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One little Lebanese cucumber is not going to break the bank: Price in the choice of fresh fruits and vegetables*

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This paper reports on empirical research into individual consumer behaviour in the context of fresh fruit and vegetable purchases. The discussion draws on research results from two studies conducted around the actual shopping process. The findings suggest that consumers' price response behaviour may not be consistent with that predicted by economic theory and that this could be significant at the aggregate level. The existence of 'acceptable price ranges' points to the presence of price thresholds within which consumers are relatively insensitive to price movements. Also of relevance is that the primary influence of the budget constraint may be at a broader level rather than at the level of choosing particular products.

1. Introduction

> 'The different emphases of the agricultural economics marketing and business management marketing traditions could be crudely characterised as follows: 'To agricultural economists marketing is mainly about prices while business approaches to marketing are mainly about everything except price.''
>
> (Malcolm *et al.* 2000, p. 2)

In a recent wide-ranging discussion of agricultural marketing approaches and issues, the authors of the above quote call for more collaboration between practitioners of agricultural economics marketing and business management marketing. They make the point that such collaboration would lead to a

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better balance of disciplinary knowledge capable of assisting in finding solutions to real-world agricultural marketing problems. One of their specific conclusions is that 'there is a case for a more analytical approach to business marketing, and for economic models that seek to explicitly deal with quality/market segmentation issues. There is scope for more interdisciplinary empirical research in this area' (p. 11).

These sentiments are of course not new. There have been calls in the traditional agricultural economics literature for a greater interdisciplinary balance in agricultural marketing research for at least 30 years (see for example Shaffer 1968). In this *Journal*, Piggott and Wright (1992) highlighted the value of insights from the business marketing literature in specifying models of meat demand. Yet, such collaboration remains rare.

In the present paper, the recommendation of Malcolm *et al.* (2000) is taken up and an empirical example of such interdisciplinary research is offered. The objective was exploratory. The purpose was to investigate actual shopper behaviour to assess the degree to which response to price as a product characteristic conformed or not with economic and marketing expectations. In so doing, the results of two studies are reported that examined individual consumers' perceptions of, and response to, price in fruits and vegetables in the shopping context.

Fresh fruit and vegetable choices are particularly interesting as detailed in the following text. The research was conducted over a 6-month period in Armidale in northern New South Wales, which is comparable in size, and scope of shopping outlets, to a suburban region in metropolitan areas. The focus is on individual consumers, the decisions made by these consumers prior to and during the shopping period, and the relative role of price and other factors in influencing these decisions. A particular emphasis is placed on the quality dimension (see also O'Keeffe 2000; Owen *et al.* 2000). The results obtained should be useful for the individual business in selecting and pricing various products, for industry organisations in designing effective advertising campaigns, for government agencies in defining health promotion strategies and the like, and for economic researchers in better modelling aggregate demand for these product groups.

The present paper is organised as follows. In the next section is a brief review of the relevant literature followed by an overview of the environment in which the research was conducted. The methods employed to examine consumers' characteristics and their choice behaviour in the context of fruits and vegetables shopping are then outlined. The remainder of the paper is a discussion of the results from the two studies and their implications for researchers and practitioners.

2. The fruit and vegetable choice context

Although the market characteristics and demand for fresh fruits and vegetables have been explored previously (Cox and Wohlgenant 1986; Carman and Pick 1990; Nelson 1991; Griffith *et al.* 1992; Asafu-Adjaye and Ritter 1995), choice at the retail level and in relation to the individual has received sparse attention. There have been some studies of retail demand using scanner data (Nayga 1992) but only a small subset of these have investigated a fruit or vegetable and none of these were undertaken in Australia. The principal source of research into consumers' preferences and demand for fruits and vegetables has been the Horticultural Research and Development Corporation (HRDC). However, price has not been a central focus in these studies and price response information is generally opinion-based (HRDC 1990). Hence, there has been little formal examination of how consumers respond to price in this product group.

Yet, fresh fruits and vegetables possess characteristics that set them apart from most manufactured and processed groceries, and which may have implications for the conduct of demand analyses and marketing programs. They are subject to quality and price variability that is unrelated to competitive influences, and their constitution is such that they can provoke strong sensory responses in consumers. Also, the quality of many fruits and vegetables is difficult to determine at the time of purchase, which increases reliance on sensory evaluation and introduces an element of risk into the purchase that cannot generally be overcome with experience. This adds to the uncertainty of consumer purchases and suggests that consumers' choice processes may be quite involved at times.

However, this view needs to be tempered against the fact that most fruits and vegetables are inexpensive relative to other consumables, and are purchased frequently. Observations of consumers' purchases of standard grocery items indicate they exhibit little conscious attention in choice. For example, Dickson and Sawyer (1990) report on a study that observed 800 supermarket customers purchasing four common grocery products: coffee, toothpaste, cereal and margarine. Of these, approximately 42 per cent spent 5 seconds or less at the product category and 85 per cent handled only their chosen brand. Only when the consumer encounters an unexpected stimulus such as a change in a key attribute, do product attributes or alternatives become salient (for example price or quality). Alternatively, consumers may develop simplifying heuristics or 'rules of thumb' to minimise the cognitive effort required for choice. Hoyer (1984) interviewed 120 laundry detergent consumers immediately following their purchase and examined their reasons for choosing an item. In 91 per cent of cases a simple tactic was given such as 'cheapest', 'on sale', 'works well'. In another example, Inman *et al.* (1990) simulated a grocery-shopping

environment and found that for a significant number of subjects a promotional signal alone was sufficient to induce purchase, whether or not the price reduction was significant. Whatever its form, the heuristic is designed to reduce effort and/or uncertainty (Hoyer and Brown 1990).

