Pricing Strategy and the Formation and Evolution of Reference Price Perceptions in New Product Categories

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Abstract

This study examines how pioneer and follower pricing strategies affect the formation and evolution of reference price perceptions in new product categories. It contributes to our understanding of pricing new products by integrating two important research streams in the field of marketing — reference price theory and the theory of pioneer brand advantage. This is the first research to address reference price effects for radically new product categories. Prior research has focused solely on products in existing categories, typically in fast moving consumer goods categories.

Using three experiments to causally establish the consequences of pioneer and follower pricing strategies on consumer perceptions, three critical research issues are addressed for the first time, consistent with calls for research in the literature:

1. Which reference price do consumers utilise in new product categories?
2. What is the role of consumer confidence in reference price for new product categories?
3. How do reference price perceptions form and evolve as a result of pioneer and follower pricing strategy?

In the literature, a frequently cited issue is the fragmented operationalisation of reference price perceptions. With little theory to guide researchers in terms of which measures should be used, experiment 1 provides new theory, finding as hypothesised, that fair price perceptions as opposed to expected price perceptions are more likely to be evoked by consumers for new product categories. Experiment 1 also finds that using consumers’ confidence in their reference price beliefs as an additional explanatory variable, does not improve over current reference price models. Overconfidence, a robust consumer behavioural phenomenon (Alba and Hutchinson 2000), might explain this result.

Prior research has made several contributions to understanding reference price perceptions in established product categories. However, not much is known about how these reference price perceptions initially form and evolve. Experiments 2 and 3 address this gap by simulating an emerging market and examining the role of pioneership in shaping reference price perceptions. Experiment 2 found the pioneer, due to its perceptual prominence, is able to define the reference price and subsequently define perceptions of value. That is, the value consumers place on a product and their intentions to purchase the product are about
the same whether the pioneer follows a penetration (initial low price) or skimming (initial high price) strategy.

Experiment 3 extends experiment 2 by examining what happens in the emerging market when a follower brand enters. The follower enters at a large or small discount to the pioneer, and the pioneer completes its penetration or skimming strategy, converging to a “regular” price. As predicted, the pioneer’s initial price frames subsequent price and value perceptions, signifying the importance of the pioneer as a referent brand. Lower initial prices *erode* value perceptions, whereas higher initial prices *substantiate* value perceptions. The follower’s pricing strategy does not have as much influence as the pioneer’s pricing strategy. Other findings from experiment 3 related to reference price theory in general. Specifically, there was strong evidence of an averaging process when forming reference prices. This adds theory to the measurement debate about operationalising reference price as some past price such as last price paid or some *average* of past prices. Experiment 3 also provides a further measurement contribution by supporting the use of brand specific measures of reference price, rather than category based measures.

More generally, because of the causal research design, this thesis provides strong evidence of the use of reference prices in consumer decision making: a key concern emphasised by one of the area’s seminal articles (i.e., Kalyanaram and Winer 1995), which stresses the need to provide evidence that consumers actually use reference prices, and not just act as if they do.
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Papers Published During the Course of this Research

Refereed Conference Proceedings


This work has not previously been submitted for a degree or diploma in any university. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made in the thesis itself.

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CHAPTER 1: INTRODUCTION: PRICING STRATEGY AND THE FORMATION AND EVOLUTION OF REFERENCE PRICE PERCEPTIONS IN NEW PRODUCT CATEGORIES

“If you really do put a small value upon yourself, rest assured that the World will not raise your price” Anonymous.

1.1 Pricing New Products and Reference Price Management

1.1.1 Pricing

Pricing decisions are widely recognised to be among some of the most important and difficult decisions firms have to make (Cressman 1997; Gijsbrechts 1993; Hawkins 1956; Monroe 2003; Nagle and Holden 2002). Those firms that understand the power of pricing and its role as a resource and strategic capability (Dutta, Zbaracki and Bergen 2003; Dutta et al. 2002) assert an important competitive advantage over those that do not. New product pricing decisions present a unique and difficult problem to managers though, and have been responsible for failed new product launches in numerous industries, including automobiles and automobile parts (Drucker 1993; Marn 1990), CD players (Marn 1990) and corn chips (Marketing News 1985), to name a few. In untested, radically new markets, where marketers have little understanding of demand, competition, consumer perceptions of value and consumer reference points, the pricing problem is even more apparent (Dean 1976; Dolan 1995; Nagle and Holden 2002). Thus, “It is essential to understand how customers perceive prices, price changes, and price differences”, as noted in Monroe’s (2003, p. 128) authoritative text on pricing. However, more often than not, price setting for
such goods is determined by hunch and rules of thumb with limited systematic research (Cressman 1997; Marbeau 1987; Monroe 2003; Nagle and Holden 2002).

One implication of this, bolstered by the relative ease of manipulating price relative to other marketing variables (Dutta et al. 2002; Holden and Nagle 1998), is that many products in the marketplace remain underpriced and do not accurately reflect a product’s worth to consumers (Marn, Roegner and Zawada 2003; Urbany 2001). As Nagle and Hogan (2006, p. 266) point out from the other main text in the field, “existing products are the primary reference point for future products...customers with a low reference price will frame the purchase as a loss, leading to greater price sensitivity and lower willingness to pay”. Thus, once consumers have been exposed to a low price, it is difficult to raise price as expectations have been formed, and a price increase will be viewed negatively by consumers, regardless of what they would have paid otherwise (Doob et al. 1969; Holden and Nagle 1998; Monroe 1973; Winer 1986). Yet the decision to initially price low, as in a penetration strategy, or to initially price high, as in a skimming strategy, is a common decision problem managers face for new products (Marn, Roegner and Zawada 2004, p. 108). The issue remains largely unresolved in the marketing literature despite its importance and the implications for consumer perceptions of value and expensiveness.

These points signify the importance of pricing decisions in general and for new products in particular, yet further imply the complexity of the pricing decision, the challenges that managers face, and our deficiency in understanding this area of research.

1.1.2 Pricing and Reference Points
The paradigm of viewing decision making as a response to gains and losses, as opposed to absolute magnitudes by the utility maximising consumer of economic theory (Monroe and Lee 1999; Pindyck and Rubinfeld 1998; Skouras, Avlonitis and Indounas 2005), stems from the Nobel Prize winning work of Prospect Theory (Kahneman and Tversky 1979) and
other complementary psychological theories such as Assimilation Contrast Theory (Sherif 1963; Sherif, Taub and Hovland 1958) and Adaptation Level Theory (Helson 1964).

In applied consumer behaviour studies empirical research generally confirms that the gap between what we think a product’s price should be and the actual price \(P_r - P\) of the product is a better predictor of behavioural outcomes than the price \(P\) alone (Kalwani et al. 1990; Lattin and Bucklin 1989; Rajendran and Tellis 1994). Therefore, the marketing perspective on pricing (Skouras, Avlonitis and Indounas 2005) focuses on this gap between the actual price and what is known as the reference price, otherwise coined transaction value or utility (Bearden et al. 1992; Grewal, Monroe and Krishnan 1998; Thaler 1985; Urbany et al. 1997) or “sticker shock” (Winer 1986). Thus, in marketing studies concerning price, researchers typically study value as two separate components: transaction value (TV) or the notion of getting a good deal, and acquisition value (AV) or the worth of the product to the consumer relative to its actual price (Bearden et al. 1992; Grewal, Monroe and Krishnan 1998; Thaler 1985; Urbany et al. 1997).

1.1.3 Reference Price Management and Pricing New Products
The implication is that longer term price management and its impact upon these value perceptions is arguably a more important objective than short term price management because past prices signal a product’s worth to consumers (i.e. TV) — it is the price history as well as the current price which consumers use to make purchase decisions (Slonim and Garbarino 1999; Winer 1986). These past prices provide consumers with a reference price — a price used to judge the expensiveness of a product. The implication is that setting the right price for a product early on in its lifecycle is especially important, because it will set the standard against which the expensiveness of the product is judged, which will constrain future price changes for that product and other products.
Therefore, not only is price management important but, relatedly, so is *reference price management*. This important distinction is alluded to in the most recent edition of Nagle and Hogan’s (2006) pricing text with a new chapter, “Pricing Policy: Managing Customer Expectations and Behavior”. Price management and reference price management are clearly interlinked but how this link manifests itself in the early stages of a product’s lifecycle remains little understood, with the focus of the majority of reference price studies concerning reference price effects in established product categories. How do reference prices form? Are value perceptions fixed or can marketers manipulate value perceptions by the price that is charged? How do reference prices evolve? How does pioneership and followership influence the formation and evolution of reference price perceptions? This leads to the broad research question of this thesis:

*How do reference price perceptions form and evolve in new product categories?*

This question is explored by developing and testing a theoretical framework of the formation and evolution of reference price perceptions and highlighting the implications for marketers. More specifically, this thesis proceeds by examining:

1. How should reference price perceptions be measured in new product categories?
   a. Which reference price do consumers utilise in new product categories?
   b. What is the role of consumer confidence in reference price for new product categories?

2. How does pioneership, followership and pricing strategy affect reference price perceptions?
   a. How do reference price perceptions form as a result of pioneer pricing strategy?
   b. How do reference price perceptions evolve as a result of follower pricing strategy?
1.2 Justification for the Research

Whilst the reference price literature stream is large and clearly important to the study of consumer decision making (Kalyanaram and Winer 1995; Mazumdar, Raj and Sinha 2005), the literature is constrained by:

- Limited understanding of the reference prices consumers are most likely to utilise for new products
- Limited testing of the effect of reference price confidence — particularly for new products when consumers are unsure how much it should cost
- A focus on reference price research in established and fast moving consumer goods categories
- A limited number of studies which address this problem area using psychological experiments.

Chapter 2 discusses the background and justification of these research issues. Broadly, this work extends thinking about reference price perceptions by taking a step back and examining how these perceptions initially form in new product categories. To date, no other study has examined how reference price perceptions initially form in the early stages of a new product category and then how they change as a result of market development. Indeed a recent, comprehensive review of the reference price research area (Mazumdar, Raj and Sinha 2005) focused entirely on existing product categories, as this is the context in which most research in this area has been carried out, partly because of the proliferation of scanner based data used to model reference prices.

Yet calls for such research have been made in the literature. For instance, Biswas and Sherrell (1993, p. 44) state that, “research should examine the influence of product knowledge and other factors on reference price estimates for products in the early stages of market penetration”. Likewise, other studies seem to focus on reference prices with no explicit analysis of competitive situations. As Hardie, Johnson and Fader (1993, p. 390)
point out, “Much of the current formal analysis of brand competition assumes reference independence. In light of our results, we suggest that an attractive research stream would be to develop formal analyses of competitive situations”. Industry articles also highlight the importance of this area of research. For example, Marn, Roegner and Zawada (2003, p. 42) state that, “the incremental approach often underestimates the value of new products for customers”, suggesting that it is important to understand how consumers attribute value to new products and that current pricing practice for new products is unsystematic and simplistic. By analysing these issues, this thesis makes the following theoretical and practical contributions.

1.2.1 Theoretical Contribution
This is the first study to systematically examine how reference prices form in the early stages of a product category. It contributes to marketing theory by integrating two important streams of research — reference price research and market entry order research — to provide a model of reference price formation and evolution. The research thus makes the following contributions:

- It determines which measures of reference price perceptions work best for new products as opposed to existing products.
- It provides theory about how reference price and value perceptions form and evolve in the initial stages of a market.
- It distinguishes between the relative effects of TV and AV upon behavioural intentions.

1.2.2 Practical Contribution
Based upon the theoretical framework used to examine the formation and evolution of reference price perceptions in new product categories, this thesis consequently gives guidance on managing these perceptions in the early stages of category development, both
for pioneer and early follower brands. This leads to the following practical contributions by providing:

- An understanding of how different pricing strategies affect reference prices and value perceptions
- Guidance on how different introductory pricing strategies affect behavioural intentions
- A practical and realistic method of assessing likely consumer reaction towards different pricing strategies for pioneer and early follower brands.

1.3 Method
This thesis uses an experimental method to test the effect of pricing strategies upon reference price perceptions. Other studies typically analyse reference prices by assuming they are a direct function of past prices. For instance, typical specifications for reference price might be last price paid, some weighted average of past prices etc. (Briesch et al. 1997; Niedrich, Sharma and Wedell 2001). Whilst such studies have made a variety of contributions, this paradigm of measurement is not useful for this study’s purpose. If we are to examine how reference prices form and evolve, particularly in new product categories where there are no price histories, implicit specifications of reference price will not help us. Instead a more direct approach by actually asking respondents what their reference price is (i.e. Garbarino and Slonim 2003) will be more useful than inferred measures. Again, the main purpose of this study is twofold: firstly to examine how reference prices form as a result of pioneership and pioneer pricing strategy and secondly, to determine how reference prices evolve as a result of follower entry. Such a situation requires constructing an appropriate environment to test these effects and this can only be done experimentally. Further, if this study is concerned with how pioneer and follower pricing strategies affect the formation and evolution of reference prices, confidence in the subsequent findings will be enhanced by carefully controlling other potential confounds.
The thesis therefore uses an experimental methodology to satisfy these objectives. In further justification studies with similar objectives use similar methods (i.e. Garbarino and Slonim 2003). Likewise, other studies have called for more experimental and survey research in this area. For instance, Chang, Siddarth and Weinberg (1999, p. 190) state “Laboratory and survey work could be used to uncover the mechanisms that consumers actually use to form reference prices in different product categories” and Rajendran and Tellis (1994, p. 31) argue “Experiments provide rigorous tests of the causes of reference price and are especially useful in developing theory”.

This thesis consists of two studies. Study 1 involves an experimental approach concerned with determining which reference price perceptions are useful for new products. Study 2, consisting of two experiments, is the main study in the thesis, and addresses the research question of how reference prices form and evolve in new product categories. These two studies are discussed in more detail below.

1.3.1 Study 1 — Measurement of Reference Price Perceptions

1.3.1.1 Experiment 1

Study 1 uses a 2x2 experimental design to compare two widely used measures of reference price for an innovative and existing product. This experiment is replicated across two different product categories, to enhance generalisability, forming eight experimental groups. Subjects were exposed to a short text description of a product in an emerging market, via a web based questionnaire, with random allocation to experimental conditions. Having been exposed either to the innovative or existing product, subjects were then asked a series of questions which differed only on whether or not they were asked about their fair price perceptions or expected price perceptions. Study 1 examines research questions 1a and 1b.
1.3.2 Study 2 — The Formation and Evolution of Reference Price Perceptions

Study 2 consists of two experiments which examine the formation and evolution of reference price perceptions in an emerging competitive market.

1.3.2.1 Experiment 2

Experiment 2 begins this analysis by focusing on the pioneer and its ability to define the reference price. It is a 1x3 experimental design replicated across two novel product categories to form six experimental groups. Respondents were exposed either to a high priced pioneer, representing a skimming strategy, a low priced pioneer representing a penetration strategy, or a pioneer with no price information to act as a control group. Subjects were then asked to provide their reference price estimates to determine how reference perceptions are shaped as a result of the pioneer’s initial price. Differences in reference price perceptions between groups based on price information were then compared and analysed.

1.3.2.2 Experiment 3

Experiment 3 extends experiment 2 by changing the price of the pioneer to further simulate either a penetration or skimming strategy — the price increased to a regular price to simulate a penetration strategy and decreased to a regular price to simulate a skimming strategy. Experiment 3 further extends experiment 2 by opening up the emerging market to a competitor — a follower brand at a discount to the pioneer. The effect of these changes to market prices and market structure was analysed to see how reference price perceptions evolved. The experimental design involved a 2x2 experiment replicated across the same two product categories as in experiments 1 and 2, and was counterbalanced to control for brand effects. This led to sixteen experimental groups. Apart from the product categories, the treatments varied in terms of pioneer pricing strategy (i.e. penetration or skimming) and follower pricing strategy (i.e. small discount or large discount to the pioneer). Similar
to experiments 1 and 2, subjects were initially exposed to a concept statement with a picture of the new product, differing in terms of pricing strategy employed by the pioneer. They were then told about how the pioneer’s price had changed and how a follower had entered the market. Respondents were then asked to provide their reference price perceptions and other information.

For internal validity, a variety of different experimental control procedures were implemented in all of the experiments, including manipulation checks (i.e. to ensure the treatments were perceived in the way intended), pilot studies (i.e. to determine measurable manifestations of the experimental manipulations), randomisation of treatments, counterbalancing (i.e. to control for brand effects), a distracter task (i.e. to erase short term memory effects) and measurement of covariates for statistical control (i.e. product category knowledge).

1.4 Analysis
Most of the analysis involved comparing means and correlation coefficients between groups using t-tests, ANOVAs and MANOVAs. Other techniques such as OLS regression were used to test basic model effects. Factor analysis and reliability tests, using Cronbach’s $\alpha$ were used for measurement validation.

1.5 Thesis Structure
1.5.1 Chapter 1 — Introduction: Pricing Strategy and the Formation and Evolution of Reference Price Perceptions in New Product categories
Chapter 1 presents a broad overview of the thesis, stating and justifying the research problem under investigation, the contribution this thesis makes, the method and analysis procedures used, and the thesis structure.
1.5.2 Chapter 2 — Consumer Decision Making: The Role of Reference Prices in Brand Choice
Chapter 2 introduces the concept of reference prices, drawing on theoretical work in psychology and behavioural economics. The importance of this theoretical framework, and relevance to consumer decision making, are then demonstrated with reference to the marketing literature. The literature to date is critically evaluated to highlight three important research issues in the reference price stream. These research issues are discussed and explicit directions concerning the research issues are presented.

1.5.3 Chapter 3 — Reference Price Perceptions for New Products: Conceptual and Measurement Issues
Chapter 3 is the beginning of study 1 and addresses research questions 1a and 1b identified in chapter 2. It begins to address these research issues by thoroughly examining literature in the area and presenting formal hypotheses to test.

1.5.4 Chapter 4 — Study 1: Method, Instrument Development and Pretesting
Chapter 4 presents the method used to test the hypotheses developed in study 1. An integral part of this study involves simulation and construction of an emerging market. The procedure used to do this is described and explained, and the results of pretesting are presented, to show how the instrument was refined for final testing.

1.5.5 Chapter 5 — Study 1: Analysis, Findings and Discussion
Chapter 5 presents the findings from study 1 with appropriate analysis procedures and discussion about the results. It shows how these findings are necessary to proceed and how they relate to the main study. Other findings from study 1 are also discussed.

1.5.6 Chapter 6 — The Formation and Evolution of Reference Price Perceptions in New Product Categories
Having validated the most appropriate measures of reference price to use for new products in study 1, chapter 6 begins to address the central research question of how reference
prices form and evolve in new product categories. In particular, chapter 6 expands upon the main research issue identified in chapter 2 and thoroughly analyses key literature from two distinct, complementary bodies of work in the marketing discipline — the reference price literature and the pioneer brand advantage literature. By integrating these two bodies of work, the research proceeds by presenting formal hypotheses for subsequent testing.

1.5.7 Chapter 7 — Study 2: Method, Instrument Development and Pretesting
Chapter 7 extends chapter 6 by presenting the method used to test the hypotheses generated for study 2. It provides further explanation of the data collection procedure, outlining the two experiments which make up study 2. It also describes and explains several pilot studies used to design the instrument and the pretests used to refine the initial instruments for testing in experiment 2 and experiment 3.

1.5.8 Chapter 8 — Study 2: Analysis, Findings and Discussion
Using appropriate analysis procedures, chapter 8 presents the findings from experiments 2 and 3 and discusses these findings to address the main research question.

1.5.9 Chapter 9 — Conclusions, Speculations and Contribution
This is the final chapter in the thesis and presents the main conclusions established from study 1 and study 2. It summarises the contribution of this thesis in the context of the relevant literature and addresses the research questions identified in chapter 2. It closes by assessing the scope and limitations of the thesis and offers directions for future research in this area.

1.6 Ethical Considerations
Because this research involves humans, ethical clearance was sought from the Human Research Ethics Committee at Griffith University. All ethical concerns highlighted by the Ethics Committee were adhered to and the research was subsequently approved.
1.7 Conclusions
The study of reference prices is an important and widely researched area in marketing. However, the research stream is limited by a reliance on research in established product categories with little regard to the role of reference prices in new product categories. This thesis addresses the broad problem area of pricing new products by integrating the reference price literature and literature in the market entry order domain to construct a theoretical framework for the formation and evolution of reference price perceptions in new product categories. It does this by presenting the results of three consumer experiments in two different studies designed to determine:

1. Which measures of reference price perceptions should be used in new product categories.
2. How these reference price perceptions form and evolve in new product categories as a result of pioneer and follower pricing strategy.
2.1 Introduction

Chapter 1 identified the broad problem area of pricing new products, justifying its practical importance and importance to theory. It also alluded to the difficulty of pricing new products, the ad hoc nature of pricing decisions and the limited systematic research in this area. Psychological explanations of consumer reactions to price and price promotions, such as reference price research, are widely cited in the marketing literature and offer a theoretical framework to contribute to our understanding of consumer perceptions and reactions to new product pricing strategies.

Consumers use reference prices to simplify the decision making process. Economic theory suggests that consumers evaluate price as an absolute magnitude, comparing it with product benefits to assess the overall utility of a purchase (Pindyck and Rubinfeld 1998). Economic models of consumer choice, whilst broadly useful are prone to the traditional limitations of homo-economicus or rational man. Instead, marketing models of consumer choice, grounded in psychological theory, suggest that a better way to explain choice behaviour with regards to price is to understand a consumer’s reference price. The reference price serves as a benchmark by which actual prices can be judged and compared to evaluate the worth of a product. This general proposition has been widely supported in a vast number of theoretical and applied studies of consumer response to price (see section 2.3). Yet research in the reference price field is limited by a focus upon understanding reference prices in established product categories, which leads to the research issues presented towards the end of the chapter.
Chapter 2 proceeds by outlining the theoretical framework attributed to reference price research, highlighting the importance of reference price research, and the contribution the research stream has made to understanding the link between price and behaviour. The second part of the chapter concludes with a critical analysis of the gaps which exist in this literature stream. These research issues set the research agenda and provide the structure and subsequent chapters of this thesis, which address these limitations.

2.2 The Economic Theory of Price and Consumer Choice

Neoclassical theories of consumer choice assert that consumers seek to maximise utility in consumption and are able to maximise utility in consumption, with price having a direct inverse relationship to utility. Consumers seeking to maximise utility is not an unreasonable assumption to make but consumers being able to maximise utility is somewhat more unrealistic. For a consumer to be able to maximise utility they must be rational beings in an economic sense and must possess perfect information about the relevant costs and benefits of different products (Pindyck and Rubinfeld 1998). By possessing such information consumers can then accurately compare the costs of acquiring the product (generally price) with the benefits obtained from acquiring the product to determine the utility of the purchase. Consumers then choose the purchase which maximises utility. See Monroe and Lee (1999) and Skouras, Avlonitis and Indounas (2005) for detailed reviews on the distinction between pricing research in economics and marketing.

Consumers do not have accurate information about the costs and benefits of different products though and often do not even have the time to attempt to increase the accuracy of their information about products. As a result, in many situations consumers use heuristics to simplify the purchase decision (Harvey 1998; Tversky and Kahneman 1974). One such heuristic is a reference price — an internal standard or external signal against which the
actual price of a product is judged. For instance, “I paid $50 last time and now it is $60. Wow, this product is expensive” (an internal standard) or “Wow, 50% off. What a bargain!” (an external signal). The comparison of price to an internal or external reference price then leads to positive or negative feelings towards the purchase depending upon the direction and size of the discrepancy to actual price.

2.3 The Contribution So Far: Reference Prices and Consumer Decision Making

2.3.1 Reference Points: The Theory of Reference Prices
The role of reference points in consumer decision making is of crucial importance to marketers because consumers make decisions on the basis of points of reference, not absolute magnitudes. One important application of this theory is with prices (Monroe 1973; Winer 1986). The theory of reference prices stems from Adaptation Level Theory (Helson 1964), Assimilation Contrast Theory (Sherif 1963; Sherif, Taub and Hovland 1958) and Prospect Theory (Kahneman and Tversky 1979); distinct but complementary theories from psychology which suggest that consumers possess reference points based upon exposure to past information — these reference points are then used to compare and contrast new information. To gain a better understanding of the roots of reference price theory, these are discussed below.

2.3.1.1 Adaptation Level Theory
Adaptation Level Theory posits that individuals develop internal norms or adaptation levels (ranges or regions) with which they assess or compare new stimuli. When presented with new prices, the consumer’s adaptation level or range of acceptable prices changes in the direction of the new price to incorporate this new information, if the price change is greater than the consumers just noticeable difference level (Abe 1998; Gupta and Cooper 1992) — thus higher prices raise the consumer’s adaptation level, and prices previously
deemed acceptable may become more or less acceptable with new information about prices (Helson 1964). For example, suppose a consumer is interested in buying a new plasma screen television and thinks that they should cost around $5000. On shopping around, the individual sees that such televisions cost $6000. On processing the new information, the individual’s adaptation level changes in the direction of the new prices say to around $6000. If the individual originally encountered a television that was $5000 then he or she may have believed this to be a reasonable price. However, after incorporating the new information, if the consumer sees a television for $5000 this would be considered cheap, and now $6000 is the reasonable price (see figure 2.1).

![Figure 2.1: Adaptation Level Theory](image)

2.3.1.2 Assimilation Contrast Theory
Similar to Adaptation-Level Theory, Assimilation Contrast Theory (Sherif 1963; Sherif, Taub and Hovland 1958) suggests that as consumers we encounter price information and compare and contrast this information with our existing frames of reference about price. When the new stimulus is not too far away from the existing frame of reference, respondents incorporate the new information into their existing frame of reference (an assimilation effect). However, when the new stimulus is far away from the existing frame of reference and consumers update their frame of reference, the new information is not incorporated into the existing frame of reference and the frame of reference shifts in the
direction of the new stimulus (a contrast effect). For example, suppose the same consumer is still looking for plasma screen televisions. They may have a range of prices within which they believe a plasma screen television should cost — say $5500 to $6500. If price information in encountered within this range then an assimilation effect occurs and the new information is incorporated into the existing range which does not change (see figure 2.2).

**Figure 2.2: An Assimilation Effect**

<table>
<thead>
<tr>
<th>Price Perceptions of Plasma Screen TVs in $T_2$</th>
<th>Price Perceptions of Plasma Screen TVs in $T_3$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too High</td>
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<td>$7000</td>
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</tbody>
</table>

Alternatively, if the new price information falls outside of the consumers existing range of prices (say new information suggests prices might be $7000), then this new information is contrasted against the existing price range (see figure 2.3).

**Figure 2.3: A Contrast Effect**

<table>
<thead>
<tr>
<th>Price Perceptions of Plasma Screen TVs in $T_2$</th>
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2.3.1.3 Prospect Theory

The Nobel Prize winning work of Prospect Theory (Kahneman and Tversky 1979) relates to the individual’s evaluation of decisions in terms of losses and gains. That is, a reference point, as opposed to a range, is formed and when product attributes (such as price) deviate from this reference point, this is viewed as a loss or a gain. For instance, instead of evaluating the actual price of a product and comparing this price to the benefits attained from the product, consumers simplify the purchase process and instead form a reference price ($P_r$) — a price which this product should cost — and compare this to the actual price ($P$) to derive value. If $P_r - P$ is positive then consumers view this as a gain because they expected to pay more and if $P_r - P$ is negative then consumers view this as a loss because they expected to pay less. Further, equivalent losses are valued more than equivalent gains. Thus, the value function is concave for gains and convex for losses, as shown in figure 2.4.

To illustrate, suppose a consumer expects to pay $70 for a new computer game and may value that computer game at $100. Then they see that the new computer game costs $80. Assuming they notice this difference between expectations and actual price then the consumer views this discrepancy as a loss. Alternatively, the game may be priced at $60. As this is less than what the individual expects to pay then this is viewed as a gain. Losses have a steeper value function than gains, accounting for the differing slopes of the curve.

In summary, individuals have some reference point/zero point, or in this case a reference price, and deviations away from this are viewed as gains or losses. Gains and losses are evaluated as a decreasing logarithmic function as shown below. This is important and provides an explanation as to why some retailers offer cash back vouchers instead of simply reducing the price.

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1 The term *should* is used here in the interests of brevity – there are many more operationalisations and concepts of reference price. Indeed, distinguishing between these concepts and measures is a key contribution of this thesis, addressed in chapters 3-5.
2.3.1.4 Summary of Theoretical Support
In summary, these three theories posit that consumers have a range of prices which they find acceptable for a particular product or product category and this range may change when new price information is acquired. The changes occur in the direction of the new price information, and when this change is large enough to be noticed by consumers (Abe 1998; Gupta and Cooper 1992), but not too large to be deemed either implausible or as relating to a different product category altogether.

2.3.2 A Definition: What is a Reference Price?
The previous discussion on reference prices has hinted at what a reference price is, for instance, how much a product should cost or a price acceptable to consumers. These terms are indicative of what a reference price is but at this stage it would be helpful to further clarify the idea of reference prices by providing a more thorough definition and presenting some typical examples of how reference prices have been measured in past research (this will be discussed again in further detail in chapters 3 to 5, which highlight measurement of reference prices as an important research issue and one which this thesis addresses in the context of new products).
2.3.2.1 Internal Reference Price
The concept of a reference price in which consumers compare the normal or fair price to an actual price to infer *cheapness* or *expensiveness* is not new to consumer behaviour (Scitovsky 1945). In the literature, this reference price is often referred to as an internal reference price (Chandrashekaran and Jagpal 1995a; Mayhew and Winer 1992; Niedrich, Sharma and Wedell 2001) or a temporal reference price (Rajendran and Tellis 1994) to reflect the way that reference price is learned from exposure to past price information.

2.3.2.2 Value: Decomposing the Reference Price Effect
The role that this reference price plays in the consumer decision making process is termed “sticker shock” (Winer 1986). If a consumer has some price in mind that they relate to a particular product then deviation of the actual price above or below this price evokes negative or positive emotions with respect to the purchase, which in turn influences behaviour. Relatedly, reference prices are often discussed in the context of value because if we think a product should cost a certain price then this will drive our understanding of value when we compare it to the actual price. Value is of course a key driver of exchange in marketing but may consist of different components and definitions (Woodall 2003). For instance, Thaler (1985) decomposes value into two related but theoretically distinct concepts — transaction value (TV) and acquisition value (AV). TV represents a relatively short lived component of value, related to the notion of a deal. For instance, *what a great deal* or *what a rip off* might be terms to describe TV. Marketing research studies operationalise the concept as $P_r - P$, where $P_r$ is the reference price or price that the product *should cost*. AV on the other hand relates to the get relative to give component of value (Dodds, Monroe and Grewal 1991; Zeithaml 1988), and can be defined as $P_h - P$, where $P_h$ is the highest price a consumer would be willing to pay and $P$ is the product’s actual price. In other words, AV is the difference between what a consumer believes something is worth to them and what it costs them. Conceptually, this can be represented in figure 2.5, which
decomposes value and shows its antecedents. This basic model has been documented extensively and empirically verified in the literature (Bearden et al. 1992; Grewal, Monroe and Krishnan 1998; Thaler 1985; Urbany et al. 1997).

**Figure 2.5: Decomposing Value**

![Diagram showing the components of value](image)

2.3.2.3 **Reference Price Defined**

But how is $P_r$ defined? Reference price has been defined in several ways throughout the literature and has been operationalised in many more ways (Biswas, Wilson and Licata 1993; Lowe and Alpert 2002; Lowengart 2002). Broad definitions have been offered in the literature such as “…any price to which other prices are related” (Biswas, Wilson and Licata 1993; Jacobson and Obermiller 1990), but such definitions fail to focus on the reason that consumers use reference prices — that is, to evaluate the price that they are observing, and therefore the reference price is a cue to assist in the decision making process.

Other definitions in the literature are broad enough to incorporate the evaluative nature of reference prices in consumer decision making but are limited by a reliance on exposure to past prices in forming the reference price. For instance, “…a price (or price scale) in buyers’ memories that serves as a basis for judging or comparing actual prices” (Grewal, Monroe and Krishnan 1998; Monroe 1973; Monroe, Grewal and Compeau 1991). Such a definition does not incorporate how a consumer would form a reference price when exposed to a new product that they have no prior price information for. Other definitions
such as “an internal price to which consumers compare observed prices” (Winer 1988; p. 35) satisfy the two concerns addressed above, but are narrow in their focus because they do not include other types of reference prices commonly used by marketers such as “Was $100, Now $89.95”.

For the purposes of this research, which considers reference price effects for new products, reference price is defined as “the standard (Rosch 1975) price against which consumers evaluate the actual prices of the products they are considering” (Rajendran and Tellis 1994, p. 22). This is a more useful definition for the new product context, implying that reference price need not be formed as a result of exposure to past prices, and that consumers may form a reference price through other means. It also explicitly identifies the reason that consumers use a reference price — that is, to evaluate and compare against actual prices. Further, it allows for the analysis of multiple reference prices which may be used by consumers to infer AV and TV. The subsequent challenge to researchers is operationalisation of this definition. This is discussed further in chapter 3.

2.3.3 Evidence of the Use of Reference Prices in Consumer Decision Making

2.3.3.1 External Reference Prices
Another type of reference price often discussed in the literature as an antecedent to internal reference price is an external reference price. Essentially this is a price claim advertised by sellers to positively frame a purchase and induce the notion of a deal (i.e. “50% off” or “Usually $99.99, Now $49.99”). The implication is that this framing effect increases internal reference price standards making the current price seem like a better deal (Biswas and Blair 1991; Biswas, Wilson and Licata 1993; Urbany, Bearden and Weilbaker 1988). Though this thesis is not directly concerned with external reference prices, external reference prices are an everyday occurrence in many retail outlets and represent an important promotional activity. To illustrate the importance of understanding external
reference prices, the effect of such reference price claims on internal price standards is discussed to add context to the study and validate the existence of an internal reference price.

2.3.3.2 The Relationship Between Internal and External Reference Prices

The rationale for marketers using external reference price claims lies in the ability of these claims to influence and shift a consumer's internal reference price standards, thus promoting the idea of a deal or a consumer getting value for money. The structural relationship between constructs is represented in figure 2.6.

![Figure 2.6: A Model of External Reference Price Claims](image)

Several studies have empirically verified the relationship between external reference price claims and internal reference price standards (for a review see Biswas, Wilson and Licata 1993). As a practical application to the theory, such claims can be so effective in shifting consumer reference price standards that legal action has been taken against some retailers in the USA to protect consumers against deception by retailers’ false claims (Compeau and Grewal 1998; Compeau, Grewal and Grewal 1994; Grewal and Compeau 1999). Although this relationship is moderated by factors such as knowledge and expertise (Biswas 1992; Biswas and Sherrell 1993), ambiguity of the price claim (Biswas and Burton 1993; Biswas and Burton 1994; Dhar, Gonzales-Vallejo and Soman 1999; Licata, Biswas and Wilson 1998; Mobley, Bearden and Teel 1988), plausibility of the price claim (Urbany, Bearden and Weilbaker 1988), frequency and depth of discounting (Alba et al. 1999) and perceived product quality (Grewal, Monroe and Krishnan 1998; Urbany et al. 1997).
2.3.3.3  Internal Reference Price: Scanner Research

*Indirect Measures of Reference Price*

To measure the effect of the $P_r - P$ discrepancy on brand choice, reference price studies have generally employed two main data collection methods: scanner data, using indirect methods of reference price estimation and survey research/experimentation, using direct methods of reference price estimation. Using indirect measures, researchers create a reference price term by subtracting $P$ from $P_r$ and use this in models of brand choice. The reference price chosen is some mathematical function of past prices. Recent studies have made a number of contributions in explaining consumer behaviour towards prices, in part because of the availability of large amounts of observational UPC scanner data.

*Indirect Measures: The Results*

Several studies have confirmed a reference price effect, using indirect measures. Winer (1986) presents a model of reference price effects for frequently purchased household goods, finding that for two out of three major brands of coffee, consumers used a reference price, modelled as a rational expectations function of past prices lending initial applied support to the theory. Kalwani et al. (1990) extend the model proposed in Winer (1986), again using coffee scanner data. Reference price was modelled in two ways, either as a weighted log mean of the last five prices paid or the last price paid. They combine this expected price with other contextual variables such as the frequency with which the brand is promoted, economic conditions, customer characteristics and type of retail outlet and find strong support for their proposition that expected price is formed by other contextual variables and that reference prices are useful predictors of behaviour. Similarly, Kalyanaram and Little (1994) operationalise reference price as an exponentially smoothed function of past prices and, consistent with the extant literature find that reference price-price discrepancies affect consumer response and as posited by Prospect Theory, consumers are more sensitive to losses than to gains.
Jacobson and Obermiller (1990) take a somewhat different perspective to Winer (1986) by proposing a more forward looking measure for reference price, noting that a consumers decision to purchase more or less now is a function of how much they expected price to be in the next period, because once they are exposed to a price in the current period, no matter what their expectations had been, that price then becomes a past price. Rather, Jacobson and Obermiller (1990) suggest that a better measure of reference price should account for the fact that consumers form an expected future price and evaluate the benefits of buying now at the actual price in comparison to later at the expected price. Putler (1992) also finds a strong reference price effect using scanner data for egg sales.

Other studies have compared competing operationalisations of the reference price term. For instance, Mayhew and Winer (1992), compared the relative effect of internal and external reference prices for yoghurts, finding a strong and significant effect for internal reference price, this time measured as the last price paid. Using scanner data for saltines, Rajendran and Tellis (1994) compared the relative effects of temporal reference prices and contextual reference prices on utility. They found that contextual reference prices are at least as important as temporal reference prices.

Using Assimilation Contrast theory as a foundation, another stream of reference price research has examined reference price in terms of latitude of price acceptance. That is, there is a region of price insensitivity around the reference price. Changes within this region of price acceptability are assimilated and do not lead to changes in behaviour and prices outside of the region are contrasted and result in changes to behaviour (Sawyer and Dickson 1984). Kalyanaram and Little (1994) use scanner panel data for sweetened and unsweetened drinks and find evidence to support this conjecture — thus marketers should “nibble”, not “bite” when increasing prices and the opposite when reducing prices (p. 416). This is consistent with other findings in the literature (Abe 1998; Han, Gupta and Lehmann
Kalyanaram and Little (1994) also find the width of latitude of acceptance depends upon the reference price level and purchase frequency.

**Limitations of Indirect Measures**

Despite strong support for the phenomenon of reference prices, these types of observational studies should be taken in context. To model reference price effects, typically researchers subtract the actual price from the reference price, defined as some weighted average of past prices. In other words, reference prices are modelled or assumed to be a direct function of past prices. Therefore, the operationalisation of this reference price term can only be made by making some assumption about how consumers incorporate and weight past price information to form a reference price. There are three main criticisms with such procedures:

i. Consumers do not assess price information by attributing complex mathematical formulae to the prices they have been exposed to (Tversky and Kahneman 1974), even though they may seem to in a statistical model.

ii. Whether such formulae actually reflect a consumer’s reference price cannot be determined and thus the correlations found may be spurious to some degree or at least little understood by researchers. As one study noted, even though consumers appear to act as if they respond to reference price we cannot be sure they do (Kalyanaram and Winer 1995, p. G167).

iii. Such formulae assume that the consumer can accurately remember past prices paid for products. A large amount of research evidence suggests this is not the case (de Chernatony and Knox 1992; Dickson and Sawyer 1990; Gabor and Granger 1961).

