonly consumed fruits. Peak day for consumption of fruits and vegetables was Monday.

The findings of the Food Team indicate that fewer vegetables were consumed during that particular week in 1995 than in the week sampled in 1993 (63% versus 51%), more fruits were consumed (19% versus 22%), and that more consumers agreed with the statement: 'I am now eating more fresh food than I did a year ago' (40% versus 51%) (Rob Mason, pers. comm., 1997). However, as was the case for the Horticultural Research and Development (1990) study, positive response bias may have contaminated this latter finding in that respondents might have overstated their agreement with the statement to create a favourable impression of their diet.

Baghurst, Crawford, Worseley and Record (1988) conducted a survey of the food consumption habits of 5000 Australian adults. The questionnaire listed 180 food and beverage items, and respondents indicated how often they consumed each of these foods. In addition, consumers were asked several questions regarding food preparation and eating habits. Demographic information was also obtained. The items chosen for inclusion in the questionnaire were derived from earlier studies using open–ended questionnaires. In this regard, the survey was methodologically strong. With respect to fruit and vegetable consumption, information regarding age and sex trends in consumption of various products was obtained. Generally speaking, it was found that women ate higher levels of citrus fruits, apples, pears, tropical fruits, stone fruits, berries, dried fruit and fruit juice, tomatoes, leafy green vegetables,

brassica, marrow and pumpkin, mixed vegetables and sweetcorn than men, whereas women ate less potato than men. In addition, older people ate more potatoes, apples, pears, kiwifruit, tomatoes, carrots, leafy green vegetables, brassica, marrow and pumpkin, onions, leeks and turnips than younger people. Older people ate fewer peas than younger people. There were few occupational or class differences in fresh fruit and vegetable consumption. The information obtained in this study related to amounts of fresh fruits and vegetables consumed and, in this sense, was not informative regarding specific product attributes that are of importance to consumers.

Roy Morgan Research Centre (1992) conducted research on the consumption habits and attitudes toward nutrition of a sample of Australians. This research was commissioned by the National Heart Foundation. Specific information on foods and beverages consumed, and knowledge of exercise and diet–related health matters was obtained. The methodology utilised was not described, and it would appear that respondents were given lists of food and beverage products, and asked to indicate how frequently they were consumed. Responses regarding exercise habits, and knowledge of the relationship between health and various behaviours (smoking cigarettes, drinking alcohol, eating various products) were obtained.

The most valuable information to come from this research regarded Australians' consumption levels of various fresh fruits and vegetables. For example, women consumed higher quantities of various fruits, and older age groups ate more apples. Women consumed less potato, but more tomatoes, leafy green and other vegetables. More potato was consumed in rural areas and townships, but fewer peas, beans, tomatoes, marrow, pumpkin, turnips and parsnips. Older age groups ate the same amount of potato as younger groups, but preferred boiled, mashed and steamed. Older groups ate more tomatoes, carrots, leafy green vegetables, marrow, pumpkin, onions, leeks and turnips. Few occupational or class differences in consumption habits of fruits and vegetables were observed.

2.3.2 Studies on school children's fruit and vegetable consumption

Dowling (1994) was commissioned by the Horticultural Research and Development Corporation (HRDC) and Communique Consulting to undertake a student nutrition survey, which investigated the eating patterns of 257, 13 – 18 year old students. Many of the questions contained pre–determined lists of products, attributes and other factors deemed to be relevant to consumption, and so, again, results must be treated with caution.

Information obtained dealt with preferences and consumption of fruit, availability at school and at home, nutritional knowledge, availability of information, and encouragement at home and at school to eat fruit, fruit selection, quality, and methods of encouraging greater consumption. Respondents claimed that apples were the most liked fruit, fruit was regarded as nutritious, more information regarding nutritional aspects at school was required, and increased availability at school was also requested. Three–quarters of respondents claimed to eat fruit daily, and felt that more information and availability of fruit would increase consumption. Respondents also provided views on the nutritional value of various products, including milk, meat, pasta, fish, hamburgers, pies, butter, and so on. Generally speaking, the results of Dowling's study (1994) are of interest in providing some information relating to attitudes of adolescents toward nutrition, although positive response bias may have been operative in this research, due to the leading nature of some of the questions. For example, many adolescents might agree that they would consume more fresh fruits and vegetables if they were readily available, and if information relating to nutritional benefits was increased. Whether these individuals would actually behave in this manner is, however, undetermined.

The Australian Horticultural Corporation (1996) conducted a study of primary schoolers' eating habits The food intake of 300 school children was measured throughout a 'typical' day. The methodology utilised comprised telephone interviews of children aged 8 – 13 years. Children were interviewed in the afternoon or evening, and asked to provide details of their food consumption over the previous 24 hours. The study was conducted over five school days.

Methodological difficulties involved selective recall of children. As was discussed previously, in relation to the study conducted by Curtis (1995), remembering everything eaten over the preceding 24 hours can lead to selective recall. The study also was conducted over five days. That is, the day of the week interviewed might influence food consumption (see Food Team study (Curtis, 1995), reviewed above, for a discussion of this phenomenon). A study using the telephone as the primary form of interaction is also limited in that children who are not adept at communicating over the phone, or who suffer anxiety in this context might be excluded. Furthermore, details regarding the format of questions asked were not available.

Findings indicated that 40% of children aged between eight and 13 years did not report eating fruit on the survey day, and 27% reported eating neither fruit nor vegetables. In addition, children eating breakfast were less likely to consume sugary foods between home and school. 58% of children ate a high fat packet snack–type food. Finally, females ate considerably more fruit than males (64% versus 55%), urban children ate more fruit than rural children (62% versus 54%), and children from white collar homes ate more fruit than children from blue collar homes (65% versus 50%).

Williams, Woodward, Ball, Cumming, Hornsby and Boon (1993) conducted a study involving 2082 high school students in Tasmania. Information sought related to usage (by selves, parents and friends) of certain foods, perceived healthiness and likeability. A pre–determined list of 22 foods (including fruits and vegetables such as apples, potatoes, orange juice and tomatoes) was presented to students, and they rated these on the above–mentioned dimensions. Information on demographics and health–related behaviours was also obtained. Information was not provided regarding how the 22 foods included in the study were chosen.

Focus groups involving students were used to determine factors perceived to be relevant to dietary decisions. School health educators were also consulted. It must be noted that the factors identified by focus groups to be important are typically obtained by contextualising the topic; that is, students are given some information regarding the nature of the study. It is assumed that the issue of health was used in this research to anchor the focus group discussions, and, as such, some of the information obtained

might suffer from positive response bias. Additionally, group dynamics such as 'groupthink' and 'groupshift' (Robbins, Waters-Marsh, Cacioppe & Millett, 1994, p. 446), may have constrained the contributions to the discussion of individual members of the focus group, thereby producing nonrepresentative data. For example, group–think is a phenomenon wherein the pressure for group conformity causes individuals to provide responses that will not deviate from the group consensus and, in a focus group discussion, individuals might not provide information of a critical nature, if this appears to go against information provided by other group members. Groupshift occurs when the tendency of the overall group to be more or less conservative or risk–taking causes the group to take a position on an issue that is actually more extreme (either conservative or risk–taking) than any one individual in the group would be individually. This might affect focus groups in moving the discussion to extreme positions or viewpoints that might not accurately reflect the views of particular individuals in the group, and should be borne in mind when interpreting the findings of this study.

Findings indicate that high percentages of students consumed apples, orange juice and potatoes (over 82%), and fewer ate tomatoes (67%). Apples and potatoes were liked, orange juice was 'loved', and tomatoes were neither liked nor disliked. Apples, orange juice and tomatoes were considered to be very healthy; potatoes were considered to be healthy. Usage of these products by parents and friends ranged from sometimes to fairly often. These results are informative in providing information relevant to adolescent attitudes toward specific fresh fruits and vegetables.

2.3.3 Stone fruit studies

In 1993–94, McKinnon conducted research into stone fruit consumption. The research was primarily aimed at analysing consumer preferences and buying habits. A structured questionnaire, including both open and closed questions was devised, which gleaned information regarding frequency of purchase, varieties purchased, eating occasions, ripeness preferences, price, utility of information and store tastings to assist in the purchase decision, and explanations for purchase/non–purchase of stone fruit. Basic demographic information was also obtained.

McKinnon's research detailed attributes that were important in the purchase decision, however, these were pre–determined by the researcher (visual appearance, ripeness, price, size, variety, growing region). That is, consumers' attention was drawn to certain attributes deemed salient by the researcher. No information was provided regarding whether these *a priori* assumptions were based on previous research. In addition, consumers sampled various stone fruits in–store before answering the questionnaire. It was stated that the tastings comprised a form of reward for consumers' participation in the subsequent interviews. However, it is not apparent whether these tastings biased responses to particular answers. For example, consumers might have answered in a way that they thought might please the researcher, to 'earn' the reward. It might also be the case that the responses of consumers regarding stone fruits were affected by the proximity and opportunity to taste the product. That is, it can be expected that cues related to the eating experience would be uppermost in consumers minds in this context, and that they might selectively attend to 'eating' cues, to the detriment of other, equally important attributes, such as potential uses of the product, and previous purchase habits.

Some of the findings of McKinnon's research (1993–94) were instructive, providing information on purchasing frequency of stone fruit (91% overall; peach – 84%; nectarine - 65%; plum – 54%; apricot – 51%), purchase occasions (snack – 67%; dessert – 45%), relative favourability of particular stone fruits (in order of most to least favourable): peach – 37%; peacherine – 20%; nectarine – 19%; apricot – 11%; plum – 7%), age trends in purchasing habits (older age groups purchased plums and apricots more frequently than younger age groups), ripeness preferences (more than half of the sample preferred to have a selection of both ripe and unripe stone

fruits) and packaging preferences (91% do not wish to buy pre–packaged stone fruit). Price was considered to be reasonable, consumers wanted more information regarding storage, selection, recipes, and the like, and store tasting was considered to be conducive to purchase. It must also be noted that, according to information supplied by McKinnon (1993–94), female shoppers predominated in this sample (232 females versus 52 males).

A finding of special significance to the present research related to the images and comments made with regard to stone fruit. Consumers were invited to provide additional comments relating to thoughts they might have about stone fruits. These comments were very similar in nature to the word association responses obtained in the present study, and provided interesting ideas regarding consumers' thoughts on stone fruits. It can be seen that, compared with the above more directed questions, information from these particular questions is more likely to provide bias–free responses which, as argued earlier, are essential in the initial stages of research. Some comments were 'like a baby's bottom', 'jewels of the sun', 'sticky fingers', 'messy face needing a wash', 'childhood' and 'peachy cheeks'.

2.3.4 Potato research

Lewis (1994), of Harrison Market Research (with associate consultants Richard Marketing) was commissioned by the South Australian Department of Primary Industries who, in turn, were responsible to the HRDC and Australian Potato Industry Council to conduct a marketing research project into factors affecting potato purchase and use of fresh potatoes in Australia. Twelve focus groups and one thousand telephone interviews were conducted.

Overall, this study provided much useful descriptive information on consumption frequency, nutritional information and packaging requirements. However, it must be noted that the focus group samples were not large and, significantly, several of the questions in the telephone survey were of a directed nature, in that respondents were not asked to write down their answers in a free–response format, but were asked whether any of the listed, predetermined factors were relevant to them.

For example, when asked why respondents purchased either washed or unwashed potato varieties, a list of possible explanations, including 'easier to prepare', 'It's just what I've always done – traditional', and 'don't go soft as quick', were provided to which the respondents merely indicated if the statement was relevant to them. Again, when asked about occasions for which different varieties were required, a list of possible occasions, including 'dinner party', 'boiling in their jackets', 'making chips', and 'other' were provided. This type of question can be considered leading in that respondents are directed toward *a priori* assumptions regarding factors of significance. These assumptions do not appear to be derived from pre–existing research.