Of course, the manner in which consumers respond to price and other attributes of fruits and vegetables will be also contingent upon individual preferences and circumstances (Lichtenstein *et al.* 1993). Demographic factors such as age, sex, and profession can be significant to the breadth and specificity of preferences (Owen 1997). Personality and demographic factors interact with product attributes and experience to determine consumers' beliefs and perceptions of a product, and the weighting given to different evaluative criteria. Wierenga (1983) argues that choice is determined by these factors and immediate budgetary or other situational factors such as time and usage context. In short, a large number of potentially conflicting influences can effect consumers' price responsiveness in this product group, and with little prior knowledge to go on, a research strategy focused on the individual consumer is required.

3. The shopping environment

The typical food demand study assumes a context where there are consumers with generalisable socio-economic profiles who demand a product (group) that is characterised by a price and quantity series and other variables such as seasonal or quality dummies where appropriate. These consumers face some income constraint, and have unobservable search costs and preferences that determine their choice behaviour. However, within these constraints they are considered to optimise the value of their purchases.

However, consider the actual context in which the consumers in the research area of this study shop for fruits and vegetables. At the time the studies were conducted there were seven outlets for fruits and vegetables in the centre of the city, all within a 500-metre radius. Each had distinctive features but carried approximately the same range of produce. In most cases consumers were offered more than 100 different products to choose from and one product might be available in five different varieties (for example, apples or cucumbers). In terms of pricing, all seven outlets offered some combination of specials on a weekly/daily basis and employed several pricing methods. Prices of products were ticketed by the kilogram, per item or a fixed number of items (five kiwi fruit for $1.00), and a single product could be priced by weight at one shopping incident and by the item at another (e.g., rockmelons).

Adding further to the complexity in prices for this set of products is the substantial price and quality variation that can result from seasonal and

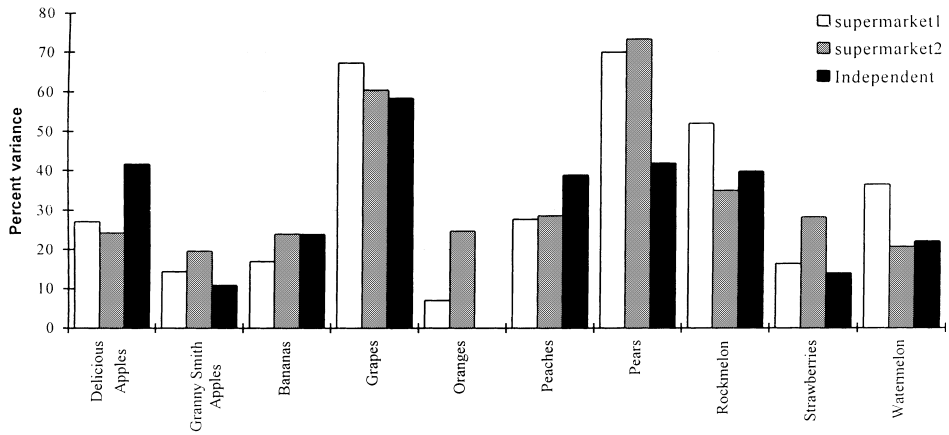

Figure 1 Price variation for selected fruits for the period January to March 1995 ($C = (\sigma/\mu)*100$)

other supply-side factors. This can create uncertainty in consumers about the true value of products and is heightened by the fact that quality and price are not necessarily correlated.

When these factors are combined with quality management and retail competition the result can be considerable price variance over time and across outlets. Figures 1 and 2 illustrate the extent of price variation that consumers encountered in the study area over a 3-month period (January to March 1995).[1] The figures provide the coefficients of variation for a selection of fruits and vegetables across three of the seven outlets. The average variance is in the vicinity of 20 per cent of the mean price. By contrast, the price variance for instant coffee and margarine for the same period was less than 10 per cent of the mean, and these are considered to be high promotion grocery items by marketing researchers.

Also evident from the figures is that outlets do not necessarily follow one another's prices, and this is particularly the case for the independent store. In fact, in any week consumers could significantly reduce the overall cost of purchases by shopping between different outlets. The average saving obtainable by shopping in this manner was 15 per cent but was as high as 26 per cent in some weeks. Clearly, though, shoppers bent on optimising the value of their purchases must be prepared to put some effort into the exercise.

[1] These prices were collected systematically over the period by the senior author, since published data at this level were unavailable. Although this period is not necessarily representative of price movement throughout the year, it is indicative of the overall price characteristics for the product groups.