Other more direct methods of reference price estimation through survey research and experimentation have also been used and validated in the literature, demonstrating multi-method convergence with reference price research.
2.3.3.4 Internal Reference Price: Survey Research and Experimentation

**Direct Measures of Reference Price**

Questioning consumers about their price perceptions using survey methods and experimentation may overcome some of the difficulties in using scanner data. Instead of placing restrictive assumptions about how past prices are incorporated to form a reference price, direct measures overcome the three limitations presented in section 2.3.3.3. A wide body of research literature has shown that consumers do not typically have an accurate memory of past prices (de Chernatony and Knox 1992; Dickson and Sawyer 1990; Gabor and Granger 1961). Therefore, directly asking consumers how much they expect to pay may provide a more accurate estimate of expected price because it overcomes likely measurement error from using indirect measures which make unrealistic assumptions about consumer memory of past prices.

Thus direct measures of reference price are more likely to provide true estimates of reference price than indirect measures, which are subject to memory error and specific assumptions about how consumers process information. That is, while the incorporation of past price information into memory may be less well understood with direct questioning methods, such methods are likely to provide more accurate estimates of reference price, as long as we know which reference price to use.

**Direct Measures: The Results**

In a controlled experiment, Kalwani and Yim (1992) directly asked consumers how much they would expect to pay for a product in one week’s time, having been exposed to ten weeks of prior price movements. Frequency and depth of price promotions was found to affect the consumer’s expected price as hypothesised. In particular, as the frequency of price promotions increases, consumer reference prices decrease as they come to expect price promotions regularly. Consistent with Lattin and Bucklin (1989) they also find that if
a brand is promoted more than 50% of the time then this seems to be the level at which consumers become reluctant to purchase it unless it is on discount. Similarly, as depth of discount increases then reference price decreases as consumers come to expect larger discounts and thus revise down their reference price. Alba et al. (1999) extend this analysis by asking which strategy is better — small but frequent price promotions or large and but infrequent price promotions? Their findings indicate that frequent and shallow discounts are more effective than infrequent and deep discounts as they do not lower the reference price as much. Similarly, Gupta and Cooper (1992), consistent with Lowe and Alpert (2003), find that discounting exhibits an S-shaped response function where large discounts become marginally ineffective.

Cox (1986) examines the factors which affect consumer price limits — prices paid in the past and the range of prices at the point of purchase. Gupta and Cooper (1992) provide more rigorous experimental evidence of the existence of a region of price acceptability around the reference price which differs in size for store and name brands. Consistent with the scanner literature and with Assimilation Contrast Theory, they find a region of price insensitivity around the reference price, although this differs between store brands and name brands. Namely, name brands have lower thresholds than store brands suggesting that marketers can attract shoppers with small discounts on name brands but have to promote with larger discounts on store brands. Relatedly and using Range Theory, Janiszewski and Lichtenstein (1999), show that price attractiveness and thus purchase intention are determined by the endpoints of the consumers price range.

Limitations of Direct Measures
Though several contributions have been made to the reference price literature using direct measures of reference price, the use of direct measures manifests its own limitations. In particular, as with indirect measures, there is wide recognition that reference price is a
multi-faceted construct whereby individuals refer to numerous reference prices when making a purchase decision. For instance, Winer (1988) and Klein and Oglethorpe (1987) offer several alternative measures of reference price, but do not empirically test them. In reality though, the degree to which individuals utilise a particular reference price may differ in different situations and with different consumers (Bearden et al. 1992; Chandrashekaran and Jagpal 1995b; Lowengart 2002; Urbany et al. 1997). Whilst some inroads have been made from other studies, still the reference prices most likely to influence behaviour, and the circumstances in which they do, are unclear.

Bearden et al. (1992) test competing operationalisations of the reference price construct, including normal, expected, average and fair price. The normal, expected and average prices were found to have essentially the same means and standard deviations as each other and therefore represent similar measures of reference price but the fair price estimate was higher and had a greater variance. Chandrashekaran and Jagpal (1995a) also attempted to discover if consumers have a well defined reference price by determining the affect of fair, lowest, highest and normal price discrepancies with actual price upon willingness to buy. They find that different reference price measures are more likely to affect willingness to buy than others but this is category specific. For instance, with stereos, a reservation price is the best measure to use. However, with running shoes, either the fair price or the observed price is the best to use, showing that reference price utilisation is context specific and that measurement of reference price should not be broadly generalised or inferred based on precedent. Contrary to Bearden et al. (1992) they find that fair price estimates are used to compare against actual price and are important influences upon willingness to buy in both product categories tested, indicating further disparity about the appropriateness of different reference price measures. More conceptual understanding may be necessary to understand differences in reference price more thoroughly.
2.3.3.5 Moderating Influences: Consumer Heterogeneity and Reference Prices
The use of reference prices in consumer decision making is further confounded by consumer heterogeneity. For instance, Biswas and Sherrell (1993) examine the affect of product knowledge on internal reference price estimates and find that low knowledge consumers more easily except exaggerated external reference price claims which then influence internal reference price standards differently. This is broadly consistent with Biswas (1992) where it is found that product familiarity is a key determinant of reference price estimates. Similarly, Adaval and Monroe (1995) show how acquisition of product information affects price acceptability thresholds.

2.3.3.6 Summary
Therefore, research suggests that strong support exists for the use of reference prices — either as points or ranges — in consumer decision making. This has been supported across numerous studies, using different methods, and across a range of different consumer products. However, it remains unclear which reference prices consumers utilise in the decision making process other than the fact that reference price utilisation depends upon different circumstances and contexts.

2.4 Research Issues: Limitations of Prior Research
2.4.1 Fragmented Definition and Operationalisation of Reference Price
Whilst the degree of support for the reference price construct in affecting behaviour seems to be strong and supported by a variety of methods, it is important to note the wide variety of operationalisations and definitions remain fragmented and inconclusive (Lowe and Alpert 2002; Lowengart 2002). This is an important and largely unresolved issue in the literature. A number of studies have examined the best measures of reference price to use (Bearden et al. 1992; Briesch et al. 1997; Chandrashekaran and Jagpal 1995b; Mayhew and Winer 1992; Niedrich, Sharma and Wedell 2001; Rajendran and Tellis 1994), but still
there remains no common consensus about which reference prices are best to use — largely because the use of different reference prices is likely to depend upon situational differences. Which measures of reference price are consumers most likely to use for new product categories?

2.4.2 The Effect of Reference Price Confidence
Numerous reference price studies have looked at the effect of \( P_r - P \) discrepancies on behaviour. Some studies have identified another construct which may affect behaviour, reflecting the degree of confidence or conviction that individuals place in their reference price estimates (Biswas and Sherrell 1993; Janiszewski and Lichtenstein 1999; Mazumdar and Jun 1992, 1993; Vaidyanathan et al. 2000; Yadav and Seiders 1998). Presumably, for studies researching well established product categories, reference price estimates are more firmly held which may explain why this construct has not been used as often as perhaps it might.

The effect of this construct is important to understand because it may be a mediator of purchase behaviour in instances when product category knowledge is limited (Slonim and Garbarino 1999). For instance, suppose there are two consumers who believe a product should cost $80. However, one consumer is uncertain about this perception and the other consumer is very certain. That is, they hold their reference price perceptions with a different level of confidence. Now, suppose that the actual price of the product is $100. The price certain consumer with a higher level of confidence is less likely to purchase the product that because they have strong beliefs that it should cost $80. Whereas the price uncertain consumer with a lower level of confidence is more likely to accept the actual price and revise their reference price on the basis of the new information. How does reference price confidence affect value perceptions and behavioural intentions in new product categories?
2.4.3 Reference Prices in New Product Categories
So far, reference price studies have only examined reference prices in established product categories. In particular, studies have traditionally used established and non innovative categories such as saltines (Rajendran and Tellis 1994), coffee (Kalwani et al. 1990; Winer 1986), yoghurt (Mayhew and Winer 1992), eggs (Putler 1992), sweetened and unsweetened drinks (Kalyanaram and Little 1994), laundry detergent (Kalwani and Yim 1992), aerobic shoes (Gupta and Cooper 1992) and many more. Despite acknowledgment of this deficiency in two seminal reviews (for instance, see Kalyanaram and Winer 1995 and Mazumdar, Raj and Sinha 2005), few studies have examined reference price effects in other product categories.

Clearly price management is important because setting the correct price affects the bottom line in the short term. However, it is also important because setting the correct price in one period is likely to influence a consumer’s reference price in future periods and thus their perceptions of value and purchase intention. Thus *reference price management* is also important to understand. This implies that the formation and evolution of reference price is an important topic of consumer behaviour research because initial perceptions of price are likely to affect future perceptions — thus setting the right price when a product is introduced is crucial in managing consumer price perceptions. How do reference prices form in new product categories? How do they evolve with subsequent follower entry?

2.5 Conclusion
This chapter presented an analytical review of the reference price literature, presenting the theory and rationale for using reference price as opposed to just price in models of brand choice. The chapter then assessed the contribution of several key empirical studies in the reference price domain, providing practical, empirical evidence on the importance of reference prices and their existence. The key contributions of this research stream were
highlighted and reference was also made to gaps in the literature which have yet to be
examined, or which have been addressed in a cursory manner. In particular, the following
three research issues were identified:

i. Fragmented operationalisation and definition of reference price. In particular, no
theory of clear consensus exists on which reference price measure is best suited to
the new product context.

ii. The importance of reference price confidence as a mediating construct for new
products, with which consumers have had little or no prior experience.

iii. The formation and evolution of reference price perceptions in new product
categories. In particular, the role of market pioneering and following in shaping
consumer reference price perceptions.

Chapter 3 is the first part of study 1 and extends the discussion so far to examine
limitations i and ii in more depth, by formulating three key hypotheses for testing. These
hypotheses are analysed in chapter 5 which provides empirically validated measures of
reference price perceptions for new product categories. This then sets the stage for
examining the main research question of how these reference price perceptions form and
evolve in new product categories and their impact upon consumer value perceptions and
purchase intentions. Key hypotheses for the study of reference price formation and
evolution are developed in chapter 6 which is the beginning of study 2. These hypotheses
are subsequently analysed in chapter 8.
3.1 Introduction

The key focus of this thesis concerns understanding how reference price perceptions form and evolve in new product categories. As a first step, a clearer understanding is needed of what is meant by reference price perceptions and how best to measure these price perceptions before it can be determined how they form and evolve in new product categories. From reviewing the extant literature in chapter 2, it was apparent that measurement of reference price perceptions is largely inconsistent between studies and multiple measurements of the construct have been offered in the literature, with little theoretical guidance on the choice of measure for different contexts. This is reiterated in numerous studies (Bearden et al. 1992; Chandrashekar and Jagpal 1995a 1995b; Garbarino and Slonim 2003; Lowe and Alpert 2002; Lowengart 2002; Urbany et al. 1997).

To proceed with the main research question of how reference prices form and evolve in new product categories, this research first establishes an operational definition of reference price by determining:

1a. Which measures of reference price do consumers utilise for new products?

1b. What is the role of reference price confidence for new product categories?

This chapter addresses the above research questions and begins study 1 of this thesis by examining the literature to date to review commonly used measures of reference price perceptions and establish testable propositions for further empirical testing in subsequent chapters. Chapter 4 then proceeds by presenting a method by which to test these
propositions. Study 1 concludes in chapter 5 with the analysis of these propositions and develops a framework for future testing.

3.2 Research Issue 1: What Measures of Reference Price are Best To Use in Studies of New products?

The issue of fragmented operationalisation of the reference price construct is not new to the reference price stream. In fact, many studies have commented on this very issue (Bearden et al. 1992; Biswas, Wilson and Licata 1993; Chandrashekaran and Jagpal 1995a; 1995b; Garbarino and Slonim 2003; Lowe and Alpert 2002; Lowengart 2002; Urbany et al. 1997), including Winer (1988) who makes a call for better understanding of the right reference price theory to use and under what conditions it is suitable. Indeed, Yadav and Seiders (1998, p. 312) point out, “…the available evidence indicates that buyers’ reference price formation and usage can be quite sensitive to many factors…”. Likewise, Slonim and Garbarino (1999, p. 4) state, “One concern in using a reference price measure in experimental studies is that there is no consensus on the appropriate measure”. Yet the problem still remains, with numerous operationalisations of the same construct.

Little theory exists to guide researchers in their choice of a suitable reference price measure, other than some untested propositions offered by Lowengart (2002), which distinguish between reference price measures on the basis of consumer involvement, shopping environment, macroeconomic environment and product characteristics such as durability and search quality. Often, researchers use measures based upon precedent (i.e. Grewal, Monroe and Krishnan 1998; Kalwani and Yim 1992; Kristensen and Garling 1996), taking the general conjecture that a particular reference price measure is used in the decision making process, regardless of context. However, the use of reference price is clearly context specific, and it is likely that different reference prices are used for different situations (Lowengart 2002). Therefore, the available evidence indicates that it is important
to establish the correct measure of reference for a particular situation. This section proceeds by reviewing measures available to researchers and narrowing down distinct measures to be tested for impact in new product categories.

3.2.1 A Review of Different Measures
Chapter 2 reviewed two methodologically distinct streams of research within the reference price literature, noting that reference price effects have commonly been measured indirectly using scanner data, or directly by asking consumers using a questionnaire, often for experimental purposes. For the purposes of this research which considers reference prices for new products, consumers have had limited or no prior experience with the product, limiting the use of scanner data derived reference prices based on price histories. Commonly used indirect measures of reference price revolve around some weighted average of past prices with varying lags and weights (Briesch et al. 1997; Lattin and Bucklin 1989; Mayhew and Winer 1992; Mazumdar and Papatla 1995; Niedrich, Sharma and Wedell 2001; Rajendran and Tellis 1994; Winer 1986). The new product context is specific because consumers have not been exposed to a price history and therefore are likely to form their reference price perceptions in other ways and through other cognitive processes. We are interested in how measures develop in the early stages of category introduction so the use of scanner data to model expected prices will yield reference prices equal to or similar to the prices of the products themselves. Therefore, such measures will not be considered here. That is not to say that expected price is not useful when direct measures are used because we can still ask consumers what they expect to pay. Instead, expected prices modelled from scanner data are not useful for this context. Therefore, this section will review direct measures of reference price relevant for studying new products.

Lowe and Alpert (2002) and Lowengart (2002) have reviewed the literature for different measures of reference price. In these two studies, over 30 different measures were
reviewed, with reference to many more journal articles. Lowengart (2002) goes further than reviewing the measures, categorising them into common concepts (see figure 3.1) and developing some untested propositions.

**Figure 3.1: Measures of Reference Price**

![Diagram of Measures of Reference Price]

Behavioural measures involve current prices or consumers’ prior experience whereas judgemental measures involve the interpretation of new information and comparing it with other past information. *Therefore, judgemental reference prices are most useful for the study of new products.* Within the category of judgemental reference prices are three other sub-categories. The value category represents some sort of assessment of the monetary value of the product with respect to its attributes, benefits and price. *Central tendency* measures relate to some sort of mean, mode or distribution of prices in the category and the boundaries concept, consistent with the idea of AV and the concept of an acceptable price.
range, represents a maximum price that would be paid and a minimum price, below which
the product is perceived as being low quality. However, some of the measures within these
concepts, such as a normal price, are unable to be used as reference prices for new products
because consumers do not yet know what a normal price is (analogous to using a price
history). The most commonly used measures of reference price, related to TV in the
literature tend to be either a fair price (Bolton, Warlop and Alba 2003; Campbell 1999a, b;
Monroe 1973; Grewal, Monroe and Krishnan 1998) or an expected price (Chandrashekaran
and Jagpal 1995b; Kalwani and Yim 1992; Kalyanaram and Winer 1995; Puto 1987;
Thaler 1985; Urbany et al. 1997). The highest price willing to be paid is more often used as
a proxy for AV (Bearden et al. 1992; Thaler 1985) — how much the product is worth,
relative to what is given in exchange for it. The frequency with which these measures are
used is further confirmed in Garbarino and Slonim (2003), who analyse their effects upon
perceptions of expensiveness.

In trying to distinguish between competing measures used in the literature, Bearden et al.
(1992) find that the normal, expected and average prices tend to have the same mean as
each other but different means to the fair price. Thus, normal and average prices appear to
be measuring the same construct as expected price (this makes sense given all of these
relate to a price that consumers think the product is, not what it should be). In particular,
they found support for expected price over fair price, whereas Chandrashekaran and Jagpal
(1995a) find support for fair price over expected price. Thus which measure of reference
price suits best is yet to be resolved.

The highest price is likely to be a key determinant in assessing AV but the measure of
reference price most likely to influence perceptions of TV for new products is still unclear.
Is fair price or expected price a better measure of TV for new products? What are the
relative effects of TV and AV on behavioural intentions?
3.2.2 Determining a Measure of Reference Price for New Products
We now try to gain more clarity on the concepts of fairness and expectations by reviewing key literature to distinguish between the two measures.

3.2.2.1 Fair Price: A Normative Measure
The concept of fairness has attracted increased research attention in marketing and the social sciences over recent years (Campbell 1999b; Kahneman, Knetsch and Thaler 1986; Xia, Monroe and Cox 2004). Traditional models of economic behaviour take no account of altruistic behaviour and the concept of fairness (Kahneman, Knetsch and Thaler 1986). Yet the concept of fairness suggests a natural reference point relating to what is right and wrong. To draw on a reference price analogy this can be translated into the right price or the wrong price. Indeed, many studies of reference price have used the concept of fairness to measure a reference price and find support for this as a measure (i.e. Chandrashekaran and Jagpal 1995a), stemming from Thaler’s (1985) seminal work into TV.

Conceptually, a clear cut and concise definition of fair price is hard to pin down but rests on some sort of normative belief about what a product should cost (Bearden et al. 1992; Mazumdar, Raj and Sinha 2005; Winer 1988) based on judgments about what is reasonable, acceptable or just (Bolton, Warlop and Alba 2003; Xia, Monroe and Cox 2004). This notion of fairness, and what a product should cost rests on the premise of dual entitlement, which proposes that fairness is satisfied when both parties in a transaction have attained a reasonable benefit from partaking in that transaction (Campbell 1999a, b; Kahneman, Knetsch and Thaler 1986; Vaidyanathan and Aggarwal 2003). That is, reasonable profit to the seller and reasonable value to the buyer. Xia, Monroe and Cox (2004) provide a more detailed discussion of the concept of fairness and define fairness as “… a consumer’s assessment and associated emotions of whether the difference (or lack of difference) between a seller’s price and the price of a comparative other party is
reasonable, acceptable, or justifiable” (p. 3). Thus fairness relates to a number of other commonly used reference price concepts.

In examining the notion of fair price from the perspective of reference prices, Garbarino and Slonim (2003) assume that fair price perceptions are based on past observed prices, because at these past prices, consumers assume the firm is making a reasonable profit (otherwise the product would not be for sale), satisfying the assumption of dual entitlement. This need not hold for this study because a consumer can still determine what they believe a reasonable profit to be in the absence of a price history. Whether they are right or wrong is irrelevant to the outcome.

Thus, the concept of fair price relates to a normative concept of what the consumer believes the price should be for a product, as opposed to what the price is, or what they expect it to be. We now turn our attention to the concept of expectations.

3.2.2.2 Expected Price: A Positivistic Measure
Despite acknowledgement of the different reference price measures that exist (i.e. Bearden et al. 1992; Garbarino and Slonim 2003; Klein and Ogelorpe 1987; Lowengart 2002) numerous studies have taken a stance on which measure of reference price to use based on precedent. The limitation with this approach is that there is precedent for the use of both measures, fair and expected, but we are unsure in which situations they should be used. The real question is, which is most suitable under certain circumstances.

Clearly fair prices and expected prices are different and represent different aspects of a consumer’s perception of price. Fair prices are distinct from competing models based on expectations which, by definition, relate to a positivistic belief about what the product does cost. Clearly if what a product does cost and what a product should cost are the same then there is no discrepancy. However, rarely is this the case. For instance, Garbarino and Slonim (2003) propose that fair price will always be lower than expected price because
consumers, without knowledge of the firm’s actual profit margins, assume the firm is making a reasonable profit even at the lowest observed price. These assumptions make sense to some extent but seem a little tenuous — sale prices, and thus low prices may often go below cost so the firm can get rid of overstock etc. Nonetheless, there is no apparent reason why expected prices and fair prices should be the same because typical models of expected price involve some average based on past prices with different time lags and different weightings (for a review of typical models see Jacobson and Obermiller 1990).

This notion of a reference price based on actual price is conceptually different to a reference price based on notions of fairness. Not all reference price studies using expected price model expectations by some weighted average of past prices. Instead, other research (i.e. Kalwani and Yim 1992) simply asks consumers using a survey approach. In this case expectations are asked directly, not modelled indirectly based on certain assumptions about how consumer process past price information. As stated in Garbarino and Slonim (2003, p. 230) an expected price is a market based reference price “with no adjustment for personal preferences”, reflecting what is believed to be, rather than what should be. But which of the two reference prices are consumers likely to use for new and existing products?

3.2.2.3 Fair versus Expected Price for New Product Categories

Having conceptually distinguished between these two reference prices we now turn our attention to the categorisation literature to determine which reference price will be used for new product categories.

The categorisation literature suggests that consumers learn about new products by analogy with existing products, applying existing knowledge structures to new information (Gregan-Paxton and Roedder John 1997; Moreau, Lehmann and Markman 2001). The nature of this learning mechanism appears to be moderated by the discrepancy between the new category and the existing knowledge structure. If a product is similar to existing
products then information about this product gets assimilated into existing knowledge structures; but if the product is different enough this information appears to be contrasted and the product is sub-typed with a new category formed (Coupey and Jung 1996; Ozanne, Brucks and Grewal 1992). In the context of the model of knowledge transfer by Gregan-Paxton and Roedder John (1997), consumers first access information, map the information and then transfer this onto the new category. For categories with similar attributes, more accessing occurs and thus more transfer of knowledge occurs. Yet when attributes are more discrepant then less accessing occurs and less knowledge transfer occurs. Therefore, if a product comes from a particular category then this can influence consumers’ expectations about the new product (Moreau, Markman and Lehmann 2001). More fundamentally Mervis and Rosch (1981, p. 341) state that “A category exists whenever two or more distinguishable objects or events are treated equivalently. This equivalent treatment may take any number of forms, such as labelling distinct objects or events with the same name, or performing the same action on different objects”.

Thus knowledge about price information for new products can be transferred from existing knowledge structures if the product is sufficiently similar. If consumer expectations about price are a function of past prices, then these expectations can be transferred onto existing products or incrementally new products. However, for newer, more similar products, these knowledge structures are less transferable and consumers will have to rely on reference points other than their expectations, such as reference points associated with notions of fairness. This leads to the first key hypotheses of this thesis:

\[ H_{1a}: \text{When perceived innovativeness is higher, fair price is more likely to be used as a reference price by consumers than expected price.} \]

\[ H_{1b}: \text{Likewise, when perceived innovativeness is lower, expected price is more likely to be used as a reference price by consumers than fair price.} \]
The reference price used by consumers for innovative as opposed to existing products is not the only way in which reference price models might differ for new product categories. Because consumers have less experience with the category, they may also be less confident in their reference price perceptions, decreasing the weight they place upon their reference price estimates. The interaction between beliefs and the strength with which these beliefs are held has a long tradition in the consumer behaviour literature (Cohen, Fishbein and Ahtola 1972; Dover and Olson 1977; Fishbein and Ajzen 1975; Marks and Kamins 1988; Ryan and Bonfield 1980; Smith and Swinyard 1988). The next section extends our thoughts about reference prices for new product categories by examining the role that confidence in reference price plays in models of reference price for new products.

3.3 Research Issue 2: What is the Role of Reference Price Confidence for New Products?

3.3.1 The Role of Reference Price Confidence

The majority of reference price studies have been concerned with established product categories. When analysing the effect of reference price upon behaviour or purchase intentions, these studies have generally only looked at the effect of reference prices upon behaviour or intention. However, with new product categories, it might be appropriate to examine other reference price concepts also, such as reference price confidence. Including confidence in such models enhances the link between attitude and behaviour when subjects are differentiated in terms of their confidence ratings (Bennett and Harrell 1975; Marks and Kamins 1988, p. 272; Smith and Swinyard 1983). This is likely to be the case for new as opposed to existing products. Subjects exposed to a newer product are likely to be more confident than subjects exposed to an existing product.

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2 The next chapter, chapter 4, will cover operationalisation and testing of the hypotheses in this chapter. For instance, in chapter 4 we discuss different perspectives on measuring innovativeness and how this is operationalised.
We can appreciate this intuitive relationship with a simple example. Suppose one consumer has a reference price for a product of about $80. Now suppose they are not highly confident in this reference price. They would be more willing to revise their reference price estimate on encountering an actual price discrepant from their reference price if they are not highly confident, concluding that they were wrong anyway about their perceptions. Likewise, an individual who is very confident about their reference price would be less likely to revise their reference price, and if discrepant from the true price would be less likely to buy the product.

3.3.2 The Use of Reference Price Confidence in the Literature

3.3.2.1 Reference Price Confidence, Internal Reference Prices and Expensiveness
In the reference price literature, confidence in reference price has been used to study consumer reactions but in different contexts to new products. These studies use the confidence term to capture the effect of differences in consumer characteristics such as purchase frequency, product knowledge and involvement. For instance, Biswas and Sherrell (1993) find that consumers who are highly knowledgeable about a product category have more confidence in their price estimates. Vaidyanathan et al. (2000), find that reference price estimates do not affect purchase intention when consumers are highly price uncertain — they may wait and go and look for further information first. Similarly and as we would expect, Mazumdar and Jun (1992) find that subjects who are uncertain about prices tend to have a wider range of acceptable prices than those who are certain. These studies provide support for the inclusion of reference price confidence.

Acknowledging the deficiencies of not including some term to capture reference price confidence, Slonim and Garbarino (1999) conceptualise the reference price effect by describing it as perceived expensiveness, conceptually similar to TV. In other words, what
consumers might be doing when they encounter price information is saying “Wow! That’s more expensive than I thought” or “Wow! That’s cheap”.

Measuring perceived expensiveness overcomes the limitations of using reference price and reference price confidence because any heterogeneity in confidence between consumers (and the measures evoked by consumers) is taken into account by measuring this more general concept one step up the hierarchy of effects. Despite the intuitive appeal of this measure, its benefit is its detriment for this study, because the purpose of this study is to examine the antecedents of TV. That is, this study measures reference price effects one step down the hierarchy of effects.

Similarly, Urbany et al. (1997, p. 46) refer to confidence in internal price standards (although not measuring it explicitly), stating “…the more uncertain the consumer is about quality, the less confident he or she will be about the relevance of his or her initial reference price and the weaker the transaction utility effect will be on purchase intention”. In their study, confidence was used in the context of different product quality perceptions. In particular, if product quality perceptions are low then consumers are less likely to think a lower than expected price is a good deal and instead are more likely to think the product is of poor quality. Again, the implication is that reference price confidence is an important component of reference price models and mediates the reference price effect.

3.3.2.2 Reference Price Confidence and External Reference Prices

Reference price confidence has been treated in the literature more extensively with regard to merchant supplied external reference prices (Biswas and Blair 1991; Biswas and Sherell 1993; Mazumdar and Monroe 1992; Yadav and Seiders 1998). In other research, the role of confidence has been implied but under the guise of other potentially related constructs such as product knowledge and familiarity, where lower product or price knowledge or familiarity leads to greater uncertainty (Kosenko and Rahtz 1988). In particular, most of
these studies explicitly test how consumers revise their internal reference price standards based upon external reference price claims, finding that consumers are more likely to rely on such claims when they are less highly confident in their internal price standards (unless the price claim is below their internal price standards), or have lower knowledge about a particular product category. Other studies using scanner data have made similar implications, where greater experienced price variability leads to greater uncertainty, which in turn affects consumer acceptability of prices (Janiszewski and Lichtenstein 1999; Mazumdar and Jun 1992).

3.3.2.3 Reference Price Confidence for New Products
Few studies have explicitly examined the association between internal price standards, confidence in these internal price standards, and how the two interact to affect TV, AV, and ultimately purchase intention, although much has been implied about the role of reference price confidence. No research has examined how this link manifests with respect to new product categories versus existing product categories, where confidence in internal price standards is likely to differ due to the relative newness of information. Some research has addressed the link between familiarity and confidence (Vaidyanathan 2000) but does not look at how this impacts consumer value perceptions. Vaidyanathan et al. (2000) extend the literature by showing that there is a strong, positive link between internal reference price standards and purchase intention for price certain consumers. Based upon the extant literature, this leads to hypothesis 2:

**H2:** For innovative products, variation in value perceptions will be better explained by including confidence in reference price models.

Having developed formal hypotheses for testing, we now proceed by developing a model of reference price for new products to test these effects empirically in chapter 4.
3.4 Reference Price Effects in New Product Categories — A Model

To assess the different measures of reference price and the effect of reference price confidence, the influence of these variables is analysed using a model of purchase intentions that is a function of TV and AV (Bearden et al. 1992; Grewal, Monroe and Krishnan 1998; Thaler 1985; Urbany et al. 1997). This basic model has received widespread acceptance in the literature and has been theoretically and empirically validated on several occasions. The model, however, lacks a confidence measure. Here a confidence measure will be added to allow a test of the measure and to see if it improves predictive ability. Therefore, instead of assuming that TV and AV are affected solely by the reference price and highest price, the extended model incorporates a new construct, which measures confidence in the reference price and highest price. To further test the effect of different measures of reference price, this basic model is tested in different circumstances — in particular, it is tested for two different reference price measures — a consumer’s fair price and a consumer’s expected price — to see which one most suits the new product context. This leads to the model shown in figure 3.2, tested across different reference prices and different levels of innovativeness.

Figure 3.2: A Model to Test for New Products
3.5 Conclusion
Chapter 3 began by reviewing key literature in the reference price domain to address two key concerns in the reference price literature. A theoretically grounded model was established and three key propositions were developed for testing. This chapter begins study 1 by conceptually developing a model of reference price perceptions for new product categories. It further extends current theory by offering an alternative model to test for new product categories, explicitly including a reference price confidence term. Chapter 4 extends study 1 to present a formal method of testing the propositions established in chapter 3. H1a, H1b and H2 are then empirically analysed in chapter 5.
4.1 Introduction
Chapter 3 began study 1 by elaborating on key measurement issues identified in chapter 2. It conceptually developed a model of reference price for new products, establishing a new body of work in the reference price literature. Chapter 4 extends chapter 3 by presenting a formal method and set of procedures through which to test those propositions so study 2 can proceed in chapter 6 with validated reference price measures.

A key part of the research for experiment 1 is designing the instrument. In particular, the purpose of this research was to develop a method to allow us to compare consumer perceptions of price between an innovative and existing product. This chapter shows how the method was developed through a preliminary study (study 1), designed to address measurement issues prior to finalising measurement choices for the main study. Chapter 4 proceeds by outlining the experimental design and describing the development of a unique instrument to test these effects. It further describes two pretests and incorporates the results of these pretests into the chapter to show how the instrument was refined for subsequent testing. Chapter 4 concludes with a description of the how the study was implemented.

4.2 Research Design
4.2.1 Survey Based Approaches Vs Observational Approaches
The underlying justification for conducting study 1 is to determine which reference price consumers are most likely to utilise for new as opposed to existing products. As discussed in chapter 3 a plethora of measures exist within the literature with numerous studies calling for greater measurement validation. For the new product context, the use of scanner data was ruled out. In particular, scanner data is unable to provide the answers sought for this
study because measures of reference price are mathematically defined and constrained by a
priori assumptions, and are correlational rather than causal. As stated in Kalyanaram and
Winer’s (1995, p. G167) article on empirical generalisations in reference price research
“The concept of reference price still needs to be fully validated. …we cannot be certain
that consumers actually form prices, only that they act as if they did”.

This presents an important distinction between research epistemologies within the field
implying the need for more survey based and experimental approaches to the study of
reference prices. More to the point, according to scanner research, reference price is a
direct function of past prices. If past prices have not yet been established in the category
then this method will yield a reference price that will be the price of the pioneer or follower
and will thus be of no use in establishing initial reference price perceptions — a different
method is appropriate which allows respondents to state their reference price as opposed to
the researcher making certain assumptions and effectively stating it for them.

Chapter 3 further distinguished between commonly used measures of reference price in the
field, establishing fair price and expected price as two distinct measures with some, albeit
inconclusive, empirical substantiation. This thesis proceeds by designing a questionnaire
based experiment with specific manipulations of the variables of interest to determine what
consumer reference price perceptions are, and to validate their usefulness in different
contexts, such as new product categories versus established product categories. The use of
a causal research design provides a number of advantages, including:

- Greater control over effects being tested.
- Enhanced confidence in the causal nature of findings.
- Direct measurement of key constructs.

Thus causal studies provide a heightened understanding of the relative relationships
between variables and assume a stringent stance towards the positivist paradigm. A
detailed discussion of this paradigm is beyond the scope of this thesis. For further discussion refer to Cook and Campbell (1979) or Hunt (1991).

4.2.2 Justification of Research Design
Experimentation has a long history in economics and marketing research studies and overcomes many of the limitations of other methods (i.e. Beil 1996; Hawkins 1956; Herrmann and Stewart 1958; Pessemier 1959; Pessemier 1960). Specifically, the use of the experimental method and simulated markets, in pricing and marketing studies has been endorsed by a number of authors as a method for understanding consumers better (Almquist and Wyner 2001; Scriven and Ehrenberg 2004; Wright, Gendall and Lewis 1999). Generally in field studies, the real effects of price changes are difficult to estimate because a plethora of other variables are competing to influence sales including competitive interaction, and the erroneous effects of other marketing activity.

An experimental study with hypothetical stimuli is suitable for this study into reference price perceptions for new and existing product categories because of the ability to control consumer experiences and the stimuli they are exposed to. By designing stimuli that satisfies certain criteria, the research ensures that initial reference price perceptions are not influenced by past experience with the product, before the questions are asked.

A further benefit of this design is direct measurement of constructs, as opposed to inferred measurement. By directly asking consumers we can determine what consumer perceptions really are at the initial stages of market entry. Furthermore, to isolate the effect of product category innovativeness, an experimental technique would be appropriate. Such a research design presents its own challenges for the study of reference price but is preferable to observational designs with inferred reference prices in this instance.

Repeated calls to conduct reference price research under more controlled conditions have also been made in the literature. For instance, Rajendran and Tellis (1994, p. 31), in a
scanner based study, advocate, “Experiments provide rigorous tests of the causes of reference price and are especially useful in developing theory”. Likewise, Chang, Siddarth and Weinberg (1999, p. 190) state “Laboratory and survey work could be used to uncover the mechanisms that consumers actually use to form reference prices in different product categories”.

4.3 Experimental Design

Study 1 consists of an experiment to determine which of two commonly used measures consumers are most likely to utilise in existing product categories versus innovative product categories. To determine this an experiment was designed which compared responses given by respondents for an existing category to responses given by respondents for an innovative category (two experimental groups). Of course, to eliminate confounds these products had to be the same except for how innovative the product was perceived to be by consumers. Subjects were also asked their fair price perceptions or their expected price perceptions (two experimental groups) forming a 2x2 experimental design replicated over two product categories for external validity. The experimental groups are summarised in table 4.1 below (the selection of these product categories is discussed in section 4.4.2.1):

<table>
<thead>
<tr>
<th>Product Category</th>
<th>Earphones</th>
<th>Sunscreen</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Expected Price</strong></td>
<td>Expected</td>
<td>Expected</td>
</tr>
<tr>
<td><strong>Fair Price</strong></td>
<td>Fair</td>
<td>Fair</td>
</tr>
</tbody>
</table>

Table 4.1: Experimental Treatments for Experiment 1

Subjects were not asked about each of the reference price perception measures under inquiry to keep them from focusing on the price questions in the questionnaire. Too much focus on price could considerably bias the results of the study (Monroe 2003). Thus, the
two different reference price constructs were measured independently (Bickart 1993; Janiszewski and Lichtenstein 1999).

Despite the experimental method offering a number of advantages over other research designs, a number of limitations must be overcome in order to realistically construct the stimuli. The next section addresses these concerns in detail and shows how the stimuli and measures were constructed to obtain the desired outcomes.

4.4 The Instrument
A key challenge in designing this experiment was to design an experiment which enabled comparison of measures between an existing and innovative product category. To reduce confounds these products could only differ in terms of how innovative they were perceived to be, whilst still maintaining the same basic function.

The instrument involved simulation of an emerging market through exposure to product concept statements. Having been exposed to the product concept statements, subjects were then asked a series of questions relating to reference price and product perceptions. Similar procedures involving the simulation of a market have been successfully used in several other experimental studies of this type (for instance, see Carpenter and Nakamoto 1989; Kardes et al. 1993; Moreau, Markman and Lehmann 2001; Ozanne, Brucks and Grewal 1992). The process through which these product concept statements and subsequent measures were designed is described below, beginning with a brief description of how pretesting was incorporated into the design of the instrument.

4.4.1 Pretesting
Pretesting is a crucial part of the process of instrument design (Hunt, Sparkman and Wilcox 1982; Presser et al. 2004) and is useful for detecting errors within an instrument (Reynolds and Diamantopoulos 1998). For this study it is particularly important because
the instrument presents a hypothetical situation, thus thorough testing is needed. The initial instrument was pretested to evaluate the manipulations and to evaluate interpretability of the questions used in the experiment. The role of pretesting in this study was to ensure the manipulations were perceived by respondents in the way intended and to ensure the questions were clear, unambiguous and provided the right type of information.

The basic procedure for each of the pretests is briefly discussed below. However, the results of the pretesting and the changes made to the instrument are incorporated into subsequent discussion to highlight how the stimuli and measures evolved.

4.4.1.1 Pretest 1 — Assessing the Manipulations and Testing the Instrument
Pretest 1 was used to develop the initial measurement scales, derived from the literature, and the manipulations used in the main experiment. It was further analysed to test the general value decomposition model used in this research. Not all the manipulations were made at this stage. Subjects were only exposed to the existing treatment from one category (i.e. the wireless earphones) and the innovative treatment from the other category (i.e. the 8-hour sun protection product) and were only asked to respond with their fair price perceptions, not their expected reference price perceptions. This was because of the indepth qualitative procedures used to assess the initial instrument.

At the end of an undergraduate marketing tutorial, students were asked to participate in the experiment and were given small incentives. Fourteen students agreed to participate voluntarily (see justification of student sample in section 4.5.1). This is a common size for preliminary, exploratory pretesting of this type with prior research suggesting sample sizes from 10-30+ as adequate for picking up major questionnaire flaws (i.e. see Hunt, Sparkman and Wilcox 1982, p. 270; Presser et al. 2004, p. 10). Subjects were asked to fill out the questionnaire and make notes throughout the questionnaire, indicating any areas which were unclear, ambiguous or needed further clarification. At the end of the
questionnaire, in depth interviews and mini focus groups were used to discuss how well the instrument communicated what was intended.

4.4.1.2 Pretest 2 — Further Testing and Refinement
Having incorporated the changes resulting from pretest 1, a second pretest was conducted before the final experiment, to further test and qualify the instrument, and the remaining manipulations on a larger sample. This time, subjects were exposed to all the manipulations, producing four experimental groups. However, subjects were only asked their fair price perceptions (half of the treatments for the main experiments) not their expected price perceptions (the other half of treatments for the main experiment). It was unnecessary to repeat all the manipulations in this type of pretest because the only difference between these two groups of treatments was whether or not fair price or expected price was asked. The question concerning expected price was tested separately for efficiency.