The information from this study provided data on such things as consumption frequency across different age groups, buying venues, consumer familiarity with different varieties, preparation and packaging, price, quality, preparation and cooking, and nutritional knowledge. Interviews with industry players also provided information on retailing behaviour, such as promotion, quality assurance, packaging, varieties and demand. Information was also provided on the frequency of consumption of products deemed to be possible substitutes or alternatives to the traditional potato, including pasta and rice, and individuals discussed the changes in eating patterns in families that have led to the popularity of quickly and easily prepared meals. Negative attributes identified included quality, peeling potatoes, cutting eyes out, take too long to cook, too heavy to carry, fattening, not enough named varieties and sometimes seem watery when cooked.

Focus groups' discussions covered such issues as nutrition, importance of potatoes, whether potatoes were included in the category of vegetables, quality and packaging, preparation methods, and general perceptions of potatoes. These findings should be interpreted with caution, however, as the sample sizes were quite small. The telephone interviews provided information regarding demographics, consumption frequency, buying venue, packaging preferences, consumption frequency of different varieties, differential usage of different varieties, and reasons for purchasing washed as opposed to unwashed potatoes.

2.3.5 Apple research

McKie (1989) conducted research into apple consumption using eight group discussions and eighteen depth interviews with those in the apple marketing chain. This research was commissioned by the Australian Apple and Pear Growers Association. This research was purportedly based on an analysis of the available data which, according to the report, suggested that people were eating fewer and fewer apples. Unfortunately, specific findings were not cited in the body of the report, and attempts to locate research listed in the Information Sources in the back of the report were largely unsuccessful. In addition, no information was provided regarding the specific methodology and sample used in the present research, making interpretation of the findings difficult to undertake.

Findings indicated that apples were positively perceived by consumers, that is, consumers evaluated apples in positive terms. However, competition in the form of manufactured 'health foods' and the all year availability of apples is reducing consumption levels. Apples were considered to be a very ordinary perhaps 'boring' product. Negative attributes identified included inner bruising, tastelessness and floury, chalky textures. Several advertising campaigns were launched as a result of McKie's (1989) report, with varying levels of success (see McKie for a discussion of these studies).

2.3.6 Strawberry research

Market researchers AGB McNair were commissioned by the Horticultural Research and Development Corporation to conduct research into consumer purchase behaviour and attitudes towards fresh strawberries (1996). Qualitative group discussions involving consumers (four groups with approximately eight people in each) were conducted, and the results of these formed the basis of a telephone survey of 802 people.

The focus groups were structured insofar as particular areas of interest were featured in the discussions. For example, when assessing attitudes towards strawberries, questions relating to taste, health and nutrition, cost and affordability, ease of use and versatility, acceptance by family, and storage and waste concerns drove the discussion. Similarly, when looking

at purchase behaviour, questions relating to reasons for purchase, frequency of purchase, quantity normally purchased (number of punnets) and reasons for not buying more, the extent of 'planned' versus spontaneous or 'special occasion' purchases, and type of store normally purchased from were used to lead the discussion. Again, when examining use and consumption behaviour the discussion revolved around the issues of main types of uses and meal occasions; and household consumers, including the influence of children, on purchase.

An examination of the questions in the telephone survey shows that pre-determined categories of answers were used for many of the questions, thereby leading the respondent to focus on particular areas, perhaps to the detriment of others. For example, Question 5b asked 'which one of the following statements best describes your reasons for buying strawberries for your household?' The researcher then read out the following answers, and respondents could choose one of these: 'strawberries are a healthy and nutritional fruit'; 'the family or household enjoys eating strawberries'; 'strawberries add variety to the family diet'; and 'other'. Similarly, when asked about problems that might occur if the respondent bought more fresh strawberries, the possible answers were as follows: 'would cost too much'; 'wouldn't keep fresh enough'; 'would be wasted'; and 'none of these'. When asked about choosing strawberries, a list of predetermined attributes such as size, colour, degree of ripeness, and so on, was used.

It must be noted that these categories may have been developed from information obtained in the focus groups (thereby moving away from *a priori* assumptions). However, the data obtained from the focus groups drew the focus of participants to investigator-determined factors of perceived salience, which may have caused these consumers to undervalue (and therefore not discuss) ideas they have concerning other factors. Additionally, group dynamics such as groupthink and groupshift (which have been discussed in detail in relation to the study by Williams et al. (1993)) may have constrained the contributions to the discussion of individual members of the focus group, thereby producing nonrepresentative data. These limitations should be borne in mind when interpreting the findings of AGB McNair (1996).

The research by AGB McNair (1996) provided information regarding planned versus unplanned purchases, buying venue, purchase frequency,

purchase quantity, family members influencing the purchase decision, reasons for purchase (including taste, health and nutrition), negative attributes (including problems with storage and poor quality in punnets), positive attributes (absence of mould, absence of marking or bruising, and degree of ripeness and colour), price, size, packaging, storage and usage.

2.3.7 Mushroom research

Brownlee (1993) was commissioned by the Horticultural Research and Development Corporation and the Australian Mushroom Grower's Association to conduct research into consumers' perceptions and attitudes towards fresh mushrooms. This study was compared with earlier research, including a 1990 December – 'Consumer Study of the Fruit and Vegetable Market' (Horticultural and Research Development Corporation, 1990); and others, such as 1992 – Study (Marketing Initiatives), 1992 – Newcastle Study (Creative Dialogue), and 1991 – Fresh Mushroom Study[1]. While some findings in the 1993 study were contrasted with those of earlier studies, no detail was provided regarding the methodology employed in these previous studies, and so an analysis and comparison of methods could not be performed.

The methodology employed in the 1993 study comprised a telephone survey of 600 households. The author stated that the questionnaire utilised was similar in format to the one used in the 1991 study, so comments made regarding the 1993 study can be applied to the 1991 study.

Perusal of the questions asked shows that, again, several of the questions in the telephone survey were of a directed nature, in that respondents were not asked to write down their answers in a free–response format, but were asked whether any of the listed, predetermined factors were relevant to them. For example, 'I'll read out some statements. Which ones best describe you?' 'When I shop for mushrooms....' followed by three possible responses: 'I always have mushrooms on my list', 'I sometimes have mushrooms on my list', and 'I remember mushrooms only when I see

[1] Attempts by the author of the present thesis to access referencing details for these latter studies have been unsuccessful, and the interested reader is asked to see Brownlee (1993) for details of these studies.

them'. Similarly, 'How do you serve mushrooms?' 'As I read out would you indicate by saying YES or NO as to how you serve fresh mushrooms?', followed by several possible responses, including 'on toast', 'in a casserole', 'as a salad', 'in a sauce', 'marinated', 'barbecued', 'alone – as a snack', and 'in an omelette'. Finally, 'Did you know that the mushrooms you buy are organically grown?' As stated above, biased responses cannot be ruled out as respondents were directed toward predetermined attributes or factors assumed by the researcher to be salient. This gives no opportunity for respondents to provide additional information which might be relevant to the purchase decision.

Unfortunately, no information was provided regarding the origin of these attributes. It was unclear whether these were based upon findings from the above–mentioned studies. Nevertheless, as was the case for several other studies reviewed above, some useful information was provided in this research, including purchase frequency, packaging requirements, quality, growing methods, expenditure, price, quantity purchased, buying venue, and serving occasions. In summary, findings indicated that consumers perceive mushrooms to be of high quality, are purchased more frequently in 1993 (than in 1991 and 1992), that brown paper bags should be supplied for packaging purposes, and that mushrooms are served with particular meals. However, it must again be emphasised that some of these findings are the result of questions that, in themselves, could be said to be leading the respondent to answer in a particular way, which might obscure the existence of other, perhaps relevant information.

Of particular relevance to the present research is the free–response type question that asked consumers to write down their thoughts about mushrooms, rather than asking them specific questions. This question was 'When you think of mushrooms what comes to mind?', and elicited such statements as 'taste/flavour', 'salads', 'vitamins/nutritious/good for you/ healthy/ natural', 'steak/BBQ', 'fresh', and 'sauces'. As will become evident later, the nature of these responses is remarkably similar to those obtained in the present research

2.3.8 Capsicum research

Yuen and Hoffman (1993) investigated consumer preferences for new capsicum varieties. They asked 200 consumers to state their preferences in size, colour, shape and taste of capsicums, and to comment upon the quality and price of capsicums, and their usage in the home. Results indicated that consumers preferred red and green capsicums, as opposed to newer varieties (pale green, yellow, purple, orange or mixed colour). They also preferred small to medium size, flat round shape, and indicated that crispness and sweetness were important. However, these attributes were again pre–determined by the researcher, so these results must be treated with caution. It might be the case that attributes other than those included in the questionnaire are of importance to consumers.

2.3.9 Banana research

A study conducted by Borrell, Ruby and Vincent (1993) inquired into the banana marketing system in Australia. They discussed consumers' wants, needs and habits, and stated that consumers want healthy, fresh foods; guarantees of a consistently good quality; variety and choice; and convenient, time–saving shopping. However, no previous research was cited in support of these claims, and so this document was not considered to be helpful in furthering an understanding of fresh fruit and vegetable preferences in Australia.

2.3.10 Mango research

Duggan (1995) conducted a study involving consumer perceptions and usage of mangoes. The methodology utilised was similar to that of Milgate (1994) (to be discussed next), in that focus groups were used to explore such issues as attitudes to fruit (varieties, fruit selection processes, 'head' to 'heart' criteria in mango choice); current consumption patterns; purchase patterns (who in the family influences mango purchase, triggers stimulating purchase); different mango varieties; and exposure to mango commercials. However, a predetermined format was used to focus discussion on these topics and it is therefore possible that incomplete data were obtained, that is, respondents concentrated on these predetermined

categories, perhaps at the expense of other types of information. Recall too that the limitations of focus groups' discussions, discussed earlier, are also relevant to Duggan's (1995) study.

With these methodological difficulties in mind, the findings indicate that mango consumption is a self–indulgent act, that the flavour is unique, and that mangoes are typically associated with holidays and Christmas. They are messy to consume, eating mangoes is a unique experience, consumers have pleasant memories of mango consumption (the first mango they consumed); there is an 'ideal' mango (juicy, a certain texture, colour, smell, and so on); consumers have little knowledge of mango varieties; and mango consumption waxes and wanes over the season. Consumers list 'sense of anticipation', 'unique flavour' and 'smell' as positive attributes of mangoes, and list 'expensive', 'messy', 'only a small quantity can be consumed due to their intensity of flavour', and 'not ripening well' as negatives. Usages of mangoes include entertaining purposes, special recipes, and in conjunction with other luxuries including prawns, avocado, chicken and champagne. Mango commercials were perceived to be very effective. The information from this study was useful in providing some information relating to consumer attitudes toward mangoes. However, as stated above, the predetermined format of the research might have precluded discussion of some possibly relevant issues.

2.3.11 Pineapple research

Milgate (1994) was commissioned by the Queensland Fruit and Vegetable Growers to undertake a study concerning consumers' views and usage of fresh pineapples. Her methodology involved a dual methodology, with the main part of the study being driven by a set of predetermined questions, and the second part of the study following a free–response format. These included perceptual information: 1. 'what do you particularly like about fresh pineapple?', 2. 'what things don't you like about fresh pineapple?', 3. 'have there been any changes in the pineapples available in shops over the past few years?', and 4. 'generally, how satisfied are you with fresh pineapple?' (Probe words, such as 'seasons', 'quality', 'supply', were used for the third question). They related also to purchasing behaviour: 'how often and when do you buy fresh pineapple?', 'what do

you look for when you are buying a fresh pineapple?' (probe words related to taste, appearance, freshness, size, colour, price, and variety); 'is pineapple purchase planned or impulse buying?'. Questions were also asked about consumption behaviour: 'who eats fresh pineapple in your household?'; 'how and when is fresh pineapple eaten or used in your household?'. Perceptions and attitudes towards ripeness were also canvassed: consumers were shown various pineapples, and were asked to rate each in terms of ripeness; consumers were also asked to taste these pineapples and rate them in terms of taste. Finally, questions relating to reaction to promotional options were asked: consumers being asked about things that would encourage them to buy/hold them back from buying more pineapple.