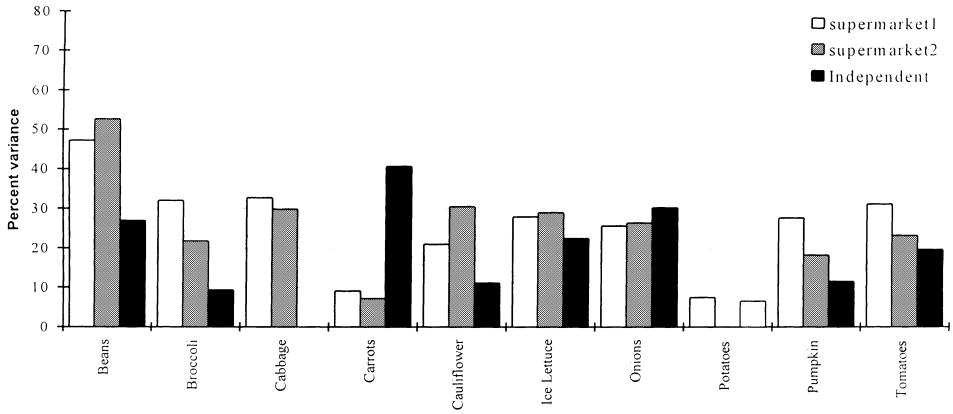

Figure 2 Price variation for selected vegetables for the period Jan to Mar 1995 ($C = (\sigma/\mu)*100$)

4. Research methods and sequence

The objective of the two studies reported in the following text was to determine how individual consumers navigate this complex price environment. The first study sought to identify consumers' perceptions of different fruits and vegetables and the affect of these perceptions on price sensitivity, while controlling for individual characteristics. In the second study, choice processes themselves were examined to determine the prevalence and role of price in actual choices.

4.1 Price awareness by consumers

To determine the prevalence and principal determinants of price awareness in choice, the first study used a regression model to analyse post-shopping survey data. The survey was administered to a random sample of 175 shoppers on completion of their shopping at a local fruit market. The research was conducted over 4 weeks, on all days of the week and covering all opening hours. Immediately following their shopping, participants were first asked to provide price recalls on a maximum of six items that they had purchased. They then completed questionnaires on their perceptions of pricing characteristics, product attributes and product uses, and were also given a take-home survey that comprised a set of consumer measures and further product attitude questions.

The model for estimating price awareness had price recall employed as a proxy dependent variable. This measure does not indicate whether price was a determinant in choice but it does indicate a form of price knowledge and,

therefore, awareness (Dickson and Sawyer 1990; Monroe and Lee 1999). Price recall was initially coded in four intervals, with '4' = full recall, '3' > 20 per cent, '2' ≤ 20 per cent, and '1' = could not recall the price (Wakefield and Inman 1993), but subsequently collapsed into just two categories 'could' and 'could not' for ease of interpretation.

The selection of independent variables for the equation was based on the evidence of their influence on price as outlined in the economics, marketing and physiology literature. Three consumer-specific variables were defined – gender, income and a self-reported measure of price consciousness. The last was a measure adapted from Lichtenstein *et al.* (1993) which used responses to six statements designed to reveal attitudes that underly the degree of mindfulness of product price.

Four key context variables have been shown in past research to affect choice and, by extension, attention to price: usage context (Wierenga 1980; Ratneshwar and Shocker 1991); varietal preference (Alavoine *et al.* 1990; Brumfield *et al.* 1993); quality (Eytan 1990; Brumfield and Adelaja 1991); and price level and variance (Berkowitz and Walton 1980; Biswas *et al.* 1993).[2]

Usage contexts can be specific to the product or more general and can also imply different purchase volumes. In terms of price sensitivity, the price of a single lemon is likely to be less significant relative to the consumers' need for the item. Conversely, a need for 'greens' increases scope for substitutes, and 'oranges as a staple fruit' suggests a volume that can prove costly. Quality can affect price sensitivity through its grading and variation. The more variable and less transparent is quality, the greater the concern with value. Finally, where a product has several varieties, the presence or absence of varietal preferences will have a bearing on price sensitivity. Thus, the net role of price for the consumer may be the outcome of a set of offsetting or reinforcing factors.

To capture usage contexts, consumers were asked to categorise a purchased product according to whether it was a staple in their diet, purchased for variation, a treat, or as a sidedish/basic household item (e.g., garlic, lemons). The latter three usage contexts were effects coded against 'staple'. In relation to quality variation, participants answered questions on whether the product's quality tended to be consistent and if it was easily assessed at point of purchase. Varietal options for each product were simply those available from the shop over the survey period. Finally, to capture the effect of price variance, price specials were noted for each product that was purchased by a participant and price variances were estimated from prices collected just prior to and over the survey period.

[2] These are a small sample of the references available. See Owen (1997).

Table 1 Results for the price-awareness model – Price recall

Variable	Coefficient	Standard Error	b/St. Er.	$P[\|Z\| > z]$	Mean of X
Constant	−2.178	0.467	−4.667	0.0000	
Sex	0.370	0.246	1.508	0.1315	0.871
Price consciousness	0.429	0.946E-01	4.540	0.0000	3.956
Special	0.010	0.234	4.319	0.0000	0.386
Price	−0.543	0.152	−3.569	0.0004	0.593
Mean					
Absdiff between actual and mean price	−0.138	0.255	−0.539	0.5898	−0.132
Variance	−0.708	0.393	−1.801	0.0717	0.351
Quality consistency	0.421	0.170	2.474	0.134	0.536
Basic	0.870E-01	0.563	0.556	0.5780	−0.383E-01
Variety	−0.394	0.173	−2.284	0.0224	−0.113
Treat	0.358	0.284	1.259	0.2080	−0.284
McFadden $R^2 = 0.109$					

Results

A total of 145 shoppers provided complete data for a total of 705 observations. The chosen regression method was a binomial logit model to be able to handle the categorical nature of the dependent variable.[3] The results of the equation are outlined in table 1.