Subjects were informed of the experiment at the end of an undergraduate marketing lecture and asked to participate with a $5 book voucher. Twenty eight subjects agreed to participate voluntarily. Again, these sample sizes are commonly used for pretesting of this nature (Hunt, Sparkman and Wilcox 1982, p. 270; Presser et al. 2004, p. 10). Fifteen subjects were exposed to the existing earphones and the innovative sunscreen and thirteen subjects were exposed to the innovative earphones and the existing sunscreen. Like pretest 1, subjects were asked to fill out the questionnaire and make notes, indicating any areas that were unclear, ambiguous, or needed a little extra clarification. Because of the larger number of subjects involved in pretest 2 than in pretest 1, the exploratory procedures used in pretest 1 were not possible. However, the advantage of pretest 2 over pretest 1 was a larger number of responses which provided greater validation of the measures to be used in experiment 1.
4.4.2 Stimulus Design

4.4.2.1 The Concept Statements
The key question this experiment addresses is “Which reference price perceptions do consumers utilise for the purchase of new as opposed to existing products?”. As such, choosing products to test is critical to the success of the experiment. To achieve the experiment’s objectives, the choice of products was driven by the need to have two products that differed only in terms of perceived innovativeness. This meant the products had to be different enough to be perceived as innovative and existing, yet not too different such that they were perceived as performing two separate functions. Such a great difference would lead to confounds caused by multiple differences in product attributes and may mean consumers have no reference price at all.

Moreau, Lehmann and Markman (2001) present a similar scenario, showing this can be done by allowing the innovative product to differ on one major attribute, termed an immutable attribute. The immutable attribute is the attribute in the innovative product that is responsible for differences in consumer perceptions of degrees of newness.

To minimise other potential confounds the products had to satisfy some other criteria:

- Should be cheap enough to be accessible to most but not too cheap such that a respondent may just buy to try.

- Should not be a product likely to involve a large degree of medical risk (i.e. a new pill) as respondents may simply not wish to buy the product due to the potential risk, thus distorting the reference price effect.

- Should be a category with which the sample have had some sort of general experience because only limited information can be provided in the experimental concept statements.

- Should be a product category which is broadly applicable to the sample.

Web searches of new products were conducted to find some initial new product ideas with which to begin. The initial list of products was evaluated on the characteristics above.
One challenge that emerged in selecting new products to test was finding a new product category that was sufficiently similar to the existing product category in all aspects, other than the benefit being provided. For instance, one idea that emerged was a “cool blanket”, similar to an electric blanket that heats up but different in that it cools down and is used in hot weather. For an innovative product, the general concept is sound. However, identifying the product category from which a cool blanket would come from is more difficult — in fact, no such product category already exists as this new product concept could derive from vastly different product categories such as fans, air conditioners, electric blankets etc. Using this type of innovative product category with a different analogous existing product category would lead to potential confounds within the experiment.

The list was therefore refined further to isolate those innovative products which came from clearly defined established product categories. The final two product categories which satisfied the above criteria were a new sunscreen — Super Sunscreen — and a new set of earphones — Sonicphones XD-37. These products are in the right price range, are applicable to the sample (discussed in section 4.5.1) and do not seem to have any sort of physical risk attached to them. They also come from established and clearly defined product categories. Novel brand names were chosen to control for familiarity and prior knowledge on respondents’ perceptions (Kardes et al. 1993). See section 4.4.3.2 for measurement of this potential confound.

4.4.2.2 Developing the Concept Statements

Differences in Innovativeness: Following a Template

Ultimately, in order to create a difference in perceptions of innovativeness for the experimental treatments, these products had to differ in some way in terms of the benefits they provided to consumers. However, in the interests of internal validity all other product
attributes were kept as consistent as possible. In an effort to reduce any likely confounds, all concept statements were generated following a standard template and only varied on:

i. The text of the second paragraph for the innovative treatment, which identified and explained the innovative aspect of the product. Other than this paragraph the descriptions were exactly the same, except for one other word in the first line which identified the innovative product as being new.

ii. The price - innovative products are more expensive than established products.

Confirming whether or not these manipulations were perceived to be innovative is addressed in section 4.4.3.1 and 5.2.3. These concept statements were modified throughout the pretesting phase and some of these modifications are discussed below to show how they evolved.

*Enhancing Innovativeness*

To enhance realism the concept statements were created with a number of the attributes of current products on the market. For instance, based upon existing earphones in the market place, some of the features of the existing Sonicphones were “a comfortable in-the-ear design to remain comfortable hour after hour” and “a moisture guard mechanism to pull sweat away from the ear canal when exercising”. Whilst these were attributes of existing products on the market some subjects (particularly those with lower knowledge and familiarity in the category) perceived these features to be innovative, misinterpreting the stimuli from what was intended.

Thus, the manipulations were a little weak to have the desired effect in the experiment. Consequently, some amendments to the initial concept statements were necessary in order to intensify the manipulations. The main thrust of these changes was to make the innovative products seem *more* innovative and the existing products seem *less* innovative without changing the basic template used for the concept statements.
Determining the Price Levels

For the Existing Treatments
Following Niedrich, Sharma and Wedell (2001), the prices selected were intended to be representative of marketplace prices. Several pharmacies and electronic shops were surveyed in the local area to determine market prices for the established products being tested. The modal price for each product was selected as the price to charge for each of the products being tested. This was $15.95 (per 250ml) for the existing sunscreen and $49.95 for the existing earphones.

For the Innovative Treatments
The prices for the existing products could not be used for the innovative products because, by definition, the innovative products offered consumers a greater benefit and as such should be priced more. Further, a seemingly low price for the innovative products would bias purchase intention, signifying a deal. A convenience sample of websites, surveying the price of innovative products in the sunscreen and earphone categories was conducted. Taking an average of prices of innovative products revealed that for the sunscreen category, innovative sunscreens were generally priced at around 80% more than the existing sunscreen in this experiment, and the innovative earphones were generally priced at around 125% more than the existing earphones in this experiment. This meant the price charged for the innovative sunscreen was $28.95 and the price charged for the innovative earphones was $109.95.

Prices were rounded for consistent price endings because research indicates that even small price changes may produce proportionately bigger changes in demand due to psychological effects (Monroe 2003; Stiving and Winer 1997; Thomas and Morwitz 2005), explaining the phenomenon of the kinked demand curve. Thus, deviations away from consistent price endings may represent a potential confound. Such price endings are also more typical of retail prices.
Differences in categories explain the differences in price premiums between the innovative and existing products between categories. Two influential meta-analysis studies in the marketing literature reveal differences in price sensitivity between product categories (Bijmolt, Heerde and Pieters 2005; Tellis 1988). In particular, Tellis (1988, p. 339), distinguishes between price elasticities for pharmaceutical products and price elasticities for durable products, based upon dozens of studies, speculating that there are differences in concern for “… safety, effectiveness and timing rather than with the price of pharmaceutical products”. This may broadly extend to the sunscreen category which relates more to pharmaceuticals than earphones. Bijmolt, Heerde and Pieters (2005, p. 146) shed further light on category level differences by highlighting differences between “big ticket items (durables)” and “small ticket items (groceries)”, based on an analysis of dozens of studies. In fact, if the price levels were kept consistent, this would fail to take account of differences between product categories.

The Sunscreen Product Concept

Essentially, the established Super Sunscreen was the same as the innovative Super Sunscreen but only differed in terms of an important attribute of sunscreens — how long the protection lasts. The innovative Super Sunscreen was said to last 8 hours instead of the usual 2–4 hours like standard sunscreens.

For both the sunscreens and the earphones, product attributes, other than the innovative attribute, were taken from the websites of existing products and included in the concept statements. Rigorous pilot testing was conducted on small groups of respondents to ensure appropriate meaning was conveyed through the concept statements. This was a crucial aspect of the experiment and led to the concept statements shown on the following pages. The existing Super Sunscreen concept statement is shown first.
Super Sunscreen — Existing

Super Sunscreen 30+ is a sunscreen that makes exposing your body to the sun a pleasure.

The sunscreen is SPF 30+ and, just like other major brands on the market, the benefits of using it include a non greasy feel, waterproof for swimming, rapid absorption into the skin and a useful applicator to ensure even application.

This product has been approved by the Cancer Council of Australia.

Super Sunscreen is manufactured by a reputable company and is available at a quality retail outlet near you, in a standard sized 250ml container.

Other than the price and the second paragraph, which explains the new product’s benefit and simulates innovativeness, the concept statements are exactly the same. There is also a minor amendment in the innovative concept statement where the word new was added to enhance innovativeness. The concept statement for the innovative sunscreen is illustrated below:

Super Sunscreen — Innovative

Super Sunscreen 30+ is a new sunscreen that makes exposing your body to the sun a pleasure.

Super Sunscreen is a unique new development. Not only does it provide great protection from the sun, but it is also the first sunscreen that lasts all day (8 hours) rather than just a few hours!!
Other sunscreens which only last 2-4 hours need constant reapplication and monitoring. But now, no more uncertainty because Super Sunscreen lasts all day. That’s right, no needing to constantly reapply lotion every 2 to 4 hours! Simply apply the lotion, as you would any other sunscreen, and go on your trip to the beach, the shops, bushwalking or whatever you wish to do. Just apply once for complete confidence of protection from the Australian sun’s harmful UV rays. And, since it lasts longer you also use less, do not have to carry it around everywhere and above all do not have to worry about burning.

The sunscreen is SPF 30+ and the other benefits of using it include a non greasy feel, waterproof for swimming, rapid absorption into the skin, and a useful applicator to ensure even application.

This product has been approved by the Cancer Council of Australia.

Super Sunscreen is manufactured by a reputable company and is available at a quality retail outlet near you, in a standard sized 250ml container.

The Earphones Product Concept

Again, the established Sonicphones XD-37 was described in exactly the same way as the innovative product except for the new innovative attribute — a wireless connection. The innovative product was described as being completely wireless — not just between the earphones (which is not new) but also, no wires to the main unit (either the personal CD
player or the MP3 player etc.). Such a product does exist for home headphones but these are not portable. The concept statement for the existing earphones is shown below:

**Sonicphones XD-37 — Existing**

Sonicphones XD-37 are earphones that make your listening experience a pleasure, whether you’re listening to CDs, MP3s or anything else.

Just like other major brands on the market, Sonicphones XD-37 features include what you would expect from quality earphones: a head band free clip-on design, powerful bass sound, a comfortable in-the-ear design, clear sound with minimal weight, and a carry case for easy and safe storage.

Sonicphones is manufactured by a reputable company and is available at a quality retail outlet near you.

Again, other than the price and the second paragraph, which explains the new product’s benefit and simulates innovativeness, the concept statements are exactly the same. Also, there is a minor amendment in the innovative concept statement where the word *new* was added to enhance innovativeness. The concept statement for the innovative earphones is illustrated below:

**Sonicphones XD-37 — Innovative**

Sonicphones XD-37 are a new pair of earphones that make your listening experience a pleasure, whether you’re listening to CDs, MP3s or anything else.

Sonicphones XD-37 are a unique new development. Not only do they provide a fantastic listening experience but they are also the *first* pair of earphones that are completely wireless!! That’s right, there are no wires to get tangled when you are listening to your favourite music! Simply plug a small jack into the socket of your personal stereo (i.e. just as you would for a normal pair of earphones) and this transmits a signal to your wireless earphones. Rigorous independent scientific tests have shown absolutely no difference in sound quality between these and normal earphones with wires. Each earphone fits snugly onto an ear, there is no need for wires or headbands between them.

Just like other major brands on the market, Sonicphones XD-37 features also include what you would expect from quality earphones: a head band free clip-on design, powerful bass sound, a comfortable in-the-ear design, clear sound with minimal weight, and a carry case for easy and safe storage.

Sonicphones is manufactured by a reputable company and is available at a quality retail outlet near you.

These concept statements were the final concept statements used in the experiment. However, to get to this stage a series of iterations and improvements were made based upon pretest results and subjects’ perceptions of the stimuli.
The overall lesson from designing the concept statements is that subjects may perceive the stimuli differently from what was intended and that it is not easy to design stimuli that works in the first attempt. Therefore, careful pretesting is essential to communicate the manipulations to respondents.

*Exposure to Prices*

Subjects were not exposed to the prices of the products within the concept statements. This was because one of the questions related to expected price. If they were exposed to the price and then asked what their expected price was, subjects would just feedback the price within the concept statement (i.e. at the point of purchase the expected price is the actual price). Therefore, to avoid a tautology-like effect where respondents simply gave the price in the concept statement as the expected price, prices were exposed after subjects revealed their reference price perceptions.

### 4.4.3 Measurement: Confounds, Manipulation Checks and Covariates

The next section discusses potential confounds and threats to internal validity. Key threats are highlighted and measures for the manipulation checks and covariates are provided. The section also discusses how the measures were initially adapted from prior studies and refined through pretesting to suit the purpose of this study.

#### 4.4.3.1 Perceived Innovativeness

*The Concept of Perceived Innovativeness*

To ensure respondents perceived the concept statements in the way intended perceived innovativeness was measured with a manipulation check for degrees of newness. The literature was searched for scales which measure degrees of newness. Whilst level of innovativeness can be measured in terms of the core technology used for the product (i.e. Chandy and Tellis 2000), this research is only concerned with whether or not consumers perceive the product to be new, regardless of how new it actually is. This is consistent with
Rogers’ (1995) view that an innovation is only new if it is perceived to be new by consumers. However, Rogers (1995) does not offer an operational measure of consumer perceptions of newness. Donnelly and Etzel (1973) offer operational measures of newness based upon judges who are expert in the product area. However, such measures are of limited use if consumers do not perceive the product’s newness in the same way as experts do. Chandy and Tellis (2000) acknowledge the sparsity of operational measures of newness in the literature and define their own measure based upon:

i. Whether or not the product incorporates a substantially different core technology.

ii. Whether it provides substantially higher customer benefits relative to the previous product generation.

Whether or not the product incorporates a substantially different core technology is of little use for this research because we are trying to ensure respondents perceive the product as new, not determine a more objective measure of newness for a particular product class as Chandy and Tellis (2000) were. The second measure concerning the incremental benefits of the product over the benefits of the product in the previous product generation is somewhat useful but still would seem to prime respondents by suggesting that the product they are evaluating is newer and offers more benefits.

Further literature searches found other measures offered by Olshavsky and Spreng (1996). Olshavsky and Spreng (1996) ask four questions — i. Do you perceive this product to be an innovation?; ii. How innovative is it?; iii. How much impact would use of this product have on your daily life?; iv. How desirable is this product for you or for someone you know? The first question was measured using a yes/no response. This was inappropriate for the current study and excluded. Questions ii and iii were more promising. However, question iv was dropped as a measure as it did not relate to the current research context. Therefore, measures ii and iii were adapted for further testing. Question ii represents the
respondent’s perception of newness, consistent with Rogers’ conceptualisation of innovativeness and question iii relates to Robertson’s (1971) conceptualisation of an innovation, as having a perceived impact upon consumption. The initial scale therefore consisted of the two questions shown below on a 1 to 7 numerical scale:

Table 4.2: Operationalising Perceived Innovativeness

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Question</th>
<th>Anchors</th>
</tr>
</thead>
<tbody>
<tr>
<td>I1</td>
<td>How innovative is [brand name]?</td>
<td>Minor variation of existing product–Completely new product</td>
</tr>
<tr>
<td>I2</td>
<td>How much impact would use of [brand name] have on your daily life?</td>
<td>Little or no impact–Very great impact</td>
</tr>
</tbody>
</table>

Scale Reliability
Scale reliability for the innovativeness construct was assessed using Cronbach’s Alpha. A summary of these reliability tests for each pretest are shown below:

Table 4.3: Reliability Tests for Perceived Innovativeness

<table>
<thead>
<tr>
<th></th>
<th>Earphones α</th>
<th>Sunscreen α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest 1</td>
<td>0.682</td>
<td>0.836</td>
</tr>
<tr>
<td>Pretest 2</td>
<td>0.506</td>
<td>0.897</td>
</tr>
</tbody>
</table>

Cronbach’s Alpha was low for the earphones and high for the sunscreen in pretest 1. As these scales have been used in prior research, they were left in the survey for further examination in pretest 2. In pretest 2, consistent with the results obtained in pretest 1, Cronbach’s Alpha for the earphones was low, and for the sunscreen was high (see table 4.3). On reflection, this could be due to the nature of the product categories under investigation. In particular, the two scales adapted from Olshavsky and Spreng (1996) define innovativeness as:

i. How innovative consumers perceive the product to be.
ii. How much impact the product would have on their daily life.
For products such as sunscreens, which are necessities (especially in hot climates such as in our region), both of these values are likely to be higher, the newer the product is because most respondents would be likely to purchase such a product and therefore, the impact on their daily life would be higher. However, for electronics equipment which might be defined as a luxury, the two scales are likely to be related differently.

In particular, many consumers would be unlikely to purchase such products, regardless of how innovative they perceived them to be, if they were not interested in purchasing them — this would have less impact on their daily lives. Therefore, I1 may be high but I2 may always be low if consumers are not interested in that product. The implication is that this multi-item measure is perhaps not of much use for product categories such as earphones. Measuring innovativeness with the first scale is likely to provide a more parsimonious scale than the multi-item scale, at no expense to the results. This is further examined below where differences in means for the single item scale and the multi item scale are compared.

*Differences in Innovativeness between Treatments*

Because pretest 1 was a small pretest designed to get more qualitative feedback on the manipulations only the innovative sunscreen and existing earphones were tested to get some initial feedback on the instrument (see section 4.4.1.1).

From the first pretest, paired samples t-tests revealed statistically and substantively significant differences in the perceived innovativeness scale between the existing and innovative manipulations for each item in the scale and the summated scale (see appendix 1). This was encouraging, and showed that respondents did perceive the treatments differently with respect to how innovative they were. Even though different product categories were being tested the innovative treatment (sunsreen) was perceived as more innovative than the existing treatment (earphones).
However, whilst this was part of what was intended by the manipulations, a difference between the two in perceived innovativeness was necessary but not sufficient for the success of the manipulations. The two products had to be perceived by respondents as *existing* and *innovative*, not just more or less innovative. Thus, whilst the innovative sunscreen was perceived as innovative with a mean of 5.25, the existing earphones were perceived as somewhat innovative too with a mean of 3.64 (see appendix 1). Therefore, the distinction between the treatments within their respective categories was heightened for more rigorous testing in pretest 2.

Pretest 2 extended the testing stage by analysing all experimental treatments. Having amended the concept statements based on the insight gained from pretest 1, mean innovativeness based on the summated scale was found to be different between treatments as expected and mean innovativeness for the existing treatments was lower than before. Further analysis revealed this to be the case regardless of whether or not I2, a potential source of measurement error, was dropped (i.e. the impact measure of innovativeness). Thus with parsimony in mind, and minimising potential measurement error, only I1 was included in the final experiment (see appendix 1 for further justification). Table 4.4 reports mean innovativeness, using I1 as a single item measure in pretest 2:

| Table 4.4: Differences in Innovativeness between Treatments |
|-----------------------------------------------|--------|--------|
| **Earphones**                           | **Existing** | **Innovative** | **t-value**<br>**(sig.)** |
| **Mean:**                                | 2.923  | 5.200  | 5.015<br>**0.000** |
| **St. Dev:**                             | 1.15   | 1.44   |                   |
| **N:**                                   | 15     | 13     |                   |
| **Sunscreen**                            | **Mean:** | **5.308** | **t-value**<br>**(sig.)** |
| **St. Dev:**                             | 1.59   | 1.33   |                   |
| **N:**                                   | 15     | 13     |                   |

The t-values show that these differences were highly statistically significant indicating the measures were perceived by respondents in the way intended.
4.4.3.2 **Product Category Knowledge**
As a further manipulation check on why consumers responded the way they did, it was important to ascertain if knowledge differences about the product category were different between treatments, which could have a potentially confounding effect upon the results. As such, a multi-item scale to measure consumer product knowledge was included in the questionnaire, adapted from Cowley and Mitchell (2003):

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Question</th>
<th>Anchors</th>
</tr>
</thead>
<tbody>
<tr>
<td>K1</td>
<td>How knowledgeable are you about the product category being tested?</td>
<td>Not very knowledgeable-Very knowledgeable</td>
</tr>
<tr>
<td>K2</td>
<td>How familiar are you with the product category being tested?</td>
<td>Not very familiar-Very familiar</td>
</tr>
</tbody>
</table>

**4.4.4 Measurement: The Independent and Dependent Variables**

**4.4.4.1 The Search for Scales**
Many of the constructs in the model have been measured before in prior studies, with measures that have been empirically validated. As with the manipulation checks, to avoid reinventing the wheel the literature was searched for measures of the constructs to be tested. This included operationalising TV, AV, purchase intention, confidence in reference price and the highest price and measures of highest price and the reference prices.

**4.4.4.2 Transaction Value and Acquisition Value**
Measures of TV and AV were adapted from Urbany et al. (1997) and Bearden et al. (1992) and were three seven point scales with bipolar adjectives shown in table 4.6.

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Question</th>
<th>Anchors</th>
</tr>
</thead>
<tbody>
<tr>
<td>TV1</td>
<td>Compared to what I expect [brand name] would normally sell for, the advertised price of [brand name] is:</td>
<td>Low–High</td>
</tr>
<tr>
<td>TV2</td>
<td>Compared to what I expect [brand name] would normally sell for, the advertised price of [brand name] is:</td>
<td>Inexpensive–Expensive</td>
</tr>
<tr>
<td>TV3</td>
<td>Compared to what I expect [brand name] would normally sell for, the advertised price of [brand name] is:</td>
<td>Underpriced–Overpriced</td>
</tr>
</tbody>
</table>
The measures for AV were three seven point scales measuring consumer value perceptions to the statements:

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Question</th>
<th>Anchors</th>
</tr>
</thead>
<tbody>
<tr>
<td>AV1</td>
<td>Overall, the price of [brand name] is:</td>
<td>Very Poor Value for Money-Very Good Value for Money</td>
</tr>
<tr>
<td>AV2</td>
<td>Overall, [brand name] is good value for money.</td>
<td>Strongly Disagree-Strongly Agree</td>
</tr>
<tr>
<td>AV3</td>
<td>[Brand name] is an excellent buy for the money.</td>
<td>Strongly Disagree-Strongly Agree</td>
</tr>
</tbody>
</table>

TV and AV are theoretically distinct constructs, as demonstrated by a number of studies (Bearden et al. 1992; Grewal, Monroe and Krishnan 1998; Urbany et al. 1997). However, researchers have had a more difficult task of demonstrating their empirical distinction (Grewal, Monroe and Krishnan 1998). Grewal, Monroe and Krishnan (1998) offer a different set of scales which the authors claim more adequately distinguish TV and AV than prior measures. However, these scales are longer and measure consumer reactions to a sale price, not an actual price, limiting their use in this situation. The scales offered above have been shown to distinguish adequately between TV and AV and appear to be more suitable for the current research purpose.

Scale Reliability
Reliability tests using Cronbach’s Alpha were run on each of the constructs separately to measure internal consistency of the items. These are shown in table 4.8.

<table>
<thead>
<tr>
<th></th>
<th>Earphones</th>
<th>Sunscreen</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TV α</td>
<td>AV α</td>
</tr>
<tr>
<td>Pretest 1</td>
<td>0.645</td>
<td>0.909</td>
</tr>
<tr>
<td>Pretest 2</td>
<td>0.906</td>
<td>0.906</td>
</tr>
</tbody>
</table>

For the sunscreen, the α’s were high for both TV and AV, revealing an internally consistent set of scales. The earphones revealed a somewhat different picture with a high
Cronbach’s Alpha for AV but a low Cronbach’s Alpha for TV. Because three out of the four sets of items revealed high Alphas and because these scales have theoretical justification from prior research, they were left in for subsequent testing.

In pretest 2, all the Alpha’s were high, lending further credence to the use of these scales in the final experiment. Pretest 2 also provides further evidence for the inclusion of the TV scales despite the apparent anomaly in pretest 1.

**Construct Validity**

With evidence of internal consistency between items, tests were conducted for unidimensionality and discriminant validity, using exploratory factor analysis with a Varimax rotation. During pretest 1 there were some minor issues demonstrating empirical distinction between TV and AV (see appendix 2).

Further tests were run on the data from pretest 2. Table 4.9 shows the results of these tests for the earphones:

<table>
<thead>
<tr>
<th>Question</th>
<th>Item</th>
<th>Communality</th>
<th>Factor 1</th>
<th>Factor 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q9a TV1</td>
<td>0.819 0.868</td>
<td>-0.257</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q9b TV2</td>
<td>0.887 0.893</td>
<td>-0.298</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q9c TV3</td>
<td>0.831 0.881</td>
<td>-0.232</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q10 AV1</td>
<td>0.760 -0.365</td>
<td>0.792</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q11 AV2</td>
<td>0.897 -0.238</td>
<td>0.917</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q12 AV3</td>
<td>0.869 -0.212</td>
<td>0.908</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This time all communalities were high enough and the data exhibited empirical distinction between constructs in the way hypothesised. Likewise, the same pattern was repeated for the sunscreen data and is shown in Table 4.10. Therefore, the empirical and theoretical evidence presented provides further evidence that TV and AV are distinct constructs. It would appear that based upon these results and the results for the reliability tests that the
apparent discrepancy in pretest 1 was an anomaly, providing evidence for the use of these scales in experiment 1.

Table 4.10: Factor Matrix for Transaction and Acquisition Value (Sunscreen)

<table>
<thead>
<tr>
<th>Question</th>
<th>Item</th>
<th>Communality</th>
<th>Factor 1</th>
<th>Factor 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q24a</td>
<td>TV1</td>
<td>0.877</td>
<td>0.405</td>
<td>0.845</td>
</tr>
<tr>
<td>Q24b</td>
<td>TV2</td>
<td>0.936</td>
<td>0.528</td>
<td>0.811</td>
</tr>
<tr>
<td>Q24c</td>
<td>TV3</td>
<td>0.794</td>
<td>-0.363</td>
<td>0.814</td>
</tr>
<tr>
<td>Q25</td>
<td>AV1</td>
<td>0.904</td>
<td>0.853</td>
<td>-0.420</td>
</tr>
<tr>
<td>Q26</td>
<td>AV2</td>
<td>0.965</td>
<td>0.891</td>
<td>-0.414</td>
</tr>
<tr>
<td>Q27</td>
<td>AV3</td>
<td>0.897</td>
<td>0.830</td>
<td>-0.457</td>
</tr>
</tbody>
</table>

4.4.4.3 Purchase Intention

Measures for behavioural intentions and willingness to buy were also taken from Urbany et al. (1997) and Bearden et al. (1992). The initial draft of the survey included the measures shown in table 4.11, adapted for the context of this research:

Table 4.11: Measures of Purchase Intention

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Question</th>
<th>Anchors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wi</td>
<td>How willing would you be to purchase this product?</td>
<td>No chance I would buy this product–Certainly would buy this product</td>
</tr>
<tr>
<td>PI1</td>
<td>Please indicate how likely or how certain you would be to purchase this product.</td>
<td>Very unlikely–Very likely</td>
</tr>
<tr>
<td>PI2</td>
<td>Please indicate how likely or how certain you would be to purchase this product.</td>
<td>Uncertain–Certain</td>
</tr>
<tr>
<td>PI3</td>
<td>Please indicate how likely or how certain you would be to purchase this product.</td>
<td>Improbable–Probable</td>
</tr>
</tbody>
</table>

Scale Reliability

Reliability for the purchase intention scales was assessed by calculating Cronbach’s $\alpha$, shown in table 4.12. Cronbach’s Alpha for the sunscreen was 0.847 and for the earphones was 0.951. Yet if Wi was removed Cronbach’s Alpha for the scale would increase to 0.972 for both the sunscreen and earphones data. As such, this item was removed, leaving the three purchase intention items. However, as the Cronbach’s Alpha for these three items was so high (i.e. 0.972), this would conform with some of the qualitative comments made by subjects in pretest 1, that the scales were repetitive. Therefore, in the interests of
parsimony and creating a shorter questionnaire with no apparent loss of accuracy, two of these purchase intention measures were also deleted (Rossiter 2002). PI1 was left in for the final survey.

Table 4.12: Scale Reliability for Purchase Intention

<table>
<thead>
<tr>
<th>Earphones</th>
<th>Sunscreen</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>α if deleted</td>
</tr>
<tr>
<td>Wi Q14</td>
<td>0.972</td>
</tr>
<tr>
<td>PI1 Q15a</td>
<td>0.732</td>
</tr>
<tr>
<td>PI2 Q15b</td>
<td>0.741</td>
</tr>
<tr>
<td>PI3 Q15c</td>
<td>0.721</td>
</tr>
</tbody>
</table>

4.4.4.4 Reference Price
Measures of expected price, fair price and highest price were open ended questions adapted from prior research (i.e. see Slonim and Garbarino 2003):

Table 4.13: Questions for Reference Price and Highest Price

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fair Price</td>
<td>What is your best estimate of a fair price for this product?</td>
</tr>
<tr>
<td>Expected Price</td>
<td>What price do you expect to pay for this product?</td>
</tr>
<tr>
<td>Highest Price</td>
<td>What would be the highest price you would be willing to pay for this product?</td>
</tr>
</tbody>
</table>

The pretests revealed some confusion with the highest price question. The initial question asked “What would be the highest price you would pay for this product?”. Some subjects thought this meant the highest price this product would be in the shops. As such it was amended to the above statement to emphasise how much they would be willing to pay.

4.4.4.5 Confidence in Reference Price
The scales for confidence in reference price and confidence in highest price were single item, seven point numerical scales, anchored by “Not at all confident” and “Very confident”, and adapted from previously validated measures (i.e., Vaidyanathan 2000). These are shown in table 4.14.
Table 4.14: Question for Confidence in Reference Price Perceptions

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Question</th>
<th>Anchors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confidence in Fair Price</td>
<td>How confident are you that this is a fair price for this product?</td>
<td>Not at all confident-Very confident</td>
</tr>
<tr>
<td>Confidence in Expected Price</td>
<td>How confident are you that this is what you expect to pay for this product?</td>
<td>Not at all confident-Very confident</td>
</tr>
<tr>
<td>Confidence in Highest Price</td>
<td>How confident are you that this is the highest price you would pay for this product?</td>
<td>Not at all confident-Very confident</td>
</tr>
</tbody>
</table>

Based on feedback from the pretests, minor amendments to question wording were undertaken. For instance, the words “fair”, “expect” and “highest” were underlined for emphasis in distinguishing between concepts.

4.5 Study Implementation

Having derived the measures and stimuli from prior research, and refining these through two pretests, the first experiment was conducted. We now discuss implementation of the study including sampling considerations and stimulus administration.

4.5.1 Sampling

4.5.1.1 Sample Selection

The experiment was promoted in undergraduate and postgraduate marketing classes at a metropolitan university. Following standard ethics procedures at the University, participation was voluntary but encouraged with incentives. The experiment was promoted on course websites and respondents clicked on a hyperlink to take them to the main experiment’s web page. On the main web page, after reading an introductory statement about the questionnaire and ethics guidelines, subjects proceeded by clicking on a ‘Next’ button which randomly allocated them to one of the experimental groups.

4.5.1.2 Justification of Sample

A student sample was used for this study. This is justified for three main reasons:

i. The product being studied is a product applicable to the student market.

ii. The sample under investigation is likely to be more homogenous than a more representative sample of the population (Peterson 2001).
iii. When testing causal relationships it is the effect of a certain manipulation which is of
interest to researchers, not so much the magnitude of that effect (Kardes 1996).

Studies using similar procedures and with similar objectives often use a student sample
(for instance, see Carpenter and Nakamoto 1989; Grewal, Monroe and Krishnan 1998;
Kardes et al. 1993; Moreau, Markman and Lehmann 2001).

4.5.1.3 Sample Size
A survey of the literature on experimentation suggests that a sufficient number of
respondents being exposed to each experimental treatment should be at least 30, although
small variations under 30 are not likely to have a significant impact (Keppel and Wickens
2004). This would suggest that with eight experimental groups, a sufficient total sample
size with even allocation across treatments would be 240. Respondents were asked to
respond to two products, effectively halving the sample size required. Respondents were
either exposed to the existing sunscreen and the innovative earphones or alternatively the
existing earphones and the innovative sunscreen. This was replicated twice as the
instruments differed in terms of whether or not respondents were asked their expected or
fair price perceptions. The final sample size totalled 276 as shown below:

<table>
<thead>
<tr>
<th>Category</th>
<th>Earphones</th>
<th>Sunscreen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovativeness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Existing</td>
<td>Fair</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>Expected</td>
<td>39</td>
</tr>
<tr>
<td>Innovative</td>
<td>Fair</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>Expected</td>
<td>38</td>
</tr>
</tbody>
</table>

The main type of analysis to be performed on these cells is a comparison of correlation
coefficients. This is a sufficient number of respondents per cell for this type of analysis
(see section 5.2.4). Indeed, several widely quoted O’Dell award winning consumer
behaviour studies have used less than the numbers quoted above (i.e. Carpenter, Glazer and Nakamoto 1994; Carpenter and Nakamoto 1989; Nowlis and Simonson 1996).

4.5.2 Stimulus Administration

4.5.2.1 Procedure

The experiment was advertised on course websites with a number of prizes as incentives including a chocolate bar and a can of soft drink for the first 150 respondents, along with entry into a prize draw to win one of 3x$150 McGraw Hill book vouchers, 1x$100 John Wiley book voucher, 5x2 movie tickets, 2x$25 café vouchers or 20x$5 café vouchers.

Subjects were told that if they wanted to participate to follow a hyperlink from their course website. This directed them to an external web page where they were briefed on the broad purpose of the experiment and the prizes for participation.

Subjects were told to imagine they were purchasing a new product and to read the product descriptions carefully. Brevity of the concept statements was a key concern to reduce respondent fatigue. Subjects were then asked to answer questions relating to the product’s innovativeness and their reference price perceptions. Then subjects were exposed to the price of the brand and asked further questions relating to their value perceptions, purchase intentions and product knowledge. Subjects were not exposed to the price of the brand within the concept statements because if they were then asked their expected price then the obvious answer would be to write down the actual price of the brand.

The same task was then repeated, with subjects being exposed to the other experimental treatment and then asked the same questions concerning their product perceptions. Finally, some basic demographic questions were asked to describe sample characteristics.

Respondents were unaware that this was an experiment and it was promoted as a survey. The broad purpose of the survey was made known to respondents (i.e. they were told the
survey was about perceptions of new products), but the specific purpose was not made known to them. This was done to reduce demand artefacts.

Using the ‘Full Window’ Java Script code, subjects were unable to view the assigned web page’s URL, nor to utilize their web browser’s navigation bar to move back and forth through the experiment. This further ensured that participants were unaware of the experimental nature of the research and prevented them from going back and forth within the experiment. This research was approved by the University’s ethics committee.

4.5.2.2 The Benefits of a Web Experiment
A web experiment was used as it provided a number of potential advantages over a paper and pencil experiment. Firstly, subjects were not forced to participate during class time, suggesting less reluctance to answer honestly. Subjects were also able to proceed in their own time suggesting more accurate answers.

4.5.2.3 Randomisation
To guard against other threats to internal validity subjects were randomly allocated to treatments (Cook and Campbell 1979). After clicking the ‘Next’ button on the introductory web page (refer to appendix 3) Java Script code was activated, which randomly assigned each participant to one of the treatment web pages. To do this, the Java Script code generated a random number between one and four representing each of the potential survey forms. The participant’s web browser was then redirected to the corresponding URL. Participants were unaware of the existence of the other web pages and hence were unaware of the experimental nature of the research.

4.6 Conclusion
Chapter 4 specified the research and experimental design of study 1 and reported on the results of two pretests used to design the instrument for experiment 1. It then described how potential confounds were controlled for isolation, or measured for effect and
presented how the measures were selected. The sampling procedure and survey administration were then described. Chapter 5 proceeds by analysing the results of this experiment and reporting on the research question of which reference prices do consumers utilise for new product categories, established in chapter 2.
5.1 Introduction
Chapter 5 is the final chapter for study 1, which tested the measures of reference price perceptions that are most suitable to use for new product categories. It proceeds by validating the measures used in the instrument, analysing the manipulation checks for internal validity, and then shows the degree to which the hypotheses developed in chapter 3 hold, and the implications of these findings for pricing new products. The findings from the analysis are incorporated into study 2 to provide valid measurements to test the formation and evolution of reference price perceptions.

5.2 Analysis and Results
5.2.1 Reliability: Transaction Value, Acquisition Value and Product Category Knowledge
Final checks were performed on the data to assess internal consistency of the measures. Cronbach’s Alpha values for TV and AV are shown below:

<table>
<thead>
<tr>
<th></th>
<th>Earphones</th>
<th>Sunscreen</th>
</tr>
</thead>
<tbody>
<tr>
<td>TV</td>
<td>0.942</td>
<td>0.926</td>
</tr>
<tr>
<td>AV</td>
<td>0.909</td>
<td>0.910</td>
</tr>
</tbody>
</table>

These results demonstrate a set of highly reliable scales to measure TV and AV. Further reliability tests were performed on the measures of knowledge and familiarity and are shown below in table 5.2:

<table>
<thead>
<tr>
<th></th>
<th>Earphones</th>
<th>Sunscreen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product Category Knowledge</td>
<td>0.877</td>
<td>0.933</td>
</tr>
</tbody>
</table>
The Cronbach’s Alpha values show a highly internally consistent scale for product category knowledge, suitable for summation in further analyses.

5.2.2 Validity: Transaction Value and Acquisition Value
Construct validity was again assessed for TV and AV using factor analysis with a Varimax rotation. These factor analyses produced the following results.

<table>
<thead>
<tr>
<th>Question</th>
<th>Item</th>
<th>Communality</th>
<th>Factor 1</th>
<th>Factor 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q9a</td>
<td>TV1</td>
<td>0.908</td>
<td>0.905</td>
<td>-0.298</td>
</tr>
<tr>
<td>Q9b</td>
<td>TV2</td>
<td>0.927</td>
<td>0.924</td>
<td>-0.272</td>
</tr>
<tr>
<td>Q9c</td>
<td>TV3</td>
<td>0.856</td>
<td>0.861</td>
<td>-0.339</td>
</tr>
<tr>
<td>Q10</td>
<td>AV1</td>
<td>0.858</td>
<td>-0.257</td>
<td>0.890</td>
</tr>
<tr>
<td>Q11</td>
<td>AV2</td>
<td>0.850</td>
<td>-0.245</td>
<td>0.889</td>
</tr>
<tr>
<td>Q12</td>
<td>AV3</td>
<td>0.859</td>
<td>-0.471</td>
<td>0.798</td>
</tr>
</tbody>
</table>

Table 5.4: Factor Matrix for Transaction and Acquisition Value (Sunscreen)

<table>
<thead>
<tr>
<th>Question</th>
<th>Item</th>
<th>Communality</th>
<th>Factor 1</th>
<th>Factor 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q24a</td>
<td>TV1</td>
<td>0.899</td>
<td>0.909</td>
<td>-0.270</td>
</tr>
<tr>
<td>Q24b</td>
<td>TV2</td>
<td>0.920</td>
<td>0.917</td>
<td>-0.281</td>
</tr>
<tr>
<td>Q24c</td>
<td>TV3</td>
<td>0.816</td>
<td>0.856</td>
<td>-0.288</td>
</tr>
<tr>
<td>Q25</td>
<td>AV1</td>
<td>0.854</td>
<td>-0.190</td>
<td>0.905</td>
</tr>
<tr>
<td>Q26</td>
<td>AV2</td>
<td>0.879</td>
<td>-0.294</td>
<td>0.890</td>
</tr>
<tr>
<td>Q27</td>
<td>AV3</td>
<td>0.834</td>
<td>-0.394</td>
<td>0.824</td>
</tr>
</tbody>
</table>

Both product categories exhibited empirical distinction between the constructs as hypothesised lending further credence to theoretical explanations of these two components of value and suggesting accurate measurement of the constructs.