It can be seen that these questions were directed, to some extent, by the researcher's preconceptions about factors relevant to the purchase and consumption of pineapples and, in this respect, the ensuing data must be interpreted with caution. However, of special relevance to the present study is a particular aspect of Milgate's (1994) study. To elaborate, the research included an introductory exercise wherein focus groups were asked to sort a set of ten cards into groups. A fruit name was written on each card (apples, bananas, grapes, pears, pineapples, rockmelons, pawpaw, mangoes, strawberries, and oranges). Respondents were informed that 'their groupings could be as few or as many as they wished and could be formed on whatever bases they considered appropriate' (1994, p. 5). This task provided the researcher with information (non-directed) relating to the way in which consumers group pineapples. This is instructive in the sense of providing an index of the ordering of information in consumers' knowledge structure for pineapples.

It was found that consumers primarily group pineapples along particular lines, including usage, seasonality and preference. Usage related to the functions of pineapple, and it was found that consumers think often about the use of pineapples in fruit salad. Seasonality related to ideas about frequency of consumption, and it was found that pineapples were not put into the group of basic, or staple fruits but were rather seen as a seasonal fruit. Preference related to the extent that consumers liked pineapples. They were looked upon favourably because of their perception as a summer fruit, and summer fruits are favoured. Other categories or groups evident from the card-sorting task were category (whether pineapples

were seen as a citrus fruit, a tropical fruit, and so on), their taste, what colour they are, and what time of day they are eaten.

The researcher concluded that pineapples are seen as a tropical and summer fruit, a fruit salad ingredient, a citrus, and something for dessert. These findings were highly relevant to the present study in that they comprised data that were not contextually bound and, importantly, provided empirical support for the categorisation system used in the present study. That is, when ordering the enormous volume of word association responses obtained in the present study, categories similar to those of Milgate were adopted, thus basing the present categorisation scheme on previous empirical data.

A second aspect of the study by Milgate concerned respondents' second task, which asked consumers to write down those things which first came to mind when they heard the word pineapples. This methodology was identical to that used in the present study, except that consumers only *heard* the word pineapple, whereas in the present study, several different modes of stimulus presentation were used, such as words and pictures differing in aspects of stimulus dimensionality.

Top–of–the mind responses revolved around taste, preparation, ripeness and appearance. Other associations were with Queensland, tropical and summer. In addition, the words 'juicy' and 'sweet' were strongly associated with pineapples. The taste responses were positive and negative in nature (negative words were 'tart', 'acidic', and 'bitter'). Preparation responses included words such as 'messy', 'difficult to cut', and 'hard to prepare'. Appearance words included 'spikey', 'prickly', 'rough skin', and 'good for decoration'.

To summarise, the methodology employed for parts of the pineapple research was that adopted in the present thesis, and provided validation for the categories utilised for the present research.

2.3.12 Studies on taste development and perception

Findings from research centres such as CSIRO (Bell, 1993), have concentrated on the development of taste, and have found that different cultures have palates that are in some ways dissimilar, and that understanding these varying palates would enable Australians to develop products more suited to other cultures. Laing and his colleagues (Laing & James, 1992; Laing & Oram, 1992, Laing, pers. comm., 1995.) from the University of Western Sydney have investigated the food preferences of Australian children, with special emphasis on the role of developmental factors and non–sensory factors such as socio–economic and ethnic background, to the development of taste. These findings are useful in providing information on how taste develops, and why consumers might prefer certain vegetables over others. Evidence of this nature will assist us in developing strategies to increase consumption of fresh fruits and vegetables.

2.3.13 Conclusion – summary of existing findings and critique of existing methods

As stated above, methodological difficulties limit the interpretability of many of the findings from the above–reviewed studies. However, it would appear that some interesting findings can be distilled. Firstly, the most commonly consumed vegetables are (in descending order of frequency): potatoes, carrots, tomatoes, onions, lettuce, pumpkin, cauliflower, cabbage, celery and broccoli. The most commonly consumed fruits (again in descending order of frequency) are: apples, bananas, oranges, grapes, strawberries, pears, rockmelon, peaches, watermelon and mandarins (Horticultural Research and Development Corporation, 1990; Curtis, 1995).

Consumers appear to have particular knowledge structures of various products. The work of Milgate (1994) shows that consumers group their product knowledge around a small number of predominant themes, such as taste, preparation and appearance, and from this it is possible to ascertain general views held by a sample of consumers. Finally, the actual word association responses, such as 'acidic', 'difficult to cut', 'spikey', 'juicy', and 'sweet' provided specific information on particular attributes

of importance to consumers. Importantly, these were not predetermined by the researcher, but were obtained from consumers in a non–directed, free–response context.

The preceding literature review demonstrates the emphasis that has been placed upon the survey and interview methods in eliciting consumer fruit and vegetable preference behaviour. Most of the above–listed studies have used either one or a combination of these two methodologies, while two studies utilised the diary method.

To reiterate my earlier statements on methodological limitations, it is the case that, while traditional consumer survey methods provide much useful data regarding consumer trends over a large cross–section of the community, are relatively lower in cost to conduct, and have a rapid turnaround of results, this type of methodology limits interpretability and generalisability of results. Quite apart from positive response bias and other subject–generated data contaminants (Oppenheim, 1966), the construction of surveys and in–depth interviews is typically driven by the researcher's preconceived views regarding what is relevant to consumer preferences (Marshall, cited in Reid, 1995; Oppenheim, 1966; Bennington & Cummane, 1996). That is, research ideas are typically fuelled by *a priori* assumptions regarding particular factors posited to influence the relationship of interest (Steenkamp, van Trijp & ten Berge, 1994). A relatively comprehensive body of fundamental, purely descriptive data from which to frame hypotheses regarding factors of possible significance is required.

2.4 Consumer research methodologies -- can these be used to investigate fresh fruits and vegetables?

The next section of this thesis contains a review of methodologies that have been applied in the area of consumer behaviour, and that comprise less directed forms (than those reviewed above) of gathering information regarding consumer knowledge of particular products. It must be noted that these methods have not been used to undertake fresh fruit and vegetable research (to the author's knowledge), with the exception of a

verbal protocol conducted by Owen (1996). The objective of this section is to further argue that many existing research methods, while less-directed than the survey and telephone interview, are inappropriate *in the initial stages of investigation* as they: (1) are developed in such a way as to direct the subject to concentrate on particular areas of knowledge, to the detriment of others; (2) assume the importance of particular attributes that have not been shown by previous research to be salient; and (3) are based on questionable assumptions regarding the nature of human knowledge acquisition and the manner in which this information is cognitively structured.

The following discussion will show that, depending upon the particular methodology employed, points (1) and (2) overlap to a considerable degree. That is, it can be argued that, by drawing the attention of consumers to predetermined *a priori* factors of possible importance, researchers are directing consumers to focus on a particular context, to the possible exclusion of others. For example, if a researcher asks consumers about the relative importance of price, and type of packaging, the consumer will typically think about the purchase context. However, the particular research used in a study will affect the degree of overlap in that, in some cases, consumers are directed to a particular context (purchase, for example), and are asked to rate the importance of predetermined categories of attributes, such as, 'When shopping, I prefer to choose my potatoes myself', whereas in other instances, the consumer is less directed, for example, 'when shopping, I choose potatoes because .....', to which the consumer freely responds.

Generally speaking, the (abovementioned) methods of eliciting factors important in the consumer decision process relate to *asking individuals more specifically about their knowledge base* of a particular object. This, in turn, can be obtained using a verbal protocol method (Murtaugh, 1984), focus groups, and other projective methodologies, such as sentence completion tasks. A word association variant, such as perceptual mapping (Green, Wind & Jain, 1973; Steerkamp et al., 1994), in which the task is relatively unstructured, can also be used. These comprise methods of attempting to record thoughts and ideas at a fundamental, descriptive level.

2.4.1 Free–response methodologies in consumer marketing

The Verbal Protocol

In the verbal protocol, the consumer delivers a running commentary of their thoughts and feelings as they actually make a purchase decision. This is interspersed with conversation with the researcher relevant to the purchase, and sometimes recording of the subject's overt movements (Murtaugh, 1984). It provides information that is 'less susceptible to problems of rationalisation and retention' (Countiss & Tilley, 1995, p. 88), and provides relatively comprehensive data (Countess & Tilley, 1995). In addition, the verbal protocol method allows explanations of consumer behaviour at several levels and perspectives: psychological, sociological, anthropological and economic (Countiss & Tilley, 1995).

A limitation of the method is that, due to the time–consuming nature of recording and analysing data, small samples are typically obtained (Countess & Tilley, 1995, Murtaugh, 1984). In addition, the consumer is led, to a certain extent, as they are aware that the researcher is interested in thoughts and ideas related to purchase behaviour, which might limit information to that deemed to be relevant to a purchase context. In this respect, the verbal protocol is a structured (as opposed to an unstructured) methodology (Green, Tull & Albaum, 1988). Finally, respondents may 'edit' their responses in order to deliver socially acceptable responses to the researcher. It must, however, be remembered that the verbal protocol is not constrained in its use to the purchase context and, when used in a variety of contexts relating to fresh fruit and vegetable purchase, consumption, and perception, can provide interesting and informative results.

Focus Groups

Focus groups are a projective method in which a group of individuals is interviewed regarding an area of research interest. Projective methods are said to work because they provide information that is 'gut–level'. They also provide information unique to particular consumers, including needs, motivations, and self–perceptions which are relevant to everything

they do (Green et al., 1988). However, as is the case with verbal protocols, the focus group methodology suffers from contextual limitations. That is, it is partially structured, in that the interviewer asks particular questions, and the consumer is aware *of the purchase context of the interview.*

It is also the case that particular group dynamics, such as groupthink and groupshift (Robbins et al., 1994, p. 446), discussed earlier, can influence contributions made by individuals to the discussion, and can affect the group decision process in several ways. When discussing fresh fruit and vegetable preferences, these tendencies towards groupthink and groupshift can distort the information obtained so that a representative and accurate dialogue is not achieved.

Other projective methodologies

It is also the case that marketing researchers utilise projective tests in order to elicit consumer views of various products (Green et al., 1988). This style of technique includes the third-person technique, sentence completion and thematic apperception tests. In the third person technique, a subject is asked to state the views of another person, such as a neighbour, an associate, or a friend. In sentence completion tasks, a subject is given the beginning of a sentence, such as 'good housewives use ....', and is asked to complete the sentence. In thematic apperception tests, a subject is shown a picture of an ambiguous situation, typically with one or more persons depicted in the picture, and is asked to assume the role of one of the persons. They are then asked to describe what is happening in the picture. In each of these methods, it is assumed that the subject will feel comfortable in projecting their own views into their answers.

These methods differ in terms of degree of structure in that the researcher is able to choose how 'freely' the consumer is to respond, by introducing levels of context. That is, the researcher can design the study in a manner that is context free, by not anchoring the discussion to a particular context. On the other hand, the researcher can introduce varying levels of structure, thus limiting the 'freeness' of the consumer's response. Given the embryonic stages of research into fresh fruit and vegetable selection, any research conducted would benefit from a relative lack of contextual limitations, thereby providing fundamental, descriptive data from consumers' knowledge structures.