The equation has a low goodness-of-fit measure, however the maximum likelihood estimator used here is chosen to maximise the joint probability (i.e., likelihood) of observing the data rather than to maximise fit (as it is in the classical regression case).[4] Further, the proportion of correct predictions is near 90 per cent and the results seem quite robust in terms of signs and significance of the explanatory variables. The probability of price recall (price awareness) increases with price consciousness when there is a special, and when quality consistency is perceived to have decreased. Price consciousness is the most significant consumer characteristic, and the more price conscious the consumer the more attention they pay to price during shopping. Gender is only weakly significant while income is not significant and was omitted from this equation. The special status of a product has been shown to be a significant positive cue to purchase (Inman *et al.* 1990), and perceived quality

[3] Hierarchical Regression Analysis models (Cohen and Cohen 1983) were also estimated but are not reported here. Interested readers should consult Owen (1997).

[4] There is Monte Carlo evidence suggesting that very few pseudo-R^2s accurately measure the proportion of variation in the latent variable that can be explained by the regressors (Windmeijer 1995).

inconsistency is also positively associated with price recall. Thus, the more quality inconsistent a product the greater the attention to price.

The probability of recall decreases with increasing price variation, when the purchase is for variety, and when the price of products is lower. As the price variance of a product increased, the ability of consumers' to recall the price diminished. Another measure of variability 'difference between price-paid and mean (in absolute terms)', is not significant. This result is consistent with earlier research that showed that where substantial price variation is the norm, a given difference between price-paid and the 'normal' price has a relatively small impact on probability of recall (Gabor and Granger 1964). The significant negative correlation between recall and variety may be due to the fact that consumers are looking at a number of products (e.g., range of greens) and therefore they might find it harder to recall the price of the one they purchased. Or, it might indicate that price is not an issue in this type of purchase. Of the other usage variables, 'treats' was positively associated with recall and suggests that price awareness is implicit in the construct 'treat'.

A similar regression was run with an alternate measure of price awareness – whether a consumer used a 'reference price' or not (table 2). That is, whether or not a consumer had a price in mind that they expected to encounter at the point of sale (Winer 1986, p. 251). The equation predicts the probability that the respondent references a price quite well (85 per cent correct) but yields an unacceptable proportion of false positives (only 40 per cent correct in predicting no use of references).

There are also slight differences from the price recall model. Respondents are more likely to reference price when they are price conscious, when the item is on special, and when there is high variance in the price of the product.

Table 2 Results for the price-awareness model – Reference price

Variable	Coefficient	Standard Error	b/St. Er.	$P[\|Z\| > z]$	Mean of X
Constant	−2.772	0.539	−5.146	0.0000	
Sex	0.220	0.285	0.772	0.4401	0.868
Price consciousness	0.810	0.112	7.217	0.0000	3.965
Special	0.740	0.321	2.304	0.0212	0.384
Mean price	−0.186E-01	0.169	−0.110	0.9124	0.593
Absdiff between actual and mean price	−0.503	0.431	−1.167	0.2430	−0.130
Variance	0.200	0.445	0.450	0.6530	0.351
Quality consistency	0.482	0.203	2.374	0.176	0.536
Basic	0.963E-01	0.181	0.531	0.5955	−0.337E-01
Variety	0.173	0.208	0.833	0.4048	−0.111
Treat	−0.542	0.308	−1.758	0.0787	−0.283
McFadden $R^2 = 0.139$					

They are less likely, relative to staples (oranges, apples, etc) to reference price when the item is purchased as a treat or for a sidedish (included under 'treat'). Generally, the latter were small purchases.

4.2 Price in actual choice decisions[5]

A shortcoming of post-purchase surveys is that they do not capture consumers' behaviour at the time of purchase, therefore price information is only available on those products purchased. Another shortcoming is that the context in which price enters the choice process cannot be determined nor can its significance to the outcome. In the second study, choice processes themselves were examined to determine the salience and role of price in actual choices.

The method employed to do this was verbal protocol analysis. The collection of verbal reports has become an increasingly popular and accepted method for examining participants' cognitive processes (Ericsson and Simon 1993). Verbal reports have been collected during actual shopping expeditions to examine consumers' information acquisition and the decision processes they employ in grocery shopping (Bettman 1970; Payne and Easton Ragsdale 1978; Murtaugh 1984). Some protocol analyses have been reported in the traditional agricultural economics literature (e.g. Countiss and Tilley 1995).

In the present study, verbal reports were collected from 24 consumers shopping for fruits and vegetables. The sample was drawn from the university, city and a local church. The participants were asked to follow their normal shopping pattern and to verbalise their thoughts into a small dictaphone that they wore around their neck as they shopped. Prior to commencing the shopping expedition participants were given precise instructions for their verbalising (Ericsson and Simon 1993) and a brief warm-up exercise.[6] During their shopping, a researcher followed at a distance noting for each product whether the shoppers looked for a price, and whether an item was purchased. On completion of their purchases, 14 of the participants completed the post-shopping survey questionnaires used in the first study, and in the same sequence.

Once collected, the verbal reports from the 24 shoppers were segmented according to a comprehensive categorisation scheme based on choice-level

[5] This broad area of study has been called 'retail anthropology' by Underhill (1999). A retail anthropologist '…studies the behaviour of shoppers in supermarkets and stores. He watches them, counts them, times them, follows them around and videotapes them.' (Gittens 2001, p. 1).