5.2.3 Manipulation Checks
Mean innovativeness for the existing and innovative concept statements, by product category is displayed in table 5.5 along with independent samples t-tests used to statistically test whether or not these differences could have occurred by chance. The t-tests indicate that these differences in means are unlikely to have occurred by chance providing further substantiation that experimental treatments were perceived as intended.
Table 5.5: Differences in Mean Innovativeness by Treatment

<table>
<thead>
<tr>
<th></th>
<th>Existing</th>
<th>Innovative</th>
<th>t-value (sig.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earphones</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.35</td>
<td>4.96</td>
<td>-6.683 (0.000)</td>
</tr>
<tr>
<td></td>
<td>1.67</td>
<td>1.25</td>
<td></td>
</tr>
<tr>
<td></td>
<td>81</td>
<td>72</td>
<td></td>
</tr>
<tr>
<td>Sunscreen</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.94</td>
<td>4.50</td>
<td>-6.382 (0.000)</td>
</tr>
<tr>
<td></td>
<td>1.52</td>
<td>1.56</td>
<td></td>
</tr>
<tr>
<td></td>
<td>72</td>
<td>90</td>
<td></td>
</tr>
</tbody>
</table>

5.2.4 Analysis Procedure

To test the hypotheses, the relationships between constructs were statistically examined with regression and correlation techniques. These techniques produced coefficients which were compared between experimental treatments. The comparison of coefficients was done using the Fisher Z-transformation, a procedure analogous to a t-test, where:

\[
Z = \frac{1}{2} \ln \left( \frac{1 + \rho}{1 - \rho} \right)
\]

The differences were calculated using the following equation:

\[
z = \frac{(Z_1 - Z_2)}{\sqrt{\frac{1}{n_1 - 3} + \frac{1}{n_2 - 3}}}
\]

This procedure is outlined in Cohen and Cohen (2003, p. 54). The assumptions of the comparison of correlation coefficients are relatively relaxed and include bivariate normality and sample sizes of at least ten.

5.2.4.1 The Basic Model: Some General Relationships

The earphones model demonstrated good fit with an R² of 0.457 and a highly significant F-statistic (F₁,₁₄₈ = 62.312; p = 0.000), shown in figure 5.1. The standardised coefficients were of the expected signs. That is, higher AV is associated with greater purchase intention and higher TV is associated with greater purchase intention. The AV coefficient is highly statistically significant. However, the TV coefficient is not statistically significant. With
theoretical evidence for its inclusion in the model and empirical validation for the sunscreen data (see figure 5.2), it will still be treated as a predictor.

**Figure 5.1: Correlations of TV and AV upon Purchase Intention (Earphones)**

![Diagram showing correlations]

The sunscreen model is shown in figure 5.2 and also demonstrates good fit with an $R^2$ of 0.465 and a highly significant $f$-statistic ($f_{2,158} = 68.757; p = 0.000$). The standardised coefficients were of the expected signs. That is, higher AV is associated with greater purchase intention$^3$ and higher TV is associated with greater purchase intention. Both of these coefficients are highly statistically significant.

**Figure 5.2: Correlations of TV and AV upon Purchase Intention (Sunscreens)**

![Diagram showing correlations]

With each dataset, there appears to be a difference between the TV and AV standardised coefficients. Using Fisher’s Z-transformation these differences are statistically compared in table 5.6.

---

$^3$ In fact, the signs in the output for TV are negative. However, this was because of question wording (i.e. lower numbers for TV were associated with higher TV, whereas higher numbers for purchase intention were associated with higher purchase likelihood). Signs in the above diagrams were reversed for simplicity.
Table 5.6: Differences in Predictive Ability between Transaction and Acquisition Value

<table>
<thead>
<tr>
<th>Correlation Coefficient</th>
<th>TV</th>
<th>AV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sunscreen</td>
<td>0.162</td>
<td>0.575</td>
</tr>
<tr>
<td>Sig.</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>Earphones</td>
<td>0.121</td>
<td>0.593</td>
</tr>
<tr>
<td>Sig.</td>
<td>0.000</td>
<td></td>
</tr>
</tbody>
</table>

These differences are highly statistically significant, indicating that $AV$ is a better predictor than $TV$. Overall, the model appears to be a reasonable fit and can therefore be used for subsequent hypothesis testing. However, before proceeding with subsequent hypothesis testing we discuss the meaning of these results in the context of the extant literature.

5.2.4.2 Transaction Value and Acquisition Value: Relative Effects

In the above regressions, AV and TV were good predictors of purchase intention, consistent with past research (Bearden et al. 1992; Grewal, Monroe and Krishnan 1998; Urbany et al. 1997). The relative effects of AV and TV on purchase intention was also consistent with past research, with AV a stronger predictor of purchase intention than TV. Therefore, the data supported the basic value decomposition model, provided in past empirical studies, across two different product categories and with relatively consistent results.

Past research has claimed “TU may be influential only in specific ‘sale’ contexts” (Urbany et al. 1997). This research demonstrates that the TV construct is in fact more powerful than that and consumers may respond with reference to internal judgments regardless of whether or not a sale exists. That is, reference price is not only important with sale prices. Even if consumers are not necessarily knowledgeable about the prices of products, they may believe they are knowledgeable, and indeed form perceptions about how much a product should cost and thus managing these perceptions more effectively is important in influencing purchase intention. These findings replicate other findings that suggest
consumers do respond to actual price based upon their own perceptions of what that price should be and the value of that product to them.

Also consistent with other studies, the overall worth of that product to them (i.e. AV) is a more important determinant of purchase intention than the initial surprise or “sticker shock” (Winer 1986) effect associated with a price outside of their own expectations or judgements of fairness (i.e. TV). This is an important finding. Whilst managing consumer price expectations and judgments of fairness are somewhat important, managers should focus more attention on promoting the product’s overall value to consumers. Indeed, as the name “sticker shock” suggests, the role of TV appears to be somewhat temporary, and whilst useful in understanding consumer response to price, it is less important than understanding overall value or AV. These findings were consistent across the two product categories being tested in this research, and with other research (i.e. Grewal, Monroe and Krishnan 1998; Urbany et al. 1997). This provides a strong foundation for further hypothesis testing.

5.2.5 Hypothesis 1a and 1b — Determining the Best Measure of Reference Price

H$_{1a}$ stated “When perceived innovativeness is higher, fair price is more likely to be used as a reference price by consumers than expected price”. Conversely H$_{1b}$ stated, “…when perceived innovativeness is lower, expected price is more likely to be used as a reference price by consumers than fair price”.

To analyse these assertions, correlation coefficients were calculated for each measure of reference price with the scaled TV measure for each of the experimental conditions$^4$. This is similar to the procedure outlined in Bearden et al. (1992). Given that our model predicts

---

$^4$ Before being calculated, one extreme outlier was removed from the data. This was respondent 2 whose reference price estimate was around six times the actual price. This one outlier significantly biased the normality of the distribution and thus the strength of the correlation coefficient.
TV is a direct function of reference price, then the reference price measure (i.e. fair or expected) which correlates most highly with the scaled measure of TV will be the better measure of reference price to use, as long as the difference is statistically significant. The final correlation coefficients are presented in the table below, with the significance value from the comparison of coefficients using Fisher’s Z-transformation directly beneath the pair of coefficients under comparison.

Table 5.7: Differences in Correlation Coefficients by Treatment

<table>
<thead>
<tr>
<th></th>
<th>Earphones</th>
<th></th>
<th>Sunscreen</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fair</td>
<td>Expected</td>
<td>Fair</td>
<td>Expected</td>
</tr>
<tr>
<td>Existing</td>
<td>0.674**</td>
<td>0.737**</td>
<td>0.573**</td>
<td>0.821**</td>
</tr>
<tr>
<td>n = 27</td>
<td>n = 39</td>
<td>n = 34</td>
<td>n = 37</td>
<td></td>
</tr>
<tr>
<td>Sig.</td>
<td>0.653</td>
<td></td>
<td>0.0408</td>
<td></td>
</tr>
<tr>
<td>Innovative</td>
<td>0.806**</td>
<td>0.550</td>
<td>0.829</td>
<td>0.322</td>
</tr>
<tr>
<td>n = 33</td>
<td>n = 38</td>
<td>n = 26</td>
<td>n = 39</td>
<td></td>
</tr>
<tr>
<td>Sig.</td>
<td>0.0457</td>
<td></td>
<td>0.00143</td>
<td></td>
</tr>
</tbody>
</table>

* Significant at the 5% level
** Significant at the 1% level

For H1a, the assertion that fair price is a better predictor of TV than expected price for innovative products is strongly supported by both product categories. The coefficient for fair price is higher than the coefficient for expected price for both the earphones (i.e. corr_{fair} = 0.806; corr_{exp} = 0.550) and the sunscreen data (i.e. corr_{fair} = 0.829; corr_{exp} = 0.322) and these differences are statistically significant using the Fisher Z-Transformation to compare coefficients.

An alternative explanation for the results in H1a could be that fair price is a better predictor of TV, regardless of whether the product is innovative or existing. Thus H1b extended H1a by stating that expected price is more likely to be used as a reference price than fair price for existing categories. For the sunscreen data, this assertion is strongly supported. The coefficient for expected price is higher than the coefficient for fair price (i.e. corr_{fair} = 0.573; corr_{exp} = 0.821) and this difference is statistically significant. For the earphones data the coefficients are in the predicted direction with the coefficient for fair price lower
than the coefficient for expected price (i.e. \( \text{corr}_{\text{fair}} = 0.674; \ \text{corr}_{\text{exp.}} = 0.737 \)). However, this difference is not statistically significant. Thus, there is clear support for \( H_{1b} \) for the sunscreen data but no statistical support for the earphones data.

Taken together, these findings validate the utilisation of different reference prices for innovative and existing products. These findings provide new theory in terms of the situations and contexts in which different reference price measures should be used. We now test for the moderating influence of product category knowledge.

### 5.2.5.1 The Moderating Effect of Knowledge

Product category knowledge has been found to moderate the reference price effect in prior studies (Urbany et al. 1997; Vaidyanathan et al. 2000). Table 5.8 below compares the coefficients from table 5.7 (in parentheses) with the partial correlation coefficients controlling for product category knowledge.

<table>
<thead>
<tr>
<th></th>
<th>Earphones</th>
<th>Sunscreen</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fair</td>
<td>Expected</td>
</tr>
<tr>
<td>Existing</td>
<td>0.667</td>
<td>0.748</td>
</tr>
<tr>
<td></td>
<td>(0.674)</td>
<td>(0.737)</td>
</tr>
<tr>
<td>Innovative</td>
<td>0.814</td>
<td>0.526</td>
</tr>
<tr>
<td></td>
<td>(0.806)</td>
<td>(0.550)</td>
</tr>
</tbody>
</table>

Except for the existing earphones, knowledge appears to enhance the reference price effect by increasing the magnitude of the larger coefficients and decreasing the magnitude of the existing coefficients, enhancing our confidence in the findings for \( H_{1a} \) and \( H_{1b} \) (i.e. the significance values will now be lower). However, comparing the marginal impact of product category knowledge over the existing coefficients, there are only small differences and these are not statistically significant. Therefore, knowledge does not appear to have a meaningful effect.
5.2.5.2 Hypotheses 1a and 1b: Discussion

H₁a was clearly confirmed for the sunscreen data but not statistically confirmed for the earphones data, although the results for the earphones were in the expected direction. Of more interest, H₁b was confirmed for the sunscreen and the earphones data. Specifically, there was evidence that expected price was a better predictor of purchase intention than fair price for the existing products and fair price was a better predictor for the innovative products. These findings are consistent with prior research which suggests reference price utilisation is product category specific (Lowengart 2002; Slonim and Garbarino 1999; Yadav and Seiders 1998). Yet this research goes further by not only offering theory about the use of reference price measures in different situations, but statistically testing this theory. This is important and stresses the need to consider contexts as opposed to a blanket approach of ‘one size fits all’. It appears that consumers go through different judgment processes when assessing value for new and existing products and understanding these better is important in influencing these value perceptions. The above approach is a practical method for uncovering how consumers attribute value in different circumstances and can be used to understand consumers and their thought processes better.

In light of the findings this would suggest that managers should focus on promoting the fairness of a new product’s price in the initial stages of its introduction and then as the product becomes more established in the market should try to manage consumer expectations of its price. Ways of promoting fairness might involve emphasising the high cost of research and development and the benefits of the new product over the prior product generation, to promote dual entitlement (Campbell 1999a, b; Kahneman, Knetsch and Thaler 1986; Vaidyanathan and Aggarwal 2003). For many products consumers may not understand all the costs involved, such as for pharmaceuticals with huge direct and indirect costs (i.e. the costs of drug development that failed) generally not visible to consumers. This could be done through catchlines such as “we spend a lot on developing
our products to benefit you” or “we go to a lot of effort to bring you value by developing products which suit your needs”. We now move on with the analysis to understand the role of confidence in reference price estimates for new products.

5.2.6 Hypothesis 2 — The Effect of Reference Price Confidence

H2 states, “For innovative products, variation in value perceptions will be better explained by including confidence in reference price models”. The comparison of correlation coefficients for reference price and the interaction between reference price and confidence in reference price are shown below:

Table 5.9: The Effect of Confidence on Transaction and Acquisition Value

<table>
<thead>
<tr>
<th>Experimental Condition</th>
<th>Relationship</th>
<th>ρ</th>
<th>sig</th>
<th>Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 11 Earphones (Existing Fair)</td>
<td>(P_r-P) → TV</td>
<td>-0.674</td>
<td>0.000</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>(P_r-P) x CP_r → TV</td>
<td>-0.493</td>
<td>0.010</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>(P_r-P) → AV</td>
<td>0.708</td>
<td>0.000</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>(P_r-P) x CP_r → AV</td>
<td>0.755</td>
<td>0.000</td>
<td>26</td>
</tr>
<tr>
<td>Group 12 Earphones (Innovative Fair)</td>
<td>(P_r-P) → TV</td>
<td>-0.794</td>
<td>0.000</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>(P_r-P) x CP_r → TV</td>
<td>-0.706</td>
<td>0.000</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>(P_r-P) → AV</td>
<td>0.654</td>
<td>0.000</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>(P_r-P) x CP_r → AV</td>
<td>0.634</td>
<td>0.000</td>
<td>34</td>
</tr>
<tr>
<td>Group 21 Earphones (Existing Expected)</td>
<td>(P_r-P) → TV</td>
<td>-0.737</td>
<td>0.000</td>
<td>39</td>
</tr>
<tr>
<td></td>
<td>(P_r-P) x CP_r → TV</td>
<td>-0.698</td>
<td>0.000</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>(P_r-P) → AV</td>
<td>0.460</td>
<td>0.003</td>
<td>39</td>
</tr>
<tr>
<td></td>
<td>(P_r-P) x CP_r → AV</td>
<td>0.431</td>
<td>0.006</td>
<td>39</td>
</tr>
<tr>
<td>Group 22 Earphones (Innovative Expected)</td>
<td>(P_r-P) → TV</td>
<td>-0.550</td>
<td>0.000</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>(P_r-P) x CP_r → TV</td>
<td>-0.445</td>
<td>0.006</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>(P_r-P) → AV</td>
<td>0.323</td>
<td>0.051</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>(P_r-P) x CP_r → AV</td>
<td>0.437</td>
<td>0.007</td>
<td>37</td>
</tr>
<tr>
<td>Group 12 Sunscreen (Existing Fair)</td>
<td>(P_r-P) → TV</td>
<td>-0.573</td>
<td>0.000</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>(P_r-P) x CP_r → TV</td>
<td>-0.532</td>
<td>0.001</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>(P_r-P) → AV</td>
<td>0.671</td>
<td>0.000</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>(P_r-P) x CP_r → AV</td>
<td>0.671</td>
<td>0.000</td>
<td>34</td>
</tr>
<tr>
<td>Group 11 Sunscreen (Innovative Fair)</td>
<td>(P_r-P) → TV</td>
<td>-0.829</td>
<td>0.000</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>(P_r-P) x CP_r → TV</td>
<td>-0.436</td>
<td>0.026</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>(P_r-P) → AV</td>
<td>0.157</td>
<td>0.443</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>(P_r-P) x CP_r → AV</td>
<td>0.378</td>
<td>0.057</td>
<td>26</td>
</tr>
<tr>
<td>Group 22 Sunscreen (Existing Expected)</td>
<td>(P_r-P) → TV</td>
<td>-0.821</td>
<td>0.000</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>(P_r-P) x CP_r → TV</td>
<td>-0.589</td>
<td>0.000</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>(P_r-P) → AV</td>
<td>0.161</td>
<td>0.342</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>(P_r-P) x CP_r → AV</td>
<td>0.157</td>
<td>0.362</td>
<td>36</td>
</tr>
<tr>
<td>Group 21 Sunscreen (Innovative Expected)</td>
<td>(P_r-P) → TV</td>
<td>-0.322</td>
<td>0.046</td>
<td>39</td>
</tr>
<tr>
<td></td>
<td>(P_r-P) x CP_r → TV</td>
<td>-0.674</td>
<td>0.000</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>(P_r-P) → AV</td>
<td>0.153</td>
<td>0.351</td>
<td>39</td>
</tr>
<tr>
<td></td>
<td>(P_r-P) x CP_r → AV</td>
<td>0.331</td>
<td>0.040</td>
<td>39</td>
</tr>
</tbody>
</table>
Table 5.9 compares the relevant correlation coefficients side by side by experimental group. For instance, for experimental group 11 (i.e. rows 1-4) the first row presents the correlation coefficient for the correlation between TV and reference price. Row two beneath presents the correlation coefficient for TV, this time correlated with the interaction between reference price and reference price confidence. Likewise, rows three to four do the same, but with respect to AV, the highest price measure and the interaction between the highest price and confidence in the highest price. These correlation coefficients are charted below for the existing category:

Figure 5.3: Comparing Correlation Coefficients for the Existing Categories

Figure 5.3 compares the coefficients for reference price and reference price multiplied by confidence with TV (top half of the graph) and AV (bottom half of the graph) for the existing products. The first four groups are for the earphones data and the final four groups are for the sunscreen data. A comparison of the coefficients suggests that the coefficients are relatively similar as they tend to be of roughly the same magnitude. There does not appear to be any difference in predictive power by adding the confidence term to

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5 Recall that the TV questions were scaled in the opposite direction to the AV questions, accounting for the negative correlations. Therefore, the values for TV are in the bottom half of the graph.
the equation for the existing products. Although, this is what we would expect because these correlations are for the existing product categories. The difference between correlations is statistically compared below in table 5.10:

Table 5.10: Statistical Comparisons of Correlation Coefficients for the Existing Treatments

<table>
<thead>
<tr>
<th>Experimental Condition</th>
<th>sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 11 TV (Earphones)</td>
<td>0.341</td>
</tr>
<tr>
<td>Group 11 AV (Earphones)</td>
<td>0.728</td>
</tr>
<tr>
<td>Group 21 TV (Earphones)</td>
<td>0.424</td>
</tr>
<tr>
<td>Group 21 AV (Earphones)</td>
<td>0.893</td>
</tr>
<tr>
<td>Group 12 TV (Sunsreen)</td>
<td>0.735</td>
</tr>
<tr>
<td>Group 12 AV (Sunsreen)</td>
<td>0.878</td>
</tr>
<tr>
<td>Group 22 TV (Sunsreen)</td>
<td>0.561</td>
</tr>
<tr>
<td>Group 22 AV (Sunsreen)</td>
<td>0.582</td>
</tr>
</tbody>
</table>

The significance levels indicate that any differences are likely to have occurred by chance.

We now compare correlation coefficients for the innovative product categories:

For the innovative products there now appear to be some differences in predictive ability by multiplying reference price by confidence. However, these differences are somewhat inconsistent. For instance, when correlating with AV, in groups 22 (earphones) and 21 (sunscreens), including confidence improves the predictive ability of reference price. However, for group 12 (earphones) and group 11 (sunscreens) the coefficients appear to be very similar again. Likewise, the pattern for correlations with TV also appears to be
inconsistent. For instance, for group 21 (sunscreens) including confidence improves the predictive ability of reference price. Yet with groups 22 (earphones) and 11 (sunscreens), including confidence detracts from the explanatory power of reference price. Thus, at face value the result appears to be inconsistent. We now examine these differences more rigorously by comparing the correlation coefficients:

### Table 5.11: Statistical Comparison of Coefficients for the Innovative Treatments

<table>
<thead>
<tr>
<th>Experimental Condition</th>
<th>sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 12 TV (Earphones)</td>
<td>0.818</td>
</tr>
<tr>
<td>Group 12 AV (Earphones)</td>
<td>1.000</td>
</tr>
<tr>
<td>Group 22 TV (Earphones)</td>
<td>0.015</td>
</tr>
<tr>
<td>Group 22 AV (Earphones)</td>
<td>0.417</td>
</tr>
<tr>
<td>Group 11 TV (Sunscreen)</td>
<td>0.048</td>
</tr>
<tr>
<td>Group 11 AV (Sunscreen)</td>
<td>0.987</td>
</tr>
<tr>
<td>Group 21 TV (Sunscreen)</td>
<td>0.043</td>
</tr>
<tr>
<td>Group 21 AV (Sunscreen)</td>
<td>0.421</td>
</tr>
</tbody>
</table>

Three of the pairs of coefficients are statistically different. Again, the results of the statistical comparisons are inconsistent, with a statistical difference in the predicted direction for one pair but also a statistical difference for two other pairs, but in the incorrect direction. Thus the results are inconclusive, disconfirming H2. There is no strong evidence to show that including confidence improves or detracts from explanations of value perceptions.

#### 5.2.6.1 Hypothesis 2: Discussion

Including confidence in models of reference price effects for innovative products does not significantly add to the explanation of variability in TV and therefore, does not add to the predictability of TV. In some cases it even detracts from the explanatory power of reference price.

While the study does not test explanations for this result, we now speculate as to what is happening. One explanation could be related to measurement issues. For instance, an incorrect measure of confidence or product category knowledge. However, this is unlikely because we find, consistent with prior research (i.e. Biswas and Sherrell 1993; Kosenko
and Rahtz 1988), a moderately strong statistically significant correlation between confidence and product knowledge, suggesting legitimacy of the measures used. These are shown below and are robust between categories:

**Table 5.12: Correlation between Product Category Knowledge and Confidence**

<table>
<thead>
<tr>
<th></th>
<th>Earphones</th>
<th>Sunscreen</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Corr.</strong></td>
<td>0.481</td>
<td>0.350</td>
</tr>
<tr>
<td><strong>Sig.</strong></td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>149</td>
<td>157</td>
</tr>
</tbody>
</table>

Additionally, Urbany et al. (1997) state “TU may be influential only in … situations in which consumers are relatively confident in their quality and price expectations”. This study finds that TV is useful to some degree, regardless of confidence. However, in situations of high confidence TV does seem to be a better predictor of purchase intention than when confidence is lower. To test this assertion the dataset was segmented into the lower and upper quartiles of the confidence measures to reflect low and high confidence and the influence of TV on purchase intention was calculated with bivariate correlation coefficients shown in table 5.13 below:

**Table 5.13: Correlation between Transaction Value and Purchase Intention by Confidence**

<table>
<thead>
<tr>
<th></th>
<th>Earphones</th>
<th>Sunscreens</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Low Confidence</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Corr.</strong></td>
<td>–0.349</td>
<td>–0.541</td>
</tr>
<tr>
<td><strong>Sig.</strong></td>
<td>0.029</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>39</td>
<td>58</td>
</tr>
<tr>
<td><strong>High Confidence</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Corr.</strong></td>
<td>–0.598</td>
<td>–0.712</td>
</tr>
<tr>
<td><strong>Sig.</strong></td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>73</td>
<td>49</td>
</tr>
<tr>
<td><strong>Coefficient Comparison</strong></td>
<td>0.112</td>
<td>0.153</td>
</tr>
</tbody>
</table>

These findings substantiate the comment made by Urbany et al. (1997) because TV is a better predictor of purchase intention for high confidence respondents than low confidence respondents, although these differences are not statistically significant. Thus, comparison of the fundamental linkages is consistent with prior research.
Another explanation could be that the confidence ratings tended to be relatively constant with little variance. If this were the case then this would account for the generally small, insignificant differences when confidence was used. However, the distribution of responses and the standard deviations for confidence for both the earphones and sunscreens data exhibited a wide spread with no obvious clustering around a central point as shown below:

Figure 5.5: Distribution of Confidence Responses

Yet another explanation for the results could be that confidence did not differ between the existing and innovative categories. Indeed, an examination of mean confidence by level of innovativeness shows that *confidence did not differ between these treatments*:

Table 5.14: Differences in Mean Confidence by Innovativeness

<table>
<thead>
<tr>
<th></th>
<th>Existing</th>
<th></th>
<th></th>
<th>Innovative</th>
<th></th>
<th></th>
<th>t-value</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>n</td>
<td>St. Dev.</td>
<td>Mean</td>
<td>n</td>
<td>St. Dev.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Earphones</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TV</td>
<td>4.228</td>
<td>79</td>
<td>1.423</td>
<td>4.535</td>
<td>71</td>
<td>1.263</td>
<td>-1.393</td>
<td>0.166</td>
</tr>
<tr>
<td>AV</td>
<td>5.113</td>
<td>80</td>
<td>1.567</td>
<td>5.278</td>
<td>72</td>
<td>1.513</td>
<td>-0.660</td>
<td>0.510</td>
</tr>
<tr>
<td><strong>Sunscreens</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TV</td>
<td>4.698</td>
<td>63</td>
<td>1.399</td>
<td>4.812</td>
<td>69</td>
<td>1.427</td>
<td>-0.459</td>
<td>0.647</td>
</tr>
<tr>
<td>AV</td>
<td>4.862</td>
<td>65</td>
<td>1.488</td>
<td>4.957</td>
<td>70</td>
<td>1.574</td>
<td>-0.362</td>
<td>0.718</td>
</tr>
</tbody>
</table>
The means for the confidence measures were all relatively high and exhibited small differences but these were statistically insignificant. Thus assignment of respondents to either the innovative or existing product categories did little to affect how confident they were in their reference price perceptions. Given these results, perhaps the confidence construct might be less useful than originally supposed if consumers tend to be overly confident of their perceptions in spite of low actual knowledge (Alba and Hutchinson 2000; Harvey 1998; Tversky and Kahneman 1974). Indeed, Harvey (1998) points out that decisions makers are often overly confident and keen to make predictions about events which they know nothing about. Likewise, Alba and Hutchinson (2000, p. 123) state “overconfidence is indeed a robust phenomenon”. That is, a consumer might think they know more about a product category than they actually do, accounting for these discrepant results. After all, only perceived self reported confidence was measured in this study.

In sum, it appears that using confidence in models of reference price does little to add to the explanatory power of the model across different levels of innovativeness. This is not to discount confidence in models of reference price because it clearly shares important associations with product category knowledge. However, it appears that intent to purchase within a category is clearly linked to knowledge about that category as shown below:

Table 5.15: Correlations between Purchase Intention and Product Category Knowledge

<table>
<thead>
<tr>
<th></th>
<th>Earphones</th>
<th>Sunscreen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corr.</td>
<td>0.283</td>
<td>0.312</td>
</tr>
<tr>
<td>Sig.</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>n</td>
<td>150</td>
<td>160</td>
</tr>
</tbody>
</table>

Thus it is not confidence which is moderating TV between the existing and innovative categories, but rather perceived product category knowledge — a distinct but somewhat related construct.
5.3 Summary of Support
Support for the hypotheses in experiment 1 are summarised below in table 5.16:

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Earphones</th>
<th>Sunscreens</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1a: When perceived innovativeness is higher, fair price is more likely to be used as a reference price by consumers than expected price.</td>
<td>Correct direction. Not statistically significant</td>
<td>Supported</td>
</tr>
<tr>
<td>H1b: Likewise, when perceived innovativeness is lower, expected price is more likely to be used as a reference price by consumers than fair price.</td>
<td>Supported</td>
<td>Supported</td>
</tr>
<tr>
<td>H2: For innovative products, variation in value perceptions will be better explained by including confidence in reference price models.</td>
<td>Not supported</td>
<td>Not supported</td>
</tr>
</tbody>
</table>

In summary, three of the six hypotheses were supported statistically. H1a for the earphones data was supported in terms of the relative magnitude of the correlation coefficients but was not supported statistically, and H2 was not supported for either product category. These findings shed new light on measurement and conceptual issues related to reference price research in new product categories and form the groundwork for method and analysis in subsequent experiments.

5.4 Limitations and Future Research
Limitations and future research are discussed in chapter 9 with reference to experiment 1 and the subsequent two experiments from study 2.

5.5 Conclusion
Chapter 5 was the final part of study 1 and sought to find answers to the research questions which arose within chapter 2. In summary, chapter 5 found, consistent with prior studies, that reference price utilisation is context specific. In particular, for new product categories consumers appear more likely to rely on perceptions of fairness to initially judge value. This has implications for the way marketers promote new products. Yet when the category
becomes sufficiently established, consumers appear to have some price knowledge regarding the category and instead of using fairness to judge value consumers then rely on their expectations and beliefs about what the price is.

This has important implications for the study of reference price and shows how important selecting the correct measure is to the results obtained. Selecting the wrong measure can obscure reference price effects and lead to lack of understanding about how consumers make value judgments.

More specifically this has important implications for study 2, the main study of this thesis, which addresses the research issue of how reference prices form and evolve. As a result, fair price will be used in the subsequent study as an appropriate measure of reference price for new products.

This study also found that confidence in reference price perceptions was not a useful predictor of TV or AV. It seems that using reference price alone is a good predictor of value perceptions. This is not to discount the role of confidence — it is just that it doesn’t appear to be useful in distinguishing between behavioural intentions for new versus existing products. We now proceed with the main study for this thesis by examining how reference price perceptions form and evolve in new product categories. Chapter 6 proceeds by providing key hypotheses to test.
CHAPTER 6: THE FORMATION AND EVOLUTION OF REFERENCE PRICE PERCEPTIONS IN NEW PRODUCT CATEGORIES

6.1 Introduction
Study 1 addressed two research issues from chapter 2 by comparing two commonly used measures of reference price — expected price and fair price — and analysing the relative worth of including reference price confidence in models of reference price. The empirical analysis determined that fair price, as opposed to expected price, was the best measure of reference price to use for new product categories and that using reference price confidence does not significantly improve explanation of variability in value perceptions.

This chapter proceeds by addressing a third limitation of the reference price literature, identified in chapter 2, how reference prices form and evolve in new product categories. Nagle and Hogan (2006, p. 268) touch on the importance of this question by stating “…they lack a reference for determining what would constitute a fair or bargain price and this uncertainty leads to higher price sensitivity”. However, this is the extent of the discussion.

Chapter 6 bridges this gap by integrating two extensive and complementary bodies of theory — reference price theory and the theory of pioneer brand advantage — to determine how reference prices form and evolve in new product categories. Chapter 6 begins by highlighting the main literature in these two areas and integrating current theories to generate key hypotheses about the formation and evolution of reference prices.

6.2 Pricing New Products: Strategies and Tactics
The price of a product or brand is often set in relation to the product’s overall strategy such as gaining market share, establishing a particular image etc. Typical new product pricing
decisions for pioneers include an introductory low price or a skimming strategy. These are summarised in figure 6.1 below:

![Figure 6.1: Typical New Product Pricing Strategies](image)

A skimming strategy involves an initial high price with price decreasing in subsequent periods to tap other market segments. The product’s price decreases sequentially to cater for different segments of the market with different price sensitivities and levels of demand. This kind of strategy is often used for high tech products with high marginal costs and when the likelihood of a long lead-time is high, so the company can focus on initial price sensitive segments. Typical examples have included DVD players, computer processors, MP3 players and other electronic products.

An introductory low price or penetration strategy is another common new product pricing strategy used to gain market share quickly when a product is new and when marketers are trying to gain awareness and loyalty\(^6\). For instance, typical products that have used

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\(^6\) In the marketing literature there seems to be no common consensus about the exact definition of a penetration strategy. Some refer to it as entering the market at a low price and keeping the price low (i.e. Monroe 2003; Nagle and Hogan 2006), whereas others view it as an initial low price, either implying a price increase in subsequent periods (Dictionary of Marketing Terms 2006) or explicitly stating that the price increases in subsequent periods (Slonim and Garbarino 1999, p. 12). For the purposes of this research, penetration pricing and introductory low pricing will be used synonymously.
penetration pricing strategies include new grocery items, telephone or internet services, music downloads etc. The introductory low price may also serve a further function by creating a barrier to entry for followers who may find it unprofitable to compete at the lower price in light of the pioneer’s economies of scale and position on the learning curve. This type of strategy would also be applicable for products with a short lead-time so the company can focus on larger, more price sensitive segments.

Whilst these strategies are commonly used in practice, the decision to use either strategy is not straightforward (Marn, Roegner and Zawada 2004, p. 108). Little is known about their optimality, and the effect they have on consumer perceptions of value and the longer term impact of pursuing them. To what extent do marketers define consumer perceptions of a product’s value with an introductory price?

The reference price literature alludes to consumers averaging past prices in order to determine a reference price which is used to judge expensiveness and determine value. If this is the case then the brand following a skimming strategy will obtain a high reference price, advantageous to subsequent price reductions, and a brand following a penetration strategy will obtain a low reference price, disadvantageous to subsequent price increases. Thus, in the early stages of a new product category consumers are unlikely to know what constitutes value and how expensive a brand really should be. For instance, Nagle and Hogan (2006, p. 268) state, “… they lack a reference for determining what would constitute a fair or bargain price and this uncertainty leads to higher price sensitivity”.

This hints at the psychological implications of pricing too low in terms of perceptions of expensiveness but the literature does not sufficiently explain how consumer reference price and value perceptions initially form in a new product category and in particular how they form in relation to the prices of competitors introduced later.
For instance, pioneers can attain behavioural advantages by virtue of entry order, including becoming the prototype and category exemplar (Carpenter and Nakamoto 1989; Lowe and Alpert 2003; Schmalensee 1982), being remembered better (Kardes and Kalyanaram 1992), attaining advantages in retrieval, consideration, and choice (Kardes et al. 1993) and favourable consumer predispositions toward pioneer status (Alpert and Kamins 1995). These advantages essentially revolve around the pioneer’s unique association with the category and its distinctiveness as the category exemplar. How are reference price and value perceptions formed in the early stages of a new product category? How does this behavioural advantage moderate the process of reference price formation and evolution and perceptions of value? Does the pioneer’s price, whether high or low, set the reference price, at least initially? How competitive entry affect or change the reference price?

The literature remains unclear, but some research provides guidance on integration of these two important streams of research. Some sources allude to the need to keep initial prices up so as not to undervalue the product (Marn, Roegner and Zawada 2003; Nagle and Hogan 2006). Further, some tangential academic research has been devoted to this area of study but it is fragmented and doesn’t necessarily consider the role of the pioneer in establishing reference prices (i.e. Doob et al. 1969; Slonim and Garbarino 1999). Likewise, other research has briefly drawn some implications of reference point theory to pioneer brand advantage theory and follower response strategies (Hardie, Johnson and Fader 1993, p. 391). Yet the research only makes tangential reference to how this affects pricing decisions, and these are speculations rather than a systematic research effort.

6.3 Research Issue 3 - Reference Price Perceptions in New Product Categories

Chapter 2 outlined how the reference price literature has made a significant contribution to our understanding of consumer decision making. It further highlighted that despite better
understanding of reference prices, our understanding of reference price usage in new product categories, with which the consumer has little experience, is limited. To date, few research studies have explicitly analysed the phenomenon of reference prices in the early stages of market evolution, despite its obvious importance to marketing strategy and despite calls for research in this area from academic and practitioner literature. For instance, Biswas and Sherell (1993, p. 44) state, “…research should examine the influence of product knowledge and other factors on reference price estimates for products in the early stages of market penetration”. Hardie, Johnson and Fader (1993, p. 391) further these calls by pointing out the need to consider competitive interaction, “Much of the current formal analysis of brand competition assumes reference independence. In light of our results, we suggest that an attractive research stream would be to develop formal analyses of competitive situations”. Marn, Roegner and Zawada (2003, p. 42) also comment by criticising the ad hoc, unsystematic nature of typical approaches to pricing new products, suggesting price setters have an inadequate understanding of value, “…the incremental approach often underestimates the value of new products for customers”.

Thus, despite repeated calls in the literature, our understanding of the effect of introductory pricing strategies remains limited. We now evaluate key literature in the area to develop a framework for testing.

6.3.1 The Formation of Reference Prices

Puto’s (1987) seminal work on the framing of buying decisions sheds some light on the mechanism for the formation of reference prices. In an industrial buying context the author develops a conceptual model for how buying decisions are made. As illustrated in figure 6.2 below, the model posits that an initial reference point is formed based on expectations and buying objectives. This reference point is revised on the basis of sales messages and
justification for the purchase and leads to choice decisions in the way proposed by Prospect Theory (Kahneman and Tversky 1979).

Figure 6.2: Puto’s Model of Framing Buying Decisions

However, within this framework, expectations are formed through buyers’ past experience with similar products, not innovations with less well defined price anchors. Furthermore, due to the industrial context, it is not clear how this model translates to B2C transactions because of the industrial buying context.

6.3.1.1 The Impact of Introductory Low Prices
Other research has alluded to, but not explicitly examined the mechanisms for reference price formation in new product categories. For instance, Doob et al. (1969) conducted a field experiment across five product categories in a matched sample of twelve stores, to test the longer term impact of an introductory low price on sales, as opposed to a regular price. They measured sales periodically for the different pricing strategies. In general the results showed sales were initially higher for those products with an introductory low price, as expected, and when the price increased to the regular price sales declined, also as expected. However, of more interest, sales for the product using a penetration strategy declined further than sales of the products which remained at the regular price from the beginning. A summary of these findings is illustrated in figure 6.3 which shows sales at different time periods and for different pricing strategies.
The authors offer two somewhat complementary and plausible explanations for these results. Firstly, they explain these observations in terms of cognitive dissonance. That is, if consumers buy a product at a higher price, the more they come to like the product. This in turn leads to greater brand loyalty and as a result a higher proportion of buyers remain loyal in period two when the price increases than for the brand which pursued an introductory low price.

A second explanation offered relates to consumers and their adaptation levels or reference prices. In particular, as consumers became used to the initial low price (which was not communicated to them as an introductory low price), when the price increased to the regular price this was perceived as expensive (relative to the initial price) whereas perceptions of expensiveness stayed the same for the brand which remained at the regular price because the price did not change — the initial low price formed perceptions of expensiveness, and thus value. This made the regular price brand appear more attractive as perceptions of expensiveness did not change and suggests that if consumer reference prices are a function of a new product’s actual price, then the new product can define and set reference prices and therefore, consumer perceptions of value. That is, even though the
price was exactly the same for each product in $T_2$, consumer perceptions of value differ based on introductory prices, accounting for differences in market share in $T_2$. However, this explanation is an implied aspect of their work and has not been explicitly tested.