A possible limitation of projective methods relates to the validity of data analysis. It has been suggested that projective methods can suffer from experimenter bias in data interpretation, because of the qualitative nature of responses. However, rigorous methods do exist for the analysis of qualitative data, which do provide explicit structures for analysis that preserve connections between categories and original data, and which can facilitate conduct of quantitative tests of significance on count data (NUDIST[2], Monk, 1983a and 1983b).

It is concluded that projective methodologies such as sentence completion tasks and thematic apperception tasks might prove useful in obtaining descriptive, relatively context–free data, provided that data analysis is methodologically sound.

Other free–response techniques, in which subjects are presented with a stimulus word or object, and asked about particular attributes or characteristics include perceptual mapping and means–end chain analyses (Green et al., 1973). A variant of this method is termed 'perceptual mapping', and this comprises an attempt *to derive attributes of a product* that are significant to a sample of consumers (Steenkamp et al., 1994). In this context, variants of the so–called attribute–elicitation method are commonly used (Steenkamp et al., 1994). Depending upon the research question, particular procedures are used to tap attributes of products that are salient to the consumer. In this respect, subjects are provided with varying levels of direction from the researcher, as was the case for the above–mentioned projective methods.

Predetermined attributes can be supplied by the researcher, and are subsequently rated by subjects (Green et al., 1973). Difficulties of using pre–determined attributes regarding fruit and vegetable preferences have been discussed previously. Alternatively, subjects are asked to record words associated with particular brands of product (Steenkamp et al., 1994). A methodological difficulty that exists in this respect is that these methods typically focus on particular brands and the respondent's attention is drawn to the notion of *attributes*. That is, the respondent is directed to responses dealing with attributes or brands and in this respect, the

---

[2] QSR NUDIST (1997)

attribute–elicitation method is researcher– or hypothesis–directed. For example, a consumer might be asked to consider which attributes are important when purchasing a product, or in which way(s), i.e., attributes, do particular products differ.

Means–end Chains and Laddering Techniques

Recognising that more traditional consumer marketing research has focussed primarily on product attributes, and that this emphasis limits our understanding of the decision making criteria that are *personally relevant to each consumer*, some marketing researchers use means–end chain analyses and laddering techniques in an attempt to model cognitive representations of knowledge of particular phenomena, that is, 'encoded representations of information in memory' (Kanwar, Olson & Sims, 1975, p. 122; see also Gengler & Reynolds, 1995).

Means–end chains involve an attempt to elicit consumers' product knowledge and value–related self–knowledge, and to determine the degree of congruency between these (Gengler & Reynolds, 1995). If the consumer links the product with important end goals or values, they are said to be highly involved in the purchase decision (Peter & Olson, 1996). In–depth interviews are typically used to elicit consumer self– and product–knowledge, and the laddering technique is used to order and model the data. The laddering technique was developed to gain knowledge about how product attributes are linked to values important to each consumer (Gengler & Reynolds, 1995).

Initially, attributes salient to consumers are derived in one of three ways: direct elicitation, free–sort task, or triad task (the latter involves comparing three brands of a given product in terms of attribute similarities and differences). Following this, and using the laddering technique, an interview is conducted in which the investigator attempts to link 'product attributes to more abstract consequences and values' (Peter & Olson, 1996, p. 99). Proponents suggest that, in this way, it is possible to determine the knowledge structure of a sample of respondents, by identifying links, or associations between levels of meanings (from the product level to the benefit level to the more abstract value level).

It is argued, however, that this research method introduces context effects. To elaborate, marketing researchers are interested in understanding consumer behaviour, and the focus of in–depth interviews and attribute–elicitation tasks is on purchase behaviour. Respondents are typically asked to think about what attributes are important *when purchasing certain products*, and this might constrain them in the sense of activating knowledge schemas relevant to a purchase context (Walker & Olson, 1991, Mulvey, Olson, Celsi & Walker, 1994). That is to say, this research format directs the consumer to concentrate upon certain categories of information, such as salient attributes, which might, in turn, lead the consumer to pay relatively less attention to other characteristics of possible importance, such as personal experiences (Epstein, 1994; Loewenstein, 1996; Fazio & Zanna, 1978; Bechara, Damasio, Tranel & Damasio, 1997; Vogel, 1997).

It is generally accepted that many cognitive processes are unconscious, and are not available to the conscious mind for the purposes of explaining to researchers what type of impact these processes might have on conscious reasoning (Epstein, 1994; Jaynes, 1990). Cook (1994, p. 7), for example, states that:

> *it is increasingly clear that the contents of our consciousness are determined by processes which are open neither to inspection nor control by us. Cognitive psychologists now tend to see consciousness as a kind of aide memoir - a blackboard onto which the results of intrinsically non-conscious computations are projected for inspection and action. Additionally, it is clear that much of our behaviour is driven directly by "cognitions" which are not conscious, and which are not capable of being made conscious.*

It is therefore unlikely that means–end chains and laddering techniques, which rely solely on the articulation of consumers' thoughts relating to a product, can tap all of the information that is likely to influence the purchase decision. It is also the case that respondents might edit their responses to give the researcher a logical and coherent response which might not accurately reflect cognitive processes that underlie their purchase decisions. Moreover, some researchers present consumers with predetermined concepts, derived from focus groups, and the difficulties associated with *a priori* assumptions have been discussed above.

Regarding the use of predetermined lists of attributes, there are also difficulties inherent in assuming a group of consumers to be homogeneous. That is, it cannot be assumed that consumers in the focus

group are sufficiently similar to warrant the use of a set of predetermined concepts. In this instance, a less structured manner of deriving concepts salient to consumers seems more appropriate. Therefore, the trade–off is between using research methods that are time–consuming (in–depth interviews with individual consumers which assume some degree of heterogeneity) as opposed to those that are less so, but that make certain assumptions that have not been empirically validated such as homogeneity (Gengler & Reynolds, 1995). Finally, the possibility of actually 'leading' the respondent through the depth interview is arguably the most problematic (Bennington & Cummane, 1996).

Therefore, although means–end chains are instructive in extending the research focus to an inclusion of information regarding consumer values, the focus remains on the object as a 'product', and the values that relate to this 'product' (thereby constraining the breadth of information obtained).

2.5 Summary – Chapter 2

Chapter 2 can be summarised as follows: (a) given our present state of knowledge regarding human knowledge acquisition, which prescribes the use of unstructured methodologies in the initial stages of research to obtain fundamental descriptive data, and (b) the embryonic nature of research into fresh fruit and vegetable preferences, it is suggested that the structured nature of methodologies utilised in existing fresh fruit and vegetable studies and traditional consumer research is inappropriate for use in fruit and vegetable research programs, at this point in time. That is, research should parallel the sequence of learning stages, and must therefore begin by capturing a comprehensive body of descriptive information which will provide data regarding the group of concepts that collectively comprise consumer knowledge of the nature of various fresh fruits and vegetables. This knowledge can then be used to hypothesise causal relationships, a stage of knowledge acquisition that takes the researcher beyond what is known about a product to investigate proposed relationships. As mentioned previously, one of the primary focuses of this thesis is to further investigate consumers' knowledge structures of fresh fruits and vegetables. That is, an attempt is being made in the present thesis to provide descriptive, fundamental data relating to fresh fruits and

vegetables. The above discussion has demonstrated the need to utilise a relatively unstructured research method, such as the word association method, to provide comprehensive data of this nature.

Chapter 3 – Cognitive information processing and its implications for fruit and vegetable research

The brilliant mathematician Poincaré was particularly interested in the manner in which he came upon his own discoveries. In a celebrated lecture at the Societe de Psychologie in Paris, he described how he set out on a geologic excursion: "The incidents of the journey made me forget my mathematical work. Having reached Coutances, we entered an omnibus to go some place or other. At the moment when I put my foot on the step, the idea came to me, without anything in my former thoughts seeming to have paved the way for it, the transformation I had used to define the Fuchsian functions were identical with those of non-Euclidian geometry!"

(Jaynes, 1990, p. 43)

3.1 Cognitive information processing

In Chapter 2, it was concluded that many existing research methods, particularly those used in previous fruit and vegetable studies may be inappropriate to use in the embryonic stages of any area of research wherein an effort must be made to provide fundamental, descriptive data. In this section of the thesis, a relatively unstructured research methodology, the Word Association Method, is posited as an appropriate methodology for gathering fundamental, descriptive data relating to fresh fruits and vegetables. Before introducing this research methodology, however, a discussion of cognitive information processing that is relevant to consumer knowledge structures is provided. A cognitive information processing theory describing a multiple memory model is discussed and evidence supporting these claims are evaluated.

3.1.1 Dual Coding Theory

Traditional consumer behaviour research focuses on consumer knowledge structures, which are the repositories of knowledge that individuals possess regarding particular objects. Various methods, such as perceptual mapping and means-end chain analyses are used to elicit these. The theory on which these ideas are based appears to assume a *unitary*

knowledge structure (te Linde, 1983). That is, it is assumed that consumers possess a particular knowledge structure, or conceptual system, relating to a particular product, and that this can be tapped using depth interviews and laddering techniques.

According to the 'common code' model (te Linde, 1983, p. 117), individuals possess a single conceptual system, which houses various concepts' meanings and associations. Because object knowledge is located in one conceptual system, the assumption is that different modes of stimulus presentation, such as line drawings versus pictures, will each activate this one system. Initially, the word or picture is recognised, and this leads to access of the conceptual system, which contains all information relating to a particular concept.

3.1.2 Multiple–Coding Theory

This is in contrast to the 'dual–code' system (Madigan, 1983, p. 80) in which it is assumed that individuals possess:

> *two separate symbolic systems, one specialised for dealing with verbal information and the other for nonverbal information. The two systems are presumed to be interconnected but capable of functioning independently. Interconnectedness means that representations in one system can activate those in the other, so that for example, pictures can be named and images can occur to words. Independence implies, among other things, that nonverbal (imaginal) and verbal memory codes, aroused directly by pictures and words or indirectly by imagery and verbal encoding tasks, should have additive effects on recall.*
>
> (Paivio & Lambert, 1981, cited in Yuille, 1983, p.80)

In this dual–coding theory, it is also assumed that each system is directly accessed by the corresponding mode of stimulus presentation and furthermore, that each system has access to information in the other system, but this operation takes time (te Linde, 1983). According to this dual system model, when an individual is looking at an object, for example, a banana, the visual image it produces is presented in one system and information relating to verbal descriptors is processed in a second system which is connected to the first but is a separate entity. If the

individual were to read the word 'banana', this would be processed first followed by access to a visual image of a banana.

te Linde (1983) further states that the two systems are interconnected at a referential level, so that presenting the word 'banana' to an individual will access an image of a banana, but moving from one system to another is time–consuming. From this dual theory perspective, it would be expected that qualitative differences (corresponding to information stored in each of these systems) in information accessed from these systems would occur and, further, that there might be a temporal sequencing factor involved. That is to say, given a task wherein an individual views a particular stimulus object and responds with any ideas and thoughts that come to mind during this process, successive bits of information gleaned might be qualitatively distinct, revealing an action whereby an individual is accessing both systems, but that access to one system is predominant, and that this action is dependent upon the mode of stimulus presentation.