[6] The warm-up exercise is outlined in Ericsson and Simon (1993) and requires participants to count the number of windows on their house.

processes, and with particular emphasis on the role of price in choice. The scheme drew heavily on the encoding scheme proposed by Bettman and Park (1979), as well as the processes identified in the Payne and Easton Ragsdale (1978) study of supermarket shopping behaviour. However, the final form of the codes was guided by the research objectives and the verbal reports supplied by the ten pilot participants. An example of the types of codes developed can be found in the Appendix.

The categorisation scheme included four broad groups based on the presence/absence of price references and the context of the price reference. The first included overall processes related to shopping tasks or the choice-strategies that participants followed. The remaining three groups were processes directed at specific choices. One group comprised statements where a product was immediately eliminated as a purchase option because of price, quality, preference, or other reason. The second group comprised choices in which price did not feature and, the third and primary focus, were choices in which price in some form was mentioned.

All protocols were categorised by the senior author, and a subset separately categorised by two independent judges to ensure consistency and absence of bias.

Results

The encoding resulted in a total of 658 revealed choice processes. Of these, 20.5 per cent were task related (e.g., 'I need a brown paper bag for the mushrooms') and a further 5.8 per cent were choice strategies that were concerned with the participants' purchase plan, or with procedures or rules in relation to the purchase or consumption of specific products. These were particularly valuable in illuminating participants' underlying shopping philosophies and were a key element in identifying the three consumer groups (price-indifferent, value-conscious and price-based) that are used in the following tables. The specific nature of these groups is discussed later in the present paper.

The frequencies of processes across the three choice-related categories are summarised in table 3. Total eliminations of products from the choice set represent 33.2 per cent of choice-related processes, with 'other' the major contributor. These mostly comprised unelaborated rejections such as '*plums … no*' or indicated an absence of need for the product (generally because of current stocks). A pattern in shopping processes that often occurred was clusters of eliminations that indicated a form of mental shopping list using product cues. More price-sensitive participants also appeared to use price as a cue for sorting which products would or would not be considered for purchase. Although they could be as brief as '*apricots …*

not at that price' (this was particularly the case where price seemed to be employed as a cue), price-based eliminations generally took the form of the following statement: '*Bananas $3.99 no … we may go to the other place I think*'. Price-featured and non-price choices were more thoughtful processes than eliminations. A participant might consider a product's quality, compare it with possible alternatives, think of their particular needs or evaluate its price vis-a-vis its overall value. The percentage of choice processes with reference to price (in some form) to total choice processes was 45.7 per cent. The low prevalence of price-featured choices is consistent with Payne and Easton Ragsdale (1978) and with several studies that have elicited choice strategies in post-purchasing questioning (Hoyer 1984; Cobb and Hoyer 1986).

The context of non-price choices is summarised in table 4. Among the value and price conscious consumers, 'need for a product' and 'varietal preferences' were prevalent in choice. In all instances the product was purchased, and in 38 per cent of quality-based choices and 60 per cent of needs-based choices the volume was small (i.e., two tomatoes, one avocado). Of the need-based purchases, 81 per cent were associated with statements indicating that the purchase was to avoid the risk of running out of the product, was required for a specific purpose, or that it was one of those products which was handy to have in the house. The absence of price in these choices is consistent with the general evidence on lower-levels of price sensitivity in the presence of unique attributes (Marshall 1930; Hoyer and Brown 1990) and with the contention that consumers are less price sensitive when buying small volumes and/or 'basic' items. The presence of unique attributes may also explain the prevalence of 'favourite or treat' in non-price choices, which was contrary to expectations. In 87 per cent of these choices there was a strong focus on the pleasure derived from the product. However, it might also be that 'treat' carries an implicit 'expensive' connotation and it was this, rather than the price, that was the focus for consumers.

The choices of primary interest in the present paper are the price-based choices. The contexts in which price featured in a process are outlined in table 5. From the table it is evident that price attracts most attention when it is outside the expectations of consumers, or at least this is when it draws a response. Over 55 per cent of price references occurred when participants encountered an unusually high price or an agreeably low price (or special) i.e., 'sticker shock'.

Implied by the response to unexpected prices is that there is latent monitoring of prices that goes unarticulated. This is supported somewhat by the number of neutral references to price, which generally indicated price monitoring. In some instances neutral references had a positive or negative slant to the price reference but there was no indication that price was outside

Table 3 Summary of choice-related processes across participant categories

Participant group	Eliminations			Price-featured choices	Non-price choices	Total choice related processes	% price to total choices[a]
	Price	Quality	Other				
Price-indifferent (4)	–	4	20	1	44	69	2.0
Value-conscious (17)	15	20	81	115	128	359	46.8
Price-based (3)	10	3	8	31	5	57	83.7
Total	25	27	109	147	177	485	45.7

[a] Excludes other eliminations.

Table 4 Summaries for non-price choice processes

	Simple accept	Favourite or treat	Evaluate quality	Need a product	Compare alternatives	Attrib/varietal preference	Quality uncertain	Total
Price-indifferent	12 (27.3)	6 (13.6)	15 (34.1)	3 (6.8)	0 (0.0)	5 (11.4)	3 (6.8)	44 (100)
Value-conscious	12 (9.4)	24 (18.8)	34 (26.6)	31 (24.2)	6 (4.7)	17 (13.3)	4 (3.1)	128 (100)
Price-based	1 (20.0)	0 (0.0)	2 (40.0)	1 (20.0)	0 (0.0)	0 (0.0)	1 (20.0)	5 (100)
Total (percent/total)	25 (14.1)	30 (16.9)	51 (28.8)	35 (19.8)	6 (3.4)	22 (12.4)	8 (4.5)	177 (100)

Percentages in parentheses.