Consistent with more recent and rigorous studies which examine the formation of reference price in product categories (i.e. Yadav and Seiders 1998; Kalwani and Yim 1992; Putler 1992), the Doob et al. (1969) study also implies that reference prices are some function of past prices. However, it does not test this theory for other commonly used new product pricing strategies such as a penetration strategy, only a regular price strategy versus a skimming strategy. Experimental control was also limited due to the nature of this study as a field experiment. Therefore, possible explanations for the findings are implied and have not been rigorously scrutinised in a lab setting. Further, the products tested were not necessarily what we would define as pioneers, including toothpaste, aluminium foil, cookies, light bulbs, and mouthwash, none of which were radically new. Therefore, consumers would have had some knowledge of prior prices which enabled them to have a pre-existing and better defined anchor or reference price.

6.3.1.2 The Role of Price Histories
Slonim and Garbarino (1999) present a model to test the effect of different price histories on demand. In particular, their basic proposition is that past prices determine perceptions of expensiveness for current prices, which in turn affects relative demand. Therefore, their experiment presented eight different price histories to respondents, four with prices above the final price exposed to, and four with prices below the final price exposed to. Two of these price histories represented what the authors termed a penetration strategy (i.e. starting low and increasing the price in later periods) and a skimming strategy (i.e. starting high and decreasing the price in later periods).
Consistent with reference price theory, despite finishing on the same final price, the brand following a penetration strategy was perceived as more expensive than the brand following a skimming strategy and likewise had lower demand (because it was perceived as being more expensive) when they were exactly the same price in period 5. This is shown in figure 6.4 below. Other varying price histories were also tested.

Figure 6.4: Demand under a Skimming and Penetration Strategy

Likewise, Alba et al. (1999) examine the effect of discount frequency and depth on reference price, with price distributions of the same average (the average price differed with the study by Slonim and Garbarino 1999). They find that frequency and depth effects occur to differing degrees depending on the distribution of prices. Nonetheless, price histories have a clear and distinct impact upon reference prices.

However, these studies, like that of Doob et al. (1969) concerned products in existing categories which were not radically new to respondents — i.e. pens and shampoo. Therefore subjects’ preconceptions of expensiveness again may have been fairly well defined. Furthermore, the study did not directly consider the role of the pioneer in establishing reference prices in the category because the category was well established.
Thus, in conclusion, whilst some pricing studies have hinted at how reference price perceptions, value perceptions and behavioural intentions form and evolve in product categories, none has explicitly tested these mechanisms and relationships. Furthermore, those that make implications about the formation and evolution of reference price perceptions have tended to do so for incrementally new products, not innovative products.

### 6.3.2 Categorisation and Market Entry Order: The Pioneer Advantage

For further guidance on understanding the formation and evolution of reference price perceptions in new product categories, the other literature we need to consider is the market entry order literature. Pioneer brands can attain a number of distinct advantages by virtue of entry order, including consumer based advantages and firm resource accrual advantages (see, for example Kerin, Varadarajan and Peterson 1992, Liberman and Montgomery 1988, 1998 or Szymanski, Troy and Bharadwaj 1995 for an extended review of the pioneer advantage literature). The following discussion focuses on the consumer based perceptual advantages such as becoming the prototype and category exemplar (Carpenter and Nakamoto 1989; Lowe and Alpert 2003; Schmalensee 1982), being remembered better (Kardes and Kalyanaram 1992), having advantages in retrieval, consideration, and choice (Kardes et al. 1993) and favourable consumer predispositions toward pioneership (Alpert and Kamins 1995). These advantages essentially revolve around the pioneer’s unique association with the category and its distinctiveness as the category exemplar (Elio and Anderson 1984; Medin and Schaffer 1978; Mervis and Rosch 1981; Ozanne, Brucks and Grewal 1992), although other processes are also at work (see Alpert and Kamins 1994 for an integrated review of the behavioural advantages accruing to pioneers). To appreciate the mechanism of this behavioural advantage, we first start by defining which brand is the pioneer. This is crucial in understanding the distinctiveness of the pioneer, and the advantages accrued from pioneership.
6.3.2.1 Pioneership: A Definition
The root of a pioneer’s behavioural advantage stems from how the pioneer is defined. This is crucial in distinguishing this study from prior studies on reference prices for new products of a more incremental nature. It is this definition of pioneership which is fraught with difficulty for the researcher. For instance, Schmalensee (1982, p. 361) notes the potential confusion between differentiation and pioneering. Further to this, Schmalensee (1982) implicitly offers a definition of pioneership, although not explicitly addressing this point of concern, by conferring the pioneer as “the first brand in any product class” (p360). However, such a definition remains sufficiently vague because the reader then wonders how broadly or narrowly ‘product class’ is defined. Alpert (1987, p. 134) raises this issue in a similar vein, asserting “first entrant into what?” Alpert then furthers this definition by relating pioneership to categorisation, stressing that the pioneer is one “which creates a new product category” (p. 134), although this definition of “newness” is largely unresolved.

At this point it is important that the term category is defined for use in this research. Truly radical or discontinuous innovations such as the PC, the internet, the VCR etc. are few and far between. Products like these often represent such disparity from the prior technology that they do not come from an easily recognisable product category. For instance, Sood and Tellis (2005) trace their analysis of technological evolution through innovations within larger product categories. When examining technological evolution within desktop printers they begin with dot matrix printers, then ink jets, then laser printers, then thermal printers. In this case ‘desktop printer’ is the category and the different types of desktop printers (i.e. dot matrix, ink jet etc.) represent what might be termed sub-categories.

This definition is similar to that implied by Nagle and Hogan (2006, p. 267) who give examples of new product categories such as wireless internet, among others, when
discussing the challenges of pricing radical innovations. Wireless internet is not a revolutionary innovation (i.e. it is some combination of wireless technology and the internet, all of which exist), yet it is different enough to define a unique new category or, if you prefer, a new sub-category. There are of course degrees of innovativeness for a new product and these are defined and operationalised for experimental control in chapter 7. For the purposes of this research, these ‘sub-categories’ are sufficiently new to provide the context in which to examine initial reference price effects.

Categorisation is a natural and important process for consumers and is an important component of our knowledge of consumer learning. It determines how we organise, interpret and learn about new information (Medin and Schaffer 1978; Mervis and Rosch 1981). The pioneer, as defined above, represents the first brand into a product class and therefore influences how consumers learn about the new product class or category.

Pioneering the product class allows the pioneer to become prototypical of the category. For instance, Rosch (1978) states that categories are represented by a prototypical member of the category. This prototypicality and representativeness is often attributed to the pioneer from its temporary monopoly and unique association with the category by providing unique and novel information (Carpenter and Nakamoto 1988, 1989). When we define the pioneer and think about this new product in terms of the information it provides to consumers, a pioneer, being the first piece of information consumers see about a new category becomes important as consumers form judgments about the new category.

6.3.2.2 The Category Exemplar
Carpenter and Nakamoto (1988) suggest that product usage may help define category ideals when perceptions of product quality are poorly formed and ambiguous. The implication is that the pioneer can define category ideals and therefore become the standard against which others are judged. Carpenter and Nakamoto (1989) provide
empirical substantiation of this assertion in a lab setting. These results also provide more
fundamental implications to marketing strategy. Namely that it is not enough for marketers
to be market driven and responsive to customer needs, which is what traditional marketing
theory would suggest. In fact, if the pioneer can define the category and create an ideal
preference structure by *telling* consumers the characteristics of brands in this category, this
would suggest the role of the pioneer is even more important by being able to *drive*
markets instead of being *driven* by markets (Carpenter and Nakamoto 1994). It is the
pioneer that may be strong enough to define consumer preferences in the initial stages of
the category. With this unique competitive advantage, is the pioneer strong enough to
define value perceptions? For instance, a pioneer through its unique association with the
category may be able to define consumer preferences when the contribution of product
attributes to value is ambiguous, but with more discernible attributes such as price can the
pioneer determine what the product is worth and consequently define value perceptions?

Thus the pioneer advantage has been shown to stem from the pioneer’s ability to define the
category and perceptions within the category. The extent of these behavioural advantages
seem to be particularly robust across numerous methods and through numerous
mechanisms. But what are the implications of these advantages to how reference price
perceptions are formed in new product categories?

### 6.3.2.3 Pioneership and the Formation of Reference Price Perceptions

Following on from the arguments presented in section 6.3.2 regarding pioneer brand
advantages from categorisation, we can examine how initial reference price perceptions in
a category are formed. Past theoretical and applied research has overwhelmingly shown
that past prices and other observed prices influence reference price (Doob et al. 1969;
Mazumdar, Raj and Sinha 2005; Slonim and Garbarino 1999). The pioneer is the first
brand in the product category and being first acts as an anchor or point of reference
As consumers have limited prior points of reference upon which to base price judgments in a new category, the pioneer, being the first and only brand influences the initial formation of reference price. That is, upon first purchasing a pioneer brand, consumers have an ill-defined reference price because of a lack of experience with the category. Consumers need a point of reference upon which to base their price perceptions and this point of reference is the pioneer.

In figure 6.5 below, assume that consumers have some hypothetical initial reference price, in this case operationalised as the fair price and indicated by ‘f’. At this stage they have not been exposed to a brand in the new product category. Now suppose the pioneer enters, either with an initial high price or an initial low price. Fair price perceptions will shift in the direction of the pioneer’s entry price. For instance, if the initial fair price is less than the skimming price and more than the penetration price then fair price perceptions will increase to $f_s$ with a skimming strategy and decrease to $f_p$ with a penetration strategy.

**Figure 6.5: Mechanism for the Formation of Reference Price in a New Product Category**

This is consistent with other research that shows observed prices or price cues can shift reference price perceptions in the direction of those prices or cues (Kamins, Dreze and Folkes 2004; Urbany, Bearden and Weilbaker 1988). Urbany, Bearden and Weilbaker (1988) even extend this finding to show that exaggerated or implausible price information
is assimilated and can shift reference prices. This leads to the first hypothesis of study 2, which predicts:

**H3:** The reference price for the pioneer shifts in the direction of the pioneer’s price.

However, the pioneer’s effect on reference price may be even stronger. We generally know that past and current observed prices will influence the reference price (see Mazumdar, Raj and Sinha 2005 for an integrative review). Can the pioneer define as opposed to just influence the reference price? Past research has shown that the pioneer is highly associated with the category and can define and shape consumer preferences that are ambiguous (i.e. Carpenter and Nakamoto 1989). If the pioneer is highly representative of the category and a strong category exemplar, and if consumers do not have adequate prior adaptation levels upon which to base their reference price perceptions then the pioneer will not only be able to shift reference price perceptions but will also be able to define the reference price and therefore, define an anchor by which subsequent prices and prices of follower brands are judged. This is consistent with Rajendran and Tellis’ (1994, p. 30) speculation that, “…if a category has a prototypical brand, its price may well be the best contextual reference price”. Likewise, Hardie, Johnson and Fader (1993) suggest that consumers have a reference brand, evidenced by their operationalisation of reference price as the price of the brand last purchased. Furthermore, Schmalensee (1982, p. 360) states if the first brand in a product class performs satisfactorily, “that brand becomes the standard against which subsequententrants are rationally judged”. Thus reference effects are determined in relation to the price of this reference brand, the pioneer. Past research has indicated that if reference prices are poorly formed then consumers may rely on some other anchor or referent. The pioneer can take on this role as
it is strongly associated with the category and representative of the category. This leads to the second hypothesis for experiment 2 which is a stronger test of H₃:

**H₄:** The price of the pioneer becomes the reference price for that product.

But what happens after a follower brand enters? How do reference price perceptions evolve as market structure evolves? While prior discussion addressed the formation of reference prices in new product categories, now we look at the evolution of reference prices when a pioneer’s price changes and a follower is introduced, and see the effect this has on perceptions of value, behavioural intentions and other important constructs.

6.3.2.4 Follower Entry and the Evolution of Reference Price Perceptions: The Effect of Price Changes and Changes to Market Structure

Now suppose the pioneer changes price in T₂ (time period 2) from the price in T₁ (time period 1). What will be the effect upon the pioneer’s reference price if the pioneer increases/decreases prices to reflect a penetration/skimming strategy as shown in table 6.1.

<table>
<thead>
<tr>
<th></th>
<th>T₁</th>
<th>T₂</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Penetration</strong></td>
<td>Price = $50</td>
<td>Price = $100</td>
</tr>
<tr>
<td><strong>Skimming</strong></td>
<td>Price = $150</td>
<td>Price = $100</td>
</tr>
</tbody>
</table>

We have already seen how these initial prices in T₁ are likely to manifest into a reference price, but what happens to the reference price and consumer perceptions of value if the pioneer’s price were to converge to the same price in T₂? That is, should different starting prices in T₁ lead to different price perceptions in T₂? Analysis of this case would be a stronger test of the mechanics of reference price theory.

H₃ and H₄ examine the extent to which the pioneer’s initial price affects perceptions of reference price. Regardless of past prices, economic theory would predict equivalent current prices to lead to equivalent levels of value and equivalent levels of purchase intention. Yet we would predict reference price, value perceptions and behavioural
intentions to differ in T₂ because of the different prices in T₁. In the real world there cannot be an easy comparison of penetration and skimming strategies for the same pioneer — but in chapter 7 an experiment capturing this simple but crucial comparison is presented.

The basic proposition of reference price theory is that past prices determine the current reference price, though only tested in existing product contexts. Some studies have found a limited effect for past prices on demand (i.e. Ehrenberg and England 1990), but a large body of survey and experimental evidence exists to support this relationship (Alba et al. 1999; Kalwani and Yim 1992; Slonim and Garbarino 1999). These findings have been further empirically substantiated with a vast body of econometric literature using scanner data (Jacobson and Obermiller 1990; Kalwani et al. 1990; Kalyanaram and Little 1994; Rajendran and Tellis 1994; Winer 1986). Whilst the reference prices generated in these studies are inferred reference prices, such effects demonstrate remarkable consistency across the research stream. This suggests that even though prices are equal in T₂, due to learning effects, consumer perceptions of fairness will have been framed by the initial price, even in the new product context. For the skimming strategy, where the price decreases to the regular price, consumers will likely revise down their fair price estimate to somewhere in between the initial price and the new price, whereas for the penetration strategy, where the price increases to the regular price, consumers will likely revise up their fair price estimate to somewhere in between the initial price and the new price. As such, this suggests that exposure to prices in T₁ of an emerging market define reference prices in T₂ leading to hypothesis 5.

**H₅:** In T₂ when prices are equal the reference price for the pioneer will vary depending on the initial price of the pioneer. Furthermore, the reference price for the pioneer following a skimming strategy will be higher than the reference price for the pioneer following a penetration strategy.
In the context of this initial evolution of reference prices as a function of pioneer pricing strategy, the literature would then predict that TV or perceived expensiveness (Slonim and Garbarino 1999) would be higher for brands which were previously more expensive (i.e. following a skimming strategy) and lower for brands which were previously less expensive (i.e. following a penetration strategy) because higher/lower past prices lead to higher/lower perceptions of TV (Bearden et al. 1992; Della Bitta and Monroe 1973; Grewal, Monroe and Krishnan 1998; Thaler 1985; Urbany et al. 1997). That is, once reference price perceptions have been set, the reduction in price from the skimming strategy will be perceived as fairer than the increase in price from the penetration strategy even though prices are now equal as consumers view the resulting price changes in terms of gains and losses (Kahneman and Tversky 1979). Slonim and Garbarino (1999) tested these effects for perceived expensiveness and observations from Doob et al. (1969) suggest this mechanism to be taking place but these effects have yet to be explicitly tested for new product categories in particular, and have rarely been tested in such an experimental setting, leading to hypothesis 6:

**H₆:** In T₂ transaction value for the pioneer following a skimming strategy will be higher than transaction value for the pioneer following a penetration strategy.

Having established the effect upon reference prices and value perceptions, we now extend the analysis to see what effect this has further up the hierarchy of effects on measures of purchase intention. Even with equal prices, if the price change has been viewed as a loss (i.e. the penetration strategy) then this will lead to lower purchase intentions and if the price change has been viewed as a gain (i.e. the skimming strategy) then this will lead to higher behavioural intentions. This link has been examined either explicitly or implicitly in different contexts (i.e. Bearden et al. 1992; Della Bitta, Monroe and McGinnis 1981;
Grewal, Monroe and Krishnan 1998; Monroe and Chapman 1987; Thaler 1985; Urbany et al. 1997; Zeithaml 1988). This leads to hypothesis 7:

**H7:** In T₂ purchase intention for the pioneer following a skimming strategy will be higher than purchase intention for the pioneer following a penetration strategy.

6.3.2.5 The Pioneer Advantage: Effects upon Reference Prices

Before proceeding with the development of this study, a necessary condition for subsequent hypotheses to hold is that pioneer advantage exists (see section 6.3.2). Thus we attempt to replicate a key finding in the pioneer advantage area (i.e. Alpert and Kamins 1995; Carpenter and Nakamoto 1989; Kardes and Kalyanaram 1992; Kardes et al. 1993) to test this assertion. For the purposes of this study our concern is not to speculate as to the nature of these advantages but rather to observe their presence. Further justification can be found from prototype theory within the categorisation literature, which would predict that consumers are more likely to endorse the prototype than other brands within the category (Busemeyer, Dewey and Medin 1984; Hintzman 1986; Shin and Nosofsky 1992). Though this hypothesis is not new (and it is the only non-original hypothesis), only a few studies have examined it and none has examined it in the last decade. Therefore H₈ is:

**H₈:** A substantial proportion of respondents will prefer the pioneer brand even though the follower is always at a discount to the pioneer.

This hypothesis is operationalised more specifically in chapter 8, where the analysis procedure is explained. However, in sum if the two brands are equally preferred by respondents in the absence of the order of entry manipulation (i.e. see pilot study 2 and 3 in chapter 7), then we would expect a respondent to always pick the cheaper alternative. However, when the order of entry manipulation is activated, we expect pioneer advantage to be strong enough to exert a substantial change to preference (similarity in preference is tested for experimental control in chapter 7). Thus, in the context of a pioneer brand advantage we can now examine other new hypotheses in the area of reference prices and
new product categories. In particular, we begin by extending our discussion of the pioneer by considering it in conjunction with follower brands in the category.

The pioneer advantage literature has established that the behavioural advantages of the pioneer revolve around its prototypicality and distinctiveness with the product category. The notion of prototypicality has been theoretically argued (Carpenter and Nakamoto 1988) and empirically substantiated (Carpenter and Nakamoto 1989; Lowe and Alpert 2003). Hardie, Fader and Johnson (1993, p. 391) make this distinction in their speculations about the relationship between pioneering and loss aversion by stating, “…the first brand to enter a new product class serves as a reference brand for consumers”.

The pioneer in being prototypical becomes the standard and referent, against which others are judged and in so being may often represent how a brand should be. Prior research evidence suggests it can establish the norm by being the original. Likewise, the reference price literature revolves around the establishment of some norm or referent in order to make simpler judgments. Thus integrating these two bodies of work we may infer that the pioneer, and in particular the pioneer’s price, heavily influences reference price perceptions in the category, whether for a particular brand or the category as a whole (the distinction between brand and category reference prices is made with hypothesis 11).

This assertion can be further justified in relation to category adjustment models of learning (i.e. Huttenlocher, Hedges and Duncan 1991; Huttenlocher, Hedges and Vevea 2000). These learning models suggest we learn about new categories by relying on prior values of stimuli within these categories and forming norms based upon these prior values within the category. In the early stages of category development, the pioneer is thus a stimuli within the category and representative of the category itself. Therefore, what consumers learn about the category is dependent on values of the pioneer. One of the key implications from this theory is that memory about a category is biased towards category norms. The pioneer
as the prototype and natural referent takes on this role in establishing norms within the
category, thus subsequent reference price estimates should be biased towards the pioneer’s
reference price. Sailor and Antoine (2005, p. 840) in their discussion of category
adjustment models draw these implications out further by stating, “… responses to a
stimulus should be consistently biased toward the category prototype”. Likewise,
Rajendran and Tellis (1994, p. 30), state that the prototypical brand within the category
may be the best contextual reference price. This leads to \( H_9 \):

\[ \text{H}_9: \ \text{The pioneer’s price plays a greater role in establishing the reference price in T}_2 \ \text{than the follower’s price.} \]

In chapter 8, this hypothesis is examined in terms of different reference price perceptions
including brand reference prices and a previously unmeasured construct, category
reference price. Following on from \( H_9 \) we can now examine the effect of the pioneer as the
referent brand further down the hierarchy of effects. Thinking back to the basic value
decomposition model developed in chapter 2, perceptions of TV are largely determined by
reference price. Therefore, as chapter 3 pointed out, it is crucial to understand which
reference price consumers use to judge TV as ultimately value perceptions explain
behavioural intentions.

Subsequent to the evolution of the product category with the entrance of a follower brand,
an important question relates to which brand is most influential in determining reference
price. \( H_9 \) posited that the pioneer, due to its prototypical status, was the referent brand and
used as a proxy to judge the worth of that product, and other products within the category.
Therefore, integrating the prior discussion with the value decomposition model, when
thinking about which brand consumers refer to as the referent brand, we would expect that
if the pioneer brand was used to establish the reference price then value judgments of the
pioneer, and other brands within the category, would be made based on the reference price
of the pioneer brand. Thus TV and AV perceptions of all brands would be determined in relation to the reference price held for the pioneer as the ultimate reference point. Consequently, value perceptions for the pioneer and follower brand, and subsequent brand choice decisions would be better predicted by the pioneer’s reference price (or if prices are different, the gap between the pioneer’s price and the pioneer’s reference price) than the follower’s reference price (or if prices are different, the gap between the follower’s price and the follower’s reference price). This leads to hypothesis 10:

\[ H_{10}: \text{The gap between the reference price of the pioneer and the price of the pioneer is a better predictor of brand choice than the gap between the reference price of the follower and the price of the follower.} \]

A further issue in the reference price literature involves the distinction between category level and brand information. The psychological literature has a wide tradition of viewing categorisation processes as a way for consumers to simplify and learn about new information (Huttenlocher, Hedges and Duncan 1991; Huttenlocher, Hedges and Vevea 2000; Sailor and Antoine 2005). Thus we would expect consumers might use a category reference price rather than a brand reference price in their purchase decisions. Some authors have attempted to make this distinction (i.e. Briesch et al. 1997), but limited support for the use of category reference price has been found so far. Indeed, Briesch et al. (1997, p. 212) state despite its intuitive appeal, “specifying a single reference price for all brands is not appropriate and reference price is brand specific”. However, their measure of a category level reference price was some function of past prices of brands chosen previously. Theoretically, this seems to be an unjustified measure of category reference price because it does not consider all brands in the category, only prior purchased brands; though their rationale for including only past prices of previously purchased brands seems sound (i.e. consumers are likely to discount information from brands not purchased). We would expect consumers to use a category reference price rather than a brand reference
price to simplify information processing for brands considered as similar. In fact, this is the rationale behind categorisation theory (i.e. Cohen and Basu 1987; Mervis and Rosch 1981). This is the first time a study has examined category reference price perceptions by actually asking consumers as opposed to making particular assumptions about the nature of the category reference price measure. This leads to the final hypothesis for this thesis:

\[ H_{11}: \text{Category reference price is a better predictor of brand choice than brand reference price.} \]

6.4 Conclusion
Chapter 6 was the first step of study 2, which examines the key thesis question of how reference price form and evolve in new product categories. It developed key hypotheses for empirical testing in subsequent chapters. It is the first piece of systematic research to explicitly link together two important and complementary theories in the marketing domain — the reference price literature and the literature on pioneer brand advantage. Chapter 7 goes on to extend this thinking by presenting a method to empirically test the key propositions generated, through two experiments.
7.1 Introduction
Chapter 6 began by reviewing key literature in the reference price area and integrating it with key literature in the pioneer brand advantage area to develop an empirically testable set of propositions addressing the limitations highlighted in chapter 2. This chapter extends chapter 6 by developing a set of procedures to test those propositions. It begins by describing the experimental design and then reporting on three crucial pilot studies used to design the instrument and stimuli for two experiments. A key consideration in this chapter is the design of an experiment to simulate market entry order in order to test the hypotheses. To simulate market entry order, two hypothetical brands were designed — a pioneer and a follower. These brands had to be as similar as possible for the sake of internal validity, yet different for the sake of realism and to minimise quick comparisons. This apparent paradox was a key challenge in designing experiment 3. The pilot studies in this chapter help to fulfil this purpose through rigorous testing of the stimuli and instrument. After discussing instrument design, chapter 7 then concludes by describing how the study was implemented. Chapter 8 then follows up this inquiry by analysing and interpreting the results of the two experiments within study 2.

7.2 Research Design
The underlying premise of this thesis, and of study 2, is to determine how reference prices form and evolve in new product categories as a result of different pricing strategies adopted by pioneer and follower brands. Typical approaches to the study of reference prices include the use of scanner data, as discussed in chapter 2. However, for this study,
that approach is neither useful, nor possible (see section 4.2.1), whilst at the same time maintaining a high degree of confidence in the findings.

The best way to determine what consumer perceptions really are at the initial stages of market entry would be to ask respondents using a questionnaire. Furthermore, to isolate the effect of pioneer and follower pricing strategies, an experimental technique would be appropriate. Therefore, taking a different approach study 2 analyses reference prices with the use of two experiments. Such a research design presents its own challenges for the study of reference price but is preferable to descriptive designs in this instance. The use of a causal research design provides a number of other advantages; for a more general justification of the causal research design see section 4.2.2.

7.3 Experimental Design

Study 2 consists of two experiments designed to test how reference price perceptions form and evolve at different stages of category development.

7.3.1 Experiment 2 Overview — The Formation of Reference Price Perceptions

The purpose of experiment 2 is to understand *how initial reference price perceptions are formed based upon the entry of a pioneer with different prices*. This is the first step in understanding how reference prices initially form in new product categories, based upon pricing strategy.

Experiment 2 begins by exposing respondents to a pioneer in a novel product category. After exposure to the pioneer, respondents were asked a number of questions pertaining to their perceptions of product innovativeness, their reference price perceptions, and other questions about themselves. As in study 1, respondents could be exposed to a pioneer from one of two categories — the 8-hour sun protection category or the wireless earphones category. These pioneers differed in terms of whether or not a penetration or skimming
strategy was used, or whether no price information was presented with the pioneer. The no price treatment was used as a control group to test H₃. This forms a simple 1x3 experimental design replicated over two different product categories for generalisability.

Broadly, the outcome of experiment 2 is to determine the extent to which the pioneer brand, as a result of its prototypical status, can define reference price perceptions.

7.3.2 Experiment 3 Overview — The Evolution of Reference Price Perceptions

The purpose of experiment 3 is to extend our understanding of initial price perceptions by examining the evolution of reference prices over time by changing the price of the pioneer and exposing respondents to a follower brand.

Experiment 3 is an extension to experiment 2 and further considers the effect of time and competitive interaction upon reference price perceptions. As in experiment 2, respondents were initially exposed to a pioneer in a novel product category. Again, the pioneer could be either a pioneer following a skimming strategy or the pioneer following a penetration strategy. Respondents were then presented with a thinking task and a brain teaser to simulate the passage of time. After these tasks, respondents were told that the price in time period 2 for the pioneer had changed to a regular price — either to a higher price if the pioneer was following a penetration strategy, or to the lower price if the pioneer was following a skimming strategy. They were then exposed to a follower brand. The follower brand was designed to be a me-too follower (Carpenter and Nakamoto 1989) varying by brand name, product description and price. Rigorous tests were performed to ensure that other than largely meaningless differences, these brands were perceived by respondents to be similar (Carpenter, Glazer and Nakamoto 1994) and not objectively better or worse than one another, in the absence of order of entry effects. The follower was either presented at a
small discount or a large discount to the pioneer’s price in time period 2. To control for brand effects, the experiment was counterbalanced so that if one group of respondents saw a particular pioneer and then follower, another group would see those brands in the opposite order.

This forms a 2x2 experimental design, counterbalanced for experimental control and replicated across two product categories, to enhance the reliability and generalisability of the findings (see figure 7.1). The pioneer’s pricing strategy could vary on two levels (i.e. penetration or skimming), the follower’s pricing strategy could vary on two levels (i.e. small or large discount), the order of entry was reversed for counterbalancing (i.e. pioneer: brand A, follower: brand B; pioneer: brand B, follower: brand A) and the product category could vary on two levels (i.e. wireless earphones or 8-hour sun protection).

Figure 7.1: Experimental Design of Experiment 2

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An alternative strategy for a follower might be to signal quality through a higher price than the pioneer. Whilst appealing and methodologically straightforward, application of this strategy seems unwarranted. Firstly, with a meta-analysis of key marketing literature Rao and Monroe (1989, p. 351) conclude that the price-perceived quality relationship remains inconclusive in “magnitude, generalizability, or statistical significance”. Secondly, research using similar experimental techniques suggests the absence of such a relationship with ‘paper and pen’ stimuli (i.e. Carpenter and Nakamoto 1989; Lowe and Alpert 2003). This is also evident from pilot study 3, presented in chapter 7 of this thesis. Finally, anecdotal evidence from interviews with marketing managers and other executives responsible for making pricing decisions at the manufacturer and retailer level all suggest that such a strategy is not appropriate. Typically, follower brands may enter at a higher price but only if they offer “something extra”. In this research, the brands were designed to be similar for experimental purposes (see section 7.4.1.6 and 7.4.1.7). Therefore, the typical price strategy for a follower is to try to make up for the pioneer’s lead time by entering at a discount, everything else equal. Thus, there is limited evidence to warrant charging a higher price for the follower.
The broad goal of experiment 3 is to determine how changing the pioneer’s price and competitive interaction affects reference price perceptions. That is, how reference price perceptions evolve. Even though the experimental method offers a number of advantages over field studies, some limitations must be overcome. A crucial aspect of study design involves realistic construction of stimuli (Pessemier 1960). The next section addresses these concerns and shows how the stimuli were designed and rigorously tested for realism. Similar methods of experimentation through market simulation have been successfully employed elsewhere in the consumer research discipline (i.e. Carpenter and Nakamoto 1989; Moreau, Markman and Lehmann 2001; Ozanne, Brucks and Grewal 1992).

7.4 The Instrument

7.4.1 Stimulus Design

7.4.1.1 Challenges in Designing the Stimuli

In experiment 2 respondents will be exposed to two brands simultaneously, in the context of an emerging market. For purposes of internal validity these brands must exhibit similarity, yet they should also be different to enhance realism and avoid simple comparisons — an apparent incongruity. As such, a key challenge was to design experiment 3 with two different products perceived to be the same by respondents. Thus the brands exhibited subtle meaningless differences with respect to certain attributes enhancing differentiation, yet maintaining internal validity.

One way to enhance meaningless differentiation was to include pictures — this way subjects can see that even though the two brands had similar text based descriptions, they were in fact two different brands. This provides further ambiguity as required for this experiment. Wright, Gendall and Lewis (1999) further recommend the use of pictures in experimental research. Therefore, another challenge in experimental design was to construct realistic pictures of new products, which would assist respondents making their
judgments, and provide a common frame of reference and reduce bias from differences in interpretability of the stimuli. This thesis makes a further contribution because current questionnaire based reference price research has relied on text based explanations of products which may lack realism — this is particularly pertinent to the new product context where text based descriptions may not be sufficient for respondents’ understanding. To reduce any likely confounds, a number of pilot studies were designed and conducted to assist in providing a rigorous experimental procedure for experiment 2 and experiment 3. These pilot studies included:

- Generating and evaluating brand names that are equally attractive/preferred by respondents (pilot study 1a and 1b)
- Establishing price thresholds to ensure an objective determination of price levels for the pioneer and follower brands (pilot study 2)
- Establishing similarity in preference between brands and product concept statements, in the absence of the pioneership manipulation (pilot study 3)

These studies assist in designing an experiment where differences in brand perceptions are more likely to be the result of the order of entry manipulation, rather than differences in other perceptions between brands (see for example Carpenter and Nakamoto 1989 for a similar type of study). First the design of the concept statements is discussed, and further refinements based upon the pilot studies are described below.

7.4.1.2 The Concept Statements

Refinements to Experiment 1: Similarity and Differentiation

The same product categories and basic product information were used for the concept statements in experiments 2 and 3 as were used for the concept statements in experiment 1 (to review the development of these concept statements see section 4.4.2). A key issue in designing the concept statements for study 2 was to maintain differentiation between brands, whilst also maintaining objective similarity between both brands for internal
validity. This was not necessary for experiment 1 as it served a different objective. As such, the concept statements were replicated and modified because now two brands were needed. Therefore, the concept statements were designed to be ambiguous relative to the contribution of the product’s attributes to total utility. Even though the fundamental concept of the innovation could be drawn on (i.e. wireless earphones and 8-hour sun protection), subtle differences needed to be made to the concept statements to enhance differentiation. Whilst used as a basis for the structure of the new concept statements, the basic concept statements in experiment 1 were altered to reflect these needs.

A small sample of respondents was contacted who were expert in these product categories. They were asked to read the initial concept statements from study 1 and specify which attributes could be altered, whilst at the same time retaining basic similarity. They were then asked to replace that attribute with a description of another similar, yet different attribute. For example one respondent mentioned that with sunscreen either Aloe Vera or Vitamin E could be used for moisturising. Likewise, a platinum jack could be used instead of a gold jack for the earphones. Overall these differences in attributes promoted differentiation but did not detract from the overall utility of the innovation. This finding was further confirmed quantitatively in pilot study 3 (refer to section 7.4.1.7).

The Use of Pictures
Pictures were used to stimulate realism and promote further differentiation. For the sunscreens, this task was quite simple because many sunscreens already exist, so modifying existing packaging was relatively straightforward in Photoshop. Pictures of sunscreen bottles were searched for on the web. Labels were then modified to be consistent with the attributes described in the concept statements. Figure 7.2 is an example of how
UV Armour\(^8\) was developed from an existing sunscreen called AquaBlock (refer to appendix 4 for larger scale pictures).

**Figure 7.2: AquaBlock to UV Armour**

For the wireless earphones, pictures of Bluetooth headsets were found and these were edited to remove the mouthpiece and overwrite existing brand names with the brand names generated in pilot study 1b. An example is shown in figure 7.3 for Freedom Fones (refer to appendix 4 for larger scale pictures):

**Figure 7.3: Bluetooth to Wireless Earphones**

In initial pilot studies some respondents commented that these pictures alone did not accurately clarify how the product worked. Therefore, some context was sought for the product’s use by placing the earphones on a picture of someone, shown in figure 7.4.

\(^8\) Section 7.4.1.4 and 7.4.1.5 explains the origin of these brand names, and how the names were developed.
Exactly the same amendments were made to the other products in the experiment for internal validity (refer to appendix 4 to see the other stimuli used).

7.4.1.3 The Pilot Studies
The following sections assist in the development of the instrument by reporting on four separate pilot studies used to provide more rigour in operationalising the manipulations and minimising confounds. These sections describe in detail the purpose, procedure and results of the four studies. The reader may skip to section 7.4.2 if the detail is not required.

7.4.1.4 Pilot Study 1a — Brand Name Generation

Purpose
To reduce demand artefacts and assist in the design of novel brand names, brand names were generated through a small pilot study. The crucial aspect of this pilot study was to generate names for the two brands in the study (recall in experiment 1 there was only one brand) as the experiment now exposes respondents to a pioneer and follower brand. To minimise confounds as a result of naming effects, the brand names generated in pilot study 1a will be subsequently evaluated for similarity in preference in pilot study 1b.

Procedure
Following Kardes et al. (1993), subjects were provided with a brief description of the new product concepts. For the sunscreen it was stated: “Suppose there is a new type of sunscreen about to be introduced. It lasts for 8 hours as opposed to the usual 2-4 hours
which other sunscreens last for”. Likewise, for the earphones it was stated: “Suppose there is a new type of earphones about to be introduced. The earphones do not have wires like other earphones. Therefore, there is no physical connection to the audio device and there is no headband between the earphones”. Based on the descriptions, subjects were then asked to generate as many brand names as possible subject to the criteria that the names were, brief, easy to pronounce and dissimilar to existing brand names (refer to appendix 5 for the instrument). A small convenience sample of eight people participated in pilot study 1a.

Results
Based on the criteria, this led to a list of thirty seven brand names for the sunscreens and twenty two brand names for the wireless earphones, which respondents were subsequently asked to evaluate in pilot study 1b (see appendix 6 for the brand names).

7.4.1.5 Pilot Study 1b — Brand Name Evaluation

Purpose
Pilot study 1b involved the evaluation of the brand names generated in pilot study 1a. The purpose of this pilot study was to provide rigour to study 2 by generating names of equal preference by the target group, and providing greater internal validity and objectivity.

Procedure
The brand names were evaluated by an independent convenience sample of twenty five respondents from tutorial classes. Respondents were presented with the refined list of brand names generated in pilot study 1a. Given the large number of brand names to be evaluated, instead of rating each brand name individually, subjects were presented with the product concepts again and asked to read all the brand names in the list below the concept statement. Similar to the procedure outlined in Hult, Neese and Bashaw (1997), respondents were then asked to choose the five names they preferred the most and then rank this list in order of preference (1 = Most preferred; 5 = Least preferred). This is
censored preference data because we only ask preferences for the first five brands and do not know preferences after the fifth best brand (see appendix 6 for the instrument).

Results

The brand names could be evaluated in a number of different ways. Therefore, several methods of evaluation were used and compared to achieve consistency. For example, the number of times a brand appeared in the ‘top five’ could be counted. However, this measure is relatively simple and takes no account of intensity of preference. Another way is to reverse code the data and calculate an overall rating by summatting the score for each brand across individuals. Such methods of analysing censored preference data are relatively robust and despite potentially unrealistic assumptions about the scale properties of the data (i.e. treating the data as ratio for the ratings analysis), the outcomes remain stable (Lowe and Winzar 2005). The results for the sunscreen brand names are displayed in table 7.1 for each method of evaluation, with ranks appearing in brackets.

<table>
<thead>
<tr>
<th>Number of Times Chosen</th>
<th>Overall Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brand</td>
<td>Number of Times Chosen (Rank)</td>
</tr>
<tr>
<td>UV Protect</td>
<td>10 (1)</td>
</tr>
<tr>
<td>UV Armour</td>
<td>10 (1)</td>
</tr>
<tr>
<td>Great for Eight</td>
<td>7 (2)</td>
</tr>
<tr>
<td>Solar Guard</td>
<td>7 (2)</td>
</tr>
</tbody>
</table>

For the sunscreen product category the two names that consistently appeared as the most preferred and second most preferred were UV Armour and UV Protect. These were also relatively similar to each other, yet different, enhancing the internal validity of the stimuli. Therefore, these were the names selected for subsequent testing.

The results for the earphones brand names are displayed in table 7.2 for each method of evaluation, with ranks appearing in brackets. The results suggest Air Fones as a clear favourite and Headmates as a second preference. However, Freedom Fones, another highly
preferred name, was chosen because it was a more similar sounding name to Air Fones than Headmates, and communicated the products purpose more clearly, preserving the internal validity of the experiment. Again, internal validity was a key concern and similar sounding names provide greater internal validity.

Table 7.2: Brand Name Evaluation Exercise (Earphones)

<table>
<thead>
<tr>
<th>Brand</th>
<th>Number of Times Chosen (Rank)</th>
<th>Brand</th>
<th>Overall Rating (Rank)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Fones</td>
<td>14 (1)</td>
<td>Air Fones</td>
<td>55 (1)</td>
</tr>
<tr>
<td>Headmates</td>
<td>13 (2)</td>
<td>Headmates</td>
<td>44 (2)</td>
</tr>
<tr>
<td>Freedom Fones</td>
<td>9 (3)</td>
<td>Freedom Fones</td>
<td>34 (3)</td>
</tr>
<tr>
<td>Ear Gear</td>
<td>9 (3)</td>
<td>Sonic Fones</td>
<td>25 (4)</td>
</tr>
</tbody>
</table>

7.4.1.6 Pilot Study 2 — Comparing Price Perceptions between Brands and Setting Price Levels for the Pioneer Brands

Purpose
The purpose of pilot study 2 is to add further rigour to experiment 2 by assisting in objectively setting price levels for the skimming and penetration manipulations. This was accomplished by determining respondents’ price perceptions for the different brands in the study. This pilot study also serves a further benefit by identifying whether or not independent samples of respondents have similar price perceptions towards the different brands within each category, and therefore whether or not perceptions towards the brands are similar for internal validity within study 2. The results of this pilot study also further corroborate some of the findings in pilot study 1b.