Thus, in a task in which individuals list thoughts coming to mind when viewing a particular stimulus object, presentation of the word 'banana' would firstly access linguistic information, but that subsequent responses might reflect access of the other system (that is, later responses might relate to nonverbal, or image information). Conversely, presentation of a picture of a banana would firstly access nonverbal, or image information, but that subsequent responses might reflect access to the verbal, or linguistic system.

te Linde (1983) draws attention to neuropsychological studies which demonstrate faster access to information in the system corresponding to the mode of stimulus presentation. That is, when asked to make decisions about particular dimensions of an object, such as size and colour (which are presumably stored in the nonverbal system), presentation of the stimulus object in the nonverbal mode (i.e., as a picture, or image) led to faster reaction times than when the stimulus object was presented in non–corresponding mode (i.e., the word, or label of the object). These findings, which have been replicated consistently, provide support for the dual–code model, and work against a common–code model, which would not predict differences in response times for various modes of stimulus presentation, given that all information relating to a stimulus object is stored in one system.

Fazio and his colleagues (1993a) have conducted research demonstrating that presentation of a stimulus object as a high–resolution colour image leads to greater facilitation of the accompanying attitude than does presentation of the stimulus object lexically (as a word). This would not be expected if both visual images and lexical knowledge were stored in one common knowledge structure. The notion that qualitatively different knowledge is stored in separate memory structures is pursued in the present study, by utilising different modes of stimulus presentation for different individuals, and analysing the word association responses obtained under these different stimulus conditions for qualitative differences. Support for the dual–memory model would manifest itself in qualitatively different responses as a function of mode of stimulus presentation. This proposal is presented in more depth in a later segment of the thesis.

The above ideas focus on the content and storage of information, and are related to the ideas of Hammond (1996), Epstein (1994) and others (discussed below) in positing the existence of different forms of knowledge that deal with factual information, on the one hand, and experiential, or personally meaningful information, on the other.

Various cognitive psychologists have posited that individuals possess multiple memory systems, which lead to different types of information being stored in interconnected memory structures (Gabrieli, Fleischman, Kean, Reminger & Morrell, 1995 Nyberg, 1994; Tulving & Schacter, 1990). Generally speaking, it is proposed that one system contains information relating to the acquisition and use of factual knowledge (the semantic system), and the other contains information relevant to personally experienced events (the episodic system) (Tulving & Schacter, 1990; Nyberg, 1994). It has been further proposed that memory systems have three interacting subsystems (Johnson, 1983) relating to sensory, perceptual and reflective stimuli. The sensory and perceptual systems are said to deal with access, storage and retrieval of externally–derived experiences, whereas the reflective system deals with internally generated events, such as memories, and is used to draw inferences about and otherwise embellish externally–derived experiences. Although the above researchers describe multiple–memory systems in different ways, it is the case that each of them refers to a more complex memory system than is espoused by

the unitary-coding theorists. This multiple-memory system deals with qualitatively different information being stored in separate memory systems, or structures.

3.1.3 Broad introduction showing neuropsychological evidence of separate memory systems

Hart, Berndt and Caramazza (1985) have identified a patient with specific cognitive deficits that arose following a cerebrovascular accident. Patient M.D. shows large deficits in naming and categorising many fruits and vegetables, and this deficit exists across modalities (such as the visual and tactile modalities). M.D was unable to correctly name or categorise fruits and vegetables presented as line drawings, coloured drawings, photographs and the actual (real) object, although his performance with coloured drawings was superior to all other presentation modes. Furthermore, M.D. could correctly categorise items as fruits or vegetables when the name of the item was presented aurally.

The deficit is specific to fruits and vegetables, and provides evidence in support of theories, such as dual-processing theory, described above, which posit organisation of cognitive systems into particular categories. Furthermore, the finding that M.D. could correctly categorise aurally presented items provides yet more support for the notion of organisation of cognitive systems into particular (and perhaps independent) sub-systems, or groups, with lexical information, such as names of items, being stored separately to other information, both semantic and episodic. Although the findings of Hart et al. (1985) relate to only one patient, the authors draw attention to other studies that have found selective disruption of cognitive function following central nervous system damage.

This discussion relates to fresh fruit and vegetable choice in the following way: recent investigations of cognitive information processing, which are discussed in detail below, have led to the conclusion that the decision making process is influenced by factual and experiential knowledge and that, in many everyday decisions, individuals use a blend of these different types of information in a quasi-rational decision style. The work of neuropsychologists and cognitive psychologists, discussed above, is leading

to the construction of a template of the brain structures implicated in these processes, as well as a general theory of the way that knowledge is cognitively stored. It is only through a thorough investigation of these processes that researchers can begin to unpack the complexity of the decision making process.

According to Epstein:

> *multicoding theories....have impressive research support and may be relevant to a distinction between experiential and rational processing systems.*
>
> (Epstein, 1994, p. 712)

3.1.4 The relation of Multiple–processing to Decision Theory

As stated in the Introduction, contemporary decision theorists stress the need to view the decision process in a holistic manner, and their research points to the importance of a wide range of information that impacts on decisions, including 'information gathered using their five major senses as well as upon information reconstructed from their memory systems' (Cooksey, 1996, xi). Any attempt to capture consumers' fruit and vegetable knowledge structures should involve an unstructured methodology so that all information that is relevant to the purchase decision is obtained.

3.1.5 Contemporary Decision Theory

Hammond's ideas:

The work of decision theorists such as Hammond (1996) are relevant to the above ideas on dual–processing memory structures, in the following way. It appears that both decision theorists and cognitive psychologists are cognisant of the need to treat the information processing mechanisms of humans other than in a unitary fashion, as was the case for much of the twentieth century. Rather, these theorists are beginning to understand the complexity of the cognitive system, with its concomitant dependence on several types of information, including factual and episodic data. It would seem that researchers such as Tulving (Tulving & Schacter, 1990) and

Paivio (1983) are concentrating upon the specific mechanisms of information processing, including storage of, and access to qualitatively distinct knowledge. Decision theorists such as Hammond (1996) and Epstein (1994), on the other hand, focus on the cognitive system in a more global manner, and attempt to understand how the brain uses this qualitatively distinct information to make decisions.

To elaborate on the ideas of contemporary decision theorists, Hammond suggests that humans process information on a 'Cognitive Continuum' (1996) anchored at one end by pure intuition and at the other by analysis. Depending upon the task to be performed and the conditions surrounding the decision maker, an individual will use a cognitive process along this continuum. Hammond explains the Cognitive Continuum thus:

> *consider the behaviour of persons attempting to cope with a highly structured task, a problem in physics, say, or mathematics, that they expect to solve by analytical means. It is common to observe that problem–solvers proceed by trying an analytically derived solution, discovering failure, and, at that point, making a new attempt. When all analytically derived efforts fail, the subject's cognitive activity moves away from analysis to quasirationality; that is, the subject's cognitive activity begins to acquire elements of intuitive cognition. "Hunches" begin to guide behaviour; undefended, perhaps indefensible, ideas spontaneously appear and affect decisions about what to do. If the problem is so difficult that "hunches" refined by analysis fail to provide a solution, then the subject's cognitive activity will move far enough along the cognitive continuum to become predominantly intuitive; cognition may consist almost entirely of pictorial imagery..... But if the problem–solver finds that intuition provides an idea to be tested and is therefore sufficient to move him or her to an analytical mode ....., the subject may be said to move, not necessarily continuously or smoothly, from analysis through quasirationality to intuition and then back again to analysis. The path from the context of discovery to the context of verification is a cyclical one.*
>
> (Hammond, 1996, p. 193)

Elements of the information environment that influence cognition along the continuum include time pressure, confusing circumstances and information overload. Thus, an intuitive mode of cognition is likely to be induced whenever there is limited time to make a decision, the circumstances surrounding the decision are confusing and there is a great deal of information to be processed (Hammond, 1996). Hammond further suggests that information presented in pictorial form will induce

intuition, whereas verbal or numerical information induces analysis. His ideas are supported by research findings reviewed by Epstein (1994).

Hammond's ideas are valuable in understanding the ability of humans to process information both analytically and intuitively. Historical attempts to understand these processes have assumed an either/or view of intuition and analysis; that is, that when an individual is faced with a decision situation, they will behave either rationally or intuitively. These researchers have, furthermore, attached value judgements to these two forms of cognitive activity. Some have stated that intuition is best, whereas others have argued forcefully for the superiority of analysis (see Hammond (1996) for a comprehensive discussion of this debate).

Hammond refutes the superiority of one form of cognition over another, stating that, given sufficient time, individuals will 'oscillate' between analysis and intuition when making a single decision, and that both of these forms of information processing are necessary in everyday problem–solving. He states that 'quasirationality', which includes elements of both intuition and analysis is the predominant mode of information processing, and that it combines the best of both worlds: relative precision is gained from analysis, and generalisability (of the solution) occurs from intuition.

Hammond's ideas present a solid framework into which can be comfortably placed many current ideas relating to knowledge systems (presented below), such as those of Epstein (1994), Loewenstein (1996) and Damasio (1994) (who postulate the existence of two interacting forms of cognition, one rational, the other experiential or intuitive). As discussed below, although the terminology used by these authors differs, similarities in the ideas presented point towards a consensus relating to the relative actions of intuitive and rational cognitive processes. As is discussed in the following section, the work of these authors provides an holistic approach to human decision making which is compatible with the above–stated ideas of cognitive psychologists, such as Tulving (Tulving & Schacter, 1990) and Paivio (1983), who are interested in these processes at a finer level of analysis.

As discussed above, these deliberations are relevant to the present research in drawing attention to the limitations of a (pre–existing) unitary view of

human knowledge systems (which include knowledge of particular products), and the either/or orientation of researchers interested in understanding human judgement. The complexity of human information processing has only recently begun to be fully appreciated, and the onus now is on researchers to be cognisant of the dual–code perspective and Hammond's (1994) notion of a Cognitive Continuum, and to begin to research cognitive structures in more depth. If it is the case that humans utilise multiple information processing systems, and that the information contained therein has differential effects on behaviour, it is important for researchers to attempt to tap into these, and to measure, more precisely, their relative behavioural impacts. It is outside the scope of the present research[3] to investigate the latter proposal, rather efforts are made to tap qualitative and quantitative differences in word association responses that result from presentation of stimulus objects in particular modes. This research may shed light on the cognitive representation of information relating to fresh fruit and vegetable preferences. Respondents in the present research will be shown either (un)named colour photographs, (un)named black and white photographs, (un)named line drawings, or the name (without accompanying image) of various fruits and vegetables, thereby exploring the stimulus dimensions of colour, image versus lexicon (which translates approximately to non–verbal versus verbal stimuli), and stimulus complexity.

Contemporary Decision Theory - Epstein's ideas:

Epstein (1994) has reviewed multiple memory theory and decision theory and has, in addition, discussed supporting evidence for these views in his seminal article. Epstein (1994) discusses the notion of interactive modes of cognitive processing, the rational (a verbal–analytical, deliberative, rational process) and the experiential (a largely preconscious, nonverbal, automatic process based on experience and which is emotionally–laden). According to Epstein, individuals possess three conceptual systems: namely, a rational, an experiential, and an associationistic (1991). These

[3] Hamm (1988) has designed a categorisation system which can be used to trace the relative contributions of analytical and intuitive thought in decisions. Unfortunately, this system was not able to be used on data from the present study as Hamm's method relies upon coding of spoken–aloud, streams–of–consciousness thoughts that accompany decision makers' judgements, whereas many of the word association responses obtained in the present study were comprised of only one word, such as 'red' or 'crunchy'. It thus proved impossible to correctly code these truncated responses as being more or less analytical or intuitive.

systems constitute levels of awareness, and these, in turn, affect our feelings, behaviour and conscious thinking. The rational system operates primarily at a conscious level, and its actions are governed by socially prescribed rules of inference. The associationistic system is similar to Freud's unconscious system, and the experiential system is a relatively old system, due to its long evolutionary history (evolving over at least 7 million years), its direct link to emotions, suggesting a strong biological component, and its intractability relating to moderation by cultural training.