Table 5 Summaries for price-featured choice processes

	Unfavourable price	Favourable price	Neutral price reference	Quality uncertain	Diet variation	Compare alternatives	Total
Price-indifferent	0	1 (100.0)	0	0	0	0	1 (100.0)
Value-conscious	25 (21.7)	32 (27.8)	24 (20.9)	8 (7.0)	6 (5.2)	20 (17.4)	115 (100.0)
Price-based	8 (25.8)	16 (51.6)	2 (6.5)	(0.0)	1 (3.2)	4 (12.9)	31 (100.0)
Total (percent/total)	33 (22.4)	49 (33.3)	26 (17.7)	8 (5.4)	7 (4.8)	24 (16.3)	147 (100.0)

Percentages in parentheses.

the participant's expectation. For example: '*Always buy a few mushrooms … they're always handy … $4.99 a kilo … a fairly standard price*'.

A further 16.3 per cent of choices related to product comparisons. These were most frequent for tomatoes, potatoes, onions and apples (63 per cent of all comparisons) and were all, with one exception, made between different varieties (or packaging) of the same product.

The particularly interesting aspect of all these choices is the choice process itself. Following is a sample of processes which illustrate a range of contexts in which price was mentioned. In many of the processes there are compensatory trade-offs occurring. In the first and fourth processes, volume is reduced and alternative options are sought in response to an unfavourable price, but clearly the volume purchased and household need can override negative responses, as indicated in the second and third processes. In the 'Favourable price' category, price is instrumental in the purchase and/or volume purchased, and in processes seven and nine, price compensates for questionable quality. Finally, product comparisons were made generally when participants perceived several available choices or where price or quality prompted a search for alternatives:

Unfavourable price

1 '*And I'll get some gold squash … look at the price of gold squash … I said look at the price of gold squash … bloody gold all right, we'll get about one each … that'll do*'.
2 '*Oh, I'll have a lemon … I like to keep a lemon … Have one that's a bit on the green side … and then it might keep longer … How much are they? … Ooh they're dear … but that won't weigh too much*'.
3 '*Oranges. They're dear … but we have them every day for breakfast*'.
4 '*Um … onions … They're more expensive than usual … I'll see what the bagged ones are like*'.

Favourable price

5 '*Well first of all we'll take some of these because these are on special … [onions]*'.
6 '*Ooh what's over here? … Well they look nice … Nectarines, they're a pretty good price … I'll have a couple of those*'.
7 '*Carrots for juicing … They're really cheap so I'll get a lot … It doesn't matter what they look like because they're for juice*'.
8 '*The grapes look good and cheap … They look good from the outside, not from the inside … Okay, red and green are the same … But there's little things flying around*'.
9 '*Rockmelons … last time I had one it looked beautifully sweet and then it went horribly bitter in your mouth and you couldn't tell from the outside that*

that was going to happen … But these are well priced … I'll try that one … I'll give it a burl'.

Product comparisons

10 '*Umm, brown onions … let's see … white onions, no … brown onions keep longer … $1.49 a kilo unpacked … 1.5 for $2.69 … that's … a kilo and a half $1.50 plus 70 … hmm … they're dearer if they're packed, so I'll get the unpacked …*'

11 '*Umm … apples … there were apples out the front I think … What were they? … $2.40 a kilo … or $2.95 … I think I'll get the bigger ones … They're just a bit too small I think*'.

Of the 11 choices outlined above, price is the key determinant in eight. Of the 147 price-based choices, approximately 41 per cent were neutral or indifferent references to price, indicating monitoring or habitual behaviour. Among the other price-based choices, in 73.5 per cent of choices price was instrumental to the choice. In the remainder, price concerns or favourable prices were overridden by other factors such as quality or need. Thus, while price may have been relevant in 47.5 per cent of choices, it was instrumental (that is, not dominated by other considerations) in only 19 per cent.

The final aspect that was examined in the second study was whether price recall was a reasonable indication of price awareness. Price recalls were requested from 14 of the participants. In total, 67 recalls were collected on choices where the participant had mentioned price, seven of which were for products that had not been purchased. The small number of observations precludes statistical analysis but does provide some interesting results. Participants recalled price with accuracy in 58.2 per cent of choices, which is slightly higher than the 46.6 per cent result in the first survey but could be attributed to the greater focus on the shopping task. Price-based participants had substantially higher recall than the sample average (84.6 per cent) and recall was highest across the sample where participants encountered a particularly favourable price (62.5 per cent) or where price comparisons (69.2 per cent) were made. These results indicate that consumers' price recall underestimates their attention to price. However, they also suggest that price recall may be a useful indicator of instances where price is instrumental, or at least highly relevant, to choice.

5. Discussion

The results outlined highlight two significant influences on consumers' attention to and use of price in choice. First, it appears possible to categorise

Table 6 Consumer profiles

Group	Income level	Purchase behaviour	Key focus
Price-based	low	Pre-shopping price searches, extensive price checking	Best price (given reasonable quality)
Value-conscious	all levels	Wide use of strategies and heuristics to ensure value	Global value maximised
Price-indifferent	medium-high	Shop at most convenient location, purchases based on needs and preferences only	Minimise effort of shopping

consumers into distinct groups that differ significantly in their approach to shopping and the manner in which they attend to price. That is, it seems possible to identify different groups of consumers in terms of their overall orientation to shopping for fruits and vegetables. Similar profiles have been found by Dickson and Sawyer (1990) and Lichtenstein *et al.* (1993). The second area of influence comes from consumers' knowledge and perceptions of product attributes and the shopping context and how they use these to allocate their attention and effort in an efficient manner.