Procedure
Following on from pilot study 1, the stimuli for experiment 2 were further designed to incorporate the brand names evaluated and selected in pilot study 1a and pilot study 1b. For the earphones, the new brand names were transposed onto each earpiece and for the sunscreens, the new brand names were transposed onto each bottle.
Respondents were exposed to concept statements of the new brands, along with pictures of the products and their brand names for added realism and asked some simple questions relating to their price perceptions. Respondents were asked two questions adapted from Monroe’s (2003) Price Sensitivity Meter⁹, which enabled the construction of demand curves to determine price acceptability at different price levels. These questions were:

1. the highest price they would be willing to pay.
2. the lowest price, below which they would have doubts about the product’s quality.

Respondents were exposed to both product categories and either saw UV Armour and Freedom Fones or UV Protect and Air Fones. They were not exposed to both brands in any one category to ensure independence between group price perceptions and minimise demand artefacts. This helps to determine similarity in price perceptions, and consequently, similarity in product perceptions between groups. There were nineteen respondents exposed to UV Protect and Air Fones and twenty respondents exposed to UV Armour and Freedom Fones. Based on a small convenience sample of 39 respondents, the results are presented below (see appendix 8 for the instrument).

Results
Descriptive statistics between brands are shown in table 7.3 with standard deviations appearing in brackets. An ad hoc analysis of the data suggests that price perceptions are relatively similar between brands for the sunscreens. However, some differences appear to emerge between the means for the two wireless earphones brands. Therefore, possible reasons for these differences (i.e. brand names differences or erroneous observations from heterogeneous samples) need to be explored further.

⁹ The procedure in Monroe (2003) uses four separate questions to determine price acceptability each with separate nuances. Initial pretests revealed respondents had difficulty distinguishing between these questions resulting in the simplified version used here.
Table 7.3: Comparison of Price Perceptions Between Brand Names

<table>
<thead>
<tr>
<th>Brand</th>
<th>Median Maximum Price</th>
<th>Mean Maximum Price</th>
<th>Median Minimum Price</th>
<th>Mean Minimum Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>UV Protect</td>
<td>$19.00</td>
<td>$17.92 (8.19)</td>
<td>$10.00</td>
<td>$8.95 (3.57)</td>
</tr>
<tr>
<td>UV Armour</td>
<td>$20.00</td>
<td>$22.03 (12.60)</td>
<td>$9.00</td>
<td>$10.20 (6.28)</td>
</tr>
<tr>
<td>Air Fones</td>
<td>$80.00</td>
<td>$84.84 (64.60)</td>
<td>$30.00</td>
<td>$38.10 (23.26)</td>
</tr>
<tr>
<td>Freedom Fones</td>
<td>$87.50</td>
<td>$141.80 (124.90)</td>
<td>$36.00</td>
<td>$64.92 (70.05)</td>
</tr>
</tbody>
</table>

These differences were statistically compared with independent samples t-tests to see whether or not they had occurred by chance and to check the robustness of these findings (see table 7.4).

Table 7.4: Comparison of Means between Brands and Categories

<table>
<thead>
<tr>
<th>t-value for mean maximum price between brands (sig.)</th>
<th>Earphones</th>
<th>Sunscreen</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1.801 (0.082)</td>
<td>N=38</td>
<td>N=38</td>
</tr>
<tr>
<td>-1.199 (0.238)</td>
<td>N=38</td>
<td>N=38</td>
</tr>
</tbody>
</table>

The data does not indicate any statistically significant differences between price perceptions for the sunscreen brands (i.e. $t_{37}$=-1.199, $p=0.238$; $t_{37}$=-0.760, $p=0.452$), and despite the apparent differences in means between the earphones brands, these differences are not statistically significant ($t_{37}$=-1.801, $p=0.082$; $t_{37}$=-1.621, $p=0.119$). For further rigour, the medians, which are less susceptible to outliers, were examined along with boxplots to examine the distribution of responses (see appendix 7). The medians are relatively similar, further confirming similarities in price perceptions between brands. It would appear that any differences observed were from erroneous observations.

Treatment Levels for the Pioneers — Simulating a Penetration and Skimming Strategy

Following the procedure for the construction of a Price Sensitivity Meter suggested by Monroe (2003, p. 230), the data for the earphones and sunscreens was further compiled and analysed to determine the proportion of respondents who found potential price levels acceptable. This helps us to determine the price levels respondents perceive to be low and
high, and thus what prices might be used to simulate a penetration and skimming strategy respectively. Because of the similarity in price perceptions, the data for both brands in each category were aggregated for analysis of price thresholds. The Price Sensitivity Meter for the sunscreens is shown in figure 7.5.

![Figure 7.5: Price Sensitivity Meter (Sunscreens)](image)

Following Monroe (2003), the average highest price and the average lowest price was determined by the median price for the highest price and lowest price perceptions. The median price for the highest price is $20 and the median price for the lowest price is $10. The regular price (i.e. the price to which the skimming and penetration prices converge) can be estimated by determining the most acceptable price which would be around $15. The price levels for each of the manipulations are summarised in table 7.5.

The same analysis was done for the earphones with the Price Sensitivity Meter shown in figure 7.6. For the earphones, the median price for the highest price is $80 and the median price for the lowest price $32. Therefore, the regular price should be about $55. These price level manipulations for the pioneer are summarised in table 7.5.
7.4.1.7 Pilot Study 3 — Confirmation of Similarity between Brands and Establishing Follower Price Levels

*Purpose*

The main purpose of pilot study 3 was to determine whether or not the two brands for each category were equally preferred in the absence of the pioneering effect to minimise the confounding effect of brand preference. This was implied by pilot study 2, where it was found that respondents’ maximum and minimum prices were the same. If respondents’ price perceptions between the two groups were the same this suggests no difference in preference between the two brands, either. Thus pilot study 3 serves another important purpose by corroborating the results of pilot study 2.

![Figure 7.6: Price Sensitivity Metre (Earphones)](chart.png)

<table>
<thead>
<tr>
<th>Manipulation</th>
<th>Sunscreens Price</th>
<th>Earphones Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skimming (T₁)</td>
<td>$20</td>
<td>$80</td>
</tr>
<tr>
<td>Penetration (T₁)</td>
<td>$10</td>
<td>$30</td>
</tr>
<tr>
<td>Regular (T₂)</td>
<td>$15</td>
<td>$55</td>
</tr>
</tbody>
</table>
Pilot study 3 serves a further purpose by assisting in the determination of price level manipulations for the follower brands through analysing respondents’ responses to different price differentials between brands.

**Procedure**

Following an adaptation of the “Sequential Preferences Approach” for estimating demand, adapted from Monroe (2003, p. 240), respondents were first exposed to the introduction of the product category with no brand names mentioned. Respondents were then told that there were two brands currently on the market in this category. Descriptions of the product attributes, derived from the concept statements used in pilot study 2 were presented to respondents, along with the pictures of the products. Again, there was no order of entry manipulation, only the introduction of the product category and a description of the two incumbent brands’ attributes, compared side by side (see appendix 9 to view the instrument). Respondents were then asked to answer questions on how similar the products were and their levels of preference for the two brands at different prices. Respondents were first exposed to the sunscreen category and were then exposed to the earphones category.

After exposure to the category and the brands, similarity of preference was tested in two ways. The first was a single item measure from the comparative advertising literature which commonly measures similarity and dissimilarity in advertising (for instance refer to Droge and Darmon 1987 and Gorn and Weinberg 1984, Rose et al. 1993, p. 324). The question used in the instrument for pilot study 3 comes from Baker, Hunt and Scribner (2002, p. 50) with similarity-dissimilarity anchors adapted from Bijmolt et al. (1998, p. 254) and Rose et al. (1993).

The second measure of similarity was the “Sequential Preferences Approach” for estimating demand adapted from Monroe (2003, p. 241). This enabled estimation of preference differences between brands at different price points. Respondents were asked to
evaluate the two brands within each category by stating their preference between the two brands at different price points on a 7-point scale anchored by 1, ‘Prefer UV Protect (Air Fones) to UV Armour (Freedom Fones) Strongly’ and 7, ‘Prefer UV Armour (Freedom Fones) to UV Protect (Air Fones) Strongly. A range of different price differences shown in table 7.6 were tested to try to understand how respondents would react at various price differentials.

Table 7.6: Price Differentials Tested in Pilot Study 3

<table>
<thead>
<tr>
<th>Price of UV Armour</th>
<th>Price Difference</th>
<th>Percentage Difference</th>
<th>Price of Freedom Fones</th>
<th>Price Difference</th>
<th>Percentage Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>$20.99</td>
<td>$6.00</td>
<td>40.0%</td>
<td>$79.99</td>
<td>$25.00</td>
<td>45.5%</td>
</tr>
<tr>
<td>$18.99</td>
<td>$4.00</td>
<td>26.7%</td>
<td>$74.99</td>
<td>$20.00</td>
<td>36.4%</td>
</tr>
<tr>
<td>$17.49</td>
<td>$2.50</td>
<td>16.7%</td>
<td>$69.99</td>
<td>$15.00</td>
<td>27.3%</td>
</tr>
<tr>
<td>$16.49</td>
<td>$1.50</td>
<td>10.0%</td>
<td>$64.99</td>
<td>$10.00</td>
<td>18.2%</td>
</tr>
<tr>
<td>$15.99</td>
<td>$1.00</td>
<td>6.7%</td>
<td>$59.99</td>
<td>$5.00</td>
<td>9.1%</td>
</tr>
<tr>
<td>$15.49</td>
<td>$0.50</td>
<td>3.3%</td>
<td>$57.99</td>
<td>$3.00</td>
<td>5.5%</td>
</tr>
<tr>
<td>$14.99</td>
<td>$0.00</td>
<td>0.0%</td>
<td>$54.99</td>
<td>$0.00</td>
<td>0.0%</td>
</tr>
<tr>
<td>$14.49</td>
<td>–$0.50</td>
<td>–3.3%</td>
<td>$51.99</td>
<td>–$3.00</td>
<td>–5.5%</td>
</tr>
<tr>
<td>$13.99</td>
<td>–$1.00</td>
<td>–6.7%</td>
<td>$49.99</td>
<td>–$5.00</td>
<td>–9.1%</td>
</tr>
<tr>
<td>$13.49</td>
<td>–$1.50</td>
<td>–10.0%</td>
<td>$44.99</td>
<td>–$10.00</td>
<td>–18.2%</td>
</tr>
<tr>
<td>$12.49</td>
<td>–$2.50</td>
<td>–16.7%</td>
<td>$39.99</td>
<td>–$15.00</td>
<td>–27.3%</td>
</tr>
<tr>
<td>$10.99</td>
<td>–$4.00</td>
<td>–26.7%</td>
<td>$34.99</td>
<td>–$20.00</td>
<td>–36.4%</td>
</tr>
<tr>
<td>$8.99</td>
<td>–$6.00</td>
<td>–40.0%</td>
<td>$29.99</td>
<td>–$25.00</td>
<td>–45.5%</td>
</tr>
</tbody>
</table>

Results
Perceived similarity between brands is shown in table 7.7. For both brands, the medians were 6, indicating a high degree of perceived similarity. Likewise, for the sunscreens the mean was 6 and for the earphones, the mean was 6.13.

Table 7.7: Perceptions of Similarity

<table>
<thead>
<tr>
<th></th>
<th>Perceived Similarity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sunscreens</td>
</tr>
<tr>
<td>Mean</td>
<td>6.00</td>
</tr>
<tr>
<td>St. Deviation</td>
<td>1.103</td>
</tr>
<tr>
<td>t-value (sig.)</td>
<td>4.44 (0.000)</td>
</tr>
<tr>
<td>t-value (sig.)</td>
<td>0.000 (1.000)</td>
</tr>
<tr>
<td>Median</td>
<td>6.00</td>
</tr>
<tr>
<td>N</td>
<td>24</td>
</tr>
</tbody>
</table>
One sample t-tests in table 7.7 confirm that the means were statistically different from 5 (p=0.000 for the sunscreens; p=0.000 for the earphones) and not statistically different from 6 (p=1.000 for the sunscreens; p=0.479 for the earphones). Therefore, subjects perceived these brands to be highly similar in the absence of the order of entry effect. Table 7.8, shows that around 80% of respondents assigned values of 6 or 7, providing further evidence of similarity in preference.

Table 7.8: Frequency Distribution of Perceived Similarity

<table>
<thead>
<tr>
<th>Value</th>
<th>Sunscreens Frequency (Valid %)</th>
<th>Earphones Frequency (Valid %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1 (4.2%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>3</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>4</td>
<td>0 (0%)</td>
<td>1 (4.3%)</td>
</tr>
<tr>
<td>5</td>
<td>4 (16.7%)</td>
<td>4 (17.4%)</td>
</tr>
<tr>
<td>6</td>
<td>11 (45.8%)</td>
<td>9 (37.5%)</td>
</tr>
<tr>
<td>7</td>
<td>8 (33.3%)</td>
<td>9 (37.5%)</td>
</tr>
<tr>
<td>N</td>
<td>24</td>
<td>23</td>
</tr>
</tbody>
</table>

The sequential preferences approach revealed further confirmation of similarity in preference between the brands within each category as shown in figures 7.7 and 7.8 (see appendix 9 to view the scale descriptions).

Figure 7.7: Preference between Brands of Sunscreen Different Price Differentials
For both product categories, the charts indicate that when both brands are the same price, the average rating is 4, indicating equal preference for the two brands when at equal prices. Further statistical analysis shown in table 7.9 confirms this with one-sample t-tests indicating insignificant differences between the means (p=0.840 for the sunscreens; p=0.450 for the earphones) when compared to 4 (i.e. no difference in preference):

**Table 7.9: One-Sample t-test for Preference between Brands when Prices are Equal**

<table>
<thead>
<tr>
<th></th>
<th>Preference Between Brands at Equal Prices</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>UV Armour ($14.99)</td>
</tr>
<tr>
<td>Mean</td>
<td>4.04</td>
</tr>
<tr>
<td>St. Deviation</td>
<td>0.999</td>
</tr>
<tr>
<td>t-value* (sig.)</td>
<td>0.204 (0.840)</td>
</tr>
<tr>
<td>N</td>
<td>24</td>
</tr>
</tbody>
</table>

Figures 7.7 and 7.8 also indicate that in the absence of the order of entry manipulation respondents seem quite sensitive to price differences, exhibiting large preference differences for small price differentials. This confirms similarity between the brands, as implied by pilot study 2. In study 2 there will be no difference between the brands other
than the pioneership manipulation. Therefore, in study 2 any difference in perceptions between brands is likely to have occurred because of the pioneership manipulation rather than differences between the brands.

*Treatment Levels for the Followers — Determining a Small and Large Discount*

Having further corroborated similarity between the brands for the purposes of internal validity, we now begin to examine how preference differs at various price differentials between the brands in each category. We do this by further examining the demand curves generated through the sequential preferences approach. This way, we can establish likely consumer response to different discount levels and more objectively determine the prices for the small discount and large discount manipulations.

**Determining a Large Discount**

The sequential preferences approach to estimating demand revealed relatively linear relationships for brand preference at different price differentials (refer to figures 7.7 and 7.8). However, these curves also demonstrated some flattening out at higher price differentials, indicating that certain levels of price differential only evoked a marginal change in preference. This was more prevalent with the earphones category than the sunscreen category. For the sunscreens, these points appeared to be at around $±4 from the reference brand representing a $±26.7\%$ price differential (i.e. when UV Armour was $10.99$ and UV Protect was $14.99$), and $±15$ for the earphones, representing a $±27.2\%$ price differential (i.e. when Freedom Fones was $39.99$ and Air Fones was $54.99$).

Whilst the sequential preferences approach to estimating demand is useful, no method exists to determine where the slope flattens out, other than simple “eyeballing”. This section presents a further measurement contribution from this thesis by describing a set of tests used to determine more objectively where the curve flattens and where further discounting becomes ineffective. This was determined by a series of paired samples t-tests.
Given that subjects responded to a series of questions regarding preference at different price differentials, the point of flattening occurs when there is no significant difference in preference between two price points. This procedure is described below.

For the sunscreens, the paired samples t-tests, illustrated no significant difference in preference between $20.99-$18.99 (this is the same as $8.99-$10.99 levels, representing a ±26.7% price differential), yet statistically significant differences between the other combinations tested as shown in table 7.10.

Table 7.10: Paired Samples t-tests between Levels of Preference at Different Differentials to the Reference Brand (Sunscreens)

<table>
<thead>
<tr>
<th>Paired Comparison (N=24)</th>
<th>Standard Deviation</th>
<th>t-value (sig.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preference at $20.99</td>
<td>Preference at $18.99</td>
<td>0.338</td>
</tr>
<tr>
<td>Mean 1.54</td>
<td>1.67</td>
<td></td>
</tr>
<tr>
<td>Preference at $20.99</td>
<td>Preference at $17.49</td>
<td>0.509</td>
</tr>
<tr>
<td>Mean 1.54</td>
<td>2.08</td>
<td></td>
</tr>
<tr>
<td>Preference at $18.99</td>
<td>Preference at $17.49</td>
<td>0.504</td>
</tr>
<tr>
<td>Mean 1.67</td>
<td>2.08</td>
<td></td>
</tr>
<tr>
<td>Preference at $10.99</td>
<td>Preference at $8.99</td>
<td>0.338</td>
</tr>
<tr>
<td>Mean 6.38</td>
<td>6.50</td>
<td></td>
</tr>
<tr>
<td>Preference at $12.49</td>
<td>Preference at $8.99</td>
<td>0.932</td>
</tr>
<tr>
<td>Mean 5.96</td>
<td>6.50</td>
<td></td>
</tr>
<tr>
<td>Preference at $12.49</td>
<td>Preference at $10.99</td>
<td>0.831</td>
</tr>
<tr>
<td>Mean 5.96</td>
<td>6.38</td>
<td></td>
</tr>
</tbody>
</table>

In sum, preference starts to taper off at ±26.7% as initially indicated above. After a 26.7% price differential, there does not appear to be any large change in preference, despite larger differentials. However, up to this point there are statistically and substantively significant differences in preference between different price levels.

In table 7.11 the paired samples t-tests for the earphones revealed a somewhat complementary picture to the sunscreen data, with no difference in preference between $79.99-$74.99, $34.99-$29.99, $39.99-$29.99, $39.99-$34.99 and $44.99-$39.99. There was a difference between $69.99-$64.99, even though no difference was found between $44.99-$39.99, providing partial confirmation of the pattern for the sunscreen data. This
would again suggest a discount level of around 27%, although in this case the evidence is not quite as strong as with the sunscreen data.

Table 7.11: Paired Samples t-tests between Levels of Preference at Different Differentials to the Reference Brand (Earphones)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>1.42</td>
<td>1.42</td>
<td>Mean</td>
<td>1.58</td>
<td>Mean</td>
<td>1.58</td>
<td>Mean</td>
<td>2.00</td>
<td>Mean</td>
<td>6.17</td>
<td>Mean</td>
<td>6.29</td>
<td>Mean</td>
<td>6.00</td>
<td>Mean</td>
<td>6.00</td>
<td>Mean</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>0.295</td>
<td>0.565</td>
<td>0.381</td>
<td>t-value (sig.)</td>
<td>–1.446 (0.162)</td>
<td>–2.145 (0.043)</td>
<td>–4.053 (0.000)</td>
<td>–1.141 (0.268)</td>
<td>–1.664 (0.110)</td>
<td>–1.446 (0.162)</td>
<td>–1.813 (0.083)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Determining a Small Discount

Often we would expect to see a point of insensitivity around the reference price, reflecting a Just Noticeable Difference (Abe 1998; Gupta and Cooper 1992; Kalwani and Yim 1992; Kalyanaram and Little 1994). This JND suggests that very small discounts can be ineffective because they are assimilated into existing price distributions and are not noticed by consumers. Typical estimates suggest that 5%-10% discounts are often too small to be noticed (i.e. Abe 1998; Gupta and Cooper 1992; Kalwani and Yim 1992; Kalyanaram and Little 1994). Thus, with this in mind, we now determine the percentage discount for the small discount manipulation.

In this case the brands under comparison were basically the same with only minor and objectively meaningless differences between them. We would therefore expect that even small price differentials would invoke differences in preference and brand switching with this type of direct evaluation task, and when there is no order of entry manipulation. Indeed this is what the results of pilot study 3 show with statistically significant differences in
preference even at small price differentials. Mean preference at the smallest price differentials, and the results of the one-sample t-tests are shown in table 7.12 for the sunscreens and 7.13 for the earphones.

Table 7.12: Differences in Preference at Small Discounts (Sunscreens)

<table>
<thead>
<tr>
<th>Paired Comparison (N=24)</th>
<th>Standard Deviation</th>
<th>t-value (sig.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preference at $15.49</td>
<td>Preference at $14.99</td>
<td>0.833</td>
</tr>
<tr>
<td>Mean 3.25</td>
<td>4.04</td>
<td></td>
</tr>
<tr>
<td>Preference at $14.99</td>
<td>Preference at $14.49</td>
<td>0.770</td>
</tr>
<tr>
<td>Mean 4.04</td>
<td>4.67</td>
<td></td>
</tr>
</tbody>
</table>

Table 7.13: Differences in Preference at Small Discounts (Earphones)

<table>
<thead>
<tr>
<th>Paired Comparison (N=24)</th>
<th>Standard Deviation</th>
<th>t-value (sig.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preference at $57.99</td>
<td>Preference at $54.99</td>
<td>0.989</td>
</tr>
<tr>
<td>Mean 3.38</td>
<td>4.13</td>
<td></td>
</tr>
<tr>
<td>Preference at $54.99</td>
<td>Preference at $51.99</td>
<td>0.947</td>
</tr>
<tr>
<td>Mean 4.13</td>
<td>5.00</td>
<td></td>
</tr>
</tbody>
</table>

In the presence of the pioneership manipulation, these preference differences are likely to decrease as a result of asymmetric preference for the pioneer brand (Carpenter and Nakamoto 1989). These findings suggest that small discounts of around 5% are sufficient in shifting preference from the pioneer to the follower, similar to prior research (Abe 1998; Gupta and Cooper 1992; Kalwani and Yim 1992; Kalyanaram and Little 1994).

Summary of Final Price Level Manipulations for the Follower Brands

The follower’s price levels are shown in table 7.14. These discounts were rounded for consistent price endings (i.e. $X.X9) between treatments to avoid a potentially confounding influence (Monroe 2003; Stiving and Winer 1997; Thomas and Morwitz 2005). See section 4.4.2.2 for an explanation.

Table 7.14: Discounts for the Follower Brands

<table>
<thead>
<tr>
<th>Manipulation</th>
<th>Earphones</th>
<th>Sunscreens</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Discount</td>
<td>Price</td>
</tr>
<tr>
<td>Small Discount</td>
<td>5.5%</td>
<td>$51.99</td>
</tr>
<tr>
<td>Large Discount</td>
<td>27.3%</td>
<td>$39.99</td>
</tr>
</tbody>
</table>
7.4.2 Measurement: Confounds, Manipulation Checks and Covariates

In a casual research design, checking and controlling for potential confounds is crucial to establishing internal validity. Potential confounds in these experiments include differences in perceived product quality, differences in knowledge and familiarity, differences in perceived innovativeness and brand name effects.

7.4.2.1 Perceived Product Quality

In some circumstances price may be a signal of product quality, particularly when quality is not readily discernible (Rao and Monroe 1989). Differences in the price manipulations could potentially lead to perceived product quality differences between treatments. Perceived product quality was measured for each of the experiments with a single item 7-point semantic differential scale adapted from Slonim and Garbarino (1999, p. 7). Mean perceived product quality will be tested for differences between groups in chapter 8.

7.4.2.2 Perceived Innovativeness

Differences in perceived innovativeness between treatments may potentially have a similar effect to differences in perceived quality. That is, if respondents perceive an initial low price as a signal of marginal innovativeness then this may influence their product quality perceptions. Perceived innovativeness was measured on a single item scale adapted from Olshavsky and Spreng (1996) and refined through pretesting (see section 4.4.3.1). Mean perceived innovativeness is tested for differences between groups in chapter 8.

7.4.2.3 Knowledge and Familiarity

Product category knowledge and familiarity have been shown to be key moderators of price claim believability (Urbany et al. 1997; Vaidyanathan et al. 2000). Familiarity and knowledge were measured on two single item scales adapted from Cowley and Mitchell (2003), as in experiment 1 (see section 4.4.3.2). They will be tested as a covariate in subsequent models and analysed for affect.
7.4.2.4 Brand Name Effects: Counterbalancing
Because, subjects were exposed to two different and hypothetical brand names in each product category, any measurement differences between brands may possibly be the result of brand naming effects and the effects of small differences in product attributes, as opposed to the pioneership manipulation. Even though these brands were rigorously tested for similarity in preference (i.e. see pilot studies 2 and 3), a further experimental control was implemented by counterbalancing the experimental treatments.

For instance, for the earphones category, half the subjects were exposed to Freedom Fones as the pioneer and Air Fones as the follower. Likewise, the other half of respondents were exposed to Air Fones as the pioneer and Freedom Fones as the follower. Thus, counterbalancing enables greater confidence in the findings as a result of the pioneership manipulation and helps estimate likely brand name effects.

7.4.2.5 Random Allocation
To guard against other potential threats to internal validity subjects were randomly allocated to treatments (Cook and Campbell 1979). Thus, any potentially confounding differences between subjects are likely to be evenly dispersed across treatments.

7.4.3 Measurement: The Independent and Dependent Variables
The majority of the measures used in experiments 2 and 3 were the same as those used in experiment 1, as these measures worked well. However, some adaptations and additions were made to the survey to account for the new hypotheses and limitations of past measures. In particular, measures of TV and AV from experiment 1 were adapted, and some new measures for category reference price and brand choice were also included.

7.4.3.1 Adapting TV and AV
The measures for TV and AV used in experiment 1 seemed to perform well and satisfied validity and reliability requirements for measurement properties (see section 4.4.4.2).
However, initial pilot studies of the surveys for experiments 2 and 3 indicated that respondents found the questions somewhat repetitive and onerous. This is reflected in the extremely high Cronbach’s Alphas obtained from the data in experiment 1 — the measures may be redundant if they in fact measure the same thing. Table 7.15 shows the correlations between each individual measure of TV and AV with their respective summated scales.

Table 7.15: Correlations between Individual Items and the Summated Scale

<table>
<thead>
<tr>
<th></th>
<th>TV Summated Scale</th>
<th>AV Summated Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Earphones</td>
<td>Sunscreens</td>
</tr>
<tr>
<td><strong>TV1</strong></td>
<td>0.956</td>
<td>0.952</td>
</tr>
<tr>
<td>n = 146</td>
<td>n = 157</td>
<td>n = 162</td>
</tr>
<tr>
<td><strong>TV2</strong></td>
<td>0.966</td>
<td>0.964</td>
</tr>
<tr>
<td>n = 153</td>
<td>n = 160</td>
<td>n = 160</td>
</tr>
<tr>
<td><strong>TV3</strong></td>
<td>0.921</td>
<td>0.893</td>
</tr>
<tr>
<td>n = 146</td>
<td>n = 154</td>
<td>n = 161</td>
</tr>
</tbody>
</table>

These results clearly show that each of the single item scales correlate very highly with the summated scale. With the design of questionnaires a key concern is respondent fatigue and boredom (Malhotra, Peterson and Bardi Kleiser 1999; Narayana 1977). Instruments should be parsimonious and succinct to minimise such error. Thus the use of highly correlated multi-item scales may do more harm than good (Rossiter 2002). To achieve parsimony within the instrument without losing information, a reduced set of scales may be helpful. The scales derived from past studies and used in experiment 1 are shown in table 7.16:

Table 7.16: Scales for TV and AV used in Experiment 1

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Question</th>
<th>Anchors</th>
</tr>
</thead>
<tbody>
<tr>
<td>TV1</td>
<td>Compared to what I expect [brand name] would normally sell for, the advertised price of [brand name] is:</td>
<td>Low–High</td>
</tr>
<tr>
<td>TV2</td>
<td>Compared to what I expect [brand name] would normally sell for, the advertised price of [brand name] is:</td>
<td>Inexpensive–Expensive</td>
</tr>
<tr>
<td>TV3</td>
<td>Compared to what I expect [brand name] would normally sell for, the advertised price of [brand name] is:</td>
<td>Underpriced–Overpriced</td>
</tr>
<tr>
<td>AV1</td>
<td>Overall, the price of [brand name] is:</td>
<td>Very Poor Value for Money–Very Good Value for Money</td>
</tr>
<tr>
<td>AV2</td>
<td>Overall, [brand name] is good value for money.</td>
<td>Strongly Disagree–Strongly Agree</td>
</tr>
<tr>
<td>AV3</td>
<td>[Brand name] is an excellent buy for the money.</td>
<td>Strongly Disagree–Strongly Agree</td>
</tr>
</tbody>
</table>
Initial expert interviews with marketing academics revealed no consensus on which questions to select. This further confirms the subtle distinctions between the scale items and the need to reduce them. Slonim and Garbarino (1999) use a scale of perceived expensiveness to test underlying reference price effects. This would suggest the use of TV2 as an appropriate scale item for TV. Rossiter (2002) argues that Likert scale questions such as AV2 and AV3 do not accurately convey intensity of perceptions. For instance, a somewhat pedantic example might be a respondent who, when answering AV2 may think the product is excellent value for money and therefore strongly disagrees with the statement that the product is good value for money. In fact, the researcher would intend the respondent to answer ‘strongly agree’ to indicate intensity. Furthermore, AV1 and AV2 are highly similar. Therefore, to overcome measurement limitations identified in the pretests, TV2 and AV1 were used as single item scales for further testing.

7.4.3.2 Category Reference Price
To extend the study of reference price effects in new product categories, H11 posited that category reference price was a better predictor of purchase intention than brand reference price. As such the brand reference price measure used in experiment 1 and further used in experiments 2 and 3 needed to be adapted. Essentially the brand name in the brand reference price question was replaced with the category’s name (i.e. 8-hour sunscreen or wireless earphones). However, to minimise potential misinterpretation further emphasis was added after the question specifying “This question is about your fair price perceptions for the general product category of [8-hour sunscreens/wireless earphones]. As simple as this measurement of category reference price is, it is the first operationalisation of category reference price using the direct questioning approach. The only other measurement found was an inferred measure based on scanner data (i.e. see Briesch et al. 1997).
7.4.3.3 Brand Choice
With the introduction of a follower brand into the product category, experiment 3 involves explicit comparisons of two brands. Single brand evaluations may be limited in this regard. For example, measuring purchase intention for each brand may lead to Halo effects (Churchill and Iacobucci 2002). A natural extension is to construct a question within the instrument that overcomes these difficulties. Price judgments are inherently comparative and paired comparisons represent a natural task for consumers (Monroe 2003; Ofir 2004), suggesting a choice based approach. A related stream of research in consumer choice (i.e. Elrod, Louviere and Davey 1992) justifies such an approach largely because choice tasks are more realistic and more similar to marketplace behaviour. Likewise, Coupey and Jung (1992) successfully employ a brand choice task in other experimental product category research. Therefore, drawing on precedent and using the most suitable measurement for this type of study, a binary brand preference question was added to experiment 3.

In the initial pretest respondents were asked to indicate which of the brands they preferred the most, with pictures to remind them and facilitate comparison. However, the majority of respondents preferred the pioneer brand even though the follower was always cheaper, suggesting issues with question interpretation. On quizzing respondents about potential sources of confusion it was found they believed the question was asking about preference if the brands were the same price. Therefore, the question was adapted by indicating prices in brackets and adding a further descriptor stressing that the comparison should be made at the respective price of the brand in the questionnaire (see Q20 in appendix 11).

7.5 Procedure
7.5.1 Initial Experimental Design
Initially there was to be only one experiment encapsulating the questions within experiments 2 and 3. However, this experiment was split up to form two separate but
similar experiments. Pilot testing of the initial version of the instrument on a small group of respondents suggested respondents found the questions extremely repetitive. This was because they had to answer questions for a pioneer in T₁, then answer the same questions for the pioneer in T₂ after the price manipulation, and then answer the same set of questions once more for the follower brand.

Using this procedure, there is a possibility of carryover and learning effects if respondents have to answer the same questions twice for one brand and once for another. Also, answering so many questions about price perceptions might over emphasise the objectives of this study, thereby introducing a demand artefact. Furthermore, repeated exposure to rating scales for one brand may lead to respondents thinking more extensively about that brand, over stimulating the pioneer effect (Kardes and Kalayanaram 1992). Therefore, the experiment was split up into an experiment for T₁ — the formation of reference price — and an experiment for T₂ — the evolution of reference price. Splitting the study into two separate experiments, as illustrated below, was deemed the strongest and safest approach.

7.5.2 Experiment 2: Procedure
Experiment 2 was a 1x3 experiment replicated across two product categories. Path diagrams of experiment 2 are shown in figure 7.9. After random allocation to one of the two treatments, subjects were first exposed to a pioneer brand. The pioneer either followed a penetration or skimming strategy, or was from the control group and had no price.

Figure 7.9: Path Diagrams of Experiment 2 (Sunscreens and Earphones)
Respondents were only exposed to one pioneer brand from each product category as respondents overwhelmingly perceived the two brands for each product category as similar (i.e. see pilot studies 2 and 3). First respondents were exposed to Freedom Fones from the wireless earphones category. After exposure to Freedom Fones respondents were asked questions on innovativeness, their reference price perceptions, confidence in those reference price perceptions, TV and AV, product quality perceptions and product category knowledge and familiarity. They were then exposed to UV Armour from the 8-hour sun protection category. The prior questions were then repeated for UV Armour. Finally subjects were asked a few general questions and their thoughts on what the survey was about, to determine potential for demand artefacts.

Exposure to different pioneer pricing strategies was kept constant with respondents only being exposed to pioneers following a penetration or skimming strategy, or a pioneer with no price information. For instance, some respondents were exposed to Freedom Fones with a penetration strategy and UV Armour with a penetration strategy and others were exposed to Freedom Fones with no price information and UV Armour with no price information. Different consumers are likely to have differing price sensitivities, particularly with respect to new products (Bijmolt, Heerde and Pieters 2005; Gupta and Cooper 1992; Tellis 1988) and different levels of product category knowledge. Therefore, to keep these effects constant respondents were allocated to one treatment (i.e. penetration, skimming or no price), not some combination of each of the treatments.

7.5.3 Experiment 3: Procedure
Experiment 3 is an extension to experiment 2 and examines how reference price perceptions evolve as a result of further pioneer price changes and the introduction of a follower into the new category in T2.
7.5.3.1  **Introduction of the Pioneer**  
As in experiment 2, respondents were exposed to a pioneer from either product category, following a penetration or skimming strategy. Respondents were not asked any questions about the pioneer in T₁ to avoid repetition and demand artefacts. Instead, following the procedure for simulating an emerging market (i.e. Carpenter and Nakamoto 1989), a brief thinking task was included after the pioneer’s product description.

7.5.3.2  **Short Term Memory Effects**  
After exposure to the pioneer brand in the present experiment, subjects were then presented with a short distracter task disguised as a brain teaser to minimise short term memory effects and simulate the passage of time (Broniarczyk, Hoyer and McAlister 2003; Carpenter and Nakamoto 1989). The literature was searched for appropriate distracter tasks to use in the experiment. Morrin and Ratneshwar (2000) and Baron and Thomley (1994) report on a fairly simple anagram exercise where respondents were asked to rearrange the letters in the word *concentration* to form new words with four or more letters. Subjects were asked to produce four words because pilot testing revealed that spending too much time on it would detract from the purpose of the experiment. To induce participation subjects were also told they would be placed in a random draw for a prize, if four words were given.

7.5.3.3  **Introduction of the Follower**  
After completing the distracter task subjects clicked on a ‘Next’ button which took them to the stimuli. At this stage subjects were told the pioneer’s price had changed to the regular price, increasing if the pioneer followed a penetration strategy and decreasing if it followed a skimming strategy. Subjects were then exposed to the follower, at a small discount to the pioneer or a large discount to the pioneer. After seeing the follower subjects were then asked questions about the pioneer and the follower and general questions about the category. Path diagrams for potential treatments are shown in figure 7.10.
7.6 Pretesting
Before the experiments were conducted the instrument was pretested on small samples of respondents for clarity and interpretability. Limited changes were made because of prior testing in experiment 1, and the experiments were performed.

7.7 Sampling
7.7.1 Sample Selection
The experiment was promoted in undergraduate and postgraduate business school classes at a metropolitan university. Following standard research ethics procedures of the University, participation was entirely voluntary, but encouraged with incentives. The experiment was promoted on course websites and respondents clicked on a hyperlink to take them to the main experiment web page. On the main web page, after reading an introductory statement about the questionnaire and ethics guidelines, subjects proceeded by clicking on a ‘Next’ button which randomly allocated them to one of the treatments.

7.7.2 Sample Size
7.7.2.1 Sample Size: General Guidelines
The desired sample size was calculated relative to the number of treatments. Typical suggestions of sample size per treatment stem from the Central Limit Theorem, which
suggests a minimum sample size of at least 30 per treatment. Although small deviations from this cell size are likely to have little effect (Keppel and Wickens 2004). In fact, a number of widely quoted O’Dell award winning consumer research studies in the Journal of Marketing Research have used less than these suggested numbers (i.e. Carpenter, Glazer and Nakamoto 1994; Carpenter and Nakamoto 1989; Nowlis and Simonson 1996).

7.7.2.2 Sample Size Per Treatment
The sample size in experiment 2 was 86, distributed across groups as in table 7.17. The sample size in experiment 3 was 385, distributed across groups as in tables 7.18 and 7.19.

Table 7.17: Experiment 2: Sample Size by Treatment

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Penetration</th>
<th>No Price</th>
<th>Skimming</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earphones</td>
<td>32</td>
<td>27</td>
<td>27</td>
</tr>
<tr>
<td>Sunscreen</td>
<td>32</td>
<td>27</td>
<td>27</td>
</tr>
</tbody>
</table>

Table 7.18: Experiment 3: Sample Size by Treatment for the Earphones

<table>
<thead>
<tr>
<th>Order of Entry</th>
<th>Air Fones: Freedom Fones</th>
<th>Freedom Fones: Air Fones</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pioneer Pricing Strategy</td>
<td>Penetration</td>
<td>Skimming</td>
</tr>
<tr>
<td>Small Discount</td>
<td>Group 5</td>
<td>N=23</td>
</tr>
<tr>
<td>Large Discount</td>
<td>Group 1</td>
<td>N=23</td>
</tr>
</tbody>
</table>

Table 7.19: Experiment 3: Sample Size by Treatment for the Sunscreens

<table>
<thead>
<tr>
<th>Order of Entry</th>
<th>UV Armour: UV Protect</th>
<th>UV Protect: UV Armour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pioneer Pricing Strategy</td>
<td>Penetration</td>
<td>Skimming</td>
</tr>
<tr>
<td>Small Discount</td>
<td>Group 7</td>
<td>N=23</td>
</tr>
<tr>
<td>Large Discount</td>
<td>Group 3</td>
<td>N=26</td>
</tr>
</tbody>
</table>
7.8 Stimulus Administration

7.8.1 Data Collection
The experiment was advertised on course websites with a number of prizes as incentives. Subjects were told that if they wanted to participate to follow a hyperlink. This directed them to an external web page where they were briefed on the broad purpose of the experiment and the prizes for participation. In the first instance, only experiment 2 was exposed to respondents and the survey was initially promoted in two classes. When sufficient responses had been gathered experiment 2 was closed and subjects were exposed to experiment 3, promoted in other courses.