Epstein (1991) states that, by contrast, the rational system has been developed over a mere 5000 years, and that it has a lesser effect on everyday decisions and behaviours because 'it would be inefficient to be conscious of all of one's interpretive and decision making processes' (p. 7). That is, much behaviour is determined by preconscious cognitions that allow individuals to manoeuvre through life's course without continually bringing thoughts (cognitions) to awareness, thus allowing rapid assessment and decisive action.

An advantage of the rational system is that it is well suited to analysis and for evaluating long term consequences of particular decisions. The experiential system, by contrast, takes into account emotional consequences of decisions (thereby attending to possibly significant 'emotive' sources of data that are not considered by the rational system). This system appraises a situation according to certain feelings aroused (these are based on past experiences) – if the feelings are positive, behaviours are enlisted to enhance this state. However, if feelings are negative, behaviours will act to terminate it. Thus, these feelings influence both thoughts and behaviours in specific ways. Loewenstein (1996) discusses human decision making, and takes particular note of so–called visceral factors (emotionally driven ideas) that affect our behaviour. Loewenstein's ideas are described later.

According to Epstein (1991), the experiential system also affects conscious thoughts. The rational system can override the experiential system when there is a perceived conflict between the two. However, the experiential system will win out when the individual is not aware of any such conflict and also when the individual is under stress. Epstein states that 'it is important to note that the consideration here is of a distinction between

two cognitive systems that operate in parallel, and not between a cognitive system and a presumably noncognitive emotional system, which I do not believe exist' (p. 14). These two cognitive systems, the experiential and the rational, have been associated with left– and right–hemispheric functions, respectively (Fox, 1995). That is, the functions of these two systems appear to mimic the actions of the two hemispheres of the brain.

Evidence for the existence of these two primary systems comes from a number of sources. Fazio (1986) and Bargh and Chaiken (1992) have posited two ways of processing information, one that is purposeful and deliberative, the other being relatively automatic and heuristic. Fazio (1986) and Bargh and Chaiken (1992) propose a system whereby attitudes can be automatically activated. These authors state that, furthermore, 'attitudes can affect behaviour without any effort or intention on the part of the individual, that is, in a spontaneous, automatic manner (Bargh & Chaiken, 1992, pp 893–4). There exists much research support for this contention, namely through sequential priming experiments (Bargh, 1992; Bargh & Chaiken, 1992, 1993; Bargh, Chaiken, Governer & Pratto, 1992; Fazio, 1986, 1993).

In addition, Fazio has conducted a number of studies showing that there is a stronger attitude–behaviour relationship when a subject has had *direct experience* with the attitude object, which might be an instance of experiential knowledge affecting behaviour (Fazio, 1981). For example, in a study involving campus housing (Regan & Fazio, 1977; cited in Fazio & Zanna, 1981) it was found that the attitudes of students having direct experience with a housing shortage (which resulted in these students experiencing temporary housing before being moved into permanent housing) were more predictive of behaviour than the attitudes of students not having personally experienced the campus housing crisis. Furthermore, it has been shown that attitudes based upon direct experience with the attitude object are more accessible from memory (Fazio, Powell & Williams, 1989). Sappington et al. (reported in Epstein, 1994) also conducted experiments, the results of which showed that emotionally–based beliefs predicted subsequent behaviour more strongly than intellective beliefs. Reber (1993) also discusses implicit and explicit knowledge systems, which equate to experiential and rational systems, respectively.

The use of vignettes to determine when subjects will make irrational judgements (Miller, Tversky & Kahneman, cited in Epstein, 1994; and Epstein et al., cited in Epstein, 1994) shows that when subjects are asked specifically to make rational judgements, they can, but that these conflict with more emotionally–laden judgements. That is, when asked about the proper response, they admit that the intellectual one is more rational, but that they still prefer the experiential one.

Evidence also accrues from studies with non–human animals (Breland & Breland, 1961), which Epstein posits also act in accordance with an experiential system (1994). Breland and Breland have demonstrated that particular species, such as chickens, raccoons and pigs can be taught to behave in certain ways, in accordance with the laws of operant conditioning. However, when attempting to extrapolate these findings to non–laboratory settings, the behaviour of these animals diverges from that predicted by operant conditioning. That is to say, when a pig, for example, is taught to pick up coins and deposit them in a money box, it consistently exhibits this behaviour. However, after a prolonged period, it reverts to 'species–typical' behaviours such as 'rooting' the coin along the ground and continually dropping the coin, picking it up again and 'rooting' it along the ground. This type of behaviour is seen in pigs in natural environments, wherein they dig for foods in this manner.

In summary, many species can be taught to behave in a so–called 'rational' manner (that is, exhibiting a simple behaviour for which they are rewarded with food). However, this process is compromised by the emergence of 'species–typical' instinctive behaviours, which tend to override the stimulus–response learning process under conditions of stress and/or fatigue (Hammond, 1996). This finding would appear to conform to the notion, described above, of at least two memory systems, one which is rational and deliberative, the other being more automatic and instinctive. The findings of Tulving and others, described earlier, lends further support to this notion, in demonstrating the existence of separate but interacting memory, or knowledge structures that contain qualitatively different knowledge that pertains to factual, or semantic information, on the one hand, and episodic, or experiential/personally meaningful information, on the other.

Contemporary Decision Theory - Damasio's ideas:

This discussion on two interacting, parallel systems of information processing is directly relevant to the ideas of Damasio (1997), Vogel (1997) and Bechara et al. (1997), who posit the existence of two systems of knowledge, one that is largely factual, and which proposes response options and possible outcomes relating to these and applies reasoning strategies to the activated facts and options; and another, which contains information related to past, emotional experiences and the rewards and punishments attached to these behaviours. When faced with a sensory representation of a particular situation or object, it is thought that the latter (experiential) system is accessed prior to the former (factual) system, and that the information contained therein biases, or influences how information in the factual system is dealt with. The authors suggest that the ventromedial frontal cortices of the central nervous system are involved in storage of experiential information.

These conclusions were reached after extensive research with brain-damaged patients who experienced difficulty in making decisions. These patients appeared to lack the ability to, in the decision process, trigger the 'nonconscious emotional responses that normal people may register as intuition or a "hunch" ' (Vogel, 1997, p. 1269). In other words, a nonconscious, emotionally-oriented central nervous system mechanism, possibly processed in the ventromedial prefrontal cortex, which is responsible for guiding reasoning, is dysfunctional in some individuals, so that, when faced with several options in a decision task, they have no emotional guide as to which options would be better. Wrangham and Peterson (1996), in explaining why some individuals have difficulty in deciding which option is best, paraphrase Damasio's ideas thus:

> *their brains are unable to connect an emotional value to the intellectual menu of possible options. Without being able to feel which solution they like, they have no way to choose. These patients seem to demonstrate that pure reason is inadequate for reaching a decision, a hypothesis that Damasio applies to all of us. Reason generates the list of possibilities. Emotion chooses from that list.*
>
> (Wrangham & Peterson, 1996, p. 189)

The work of Damasio and his colleagues provides support for the existence of multiple memory systems, namely an emotional, intuitive system, and another that is factually–oriented, and that involves rational/analytic cognitive processes. The interaction of these two systems appears to mediate decision processes and, as Vogel (1997) and Bechara et al.'s (1997) research demonstrates, failure of the emotionally–oriented system to influence the actions of the factual system leads to sub–optimal decisions.

Contemporary Decision Theory - Jaynes's ideas:

In a similar vein, Jaynes (1990) suggests that the conscious mind is a relatively recent development in human history and that, prior to this, mental language did not exist, and initiation of action occurred via cognitive, or internal voices, believed by the individual to be externally–generated, instructing the individual on how to behave. These voices were interpreted by earlier civilisations as religious entities speaking to the individual. Jaynes interprets humans' predisposition towards introspection and problem solving, on the one hand, and intuitive, action–based cognitive processes in terms of influences of the right– and left–hemisphere of the central nervous system, and suggests that the right hemisphere, which is involved with creativity, non–verbal ideation, and spatial and pattern construction was dominant in earlier civilisations. The left–hemisphere, specialised for language, has only become an important influence on behaviour in more recent times. Jaynes' ideas are compatible with the ideas of Epstein (1994), Hammond (1996), Damasio (1996) and others in postulating the existence of multiple cognitive systems which underlie particular behaviours, and whose processes are not available for conscious consideration.

Jaynes marshals an impressive array of support for his theory, including a discussion of the notion that ideas, intellectual insights, and suchlike are not arrived at through conscious deliberation. Jaynes suggests that consciousness is not the seat of reason. That is, when individuals find a solution to a problem, it tends to burst into consciousness and we are at a loss to explain how this conclusion was reached. Jaynes (1990) describes the well–known anecdotes of: (a) Einstein's greatest ideas coming to him so suddenly while he was shaving that he was forced to move the razor blade carefully each morning lest he cut himself, (b) a well–known British

physicist stating that 'we often talk about the three B's, the Bus, the Bath, and the Bed. That is where the great discoveries are made in our science', and (c) Poincaré (reported in Jaynes, 1990) describing how his mathematical theories suddenly erupted into consciousness during a geological excursion. Similar examples are provided by Hammond (1996), who describes the cognitive styles of both Einstein and Richard Feynman, demonstrating their use of both intuition and analysis. It would appear that these great thinkers used both pictorial and analytical modes of cognition and that they were at a loss to explain the mechanisms of the former. This discussion relates to the present argument in highlighting the notion that humans may, in fact, possess multiple processing capabilities, and that the system responsible for some of the most brilliant ideas is not conscious, and not capable of being made conscious.

Contemporary Decision Theory - Loewenstein's ideas:

Loewenstein (1996) discusses the area of decision behaviour, and suggests that visceral factors influence behaviour. His theory relates to the observation that individuals frequently behave in a manner that runs counter to their self–interest. As stated in Chapter 1, an example of this phenomenon is the fact that individuals do not eat as many fruits and vegetables as their bodies require in order to maintain good health. This is despite the fact that industry and government–related health groups have inundated consumers with information relating to the health benefits of increased consumption of fresh fruits and vegetables, and most individuals believe that fresh fruits and vegetables are healthy.

Loewenstein (1996) suggests that, when individuals behave in a manner that is counter to their self–interest (addictions, and so on), that *visceral factors*, such as the craving for chemical substances to which they have become addicted, or the craving for food when hungry and liquid when thirsty, are at least partially responsible. He states that visceral factors entail:

> *a direct hedonic impact, ... and an influence on the relative desirability of different goods and actions. Hunger, for example, is an aversive sensation that affects the desirability of eating.*
>
> (Loewenstein, 1996, p. 273)

Loewenstein (1996) states that, furthermore, when the intensity of a visceral factor reaches a certain threshold, this will lead individuals to behave in a manner that is counter to their self–interest, even though they may be aware, at a conscious level, of behaving thus. For example, in many cases the craving for illicit sex will override rational, analytic considerations relating to the utility of this (self–defeating) behaviour, and the individual will find themselves participating in illicit sexual activities despite their awareness of the negative consequences that will follow.

This theory might help to explain the finding that traditional decision theories flounder in predicting behaviour from attitudes because they assume rational deliberation (that is, they emphasise 'cool' behaviour), rather than examining the effects of 'hot', emotionally–driven behaviour (Loewenstein, 1996, p. 274). That is, while individuals know at an 'intellectual' and rational level that continuing to take drugs will harm them, or that having unsafe sex has the potential for serious health risks, perhaps death, their behaviour in these contexts is driven by less rational, emotionally driven visceral factors.