5.1 Consumer profiles

The frequencies of choice processes reported in tables 3, 4 and 5 suggest that the three consumer groups have vastly different levels of attention to price. However, the groups were primarily based on distinctions in patterns of shopping behaviour and personal characteristics, as well as the frequency with which price featured in the choice processes and the manner in which it was used. The character of each group is summarised in table 6.

The small group of priced-based consumers constantly attended to prices and all had young families and operated under tight budget constraints. However, this alone was not sufficient to distinguish them from participants with similar income constraints. The particular distinguishing feature of this group was the presence of explicit shopping strategies related to price scanning. There was an element of challenge and pride in their knowledge of specials and their ability to reduce their weekly grocery bill; a characteristic of what Lichtenstein *et al.* (1993) termed 'price mavenism': '*I've been reading the papers so I've had a look and seen what specials are on … these weren't advertised but they're here so that means I'll get some … I'm also shopping for an aunt as well so I get her things as well when they're on special because I'm here*'.

At the other end of the spectrum was an equally small but quite distinctive group. Consumers in this group were at medium to high income levels and

perceived themselves as 'busy people'. Their choices reflected particular consumption needs or responses to quality changes. The common element was a wish to get through the shopping process as quickly and painlessly as possible. Their shopping location was based solely on convenience rather than a combination of convenience and value, as was the case for other consumers.

In between these groups were consumers for whom price was relevant in some purchases but not in others; these represented the majority of consumers and are also the most interesting of the groups. This value-conscious group comprised all income groups and ages. Some were single households, others couples or families. There was no common element in the occupations of these people nor in the apparent time they had to devote to shopping. In short, they could not be distinguished from the other groups on either objective or measurable criteria. What they did have in common was a shopping style. Participants in this group were not willing to expend energy searching for the 'best' price, but nor were they willing to purchase without regard to price. Their solution was to rely on contextual cues and to employ various strategies and heuristics, both at a global and at a local level, to satisfy their concerns with price.

It is the value-conscious group which is of most interest in examining the contexts in which prices are attended to and, given their prevalence in the present sample, the group that most matters in relation to price effects.

5.2 Heuristics: the consumers' toolkit

Central to the definition of price-based consumers, were their specified strategies for shopping. The shopping strategy just quoted, and the various contextual cues evident in the choice processes outlined in the results, represent some of the heuristics that are employed by consumers wishing to ensure they receive value-for-money. Although heuristics are also employed by price-based consumers, it is with the value-conscious consumers that they are primarily associated. Their emphasis is on obtaining value-for-money but not in an optimal sense.

Global heuristics

The simplest of global heuristics is 'to buy acceptable specials', one which the majority of consumers used in both studies and which is taken to its limit for price-based shoppers. At a higher level, global heuristics revolve around shopping location and times. For example, the shop used for the post-shopping survey had a regular Thursday 'Happy Hour' where significant specials were added to the usual weekly specials. Many of the consumers interviewed on that day had deliberately organised their shopping to coincide

with this time as a means of ensuring at least some 'cheap' buys. Consumers also develop firm beliefs about the 'value' particular locations represent, as indicated in the following verbal report: '*Now in terms of bananas I like to get ones that are green because I know they'll go yellow almost straight away … [more detail on product], … let's have a look … I love the Banana Man because you know it's the … the bananas are so cheap … that's a good bunch … okay that's the bananas … I'll stick them under here*'.

Another common strategy employed by consumers is to use product and/or attribute cues to assist the shopping process. Noted earlier was the clustering of elimination statements in verbal reports. Sequences such as the following were typical:

1 '*I think we're right for celery*'.
2 '*Cabbage looks too pale*'.
3 '*We're right, we're growing spinach*'.
4 '*Zucchini*'.
5 '*Cauliflower looks too dear … although they do look nice*'.

1 '*Okay … I've got carrots*'.
2 '*And I've got broccoli at home*'.
3 '*I'm sorry … mushrooms … yeah … too much*'.

These patterns represented shopping strategies which employed product cues as proxy shopping lists. As the consumer moved through their shopping, 'mental ticks' were made against a shopping list. Of particular interest is the use of price as a cue in both statements. For one of the participants in the value-conscious category close to 50 per cent (10) of her eliminations were on price. Her explanation of this was that she used price as one attribute with which to eliminate potential purchases. In effect she was employing a price-determined consideration set. That is, she compared prices with a mental 'range of acceptable prices' and products that fell outside this range were simply not entertained (Monroe 1971). Although global constraints may manifest in certain products being consistently excluded, as posited by Piggott and Wright (1992), it would seem more likely that the decision rule manifests in an acceptable range(s) of prices which applies to sub-groups of products in general. For example, all 'fruits' or all 'greens' under $2.00, and in which 'blueberries' become a viable option when their price falls within this range.

The operation of 'acceptable price ranges' was evident across participants in the price and value-based groups. They were implied in a number of the processes outlined earlier (e.g., price monitoring, broad terms such as 'cheap') and is made explicit in the following process: '*Maybe a few peaches, they look*

nice …. Like these yellowy looking ones … Go for the yellow ones and mixed … $3.99 is my limit … If they go up to $4.99 I won't buy them. Not too many'.