Respondents were unaware that this was an experiment as it was promoted as a survey. The broad purpose of the survey was made known to respondents (i.e. they were told the survey was about perceptions of new products), but the specific purpose was not made known to them. This was done to reduce demand artefacts.

7.8.2 The Benefits of a Web Experiment
A web experiment was used as it provided several potential advantages over a paper and pencil experiment. Firstly, subjects were not forced to participate during class time, and were able to proceed in their own time meaning less reluctance to answer honestly and less hasty answers with greater accuracy.

Also, after each stimulus and set of questions, respondents had to click a ‘Next’ button to proceed so they could not look back or adjust their responses. Using the ‘Full Window’ Java Script code, subjects were unable to view the web page’s URL, nor to utilize their web browser’s navigation bar to move back and forth through the experiment, ensuring that participants were unaware of the experimental nature of the research. This is a valuable benefit of an online experiment for entry order research because subjects have to rely on their impressions from T₁ and cannot turn back the page to inspect earlier
descriptions and adjust their responses (even when respondents are asked “not to look back at prior pages” in paper and pencil, there is no guarantee that they do not look back).

7.8.3 Randomisation
After clicking the ‘Next’ button on the introductory web page Java Script code was activated, which randomly assigned each participant to one of the treatment web pages. To do this, the Java Script code generated a random number between 1 and 3 for experiment 2 and 1 and 16 for experiment 3. The participant’s web browser was then redirected to the corresponding URL. Participants were unaware of the existence of the other web pages and hence were unaware of the experimental nature of the research.

7.9 Conclusion
Chapter 7 reported on the results of three pilot studies used to design the main instrument for study 2. In particular it presented the method used to overcome challenges in simulating an emerging product category whilst maintaining internal validity. It then provided an outline of two experiments used to address the hypotheses presented in chapter 6, which integrate two important bodies of work in the marketing literature. Chapter 8 proceeds by analysing the results of these two experiments and reporting on the main research question of how reference prices form and evolve in new product categories, established in chapter 2.
8.1 Introduction
Chapter 7 presented the method and instrument design used to study the propositions developed in chapter 6. Chapter 8 concludes study 2 by conducting formal hypothesis testing and presenting the empirical results. This chapter begins by analysing the results of experiment 2 and then proceeds by examining the results of experiment 3. The findings, with their implications drawn out, are elaborated on and discussed.

8.2 Experiment 2
Experiment 2 examines the first aspect of this thesis by examining how reference price perceptions initially form when a novel pioneer enters either with a skimming or penetration pricing strategy. First we discuss the results of the manipulation checks and then proceed by analysing the results of experiment 2 across treatments.

8.2.1 Confounds and Manipulation Checks
8.2.1.1 Differences in Perceived Quality by Pricing Strategy
One potential confound in the experiment was a difference in perceived quality between the price strategies being tested. A lower price may indicate lower quality which may confound other responses. Mean perceived quality by treatment is shown below:

<table>
<thead>
<tr>
<th></th>
<th>Earphones</th>
<th></th>
<th>Sunscreen</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Standard Deviation</td>
<td>N</td>
<td>Mean</td>
</tr>
<tr>
<td>Penetration</td>
<td>5.065</td>
<td>1.263</td>
<td>31</td>
<td>5.219</td>
</tr>
<tr>
<td>Skimming</td>
<td>5.074</td>
<td>0.829</td>
<td>27</td>
<td>5.111</td>
</tr>
<tr>
<td>No Price</td>
<td>5.250</td>
<td>1.206</td>
<td>28</td>
<td>4.889</td>
</tr>
</tbody>
</table>
There does not appear to be any difference in mean perceived quality between treatments. Differences in perceived quality were further statistically tested with ANOVAs. The results of these analyses are shown in table 8.2 below:

<table>
<thead>
<tr>
<th></th>
<th>Earphones</th>
<th>Sunscreen</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Levene (sig.)</strong></td>
<td>3.543 (0.033)</td>
<td>0.276 (0.760)</td>
</tr>
<tr>
<td><strong>F (sig.)</strong></td>
<td>0.509 (0.603)</td>
<td></td>
</tr>
<tr>
<td><strong>Welch (sig.)</strong></td>
<td>0.230 (0.795)</td>
<td></td>
</tr>
</tbody>
</table>

The earphones data exhibited unequal variances, violating an assumption behind the F-test. As a result, the Welch statistic was used (Keppel and Wickens 2004, p. 155). Nonetheless, the data exhibited no statistical difference in means as the significance values were greater than 0.05. For the sunscreen data, the groups exhibited equal variances. Therefore, using the F-statistic, there was no statistical difference in means between groups either.

### Differences in Perceived Innovativeness by Pricing Strategy

Another potential confound in experiment 2 was a difference in perceived innovativeness between the price strategies being tested. A lower price may indicate lower innovativeness which may confound other responses. Mean perceived innovativeness by treatment is shown table 8.3 below:

<table>
<thead>
<tr>
<th></th>
<th>Earphones</th>
<th>Sunscreen</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Penetration</strong></td>
<td>4.839 0.969 31</td>
<td>4.156 1.798 32</td>
</tr>
<tr>
<td><strong>Skimming</strong></td>
<td>4.519 1.397 27</td>
<td>3.778 1.528 27</td>
</tr>
<tr>
<td><strong>No Price</strong></td>
<td>4.571 1.425 28</td>
<td>4.037 1.786 27</td>
</tr>
</tbody>
</table>

The above means do not exhibit a marked difference between groups. Differences in perceived innovativeness were tested with ANOVAs for both the earphones and the sunscreen data. The results are shown in table 8.4.
Table 8.4: Differences in Perceived Quality by Pricing Strategy

<table>
<thead>
<tr>
<th></th>
<th>Earphones</th>
<th>Sunscreen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Levene (sig.)</td>
<td>3.103 (0.050)</td>
<td>1.242 (0.294)</td>
</tr>
<tr>
<td>F (sig.)</td>
<td>0.366 (0.694)</td>
<td></td>
</tr>
<tr>
<td>Welch (sig.)</td>
<td>0.650 (0.526)</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>85</td>
<td>85</td>
</tr>
</tbody>
</table>

Again, the earphones data exhibited unequal variances, violating an assumption behind the F-test so the appropriate statistic to refer to was the Welch statistic (Keppel and Wickens 2004; p. 155). Nonetheless, the data exhibited no statistical difference in means as the significance values were greater than 0.05. For the sunscreen data, the groups exhibited equal variances. Using the F-statistic, there was no statistical difference in means.

These results show encouraging signs that the hypotheses generated in chapter 6 can be further analysed without the fear of confounding influences.

8.2.1.3 Differences in Product Category Knowledge

Chapter 2 and 3 discussed the potentially moderating effect of product category knowledge. The two questions on knowledge and familiarity from the questionnaire were tested for inter-item reliability, summated, and analysed for differences between groups. Cronbach’s $\alpha$ values for inter-item reliability are shown in table 8.5.

Table 8.5: Reliability for Knowledge and Familiarity

<table>
<thead>
<tr>
<th></th>
<th>Earphones</th>
<th>Sunscreens</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cronbach’s $\alpha$</td>
<td>0.917</td>
<td>0.947</td>
</tr>
</tbody>
</table>

Scales for both products exhibit high inter-item reliability so the scales were averaged for further analysis. Mean knowledge scores between groups are shown in table 8.6.

Table 8.6: Mean Category Knowledge by Treatment

<table>
<thead>
<tr>
<th></th>
<th>Earphones</th>
<th>Sunscreen</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Standard Deviation</td>
</tr>
<tr>
<td>Penetration</td>
<td>3.94</td>
<td>1.459</td>
</tr>
<tr>
<td>No Price</td>
<td>4.45</td>
<td>1.606</td>
</tr>
<tr>
<td>Skimming</td>
<td>3.78</td>
<td>1.450</td>
</tr>
</tbody>
</table>
Small differences were exhibited between groups, however, these differences were not statistically different as shown in table 8.7 suggesting that product category knowledge did not have an influence on the results.

Table 8.7: ANOVA for Mean Category Knowledge by Treatment

<table>
<thead>
<tr>
<th></th>
<th>Earphones</th>
<th>Sunscreen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Levene (sig.)</td>
<td>0.306 (0.737)</td>
<td>0.222 (0.802)</td>
</tr>
<tr>
<td>F (sig.)</td>
<td>1.501 (0.229)</td>
<td>0.256 (0.775)</td>
</tr>
<tr>
<td>N=86</td>
<td>N=86</td>
<td></td>
</tr>
</tbody>
</table>

8.2.2 Hypothesis 3 — A Test of the Pioneer’s Ability to Form the Reference Price

H₃ from chapter 6 stated, “The reference price for the pioneer shifts in the direction of the pioneer’s price”. In effect this means the pioneer acts as an anchor in determining initial perceptions of worth. Analysis of this hypothesis proceeds by examining the distribution of reference prices by experimental condition and then concludes with a more confirmatory comparison of means by experimental condition.

8.2.2.1 Distribution of Reference Prices by Pricing Strategy

Initial exploratory boxplots of reference price by experimental condition revealed some extreme outliers which were removed from subsequent analysis. Boxplots of reference price by experimental condition are shown in figure 8.1 for the earphones and sunscreen data. The distribution of reference prices by experimental condition for the earphones data appears to show three distinct distributions for each of the price treatments. In other words, these boxplots indicate the pioneer’s price can shift the distribution of reference prices as predicted. The sunscreen data presents a similar pattern. Again there are three distinct distributions, providing further support for H₃. However, the distributions for the sunscreen data appears to be a little less dispersed, suggesting that reference price is a little less affected by the price treatment than with the earphones data.
The ability of the pioneer’s pricing strategy to shift consumer reference prices can be further empirically tested with a comparison of means by experimental condition.

8.2.2.2 Mean Reference Price by Pricing Strategy

Mean reference prices by experimental treatment are shown in table 8.8 and figure 8.2. Figure 8.2 illustrates that reference price increases as the pioneer’s introductory price increases. Not only does it increase but it increases by a similar amount suggesting the reference price appears to be the pioneer’s price\(^\text{10}\). The data indicates obvious differences in mean reference price by experimental treatment for both categories.

<table>
<thead>
<tr>
<th>Table 8.8: Mean Reference Price by Experimental Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Earphones</strong></td>
</tr>
<tr>
<td>Penetration</td>
</tr>
<tr>
<td>No Price</td>
</tr>
<tr>
<td>Skimming</td>
</tr>
</tbody>
</table>

\(^\text{10}\) Further discussion of this finding is left to section 8.2.3 as it relates specifically to H.\textsubscript{4}.
These differences are further statistically tested using ANOVA, shown in table 8.9. Levene’s test for homogeneity of variance revealed unequal variances for the earphones data and equal variances for sunscreen data. As such, the Welch statistic was used for the earphones data and the F-test was used for the sunscreen data (Keppel and Wickens 2004, p. 155). Each of the tests revealed a difference in mean reference price between the three treatments. These differences were highly significant providing further support beyond the descriptive results for H3.

Table 8.9: Comparison of Means by Experimental Condition

<table>
<thead>
<tr>
<th></th>
<th>Earphones</th>
<th>Sunscreen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Levene (sig.)</td>
<td>4.276 (0.017)</td>
<td>1.455 (0.240)</td>
</tr>
<tr>
<td>F (sig.)</td>
<td>9.333 (0.000)</td>
<td></td>
</tr>
<tr>
<td>Welch (sig.)</td>
<td>24.076 (0.000)</td>
<td></td>
</tr>
<tr>
<td>N=80</td>
<td></td>
<td>N=78</td>
</tr>
</tbody>
</table>

In light of the differences found to exist between the groups these differences were further analysed with planned comparisons examining differences between the skimming and penetration strategies. These planned comparisons are shown in table 8.10. Again, given that tests indicated the variance between groups for the earphones data was not.
homogeneous and the variance between groups for the sunscreen data was homogenous, Tamhene’s T2 test was used for the earphones data and the Tukey test was used for the sunscreen data (SPSS 2004, p. 371).

Table 8.10: Post Hoc Tests

<table>
<thead>
<tr>
<th>Treatment Comparison</th>
<th>Earphones Test: Tamhene’s T2 (sig.)</th>
<th>Sunscreen Test: Tukey (sig.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skimming-Penetration</td>
<td>38.66 (0.000)</td>
<td>5.53 (0.000)</td>
</tr>
<tr>
<td>Skimming-No Price</td>
<td>18.58 (0.013)</td>
<td>2.96 (0.095)</td>
</tr>
<tr>
<td>Penetration-No Price</td>
<td>20.08 (0.001)</td>
<td>2.57 (0.153)</td>
</tr>
</tbody>
</table>

For both product categories, the data provides strong support and further confirmation of \( H_3 \), exhibiting highly statistically significant differences between mean reference price for the penetration and skimming strategies. Statistical differences were also exhibited between the ‘no price – skimming’ group and the ‘no price – penetration’ group for the earphones, but not for the sunscreens. However, \( H_3 \) specifically concerns the impact of pricing strategy on reference price perceptions so the ‘no price’ treatment is not relevant in determining support for \( H_3 \) and simply reflects respondents’ reference price perceptions in light of no price information.

In summary, the graphs show strong support for a shift in reference price based on pioneer strategy. This is replicated across two product categories for enhanced generalisability. These results are further given credence in light of appropriate statistical testing which indicates large and statistically significant differences in reference price by pricing strategy — the pioneer’s price shifts the reference price in the direction of it’s own price.

8.2.2.3 Mean Transaction Value, Acquisition Value and Purchase Intention by Pricing Strategy

An interesting corollary arising from the questionnaires were differences in TV, AV and purchase intention between treatments. If the pioneer’s price can increase the reference price then we would consequently expect that TV and AV would not differ between
treatments — that is, not only is reference price defined by the pioneer but likewise, so are value perceptions.

For instance, assume a consumer sees the price of the new product at $80. Unsure of how much this product should cost, they might think that $80 is about right because that’s what it does cost. This may then be translated into a value of, say 5, on a scale of 1 to 7 for TV, suggesting reasonable value for money (i.e. the scaled measures of value perceptions).

Now, consider a different consumer, the same in all aspects to the first consumer, but exposed to the product with a price tag of $50. Again, unsure of how much this product should cost, they might think $50 is about right because that’s the price they were exposed to. Indeed, this is what we saw with H3. However, translating this price onto a value scale for TV, the same consumer, unknowing of what this product is worth, may translate this into a value of 5 again as it would seem to be reasonable value for money. Thus, if reference prices are ill defined and differ depending upon prices exposed to, then subsequent value perceptions will not differ. Likewise, if value perceptions are the same between brands then so too will purchase intention between brands, even at different prices. In other words, if the pioneer can define reference price then by virtue of/pioneership the pioneer can also define value perceptions, which will remain indifferent, if only a function of price. Consequently respondents will be price insensitive to pioneers.

To analyse these effects, a MANOVA was run because we are simultaneously comparing means between three different, albeit related, dependent variables. The results of the MANOVA and its subsequent univariate tests are discussed below.

**MANOVA: Assumption Testing**

MANOVA is a technique particularly susceptible to violations of its underlying assumptions. So as to not detract from the flow of this chapter, assumption testing can be viewed in appendix 12. In summary, all assumptions underlying the MANOVAs have been
met for the earphones data and the sunscreen data. This allows further multivariate and univariate testing to proceed.

**MANOVA: Overall Fit**
The purpose of a MANOVA is to determine whether or not means between TV, AV and purchase intention differ as a result of different groups. However, in this case, we are examining whether value perceptions and purchase intention are in fact the same depending on different pricing strategies, not different, in the initial stages of product introduction. Using Hotelling’s Trace for the two group MANOVA case (Hair et al. 1998), the results of the multivariate tests are shown in table 8.11.

<table>
<thead>
<tr>
<th>Pioneer:</th>
<th>Earphones</th>
<th>Sunscreen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hotelling’s Trace (sig.)</td>
<td>0.039 (0.557)</td>
<td>0.087 (0.201)</td>
</tr>
</tbody>
</table>

The multivariate testing reveals that neither of the means are different between the two experimental groups. Conventionally, because we find no simultaneous differences in means between groups we would not proceed with univariate testing. However, this time we are testing similarity so further univariate testing is conducted below to examine the differences more specifically.

**Differences in Transaction Value, Acquisition Value and Purchase Intention by Pioneer Pricing Strategy in T₁**
Mean values for TV and AV are shown in table 8.12. There are some differences between the means for the different pricing strategies and these are in the expected direction. For instance, as price increases mean TV becomes marginally higher and mean AV becomes marginally lower. However, they do not appear to be particularly large differences relative

---

11 With the scale used in the questionnaire, higher values for TV indicate lower levels of TV.
to the large difference in price (i.e. $29.99 and $79.99 for the earphones and $9.99 and $19.99 for the sunscreen).

Table 8.12: Mean Transaction Value and Acquisition Value by Treatment

<table>
<thead>
<tr>
<th></th>
<th>Earphones</th>
<th>Sunscreen</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Standard Deviation</td>
</tr>
<tr>
<td>Penetration (TV)</td>
<td>3.16</td>
<td>1.675</td>
</tr>
<tr>
<td>Skimming (TV)</td>
<td>3.70</td>
<td>1.706</td>
</tr>
<tr>
<td>Penetration (AV)</td>
<td>5.10</td>
<td>1.326</td>
</tr>
<tr>
<td>Skimming (AV)</td>
<td>4.78</td>
<td>1.672</td>
</tr>
</tbody>
</table>

Independent samples t-tests, shown in table 8.13 show there is no evidence to suggest a statistically significant difference in means. Given that the means between groups are similar, this provides further tangential evidence to support H₃.

Table 8.13: T-Tests Between TV and AV by Treatment

<table>
<thead>
<tr>
<th></th>
<th>Earphones</th>
<th>Sunscreen</th>
</tr>
</thead>
<tbody>
<tr>
<td>t-value for TV (sig.)</td>
<td>1.488 (0.228)</td>
<td>1.772 (0.188)</td>
</tr>
<tr>
<td>N=56</td>
<td>N=57</td>
<td></td>
</tr>
<tr>
<td>t-value for AV (sig.)</td>
<td>1.468 (0.421)</td>
<td>1.411 (0.240)</td>
</tr>
<tr>
<td>N=56</td>
<td>N=57</td>
<td></td>
</tr>
</tbody>
</table>

More importantly, these findings imply that the pioneer does not only form reference price perceptions, but in doing so seems to assist respondents in forming value judgments. This is important because conventional thinking about value suggests that value is fixed — i.e. some ratio of the benefits of acquiring the product relative to the costs of acquiring the product (Monroe 2003, p. 176). In fact, it would appear that value is not fixed and can be manipulated with higher prices. That is, marketers can define value with the price charged.

If value perceptions are the same by treatment then we would also expect purchase intention to be the same. Examining the descriptive statistics and conducting the univariate tests, we now look at differences in purchase intention in table 8.14. Again, the univariate tests do not show a difference in purchase intention between pricing strategies for the earphones. Although mean purchase intention for the skimming strategy is lower than for
the penetration strategy, this difference is not statistically significant. That is, consumers appear to be price insensitive, perhaps because of lack of knowledge, within the initial stages of market introduction. However, this is not the case for the sunscreen data. The sunscreen data exhibits a difference in purchase intention by different introductory prices and this difference is statistically significant.

| Table 8.14: Differences in Purchase Intention by Treatment |
|-----------------|-----------------|-----------------|-----------------|
|                  | Earphones       | Sunscreen       |                  |
|                  | Mean            | Standard        | Mean            | Standard        |
|                  | Deviation       | Deviation       |                 |                 |
| Penetration (PI)| 4.55            | 1.786           | 5.44            | 1.585           |
| Skimming (PI)   | 3.89            | 1.888           | 4.52            | 1.578           |
| t-value (sig.)  | 1.866 (0.177)   |                 | 4.943 (0.030)   |
| n               | 56              |                 | 57              |

This difference in findings between categories could potentially be due to differences in perceived product category knowledge. Therefore, paired sample t-tests, shown in table 8.15, were used to assess the likelihood of this.

<table>
<thead>
<tr>
<th>Table 8.15: Mean Category Knowledge by Product Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Category Knowledge</td>
</tr>
<tr>
<td>-------------------------</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Standard Error</td>
</tr>
<tr>
<td>n</td>
</tr>
<tr>
<td>t-value (sig.)</td>
</tr>
</tbody>
</table>

Comparing means between product categories reveals that respondents perceive they have a greater level of knowledge for sunscreens than they do for earphones. These differences may account for the differences in findings for purchase intention — that is, greater perceived knowledge may mean less likelihood of believing marketers’ price claims.

8.2.3 Hypothesis 4 — A Stronger Test of the Pioneer’s Ability to Form the Reference Price

Whilst the analysis for H₃ showed that the reference price moves in the direction of the pioneer’s price, this test only determines if the pioneer can influence the reference price. A stronger test would be to determine if the consumer’s reference price defines or becomes
the pioneer’s price. For instance, if the pioneer’s price was $80, say for the earphones skimming treatment, then the reference price would also become $80. Some evidence of the pioneer’s ability to form the reference price was noted in figure 8.2 which showed reference price increases linearly with the pioneer’s price increase. Table 8.16 shows average reference price by experimental condition.

Table 8.16: Average Reference Price by Pricing Strategy

<table>
<thead>
<tr>
<th>Pricing Strategy</th>
<th>Pioneer’s Price</th>
<th>N</th>
<th>Mean</th>
<th>5% Trimmed Mean</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earphones</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Penetration</td>
<td>$29.99</td>
<td>26</td>
<td>$32.57</td>
<td>$30.96</td>
<td>$30.00</td>
</tr>
<tr>
<td>Skimming</td>
<td>$79.99</td>
<td>26</td>
<td>$71.23</td>
<td>$71.80</td>
<td>$70.00</td>
</tr>
<tr>
<td>Sunscreens</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Penetration</td>
<td>$9.99</td>
<td>26</td>
<td>$11.95</td>
<td>$11.66</td>
<td>$10.00</td>
</tr>
<tr>
<td>Skimming</td>
<td>$19.99</td>
<td>26</td>
<td>$17.48</td>
<td>$17.79</td>
<td>$17.50</td>
</tr>
</tbody>
</table>

For the penetration strategy the median reference price for the pioneer is the same as the pioneer’s price. For the skimming strategy the median reference price for the pioneer is 12.5% less than the pioneer’s reference price. The median is used as the data is slightly positively skewed. Analysis of the means shows a somewhat complementary picture as mean pioneer reference price is again somewhat close to the pioneer’s price (the 5% trimmed mean is relatively robust in this instance), allowing further statistical testing. Simple one-sample t-tests between mean reference price and the pioneer’s price for each treatment are shown in table 8.17.

Table 8.17: One Sample t-tests Between Mean Reference Price and the Pioneer’s Price

<table>
<thead>
<tr>
<th></th>
<th>Price</th>
<th>Mean P_r</th>
<th>Standard Deviation</th>
<th>t-value</th>
<th>sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earphones</td>
<td>$29.99</td>
<td>$32.57</td>
<td>17.49</td>
<td>0.781</td>
<td>0.442</td>
</tr>
<tr>
<td></td>
<td>$79.99</td>
<td>$71.23</td>
<td>23.32</td>
<td>-1.915</td>
<td>0.067</td>
</tr>
<tr>
<td>Sunscreens</td>
<td>$9.99</td>
<td>$11.95</td>
<td>4.17</td>
<td>2.572</td>
<td>0.015</td>
</tr>
<tr>
<td></td>
<td>$19.99</td>
<td>$17.48</td>
<td>4.64</td>
<td>-2.812</td>
<td>0.009</td>
</tr>
</tbody>
</table>

The one sample t-tests indicate some support for H4. In particular, for the earphones data, H4 is supported because neither mean is statistically different from the pioneer’s price — in other words, for the earphones the pioneer’s price forms the reference price in the category.
However, whilst the reference price for the sunscreen is very close to the pioneer’s price, and clearly affected by the pioneer’s price (i.e. see section 8.2.2), the significance values for the sunscreen data are all less than 0.05 indicating a statistical difference — in other words, for the sunscreens the pioneer does not exactly form the reference price for that brand. The pioneer’s price clearly defines the reference price; though it may not exactly match the pioneer’s price it will be very close.

At this point it is useful to make the distinction between substantive and statistical significance. For the sunscreens, even though mean reference price is statistically different from the pioneer’s price (i.e. not supporting $H_4$), substantively it is not that much different from it. For instance, for the skimming strategy mean reference price is only 12.5% less than the pioneer’s price and for the penetration strategy, mean reference price is only 19.6% more than the pioneer’s price (these differences are somewhat similar to those for the earphones data). Therefore, there is strong support for $H_4$ for the earphones and substantive support, but no statistical support, for the sunscreens: for the sunscreens, mean reference price is close to the pioneer’s price but it is also statistically different.

8.2.3.1 Hypotheses 3 and 4: Discussion

Taken together, the findings from $H_3$ and $H_4$ suggest that value perceptions are not necessarily exogenous (i.e. some ratio of benefits to costs) and can, to a large extent, be defined by the price of the pioneer. This is particularly the case for the earphones data where consumers perceived they had less knowledge about the category. Reference price research suggests this is the case with TV but not for AV. Therefore, pricing at the highest possible price within some income constrained boundaries will condition consumers as to what the product is worth. Pricing lower will lead them to negate the value of the product.

In cases where perceived knowledge about a category is high, this suggests marketers should distance themselves from the prior product generation to minimise potential
knowledge carry over effects. By doing this, knowledge from the prior category will be less likely to transfer over to knowledge about the new category, lending credence to the new price. This might imply vastly different packaging, or differences in the way the product is promoted to consumers (i.e. sun protection, not sunscreen).

In sum, experiment 2 sought to analyse reference price and value perceptions in the initial stages of category introduction. An extension to this is to look forward and examine the impact of price changes and further competitive interaction on reference price and value perceptions. What happens when follower brands begin to arrive, and if the pioneer later changes its price from the initial price?

### 8.3 Experiment 3

Experiment 3 extends our understanding of the development of reference price perceptions by addressing the second key section of this thesis, how reference price perceptions evolve. In experiment 3 the pioneer’s price changed and the market structure changed with the entrance of a follower at a discount to the pioneer in $T_2$. First, manipulation checks are analysed and then section 8.3 proceeds by analysing pioneer brand advantage effects and other key hypotheses developed in chapter 6.

#### 8.3.1 Confounds and Manipulation Checks

##### 8.3.1.1 Perceptions of Innovativeness by Pioneer

Perceived innovativeness was another potential confound on the results. Innovativeness was measured once in each survey when subjects were asked questions about the pioneer. Mean innovativeness for each pioneer, with corresponding t-tests are shown in table 8.18.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>n</th>
<th>t-value</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Fones</td>
<td>4.92</td>
<td>1.67</td>
<td>92</td>
<td>1.53</td>
<td>0.128</td>
</tr>
<tr>
<td>Freedom Fones</td>
<td>4.58</td>
<td>1.48</td>
<td>99</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UV Armour</td>
<td>4.34</td>
<td>1.61</td>
<td>97</td>
<td>–1.16</td>
<td>0.247</td>
</tr>
<tr>
<td>UV Protect</td>
<td>4.60</td>
<td>1.55</td>
<td>96</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Analysis of the means suggests very small differences in perceptions of innovativeness for the pioneers, depending on which brand was the pioneer. As expected, these differences, were not statistically significant, based on the results of the independent sample t-tests between brands within each product category.

8.3.1.2 Differences in Perceived Quality by Order of Entry
Differences in perceived quality between pioneers and followers was also analysed as a potential confound. This is a different test to the test of perceived quality by price treatment carried out in section 8.2.1.1. In table 8.19 we are testing whether or not pioneers are perceived as better quality than followers with paired samples t-tests.

Table 8.19: Mean Perceived Quality between Pioneers and Followers

<table>
<thead>
<tr>
<th>Mean Perceived Quality (St. dev.)</th>
<th>n</th>
<th>t-value</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pioneer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air Fones</td>
<td>90</td>
<td>1.94</td>
<td>0.055</td>
</tr>
<tr>
<td>Freedom Fones</td>
<td>99</td>
<td>0.748</td>
<td>0.456</td>
</tr>
<tr>
<td>UV Armour</td>
<td>97</td>
<td>4.30</td>
<td>0.000</td>
</tr>
<tr>
<td>UV Protect</td>
<td>95</td>
<td>3.76</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Table 8.19 shows small differences in mean perceived quality between groups. These differences are not statistically significant at the 5% level for the earphones. However, for the sunscreens these differences are statistically significant. Further analysis of central tendency by examining median and modal perceived quality is shown in table 8.20.

Table 8.20: Central Tendency of Perceived Quality between Sunscreen Pioneers and Followers

<table>
<thead>
<tr>
<th>Average Perceived Quality</th>
<th>Pioneer</th>
<th>Follower</th>
</tr>
</thead>
<tbody>
<tr>
<td>UV Armour</td>
<td>Median</td>
<td>Mode</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>UV Protect</td>
<td>Median</td>
<td>Mode</td>
</tr>
<tr>
<td></td>
<td>5.5</td>
<td>5</td>
</tr>
</tbody>
</table>

175
When UV Armour is the pioneer there is no difference in the median or modal perceived quality between groups. When UV Protect is the pioneer there are small differences in median and modal perceived quality between groups. In light of the small, albeit statistically significant difference in means, analysis of medians and modes suggests only a very minor departure, if any, from the assumption of homogenous product quality between pioneers and followers.

8.3.2 Hypotheses 5, 6 and 7 — Differences in Pioneer Reference Price, Transaction Value and Purchase Intention by Pioneer Pricing Strategy

8.3.2.1 The Use of a MANOVA
The following three hypotheses, H₅, H₆ and H₇, test differences in three related variables by pioneer pricing strategy. This is shown below in figure 8.3:

![Figure 8.3: Pioneer Pricing Strategy and the Dependent Variables](image)

Because of the simultaneous comparisons of the dependent variables by the independent variable, the need to control for Type I error and the likely correlation between each of the dependent variables, a MANOVA is more appropriate than three separate t-tests (Hair et al. 1998). Even though figure 8.3 looks somewhat like a path diagram used in Structural Equation Modelling (SEM), SEM is not suitable for the purposes of this analysis because the independent variables are concrete dichotomous variables. The arrows reflect the nature of the proposed relationships between the dependent variables in light of differences in the independent variables. This type of layout is similar to that used in Broniarczyk,
Hoyer and McAlister (1998). As such, the basic effects are first analysed using a MANOVA. The analysis proceeds with assumption testing and then analysis of the dependent variables by the independent variable.

8.3.2.2 Assumption Testing
MANOVA is a technique particularly susceptible to violations of its underlying assumptions. So we do not detract from the flow of this chapter, assumption testing can be viewed in appendix 13. In summary, all assumptions underlying the MANOVAs have been met for the earphones data and the sunscreen data with the removal of two extreme outliers. This allows further multivariate testing to proceed.

8.3.2.3 MANOVA: Overall Fit
Given the data for the earphones did not appear to deviate significantly from any of the MANOVA assumptions, further multivariate testing was conducted using Hotelling’s Trace for significance testing with the two group MANOVA case (Hair et al. 1998). The results are shown in table 8.21 for the multivariate tests:

<table>
<thead>
<tr>
<th></th>
<th>Earphones</th>
<th></th>
<th>Sunscreen</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Pioneer:</strong></td>
<td><strong>Air Fones</strong></td>
<td><strong>Freedom Fones</strong></td>
<td></td>
</tr>
<tr>
<td>Hotelling’s</td>
<td>Pioneer:</td>
<td></td>
<td>Freedom Fones</td>
<td></td>
</tr>
<tr>
<td>Trace (sig.)</td>
<td><strong>Air Fones</strong></td>
<td>0.261 (0.000)</td>
<td><strong>Freedom Fones</strong></td>
<td>0.382 (0.000)</td>
</tr>
<tr>
<td>Sunscreen</td>
<td>Pioneer:</td>
<td></td>
<td><strong>UV Armour</strong></td>
<td><strong>UV Protect</strong></td>
</tr>
<tr>
<td>Hotelling’s</td>
<td><strong>UV Armour</strong></td>
<td>0.083 (0.060)</td>
<td><strong>UV Protect</strong></td>
<td>0.031 (0.418)</td>
</tr>
</tbody>
</table>

The results in table 8.21 suggest that simultaneous differences exist between groups for the earphones data. However, the sunscreen data provided differing results. When UV Armour was the pioneer Hotelling’s Trace was almost statistically significant at the 5% level but UV Protect was not statistically significant. Further univariate testing may indicate reasons for the marginal nature of this result.
8.3.2.4 **Hypothesis 5 Differences in Pioneer Reference Price by Pioneer Pricing Strategy**

As an extension to H₃ and H₄, H₅ predicted that in T₂ the reference price for a pioneer would vary depending on the pioneer’s initial price. Furthermore, H₅ predicted that the reference price for a pioneer following a skimming strategy would be higher than the reference price for a pioneer following a penetration strategy, *even though prices in T₂ were equal*. In H₃ and H₄ we examined the pioneer’s ability to define the reference price and value perceptions when prices were different. Now we examine the influence of the pioneer’s initial price on reference price perceptions when prices have converged in T₂.

Mean reference prices by experimental condition are shown in figure 8.4.

**Figure 8.4: Mean Reference Price by Pricing Strategy**

Figure 8.4 shows that even though prices are equal in T₂, reference price for a pioneer following a skimming strategy is still higher than reference price for a pioneer following a penetration strategy. Reference price still appears to be different, although in T₁, the difference was greater. The results are consistent across different brands and across different product categories. These differences in means were statistically tested as part of the MANOVA and are shown in table 8.22.
Table 8.22: Univariate Tests of Mean Pioneer Reference Price by Pricing Strategy

<table>
<thead>
<tr>
<th>Pioneer:</th>
<th>Air Fones</th>
<th>Freedom Fones</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pricing Strategy:</td>
<td>Penetration</td>
<td>Skimming</td>
</tr>
<tr>
<td>Mean Reference Price</td>
<td>$36.98</td>
<td>$48.04</td>
</tr>
<tr>
<td>n</td>
<td>46</td>
<td>45</td>
</tr>
<tr>
<td>f-value (sig.)</td>
<td>20.34 (0.000)</td>
<td>31.63 (0.000)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pioneer:</th>
<th>UV Armour</th>
<th>UV Protect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pricing Strategy:</td>
<td>Penetration</td>
<td>Skimming</td>
</tr>
<tr>
<td>Mean Reference Price</td>
<td>$12.28</td>
<td>$13.53</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>3.358</td>
<td>2.589</td>
</tr>
<tr>
<td>n</td>
<td>50</td>
<td>46</td>
</tr>
<tr>
<td>f-value (sig.)</td>
<td>4.136 (0.045)</td>
<td>1.685 (0.197)</td>
</tr>
</tbody>
</table>

These results show that the difference exhibited in figures 8.4 are unlikely to have occurred as a result of random error, confirming H₆ for the earphones data. The results for the sunscreens show a statistically significant difference in means when UV Armour was the pioneer. However, when UV Protect was the pioneer the difference, whilst of a similar proportion and in the hypothesised direction, is not statistically significant. This shows partial support for H₅ with the sunscreen data.

8.3.2.5 Hypothesis 6 Differences in Pioneer Transaction Value by Pioneer Pricing Strategy

H₆ predicted that in T₂ TV for a pioneer following a skimming strategy would be higher than TV for a pioneer following a penetration strategy, even though prices in T₂ are equal. This leads on directly from H₅ if TV is a concurrently valid measure of the discrepancy between reference price and actual price. In other words, if the pioneer’s price defines consumers’ initial perceptions of expensiveness then even though prices converge at some later point, perceptions of value will differ as a result of the initial price. Mean TV by experimental condition is shown in figure 8.5 for both product categories.

Figure 8.5 shows that even though prices are equal in T₂, TV for a pioneer following a skimming strategy is still higher than TV for a pioneer following a penetration strategy.¹²

---

¹² Again, given the way the TV question was scaled, lower numbers indicate higher TV.
The results are consistent across brands and categories, although when UV Protect is the Pioneer, these differences are not so pronounced.

**Figure 8.5: Mean Transaction Value by Pricing Strategy**

These differences in means were statistically tested as part of the MANOVA and are shown in table 8.23.

<table>
<thead>
<tr>
<th>Pioneer:</th>
<th>Air Fones</th>
<th>Freedom Fones</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pricing Strategy:</strong></td>
<td>Penetration</td>
<td>Skimming</td>
</tr>
<tr>
<td>Mean TV</td>
<td>4.85</td>
<td>4.20</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>1.475</td>
<td>1.342</td>
</tr>
<tr>
<td>n</td>
<td>46</td>
<td>51</td>
</tr>
<tr>
<td>f-value (sig.)</td>
<td>4.80 (0.031)</td>
<td>8.98 (0.003)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pioneer:</th>
<th>UV Armour</th>
<th>UV Protect</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pricing Strategy:</strong></td>
<td>Penetration</td>
<td>Skimming</td>
</tr>
<tr>
<td>Mean TV</td>
<td>4.30</td>
<td>3.52</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>1.581</td>
<td>1.346</td>
</tr>
<tr>
<td>n</td>
<td>50</td>
<td>46</td>
</tr>
<tr>
<td>f-value (sig.)</td>
<td>6.687 (0.011)</td>
<td>0.744 (0.391)</td>
</tr>
</tbody>
</table>

The f-tests provide evidence that the observed difference in mean TV for the earphones as a result of pioneer pricing strategy is unlikely to have occurred as a result of chance. Thus, H₆ for the earphones data is supported. As in H₅, the results for the sunscreens show a statistically significant difference in means when UV Armour was the pioneer. However,
when UV Protect was the pioneer the difference was in the hypothesised direction, but smaller and not statistically significant. This suggests partial support for H\textsubscript{6} with the sunscreen data.

8.3.2.6 Hypothesis 7 Differences in Pioneer Purchase Intention by Pioneer Pricing Strategy

Following on from prior hypotheses, H\textsubscript{7} predicted that in T\textsubscript{2} purchase intention for a pioneer following a skimming strategy would be higher than purchase intention for a pioneer following a penetration strategy, even though prices in T\textsubscript{2} are equal. This is due to framing effects from initial price information in T\textsubscript{1}, influencing perceptions of value and expensiveness. Mean purchase intention by experimental condition is shown in figure 8.6.