Loewenstein (1996) states that the action of visceral factors overwhelms individuals temporarily, so that, while they are able, at an intellectual level, to envisage the negative effects of their actions, these ideas lack any visceral factor, and individuals therefore do not experience (in their imaginings) the full emotional impact of behaving in a manner that is congruent with their self–interest. That is, when we imagine how we will feel if we do not have sex with an acquaintance, this cognitive picture consists of a scenario that is not accompanied by the corresponding emotional state and, when contrasted with the emotion present when the craving for illicit sex arrives, the battle between acting in accordance with our self–interest and not acting in this manner is won over by the activation of visceral factors. That is, we decide to have illicit sex due to the existence of visceral factors urging us on, and the concurrent lack of emotion relating to how we will feel if we follow our consciences. These ideas closely resemble those of Hammond (1996), as Loewenstein (1996) is clearly alluding to the existence of two cognitive decision styles, one that is analytical and one that is intuitive.

As stated, Loewenstein's theory is congruent with that of Hammond (1996) but is also remarkably similar to the ideas of Epstein (1994), Bechara et al. (1997), and other theorists discussed above, in postulating the existence of two information processing systems, one that is rational, and one in which cognitions are driven by emotional factors (largely derived from past experiences). Specifically, Loewenstein's ideas on visceral factors temporarily overwhelming individuals (1996) are not unlike those of Damasio (1994) and Epstein (1994) in suggesting that an emotional system that is initially triggered in response to a particular stimulus object affects the subsequent functioning of a rational system, leading to certain information and options being explored at the expense of others.

These findings relate to the present research in drawing attention to the notion that researchers investigating consumer behaviour cannot continue to use (exclusively) models of consumer behaviour that do not encompass these purported multiple systems in their theoretical underpinnings.

3.1.6 Tentative convergence For Decision and Cognitive Theory

The conclusion to be drawn from the work of Hammond (1996), Fazio (1981), and Epstein (1994), as well as that of others positing a dual-processing cognitive structure is as follows: human knowledge is not only context specific, it derives from many sources and there is evidence to suggest that there exist at least two systems for processing this knowledge which, in turn, engender two behavioural outcomes: namely, knowledge which is influenced by emotionally-significant past experience, that is emotionally-laden, and is encoded in the form of concrete exemplars and narratives; and knowledge which is based upon analytical, conscious reasoning and is factual and relatively affect-free in nature. According to Epstein (1994, p. 714):

> *higher order organisms evolved in a manner that replaced instinct with a cognitive system that could efficiently organise experience and direct behaviour on the basis of learning from past experience. This system*

> *operates in a very different manner from a system developed much later that solves abstract problems by the use of symbols and logical inference. It is inconceivable that, with the advent of language and the capacity for analytical thought, the hard-won gains of millions of years of evolution were summarily abandoned. It can more reasonably be assumed that the same principles based on direct learning from experience that apply to non-human animal cognitions apply as well to human cognitions, wherein they influence and are in turn influenced by a newly acquired verbal-analytical rational system.*
>
> (Epstein, 1994, p. 714)

Epstein further states that, for responding to everyday events, the experiential system is more efficient than the more deliberative rational system. This idea is echoed by Hammond (1996), who states that humans will use a quasirational decision style, which contains elements of both analytical and intuitive information processing, in most everyday activities. The notion that a quasirational decision style is more efficient than a more purposeful, analytical style relates to Tversky and Kahneman's (1974, cited in Sears, Peplau & Freedman, 1988) theory of cognitive heuristics. Briefly, it was proposed that humans can process information in two ways – one is more deliberative and problem-solving focussed, and the other is referred to as cognitive 'heuristics' (p. 106), and that these are a short cut way of arriving at a judgement or inference using available environmental cues. These heuristics, or cognitive shortcuts 'allow us to make accurate perceptions rapidly and provide valid data for making predictions' (Robbins et al., 1994, p. 169). In essence, these shortcuts are extremely adaptable in assisting humans in manoeuvring themselves efficiently and effectively in an extremely complex external environment.

Humans use many heuristics in everyday life. Hogarth (1980) discusses these in detail, including the (a) 'availability' heuristic (wherein the frequency of well publicised events tends to be overestimated whereas the frequency of underpublicised events is underestimated); (b) the 'representativeness' heuristic (wherein information is matched to schemata already existing in memory, and congruence leads to the assumption that the particular instance is an example of the schemata); (c) 'anchoring and adjustment' (which involves making a prediction by anchoring on a particular cue or value, such as last year's sales, and then adjusting to allow for the circumstances of the present case (perhaps adding 5% to allow for inflation); and (d) 'selective perception' (wherein particular characteristics or features increase the likelihood that the object

or person will be perceived). These heuristics allow individuals to make inferences quickly and relatively cognitive–energy free. There exists a wide body of research support for these propositions.

However, heuristics are not always accurate, and it is the inaccuracies of this process that held the research attention of Tversky and Kahneman for so long (Hammond, 1996). Unfortunately, however, this emphasis on the frailty of human judgement provided a very bleak picture of decision making, and it was generally believed that humans were faulty decision makers in many instances. However, it appears that many psychologists have overestimated the effects of cognitive biases on human decision making. Hammond states that:

> *judgements mediated by perception (e.g., the visual perception of objects and events) have been found to be remarkably good but to become less so as judgement moves away from perceptual to conceptual tasks and materials. That is, perceptual judgements of physical attributes such as size and colour under a wide variety of conditions in the natural environment are excellent, but judgements and predictions about the behaviour of objects and events (people, weather, economic conditions) that are complicated by considerable irreducible uncertainty, as well as by conceptual confusion, are often far from accurate. The central feature of the correspondence theory of judgement is its emphasis – inherited from Darwin – on the flexibility of the organism in its adaptive efforts, its multiple strategies, its ability to rely on various intersubstitutable features – what are called multiple fallible indicators – in the environment.*
>
> (Hammond, 1996, pp. 109–110)

These ideas are similar to those of Epstein in positing the existence of an adaptive and generally accurate cognitive system that is used by humans in everyday life. Generally speaking, these ideas have been supported by a wide range of researchers (Hammond, 1996; Epstein, 1994).

3.1.7 Implications of contemporary decision theory for fruit and vegetable research

It seems clear that cognitive psychologists are converging on a notion of multiple memory systems which may: (a) contain qualitatively distinct information, and (b) be accessed via different modes of stimulus presentation. These issues are addressed in the present research in a straightforward manner, which is described below.

It is not yet clear what roles these cognitive systems play in consumer behaviour, but one can imagine the engagement of many elements in a decision context. The above discussion demonstrates the necessity of recognising the complexity of our knowledge structures and, as a consequence, elucidating conceptual information that is comprehensive and, most importantly, not limited to an exploration of traditionally accepted purchase decision factors, such as the purchase environment. That is, data is needed that reflects the complexity of our cognitive information processing systems. It is argued that orienting consumers to the purchase of 'products', which occurs in much traditional marketing research might conceivably activate information contained in one structure (factual, or rational) at the expense of another information structure containing, for example, experiential (emotionally–driven) information.

As an example, and related to point (b) above, asking consumers about their *purchase behaviour* regarding various fruits and vegetables is likely to produce limited information. That is, the consumer is likely to give a conscious, rational explanation for their purchase of particular products. Factors that are possibly relevant to the purchase decision, but that appear to the respondent to be only indirectly relevant, such as emotional responses to products arising from childhood eating experiences, or motives that relate to wishing to impress one's friends by serving exotic vegetables at a dinner party, are less likely to come to light. In other words, asking consumers (via interviews and surveys) about purchase behaviour is likely to activate the rational system (unless the interview is provocative in nature), and it is possible that researchers will learn little about the experiential system which, according to Epstein (1994), is responsible for many thoughts and behaviours.

Furthermore, and related to point (a) above, it is the contention in means–end theory and many other consumer theories that 'consumers learn to choose products containing attributes which are instrumental to achieving their desired consequences' (Reynolds & Guttman, 1995, pp. 11–12). This is based on the assumption that (a) consumers are aware of the range of motivations affecting their purchase behaviour, and (b) that they will behave in a rational manner in, firstly, learning stimulus–response chains and secondly, behaving in accordance with these.

As stated above, many established marketing research methodologies utilise a survey–based technique to elicit consumer motivations. However, it is the case that surveys, and variants of this procedure are limited to providing information that relates to the first level of motivation. That is, they provide information that is (a) a product of conscious mental processes – that is, people are necessarily aware of their thoughts and feelings regarding the issue, and (b) information that consumers are willing to disclose to the interviewer.

As an example, if consumers are asked why they purchase asparagus or artichokes, they might state that they provide an unusual and colourful addition to a meal, and taste good. These are motivations of which the consumer is aware, and feels free to discuss with the interviewer. However, the consumer might also have other motivations which they are unwilling to disclose to the interviewer, but which are nevertheless important for us to know.

Consumers might, in fact, buy these items as some form of a status symbol, that is, to impress their friends at a dinner party they are hosting. In this instance, both asparagus and artichokes might be seen as very fashionable vegetables that symbolise wealth and prestige. However, although this prestige motive is a legitimate motive that does influence the consumer, it is clear that this motive is not likely to come to the surface via a survey–based methodology, as most consumers would not feel comfortable in disclosing this information to an interviewer. Yet it is important that researchers are aware of these hidden motivations that are no less important in driving consumer preferences. In particular, positive response bias is a difficult problem to overcome when using surveys (Haire, 1950).

Furthermore, it is the case that, when consumers are asked to complete a questionnaire, the information they provide regarding their motivations is available to them at a conscious level. That is to say, they are aware of certain thoughts and feelings that they have toward a particular product, and it is these thoughts and feelings that they will discuss with the interviewer.

However, within the realm of unconscious knowledge, and in keeping with the ideas of Epstein, Jaynes and others, it is clear amongst

contemporary cognitive scientists that there is a great deal of knowledge that is stored and processed at an unconscious level, and it is this information that drives much of our behaviour. It is believed that the word association technique may be successful in eliciting this unconscious knowledge (Vicary, 1948). According to Szalay and Deese (de Groot, 1989, 824), 'word associations comprise a method of retrieving information regarding the stimulus object via links in the memory network and are *relatively pure indicators of the way human knowledge is mentally represented'* (my italics).

3.2 Use of the word association method in the present research

The difficulties related to access of relatively comprehensive information from consumer knowledge structures has been addressed in the present study by allowing consumers to look at an object and freely associate to it, in a relatively neutral setting (Oppenheim, 1966). That is, in the present research, consumers were asked to provide any thoughts/ideas that came to mind while looking at pictures and/or words signifying particular fresh fruits and vegetables. Respondents were not provided with any information that might suggest what the answer should be or indicate the researcher's own point of view, that is, respondents were not given any cues that might cause them to reflect on particular contexts such as the purchase decision, or health–related issues, and so on. This unstructured methodology is likely to produce more comprehensive knowledge structures, including information from both the rational and experiential systems. The word association technique is proposed as an appropriate methodology to use in this context, and is discussed in detail in a later section of the thesis. The word association method is ideal for accessing both experiential and rational systems, as thoughts obtained in this manner are not necessarily censored by rational thought. These consumer ideas are also unconstrained by contextual limitations, that is, the word association method encourages the flow of unconstrained ideas (Anastasi, 1988) whereas questionnaires and surveys tend to contextualise the topic, which may cause respondents to provide answers that pertain only to specific areas of thought.

The word association technique utilised in the present research, which simply asks consumers to look at the product and type into the computer

any thoughts or ideas that come to mind while viewing the product, without editing their responses, will allow an intensive investigation of the content of consumer knowledge structures, that is, memory systems.

Evidence has been presented above supporting the contention that qualitative differences in word association responses reflect information contained in each memory system. Paivio (1978, cited in te Linde, 1983) has argued that abstract semantic information is accessible by the non–verbal code, and that this is so because abstract information relates to properties of objects, rather than of words, and would thus be stored in the non–verbal system.