Local heuristics

Local heuristics are those commonly employed in relation to specific products or product groups. For example, experience had taught most participants to check the price of seasonal products or of products where sharp price variation can occur. In one case, a price-indifferent participant made her only price check on a piece of cauliflower because she perceived it as a product where price 'could go through the roof'. Another technique was to develop choice strategies based on qualities of the products themselves, as in the case of the capsicum immediately below. Consumers may also compare some product varieties because they perceive little difference between varieties but not others because they see no substitutes, as in the third example below:

1 '*I'll have a small capsicum … It's got to be green … Green are always cheaper and green keep longer … Uhm*'.
2 '*And then … I always choose between zucchini and broccoli whichever one is the cheapest … broccoli $2.90 … cabbage $1.80 cut … caulies $1.40 … it's usually either broccoli or zucchini … what's zucchini $2.99 … quite expensive really … think I'll stick with the cauli … not too much … it's just for Sue and me … the kids don't eat cauli …*'
3 '*Want some capsicum … what price … I virtually never look at price until I get to something that I think that's of equal quality … green … yellow … the same … red … gosh they're all the same for once … usually red are very expensive … red looks nicer in the meal … see if it's nice quality … whether they're nice and crunchy … yeah that's a nice and crunchy one*'.

The heuristics outlined above are a few of the many that were evident in consumers' shopping and in their anecdotes. The wide reliance on heuristics highlights the efficiency of effort with which consumers deal with price. They utilise their environment as signals or cues (Bettman 1970) which have been learned over time, and they appear to allocate their attention on a 'need to know' basis (Jacoby *et al.* 1978). Thus, a consumer may organise their shopping to coincide with a Thursday 'Happy Hour' in the knowledge that at least some of their needs will be met by specials. During their shopping they may automatically turn to the green capsicums because these always represent good value, but they may well compare the prices of tomato varieties because this is a product in which relative prices change and, hence, so does the value they represent.

6. Conclusion

On the results of the recall frequencies and price-based choices outlined, it would appear that price is not a highly relevant variable in the in-store choice of fruits and vegetables for the study participants. It is mentioned in less than half of the purchase decisions observed in this study. Certainly this is the case if active and ongoing attention to price are the criteria by which we measure price awareness and responsiveness. O'Keeffe (2000, p. 2) agrees, stating 'in grocery, from the retailer perspective, price and value are virtually the same thing. The cheaper the jar of Nescafe the better value for the consumer. But not for produce. How many of us buy peaches and tomatoes just on the basis of price? Price, whilst important, is a declining part of the overall value equation for most consumers'.

However, to confine price's influence on consumers to such a narrow view is to underestimate its overall relevance in consumer choice. Consumers are clearly more imaginative and efficient than this as is evidenced by their use of global and local heuristics.

The findings of these studies are tentative but they are consistent with existing research on consumer behaviour in every-day purchases. The reduced price recall accuracy where products exhibited high levels of price variance is consistent with the evidence on threshold sensitivity provided by Winer (1986), among others. There were distinct differences in the manner of price sensitivity exhibited by the consumers interviewed, in particular, the price conscious and value conscious groups which, in their behaviour and verbalising, mirror the 'price mavens' and 'value conscious' shoppers categorised by Lichtenstein *et al.* (1993). While few of these findings are likely to come as a surprise to economists, the heuristics and consumer groups identified in this research point to undercurrents in demand that have implications for how demand response should be analysed. Economic theory assumes all consumers behave as the price-based group, yet this group was only a minor segment among consumers.

The existence of 'acceptable price ranges' points to the presence of price thresholds within which consumers are relatively insensitive to price movements. If these transfer to aggregate levels, resulting in kinked demand curves, then the price elasticities that are used to measure demand response may be highly misleading, and potentially costly for the policymakers and producers who heed them. An area for future research is to determine whether these price thresholds are prevalent at higher levels of aggregation. Also worthy of further consideration is the prevalence of the consumer groups identified in this research, and how important they are to the overall picture. Of particular interest is their apparent focus on time- and effort-saving rules of thumb in deciding where, when and how to shop for fresh

fruits and vegetables and how to deal with variations in quality. Until recently there has been inadequate data to examine these questions. However, the growing wealth of retail scanner data available for food demand research in Australia presents increasing opportunities to explore these issues relating to quality and market segmentation in the context of economic models (Malcolm *et al.* 2000).

For the marketing practitioner, these results should confirm the relevance of retail strategies that focus on overall value. At the same time the presence of insensitivity within price ranges points to the inefficiency of unnecessary exaggeration in price movements. Further, there are clearly usage characteristics which suggest that, no matter how low the price, demand is unlikely to increase unless the product is completely repositioned in the consumers' perceptions, and in some cases there will be no scope for this. And at the other extreme: '*I didn't look [at the price] and … you know, … one little Lebanese cucumber is not going to break the bank*'.

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Appendix

C8 Unfamiliar pricing, or price unavailable, prompts decision not to purchase.

C24 Uncertainty over preparation or timing of use. Decision to purchase because of favourable or acceptable price.

C25 Neutral or acceptable price, but uncertainty over usage timing, or need, leads to decision not to purchase.

C30 Concern over, or unacceptable price, overridden/traded for quality.

C35 Uncertainty over quality of a product countered by favourable price.

C34 Simple statement of price or neutral evaluation, but uncertainty over quality of a product results in no purchase, or reduced quantity.