Cardello (1996) provides a review of studies supporting the notion that sensory modalities, such as colour, influence the action of other sensory modalities, such as odour, taste, and flavour. Briefly, when a subject perceives a food product, such as an apple, the colour of the object will affect the subject's ability to judge sensory products such as sweetness, intensity of flavour, flavour recognition, and odour.

This notion that different memory systems might be accessed using particular stimulus presentation modes is addressed using the word association method. It is suggested that the responses obtained in this relatively unstructured format might reflect the operations of multiple memory systems. That is to say, presenting groups of individuals with stimulus objects that differ with regard to cues such as colour and degree of realism, and analysing the corresponding word association responses for qualitative differences as a mode of stimulus presentation allows for an exploration of te Linde (1983) and Paivio's ideas (1983) that multiple memory systems are accessed using different types of stimulus object.

To elaborate, respondents' memory systems were tapped using the word association method. Using this free–response format, respondents viewed a stimulus object and recorded any thoughts and ideas that came to mind during the viewing process. Stimulus objects (fresh fruits and vegetables) were presented in various modes (that is, the stimulus objects differed in aspects of dimensionality, such as texture and colour) to respondents. Some respondents saw colour photos of fruits and vegetables, some saw black and white photos, some saw the word representing the stimulus object, and so on.

Essentially, the word association responses of individuals from each of the seven different stimulus presentation modes were studied with a view to determining if qualitative differences in responses are evident. As discussed earlier, qualitative differences in word association responses can be interpreted as evidence for multiple memory systems, since, if all memories are held in one memory system (the unitary, or common code view (te Linde, 1983), differences in modes of stimulus presentation should not influence the quality, or type of information accessed from this one system. However, if different modes of stimulus presentation access qualitatively distinct ideas, or knowledge, then it is reasonable to assume that this knowledge, or information, is stored in particular memory systems, access to which is facilitated by certain modes of stimulus presentation. Of course, asking respondents to provide their responses in a written format (as is done in the present research), rather than verbally or non–verbally produces constraints of its own; respondents might not report the full gamut of responses available to them because it is more difficult to write them down (or type them into a computer) than it is to verbalise the response. This limitation has been noted by the author; however, for the purposes of the present research, written reporting was used and the limitations of this type of reporting have been borne in mind when interpreting the data obtained in this manner.

3.3 Extrapolating from findings of other products

As discussed earlier, one of the objectives of the present thesis is to argue that many existing marketing methodologies are inappropriate for use in the early stages of research, because they introduce contextual limitations and posit the existence of salient variables that have not been substantiated via fundamental, descriptive data. As a consequence of this, an unstructured methodology such as the word association method is recommended for use in the initial stages of fresh fruit and vegetable research. However, before engaging in the task of obtaining fundamental, descriptive data relating to fresh fruits and vegetables, one final notion that must be addressed is this: if descriptive information relating to other food products exists which meets the above–mentioned criteria, such as being relatively free from contextual limitations and providing information relating to the effects of stimulus modality on access to

cognitively stored information, it might usefully be extrapolated to fresh fruits and vegetables, thereby allowing researchers to move directly to hypothesis generation and testing. That is to say, if there exists a body of fundamental descriptive data obtained during research for another product, such as fresh meats, or convenience foods, that is in addition, relevant to fresh fruit and vegetable preferences, then it would be advisable, on parsimonious grounds, to use this pre–existing information. This suggestion must be evaluated before one wholeheartedly accepts the need to use the word association method in this context.

Fruits and vegetables, along with other foodstuffs, are typically placed into the category of mundane, everyday consumption items. However, a careful examination of the similarity of fresh fruits and vegetables to other food products leads to the conclusion that pre–existing data related to other foodstuffs will not be relevant to fresh fruit and vegetable preferences, as it has been successfully argued that fresh fruit and vegetables constitute a unique category of foodstuffs (Owen, 1996). What follows is a discussion relating to the uniqueness of fresh fruits and vegetables, as products.

3.3.1 Uniqueness of fruits and vegetables

Notwithstanding the above discussion on contextual limitations, it is the case that the purchase context is important as it is in this context that consumers actually choose between products. The operation of choosing particular products involves an inspection of product cues, and this information is combined with a range of other cognitive information, leading to a purchase decision. It is in this regard that fresh fruits and vegetables can be categorised as a unique product class.

Product cues can be either extrinsic or intrinsic. Extrinsic cues do not deal with the physical properties of the product, but rather, comprise non–physical cues such as price, image, and so on. These cues can be supplied by the producer or seller in the form of labels and brand names. Intrinsic cues relate to properties inherent to the product (taste, nutritional content, and so on), and can be either hidden or revealed. Hidden cues reveal aspects of the product 'which cannot easily be physically identified by the consumer before purchase' (Pay, White & Zwart, 1996, p. 3), such as taste and

durability. Revealed cues, on the other hand, consist of attributes readily identified by the consumer by physically examining the product (shape, colour or size, for example).

Consumers use a mixture of these cues to determine which product they will purchase, based upon which attributes of the product are important to the consumer. If the important cues are revealed, the choice is relatively simple. The consumer merely examines products for the existence of these attributes, and chooses the product with an optimal level of desired attributes (although one must bear in mind that the decision process is complex and other factors are likely to impinge on the decision process – see Hammond (1996) above). However, if the important cues, such as taste, nutritional value and freshness are hidden, as is the case for fresh fruits and vegetables, extrinsic cues must be provided by the seller, typically in the form of labels, which imply the existence of these attributes.

Within the context of most durable and non-durable purchase items, including most foodstuffs such as coffee and biscuits, a label is generally an accurate guide relating to aspects of the product such as quality. The producer is able to exercise a high degree of control over the production process of these products, and can therefore guarantee a consistent level of quality. The label accompanying the product symbolises a particular level of quality. Therefore, if a consumer purchases a particular brand of coffee, they can be sure that hidden intrinsic cues such as taste and freshness will remain at the same level from one purchase occasion to another. In this way, labels are used by consumers as a cue regarding quality of product, including taste and freshness.

However, regarding fruits and vegetables, a label typically only provides information regarding variety and region of growth (Pay et al., 1996), which do not in themselves provide sufficient cues regarding hidden intrinsic cues. The reason that labels on fresh fruits and vegetables are limited in this respect is largely because of the producer's inability to control biological processes inherent in the product's growth, hence limiting their ability to control consistency of quality of product.

It is for this reason that consumers must turn to revealed intrinsic cues, such as colour, size and shape to infer the presence of hidden intrinsic cues, such as taste and freshness. With respect to fresh fruits and

vegetables, colour, size, shape and surface texture are important determinants of quality (Cardello, 1996). Tom, Barnett, Lew and Selmants (1987) provide empirical evidence attesting to the importance of colour in consumers' evaluation of product taste. Consumers expect particular foodstuffs to be a certain colour, and will rate products as tasting better if their colour is 'typical' of what the consumer associates with this product. For example, when food colouring was used to vary the darkness of the chocolate colour of instant pudding, consumers judged the darker pudding (which they considered to be richer) as more chocolatey, and better tasting. They judged the lightest colour pudding as being creamier.

Clydesdale and colleagues (a review of these studies appears in Cardello, 1996) have conducted an extensive series of experiments demonstrating that particular colours influence taste recognition, taste discrimination, taste intensity and taste thresholds. Other studies have found that children became physically ill after eating potatoes that had been coloured blue. The potatoes were harmless, but the atypical colour severely affected the children's evaluation of the product's taste, and resulted in nausea (Tom et al., 1987). Similar findings were noted by Wheatley (1973), with regard to a meal of steak, french fries and peas. Mid-way through a meal consisting of these foods, normal lighting was altered to reveal blue steak, green french fries and red peas. These changes in colour perception of the foods induced nausea in the subjects.

Cardello (1996) reviewed literature on the interaction of colour with odour, flavour, and taste, and it can be concluded from this evidence that extensive findings support the notion that food colour influences other sense perceptions of foods. Cardello suggests that it is the appropriateness of the colour which is a primary determinant of this effect. He states that inappropriate colours add 'an irrelevant dimension to the basic detection-discrimination problem', and that 'one plausible mechanism by which inappropriate colours have a negative effect on food acceptance is through the violation of cognitive expectations' (pp. 17–19). That is, consumers expect certain foods to have certain colours, and when they perceive foods that are inappropriately coloured, this disconfirmed expectancy influences the ability to perceive the taste and odour of the product.

It can therefore be supposed that, within the area of fresh fruit and vegetable preferences, inspection of revealed intrinsic cues, particularly

colour, will be a crucial process in the purchase decision. After all, these cues are the most accurate guides regarding hidden intrinsic qualities of the product (von Alvensleben & Meier, 1990).

It has been further suggested that humans are biologically prepared to look at the exterior of fruits and vegetables for nutritional cues regarding nutritional value, such as symmetry (which would imply less damage by insects and fungi and thus increased nutritional value, relative to fruits and vegetables exhibiting less symmetry) (Thornhill, pers. comm., 1993). Studies demonstrating that humans do find symmetrical objects more attractive lend support to this contention (Thornhill, 1993; Watson & Thornhill, 1994).

It can thus be seen that fruits and vegetables in the purchase context do, in fact, comprise a relatively unique set of products, specifically because of the paucity of cues available to evaluate the product. As stated, it must be recognised that, because of the lack of quality assurance available due to the relatively unprocessed nature of fruits and vegetables, that the purchase context is likely to be important as it is at this time that consumers will evaluate products (at least partially) on the basis of *revealed cues*. This is not likely to be the case for various other products, such as coffee and biscuits, as the brand provides some measure of quality assurance and inspection of the physical properties of the product is unnecessary. Therefore, shopping for fresh fruits and vegetables presents consumers with an atypical purchase decision, and the steps followed in other decision contexts, such as identification of brand, and so on, cannot be reliably used. Importantly, the evaluation of revealed intrinsic cues will provide the consumer with specific cues regarding the freshness and quality of a particular piece of fruit or a vegetable. Researchers must therefore build decision models specific to fruits and vegetables, and part of this process will comprise identification of product attributes, or cues, that consumers use to evaluate fresh produce.

It is suggested, therefore, that when Stage One (Simple Apprehension) data is being obtained for fresh fruits and vegetables, physical cues via visual presentation of the product will feature predominantly, and when ordering this mass of data, a specific category relating to physical properties will emerge.

3.4 Summary of Chapter 3

Chapter 3 can be summarised as follows: due to the embryonic stage of fresh fruit and vegetable research in Australia, it is important to obtain fundamental, descriptive data relating to consumers' fruit and vegetable knowledge structures. It is suggested that the word association method is an appropriate research methodology for gathering data of this type and that, when this free–response data is sensibly ordered and subjected to a form of data analysis that allows for tests of significance to be undertaken, the information thus obtained is extremely useful in providing both descriptive information, and in searching the data for differences in word association response as a function of personality and/or demographic differences.

In Chapter 3, it was stressed that contemporary decision theorists appear to be converging on a theory of human decision making wherein two interacting modes of cognition, analytical and intuitive, work together to form a 'quasirational' (Hammond, 1996) decision style that is used in most day–to–day situations. It was stated that attempts to understand consumer decision making could benefit from a consideration of these contemporary ideas, as traditional views are likely to focus on analytical modes of cognition, thereby presenting a narrow view of the decision process.

The idea was postulated that responses obtained using the word association method provide information relating to the cognitive representation of knowledge structures relating to any object of interest. It was suggested that word association responses from individuals in the present study can be analysed to shed light on the cognitive representation of ideas, particularly the notion that various modes of stimulus representation access qualitatively distinct cognitive structures. Moreover, it was concluded that fresh, unprocessed fruits and vegetables are a unique foodstuff, and that it is therefore important to gather descriptive, fundamental data relating specifically to these products, rather than extrapolating from descriptive data obtained for other foods.