Figure 8.6: Mean Purchase Intention by Pricing Strategy

![Figure 8.6: Mean Purchase Intention by Pricing Strategy](image)

Figure 8.6 shows that even though prices are equal in T\textsubscript{2}, purchase intention for a pioneer following a skimming strategy is still higher than purchase intention for a pioneer following a penetration strategy, due to the reference price effect of prices in T\textsubscript{1}. The results are consistent across different brands and across different product categories,
although when UV Protect is the Pioneer, the differences are very small. These differences in means were statistically tested as part of the MANOVA and are shown in table 8.24

Table 8.24: Univariate Tests of Mean Pioneer Purchase Intention by Pricing Strategy

<table>
<thead>
<tr>
<th>Pioneer:</th>
<th>Air Fones</th>
<th>Freedom Fones</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Penetration</td>
<td>Skimming</td>
</tr>
<tr>
<td>Mean Purchase Intention</td>
<td>2.93</td>
<td>3.96</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>1.583</td>
<td>1.705</td>
</tr>
<tr>
<td>n</td>
<td>46</td>
<td>45</td>
</tr>
<tr>
<td>f-value (sig.)</td>
<td>8.76 (0.004)</td>
<td>4.19 (0.043)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pioneer:</th>
<th>UV Armour</th>
<th>UV Protect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Penetration</td>
<td>Skimming</td>
</tr>
<tr>
<td>Mean Purchase Intention</td>
<td>4.50</td>
<td>4.93</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>1.741</td>
<td>1.679</td>
</tr>
<tr>
<td>n</td>
<td>50</td>
<td>46</td>
</tr>
<tr>
<td>f-value (sig.)</td>
<td>1.55 (0.217)</td>
<td>0.000 (0.985)</td>
</tr>
</tbody>
</table>

The f-tests provide evidence that the observed difference in mean purchase intention for the earphones as a result of pioneer pricing strategy is unlikely to have occurred as a result of chance. Therefore, H7 is supported for the earphones data. However, neither of the sunscreens demonstrate a statistically significant difference in means for purchase intention. Though the UV Armour result is in the predicted direction and the UV Protect result, though not in the right direction, is not in the wrong direction. Therefore, the results for the sunscreens are not opposed to H7 but provide no statistically significant support.

8.3.2.7 Summary of H5, H6 and H7

After performing appropriate assumption testing and analysing the multivariate and univariate tests, the MANOVA revealed that the earphones data exhibited significant differences in mean reference price, TV and purchase intention, even though prices in T2 converged, supporting H5, H6 and H7.

The same pattern in means was reported for the sunscreen data (i.e. the means were of the hypothesised differences), although some of these differences were not statistically significant. In particular, the multivariate test when UV Armour was the pioneer was marginally significant. These differences were examined in more depth with the univariate
tests which revealed differences in reference price and TV but not for purchase intention. Reiterating the results from the multivariate tests, the univariate tests revealed no statistically significant differences when UV Protect was the pioneer. Therefore, there is strong support for H₅, H₆ and H₇ for the earphones data, marginal support for H₂ and H₆ for the sunscreen data and no support for H₇ for the sunscreen data.

8.3.2.8 H₅, H₆ and H₇: Discussion
Firstly, the findings of H₅, H₆ and H₇ provide further evidence of the pioneer’s ability to define value perceptions. Essentially, experiment 3 was a robust test of experiment 2. Once prices became equal in T₂, the rational consumer should value these products equally. Yet H₆ predicts and finds that they do not, because the prices in prior periods were different, framing consumer perceptions of expensiveness. Once prices converged consumers incorporated the new price information with old price information, biasing perceptions of value. Lower initial prices *erode* value perceptions whereas higher initial prices *substantiate* value perceptions. Thus value perceptions appear to be a moving target, not exogenous as current thinking suggests. Consequently, penetration pricing strategies should be used with caution and not to lull consumers into a quick purchase because ultimately lower prices mean lower profit if there is not a significant and on-going contribution to volume. Also, as consumers tend to think about products by association with prior categories (Gregan-Paxton and Roedder John 1997; Moreau, Lehmann and Markman 2001), then lower prices in the new category will harm the ability of marketers to charge higher prices for later brand extensions.

Based on exposure to other brands and different prices, H₅ showed that reference prices evolved in the direction of the price changes. This represents an important implication about the underlying processes used to form reference prices. Based on past operationalisations of reference price (i.e. the price of some other brand, some average of
past prices etc.), there are opposing views on those processes, suggesting further empirical research would be valuable. For instance, some studies have used measures which reflect the price of one brand such as the last price paid (i.e. Kalwani et al. 1990; Kumar, Karande and Reinartz 1998; Mayhew and Winer 1992). These results suggest strong evidence of an underlying averaging process when consumers form a reference price, rather than one brand in particular forming the reference price. To form reference price consumers use an averaging process based upon the prices of all brands. There is support for this process in the categorisation literature. For instance, Prototype Theory assumes consumers learn by referring to some sort of mean or modal distribution of past values from prototypes, suggesting we average information (see Smith and Minda 2001 for a review). This is in contrast to ‘exemplar models’ which specify that people store exemplars, not averages. (Zaki and Nosofsky 2004). For instance, Smith and Minda (2001, p. 984) state, “Some descriptions of categorization suggest that humans average their exemplar experiences to derive the category’s center or prototype, compare new items to it, and accept items as category members if similar enough”.

The results from experiment 3 lend support to the assertion that we abstract generalities, not store particulars. Smith and Minda (2001), also comment that this issue in the literature remains unresolved. Perhaps in this applied setting there is now some resolution. We now examine these ideas more explicitly, with respect to the pioneer, to see to what extent consumers tend to use the pioneer’s price to anchor their reference price perceptions.

### 8.3.3 Hypothesis 8 — Evidence of Pioneer Brand Advantage

A key antecedent to understanding reference price effects for pioneer brands is the pioneer’s advantage from its inimitable position of being first. Within the experimental design the pioneer was always priced higher than the follower. For instance, with the earphones the pioneer was always $54.99 in T2 and the follower was either $51.99 (small
discount) or $39.99 (large discount). Likewise, with the sunscreens the pioneer was always $14.99 in T₂ and the follower was always $14.29 (small discount) or $10.99 (large discount). Thus H₈ stated “A substantial proportion of respondents will prefer the pioneer brand even though the follower is always at a discount to the pioneer”. This behavioural advantage is analysed based on respondent brand preference. Towards the end of the questionnaire subjects were asked to select which brand they preferred, the pioneer or the follower. Therefore, given these brands were perceived to be the same and equally preferred in the pilot studies (i.e. see section 7.4.1.7), if there were no pioneer brand advantage effects then all respondents should prefer the follower all of the time. The results for brand preference are shown below in table 8.25.

<table>
<thead>
<tr>
<th>Brand Preference (Earphones)</th>
<th>Brand Preference (Sunscreens)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>Percent</td>
</tr>
<tr>
<td>Pioneer</td>
<td>69</td>
</tr>
<tr>
<td>Follower</td>
<td>121</td>
</tr>
</tbody>
</table>

χ² = 841.34 (0.000)  χ² = 1737.58 (0.000)

These findings show a strong pioneer advantage effect for the earphones data — one third of respondents favoured the pioneer even though the follower was cheaper and they were equally preferred with no order of entry manipulation (see section 7.4.1.7). The Chi-square statistic is highly statistically significant, providing further evidence. For the sunscreens, the pioneer was more preferred than for the earphones, with 50% of respondents preferring the pioneer to the follower as opposed to 37%, exhibiting an even stronger pioneer brand advantage. That is, half the respondents preferred the pioneer to the follower even though

13 Because the follower was always a lower price than the pioneer and the pioneer and follower were equally preferred in the absence of the order of entry manipulation expected preference for the pioneer should be zero. However, expected values of zero mean χ² cannot possibly be calculated (i.e. this means dividing by zero which is infinity) so the Chi-square statistic was calculated using an expected value of five, the minimum expected value for the tests’ assumptions to hold. This also makes the test more robust and with more relaxed assumptions as to the nature of the frequency distribution.
the follower was cheaper, and when past pilots studies indicated equal preference at equal prices. Again, the Chi-square statistic was high statistically significant.

However, the experiment was also counterbalanced for brand name effects. For instance, for the earphones, respondents either saw Air Fones as the pioneer and Freedom Fones as the follower or Freedom Fones as the pioneer and Air Fones as the follower. The same was the case for the sunscreens. Therefore, to further test the robustness of the pioneering effect by possible brand name effects, brand preference was analysed in relation to which brand was the pioneer. The results are shown in table 8.26 for the earphones.

Table 8.26: Pioneer Preference by Brand Name (Earphones)

<table>
<thead>
<tr>
<th>Brand Preference</th>
<th>Pioneer</th>
<th>Air Fones</th>
<th>Freedom Fones</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pioneer Frequency</td>
<td>32</td>
<td>37</td>
<td></td>
</tr>
<tr>
<td>Pioneer Percent</td>
<td>34.8%</td>
<td>37.8%</td>
<td></td>
</tr>
<tr>
<td>Follower Frequency</td>
<td>60</td>
<td>61</td>
<td></td>
</tr>
<tr>
<td>Follower Percent</td>
<td>65.2%</td>
<td>62.2%</td>
<td></td>
</tr>
</tbody>
</table>

$\chi^2 = 0.181 (0.670)$

The table shows relatively equal preference for the pioneer regardless of which brand was the pioneer, showing strong evidence of pioneer advantage. This is further confirmed by the Chi-square value which is small and statistically insignificant. The same tests were conducted for the sunscreen data and are shown in table 8.27.

Table 8.27: Pioneer Preference by Brand Name (Sunscreens)

<table>
<thead>
<tr>
<th>Brand Preference</th>
<th>Pioneer</th>
<th>UV Armour</th>
<th>UV Protect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pioneer Frequency</td>
<td>56</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>Pioneer Percent</td>
<td>57.1%</td>
<td>42.7%</td>
<td></td>
</tr>
<tr>
<td>Follower Frequency</td>
<td>42</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>Follower Percent</td>
<td>42.9%</td>
<td>57.3%</td>
<td></td>
</tr>
</tbody>
</table>

$\chi^2 = 3.485 (0.062)$

The results suggest a tendency to prefer UV Armour when it was the pioneer to UV Protect when it was the pioneer. However, the Chi-square value is not statistically significant.
Furthermore, a significant number of respondents (i.e. 42.7%) still preferred the pioneer when the pioneer was UV Protect.

### 8.3.3.1 Hypothesis 8: Discussion

Taken together, these findings strongly support H8. The data exhibits strong pioneer brand advantage effects. Numerous studies have examined the nature of pioneer advantage and amongst the behavioural studies conclude that pioneer advantage exists. Generally explanations focus on the pioneer’s unique association with the category. Here we do not speculate on the nature of the pioneers advantage but these results provide strong evidence that consumers prefer the pioneer when it is more expensive and undifferentiated from the follower — imitating is not enough. The follower, if a me-too, must be much cheaper or alternatively must differentiate based upon different associations. To some extent these findings closely parallel Urban et al’s (1986) econometric results which suggest that in general a follower must offer a price 36% lower than the pioneer’s or alternatively must offer 36% more value (i.e. convenience, variety performance benefits etc.). Clearly, a strategy of a much lower price may not always be suitable. Therefore, in line with Hardie, Johnson and Fader’s (1993) study, a more suitable strategy may be to focus on adapting attributes with “the highest degree of loss aversion”¹⁴ (p. 391). This closely parallel’s findings by Carpenter and Nakamoto (1989). Price competition alone does not appear to be a suitable strategy for attacking a pioneer. We now move onto further hypothesis testing, having established evidence for the key assumption underlying subsequent hypotheses.

### 8.3.4 Hypothesis 9 — The Relative Effect of the Pioneer’s Price and the Follower’s Price in Establishing Reference Price Perceptions

We look to the effect of the pioneer’s price on establishing reference price perceptions in relation to the follower’s price. In essence, we are looking at how strongly the pioneer’s

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¹⁴ Loss aversion is a term derived from Prospect Theory (i.e. Kahneman and Tversky 1979) which states that losses decrease value more than the increase in value of an equivalent gain (see Figure 2.4 to illustrate).
price acts as an anchor for reference price perceptions of other brands. If the pioneer is prototypical and sufficiently strong as an anchor to judge expensiveness then the pioneer’s price should be used by consumers to establish reference price perceptions for other brands. H9 states “The pioneer’s price plays a greater role in establishing the reference price in T2 than the follower’s price”. Given multiple reference prices were measured in the experiment (i.e. the pioneer’s, follower’s and category reference price), this analysis proceeds by comparing the relative influence of the pioneer’s pricing strategy with the follower’s pricing strategy on each of the three measures in T2, using the Fisher Z transformation\(^\text{15}\) to compare separate point biserial correlations (Cohen and Cohen 2003, p. 53). Computationally point biserial correlations are the same as Pearson correlation coefficients and they are also interpreted in the same way (Cohen and Cohen 2003, p. 37). However, this is the formal name when correlating a dichotomous scale (i.e. pricing strategy) and a ratio scale (i.e. each of the reference price measures). Results are shown in table 8.28.

Table 8.28: Point Biserial Correlations between Pioneer and Follower Pricing Strategies and Different Reference Price Measures (Earphones)

<table>
<thead>
<tr>
<th></th>
<th>Pioneer Reference Price</th>
<th>Follower Reference Price</th>
<th>Category Reference Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pioneer Pricing Strategy</td>
<td>Corr. 0.477</td>
<td>0.247</td>
<td>0.325</td>
</tr>
<tr>
<td></td>
<td>Sig. 0.000</td>
<td>0.001</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>N 187</td>
<td>185</td>
<td>185</td>
</tr>
<tr>
<td>Follower Pricing Strategy</td>
<td>Corr. 0.079</td>
<td>0.284</td>
<td>0.125</td>
</tr>
<tr>
<td></td>
<td>Sig. 0.283</td>
<td>0.000</td>
<td>0.090</td>
</tr>
<tr>
<td></td>
<td>N 187</td>
<td>185</td>
<td>185</td>
</tr>
<tr>
<td>Comparison of Coefficients</td>
<td>Sig. 0.000</td>
<td>0.704</td>
<td>0.0436</td>
</tr>
</tbody>
</table>

\(^\text{15}\) As in chapter 3 the comparison of coefficients was done using the Fisher Z transformation where

\[
Z = \frac{1}{2} \ln \left( \frac{1 + \rho}{1 - \rho} \right)
\]

and the difference is

\[
z = \sqrt{\frac{1}{n_1 - 3} + \frac{1}{n_2 - 3}} \frac{(Z_1 - Z_2)}{\sqrt{\frac{1}{n_1 - 3} + \frac{1}{n_2 - 3}}}
\]

which is approximately standard normal distributed.
The results show that the pioneer’s pricing strategy has a stronger effect over the pioneer’s reference price than the follower’s pricing strategy as we would expect. However, of more interest, the pioneer’s influence can extend further because the correlation coefficient between the category reference price and the pioneer’s pricing strategy is stronger than the coefficient between the category reference and the follower’s pricing strategy (i.e. corr. = 0.325, sig. = 0.000 versus corr. = 0.125, sig. = 0.090). These differences in coefficients are statistically significant (i.e. sig. = 0.0436) lending support for H9. The results for the sunscreen data are shown in table 8.29.

Table 8.29: Point Biserial Correlations between Pioneer and Follower Pricing Strategies and Different Reference Price Measures (Sunscreens)

<table>
<thead>
<tr>
<th></th>
<th>Pioneer Reference Price</th>
<th>Follower Reference Price</th>
<th>Category Reference Price</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pioneer Pricing Strategy</strong></td>
<td>Corr. 0.173</td>
<td>Sig. 0.017</td>
<td>N 191</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Follower Pricing Strategy</strong></td>
<td>Corr. 0.118</td>
<td>Sig. 0.009</td>
<td>N 191</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Comparison of Coefficients</strong></td>
<td>Sig. 0.586</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For the sunscreens, the pioneer’s pricing strategy is a better predictor of pioneer reference price than the follower’s pricing strategy, however, the difference is not statistically significant. Likewise, for the follower’s reference price, the follower’s pricing strategy is a better predictor of follower reference price than the pioneer’s pricing strategy. Yet again the difference is not statistically significant. The follower’s pricing strategy seems to be a better predictor of category reference price than the pioneer’s pricing strategy and the follower’s coefficient is statistically significant, but there is no statistical difference between coefficients. This does not lend support to H9 for the sunscreen data. Though this could be because the sunscreen data lacks the statistical power for the effects to emerge.
from the “noise”. Overall, there is support for H9 for the earphones data but not for the sunscreen data.

8.3.4.1 Hypothesis 9: Discussion

These findings suggest that it does not seem to matter what the follower does for the earphones data. The pioneer’s price always plays a greater role in establishing reference price perceptions (except for the follower’s brand specific reference price). Thus, it seems that the evolution of reference price is based around the prototypicality of the pioneer. The pioneer’s unique association with the category allows it to become the strongest anchor for reference price perceptions, though it is not the only anchor.

However, this effect is seen for the earphones data but not for the sunscreens. These differences between categories could be a function of natural differences between the product categories being examined and differences in the way consumers perceive different innovations. For instance, these earphones appear high tech because they rely on technology that consumers know is high tech. However, with the sunscreens even though they may be just as new, they do not appear to be as high tech because they may still be perceived to be a sunscreen (consumers do not know or understand which technology led to this development whereas it is obvious with the earphones). Furthermore, with pharmaceutical products the innovation is not readily observable by consumers.

These findings also provide insight into the usage of category level versus brand level reference prices. It would appear that the pioneer can influence its own reference price, and also the category reference price. However, it is not strong enough to have a major influence on the follower’s reference price. This implies that reference price usage may be brand specific, despite the intuitive appeal of a category based measure. This assertion (i.e. determining the usefulness of a category reference price measure) is more explicitly
analysed and discussed in $H_{11}$. We now extend our analysis to see if the pioneer is strong enough to influence behavioural intentions further down the hierarchy of effects.

### 8.3.5 Hypothesis 10 — The Role of the Pioneer’s Reference Price and Purchase Intention

Following on from $H_9$, $H_{10}$ states “The gap between the reference price of the pioneer and the price of the pioneer is a better predictor of brand choice than the gap between the reference price of the follower and the price of the follower.” To analyse this hypothesis a series of correlations were run using either the pioneer’s reference price (i.e. $P_r (\text{pioneer}) - P$) term or the follower’s reference price term (i.e. $P_r (\text{follower}) - P$) and purchase intention for each brand. For instance, if the pioneer’s reference price is a better predictor of purchase intention than the follower’s reference price then we would expect the coefficient to be higher using the pioneer’s reference price term than when using the follower’s reference price term in predicting not only purchase intention for the pioneer, but purchase intention for the follower also.

Before running the correlations, a further variable had to be computed to reflect the different actual prices of brands in the emerging market (i.e. penetration, skimming, level of discount etc.). That is, because the pioneer and follower brands were at different prices in $T_2$, the reference price term (i.e. $P_r - P$) had to reflect these different actual prices. This term was computed to be the actual price of the brand subtracted from the reference price of the brand. For instance, row 1 in table 8.30 is the relationship between “Pioneer Reference Price — Pioneer Price” and “Purchase Intention for the Pioneer”, whereas row 2 is the relationship between “Follower Reference Price — Pioneer Price” and “Purchase Intention for the Pioneer”. Therefore, if $P_r - P$ is positive then we would associate this with higher purchase intention and vice versa. For the earphones, the correlations are shown table 8.30.
Table 8.30: Relative Effect of Pioneer and Follower Reference Prices on Purchase Intention (Earphones)

<table>
<thead>
<tr>
<th>Relationship</th>
<th>X</th>
<th>Y</th>
<th>Correlation Coefficient</th>
<th>n</th>
<th>P-value for Comparing Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pioneer P₁ - Pioneer P</td>
<td>Purchase intention (pioneer)</td>
<td>0.546 (0.000)</td>
<td>190</td>
<td>0.289</td>
</tr>
<tr>
<td>2</td>
<td>Follower P₂ - Pioneer P</td>
<td>Purchase intention (pioneer)</td>
<td>0.464 (0.000)</td>
<td>188</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Pioneer P₁ — Follower P</td>
<td>Purchase intention (follower)</td>
<td>0.395 (0.000)</td>
<td>190</td>
<td>0.0194</td>
</tr>
<tr>
<td>4</td>
<td>Follower P₂ - Follower P</td>
<td>Purchase intention (follower)</td>
<td>0.578 (0.000)</td>
<td>188</td>
<td></td>
</tr>
</tbody>
</table>

For the earphones the correlations show that pioneer reference price is a better predictor of purchase intention for the pioneer than follower reference price, as we would expect (i.e. corr_pioneer = 0.546, sig. = 0.000 versus corr_follower = 0.464, sig. = 0.000). However, the difference is not statistically significant (i.e. sig. = 0.289). Likewise, and of most interest in analysing the hypothesis, the follower’s reference price is a better predictor of purchase intention for the follower than the pioneer’s reference price (i.e. corr_follower = 0.578, sig. = 0.000 versus corr_pioneer = 0.395, sig. = 0.000). This difference is statistically significant (i.e. 0.0194), so $H_{10}$ is not supported: the pioneer’s reference price is not a better predictor of purchase intention than the follower’s reference price. The same analysis is done for the sunscreens data in table 8.31.

Table 8.31: Relative Effect of Pioneer and Follower Reference Prices on Purchase Intention (Sunscreen)

<table>
<thead>
<tr>
<th>Relationship</th>
<th>X</th>
<th>Y</th>
<th>Correlation Coefficient</th>
<th>n</th>
<th>P-value for Comparing Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pioneer P₁ - Pioneer P</td>
<td>Purchase intention (pioneer)</td>
<td>0.629 (0.000)</td>
<td>193</td>
<td>0.0017</td>
</tr>
<tr>
<td>2</td>
<td>Follower P₂ - Pioneer P</td>
<td>Purchase intention (pioneer)</td>
<td>0.385 (0.000)</td>
<td>192</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Pioneer P₁ — Follower P</td>
<td>Purchase intention (follower)</td>
<td>0.324 (0.000)</td>
<td>193</td>
<td>0.0529</td>
</tr>
<tr>
<td>4</td>
<td>Follower P₂ - Follower P</td>
<td>Purchase intention (follower)</td>
<td>0.489 (0.000)</td>
<td>192</td>
<td></td>
</tr>
</tbody>
</table>

16 Spearman’s rank order correlation coefficient was used for this purpose as the purchase intention data is ordinal.

17 Spearman’s rank order correlation coefficient was used for this purpose as the purchase intention data is ordinal.
The results for the sunscreen data exhibit the same pattern as for the earphones data. That is purchase intention for the pioneer is better predicted by the pioneer’s reference price and purchase intention for the follower is better predicted by the follower’s reference price. The differences in correlation coefficients are statistically significant also (the significance value of 0.0529 is close enough). In summary, there is no support for H_{10}.

8.3.5.1 Hypothesis 10: Discussion
These findings suggest that even though the pioneer can influence perceptions of value and, to some extent act as the benchmark, its influence does not extend as far as behaviour. Both pioneer and follower reference prices seem to predict purchase intention for their respective brands equally well. Pioneer brand advantage effects in this study are strong (i.e. see section 8.3.3). Yet these behavioural advantages only seem to be important in influencing reference price perceptions (i.e. see H_9). Respondents do not seem to use the pioneer, despite its prototypical nature, as a strong anchor when judging value perceptions and ultimately purchase intention. Thus, whilst strong enough to affect reference prices, the pioneer’s influence is not strong enough to be used as an anchor further up the hierarchy of effects to purchase intention.

Again, reference price utilisation seems to be a brand specific phenomenon. The reference price term for one brand alone is not strong enough to explain variability in purchase intention. That is, respondents tend to think in terms of brand averages (i.e. multiple brand reference price terms), rather than specific exemplar brands when it comes to reference prices (see section 8.3.2.8 for further discussion on this issue). This is in spite of similarity between the brands (i.e. see the pilot studies in section 7.4.1.7). We now turn our attention to test this hypothesis more explicitly with H_{11}, looking at whether a brand or category reference price is the best predictor of purchase intention.
8.3.6 Hypothesis 11 — The Role of Category Reference Price in Influencing Brand Preference

H11 states, “Category reference price is a better predictor of brand choice than brand reference price”. Given the nature of the data, it was not possible to directly compare the effects of category and brand reference price terms because whilst we are able to calculate a brand reference price term (i.e. \( P_r - P \)), we are not able to calculate a category reference price term because there is no category price to subtract from the category reference price. Instead, we compare correlations between category reference price and brand preference and brand reference price and brand preference, without subtracting actual prices from the reference price measures. However, because the brands were at different prices for different experimental groups it does not make sense to compare these correlations when actual prices are the different. Therefore, to compare the effects of category as opposed to brand reference prices, coefficients for brand reference price and brand preference and category reference price and brand preference were calculated for each experimental group\(^\text{18}\). This time, the reference prices (i.e. brand reference price or category reference price) were separately correlated with a brand preference measure, which simply asked which brand the respondent preferred (i.e. Q20 — see appendix 11). Behavioural intentions were not measured using the purchase intention scale because we are comparing brand preference between two brands at the same time. If the purchase intention scale was used more correlations would need to be run and it would be more onerous to analyse and compare the results. As such, point biserial correlations were run again using the reference price measures and the dichotomous brand preference question. The results for comparing pioneer brand reference price to category reference price are shown in table 8.32 for the earphones, by experimental group.

\(^{18}\) The data for the brands which were counterbalanced were combined. That is, the results when Freedom Fones was the pioneer were combined with the results when Air Fones was the pioneer etc. For justification, see section 7.4.1.7 which shows similarity between brands. Brand name did not affect the outcome of the results.
None of the coefficients are statistically significant. Furthermore, when comparing differences between the category reference price coefficients and the pioneer brand reference price coefficients, the differences were not significant either. Using purchase intention for the pioneer as an alternative measure (i.e. as opposed to the dichotomous brand preference question) revealed similar results (refer to appendix 14). The coefficients were all statistically significant but again were not statistically different from each other. It would appear that there is no difference in predictive ability between brand and category reference price.

The same analysis was repeated for the sunscreens data in table 8.33. For the sunscreens, the data provides similar results to the earphones. Three of the correlation coefficients are significant, unlike the earphones. However, the rest are statistically insignificant and only one of the pairs displays a statistically significant difference (i.e. sig. = 0.007). Further analysis of these relationships using follower brand reference price as opposed to pioneer brand reference price revealed no change in the substantive outcome of these findings. Thus, H11 had little support.
Table 8.33: Relative Effect of Pioneer and Category Reference Price (Sunscreens)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Relationship</th>
<th>Correlation Coefficient (sig.)</th>
<th>n</th>
<th>Comparison of Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pio: Pen; Fol: SD</td>
<td>Pioneer Rp – Brand Preference</td>
<td>0.075 (0.616)</td>
<td>47</td>
<td></td>
</tr>
<tr>
<td>Pio: Pen; Fol: SD</td>
<td>Category Rp – Brand Preference</td>
<td>0.214 (0.148)</td>
<td>47</td>
<td>0.505</td>
</tr>
<tr>
<td>Pio: Pen; Fol: LD</td>
<td>Pioneer Rp – Brand Preference</td>
<td>–0.186 (0.182)</td>
<td>53</td>
<td>0.930</td>
</tr>
<tr>
<td>Pio: Pen; Fol: LD</td>
<td>Category Rp – Brand Preference</td>
<td>–0.203 (0.149)</td>
<td>52</td>
<td></td>
</tr>
<tr>
<td>Pio: Ski; Fol: SD</td>
<td>Pioneer Rp – Brand Preference</td>
<td>–0.485 (0.001)</td>
<td>45</td>
<td>0.007</td>
</tr>
<tr>
<td>Pio: Ski; Fol: SD</td>
<td>Category Rp – Brand Preference</td>
<td>0.054 (0.721)</td>
<td>46</td>
<td></td>
</tr>
<tr>
<td>Pio: Ski; Fol: LD</td>
<td>Pioneer Rp – Brand Preference</td>
<td>–0.551 (0.000)</td>
<td>48</td>
<td>0.364</td>
</tr>
<tr>
<td>Pio: Ski; Fol: LD</td>
<td>Category Rp – Brand Preference</td>
<td>–0.404 (0.004)</td>
<td>48</td>
<td></td>
</tr>
</tbody>
</table>

Pio = Pioneer; Fol = Follower; Pen = Penetration; Ski = Skimming; SD = Small Discount; LD = Large Discount

8.3.6.1 Hypothesis 11: Discussion
These results, taken together with the findings from prior hypotheses provide no support for H_{11}. In conclusion, as with other attempts in the literature (i.e. Briesch et al. 1997), reference price effects remain a brand specific phenomenon. Reference price effects are brand specific and do not appear to be detectable for the category despite the intuitive appeal of a category reference price. Indeed, the category reference price measure correlates highly with brand reference price measures and with other dependent measures — it just does not improve over the brand specific measures. Thus, it may not be that there is no category reference price, but rather that brand reference price effects dominate in this data. This is particularly interesting because much of consumer behaviour focuses on categorisation processes to simplify purchase decisions. Particularly in this study when the brands were basically perceived to be the same, other than the pioneership manipulation, we would expect stronger category effects than if the brands were more differentiated. We now summarise support for the hypotheses from experiments 2 and 3.
8.4 Summary of Support for Hypotheses

In summary, seven of the nine hypotheses from study 2 are supported for the earphones data. For the sunscreen data, two of the hypotheses are fully supported and marginal support exists for two other hypotheses, with no support for the remaining hypotheses. Summary of support for the hypotheses by the two product categories is shown in table 8.34 below.

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Earphones</th>
<th>Sunscreens</th>
</tr>
</thead>
<tbody>
<tr>
<td>H3: The reference price for the pioneer shifts in the direction of the pioneer’s price.</td>
<td>Supported</td>
<td>Supported</td>
</tr>
<tr>
<td>H4: The price of the pioneer becomes the reference price for that product.</td>
<td>Supported</td>
<td>Not supported</td>
</tr>
<tr>
<td>H5: In T2 when prices are equal the reference price for the pioneer will vary depending on the initial price of the pioneer. Furthermore, the reference price for the pioneer following a skimming strategy will be higher than the reference price for the pioneer following a penetration strategy.</td>
<td>Supported</td>
<td>Partial support</td>
</tr>
<tr>
<td>H6: In T2 transaction value for the pioneer following a skimming strategy will be higher than transaction value for the pioneer following a penetration strategy.</td>
<td>Supported</td>
<td>Partial support</td>
</tr>
<tr>
<td>H7: In T2 purchase intention for the pioneer following a skimming strategy will be higher than purchase intention for the pioneer following a penetration strategy.</td>
<td>Supported</td>
<td>Not supported</td>
</tr>
<tr>
<td>H8: A substantial proportion of respondents will prefer the pioneer brand even though the follower is always at a discount to the pioneer.</td>
<td>Supported</td>
<td>Supported</td>
</tr>
<tr>
<td>H9: The pioneer’s price plays a greater role in establishing the reference price in T2 than the follower’s price.</td>
<td>Supported</td>
<td>Not supported</td>
</tr>
<tr>
<td>H10: The gap between the reference price of the pioneer and the price of the pioneer is a better predictor of brand choice than the gap between the reference price of the follower and the price of the follower.</td>
<td>Not supported</td>
<td>Not supported</td>
</tr>
<tr>
<td>H11: Category reference price is a better predictor of brand choice than brand reference price.</td>
<td>Not supported</td>
<td>Not supported</td>
</tr>
</tbody>
</table>

These findings suggest the highly context specific nature of reference price research, consistent with a wealth of other prior research (Bearden et al. 1992; Biswas, Wilson and Licata 1993; Chandrashekaran and Jagpal 1995a, b; Garbarino and Slonim 2003; Lowe and Alpert 2002; Lowengart 2002; Urbany et al. 1997). Speculations as to the nature of these discrepant results are left to chapter 9 for further discussion.
8.5 Conclusion

This chapter concluded study 2 by analysing the results of experiments 2 and 3. It empirically examined the implications for reference price perceptions, value perceptions and behavioural intentions of different new product pricing strategies. In particular, it was found that pioneer pricing strategies have a significant impact upon reference price perceptions, value perceptions and behavioural intentions. However, this result was to some extent category specific. These findings have implications for marketing theory, regarding how value is measured. The findings also imply important aspects about the underlying processes of how consumers determine a reference price, supporting an averaging process rather than reliance on one brand in particular.

The results found further support for the notion of a pioneer behavioural advantage. However, despite strong preference results for the pioneer, and results showing consumers tended to use the pioneer as a stronger anchor than the follower when averaging their reference price perceptions, the use of the pioneer as an anchor had more limited effect further down the hierarchy of effects. This alludes to the highly brand specific nature of reference price perceptions. Again, instead of thinking “this type of sunscreen should cost $X” respondents appeared to be thinking “this brand of sunscreen should cost $X”. These findings and their importance are discussed in the context of the relevant literature in the following chapter which concludes this thesis.
CHAPTER 9: CONCLUSIONS, SPECULATIONS AND CONTRIBUTION

9.1 Introduction
Chapter 8 concluded the empirical analysis of the thesis by presenting the results of the second study, which concerned the main research question of how reference price perceptions form and evolve in new product categories. Chapter 9 concludes the thesis by summarising the findings of study 1 and study 2, making speculations about these outcomes and encapsulating the main contributions. The chapter closes by stating limitations to the two studies and suggesting fruitful areas for further research.

9.2 Reference Price Perceptions for New Products: The Research Context
The literature on reference price perceptions is wide and varied, and has a long tradition in marketing research (Kalyanaram and Winer 1995; Mazumdar, Raj and Sinha 2005; Monroe 1973; Winer 1986). Nevertheless no research has examined reference price effects in new product categories. Indeed, in a recent comprehensive review of the reference price stream (i.e. Mazumdar, Raj and Sinha 2005) all the studies considered were for existing product categories, as opposed to new product categories as in other, previous reviews (Biswas, Wilson and Licata 1993; Kalyanaram and Winer 1995). Though, studies have made explicit calls to understand reference price effects in new product categories (Biswas and Sherrell 1993, p. 44) and others have commented on the need for a more unified and systematic approach to pricing new products (Marn, Roegner and Zawada 2004).

This thesis reports on two studies designed to examine measurement and conceptual issues for the new product context in more depth. The rationale and results of these studies are presented below.
9.3 Study 1: Summary, Conclusions and Speculations

The reference price research stream is replete with studies commenting on the fragmented nature of reference price measures (Bearden et al. 1992; Briesch et al. 1997; Chandrashekaran and Jagpal 1995a, b; Lowengart 2002; Mayhew and Winer 1992; Niedrich, Sharma and Wedell 2001; Rajendran and Tellis 1994). Yet only limited guidance exists for researchers when determining which measures to use for different situations and contexts (Lowengart 2002), and there is no guidance for researchers wishing to study reference price effects for new products. Study 1 contributes to this research stream by developing and illustrating a practical method to test various operationalisations of reference price. In particular, this technique is used to determine which reference price measures are important for the study of new products.

The purpose of study 1 was thus to examine which reference price measures are most appropriate for the new product context so that a more in-depth and substantiated examination of reference price issues could occur in study 2, the main study of the thesis. Study 1 did this by comparing widely accepted and used measures of reference price to see which correlate most highly with behavioural intentions. The following were the main conclusions to come out of the research for study 1.

9.3.1 Reference Prices for New Products

For new product categories the results obtained from experiment 1 determined that fair price is a better measure of reference price than expected price. During the initial stages of market introduction expectations are poorly formed. Consequently consumers are more likely to rely on normative judgments about what the price should be, rather than positivistic perceptions about what the price is. Perhaps only after some time, when prices have converged, do consumers come to trust their expectations and rely more on these positivistic perceptions rather than their normative judgments. Thus, in the initial stages of
market introduction, other judgmental processes are important, based around what is perceived to be fair. That is, for new products a consumer may not know what to expect but appears to know what is fair.

9.3.2 The Use of Confidence in Reference Pricing Studies

The new product context provides another important distinction between measures of reference price for new and existing products. As discussed previously, all reference price studies have been concerned with established product categories and, typically with fast moving consumer goods. For new product categories there may be an important distinction — the addition of confidence in reference price models.

In theory, confidence serves to pinpoint reference price perceptions. In existing, established categories, prior experience may already have pinpointed these perceptions because consumers come to know what a product costs and are thus confident about what the price is. Though in new product categories, consumers may be uncertain about their perceptions and more likely to adjust them based on other information. Confidence thus relates not so much to whether a reference price serves as an anchor but instead to determine how heavy that anchor is. This confidence term has been used in a variety of other, different contexts with varying success (Biswas and Sherrell 1993; Janiszewski and Lichtenstein 1999; Mazumdar and Jun 1992, 1993; Vaidyanathan et al. 2000; Yadav and Seiders 1998), but has never been tested in this context.

From the results of study 1 it was found that using reference price confidence in models of reference price may be useful, but it does not seem to improve over using reference price alone. Perhaps in cases where greater uncertainty exists, reference price confidence may be a useful measurement construct. However, for existing products and even for innovative products, where consumers may be less certain about pricing outcomes, it does not appear
to make a substantive difference from a measurement perspective. In the interests of parsimony, reference price confidence does not need to be used.

9.4 Study 2: Summary, Conclusions and Speculations

The purpose of study 2 was to address the main research question of how reference price perceptions form and evolve in new product categories. This is important to the study of reference price perceptions because, as discussed earlier, all reference price studies have examined reference price effects for existing product categories. Whilst a number of these have looked at the formation of reference prices (Jacobson and Obermiller 1990; Vaidyanathan 2000; Yadav and Seiders 1998), they do so in categories in which those reference prices have already been formed, and they often use inferred measures of reference price. One influential study in particular has speculated on the confidence to be placed in the results of studies which use inferred measures, claiming that even though consumers *appear* to act as if they respond to reference prices, the evidence so far is only implied (Kalyanaram and Winer 1995, p. G167). This is one of the first experimental analyses of reference price effects and the first study to examine reference price effects for the initial stages of a new product category. From a methodological perspective, it is also the first to experimentally test these effects in this setting, establishing greater confidence in the findings of this study and in past studies which have been based on inferred measures of reference price. In addressing the call for concern from Kalyanaram and Winer (1995), we can be even more confident that consumers respond to reference prices; they do not just act as if they do.

The study was split into two experiments. In experiment 2, respondents were exposed to an emerging product category and asked their reference price perceptions based upon exposure to either an initial high price strategy (i.e. representing a skimming strategy) or an initial low price strategy (i.e. representing a penetration strategy). Experiment 3 extended
experiment 2 by analysing these effects when the pioneer’s price converged to a regular price and when a follower entered at one of two possible discounts to the pioneer’s “regular” price. Subjects were then asked their reference price perceptions to see how these manipulations affected reference price perceptions. The following conclusions were drawn from study 2.

9.4.1 Pioneership, Anchoring and Value
The pioneer acts as an anchor for reference price perceptions and, in some cases, its price becomes the reference price so that it acts as a strong anchor. This anchoring mechanism in turn leads to consumer value perceptions, such that the pioneer can even define what value is to the consumer. This is important because these initial stages are crucial in determining what a product should cost and, therefore, consumers’ judgments about a product’s expensiveness. Pricing too low may not gain sufficient extra custom if customers do not know how much the product should cost, because respondents seem to have only a limited concept of value for the new and innovative product. This suggests that the pioneer has a particularly advantageous position because initial prescriptions of worth seem to be based upon simple cues, such as price, as opposed to an accurate evaluation of the costs and benefits of the product. Analogous to reference price theory, pioneers can define value. This goes against conventional microeconomic theories which suggest that value is the sum of a product’s benefits. However, despite being advantageous, the position of the pioneer is also a responsible one. Pricing too low to gain market share may harm long term profitability for an industry as a whole because the pioneer quickly becomes the benchmark and consumers quickly come to accept and expect what the price should be.

9.4.2 Averaging Processes
The literature on reference prices remains relatively fragmented, particularly with respect to the processes consumer use and, as discussed in chapter 3, the measures of reference
price used. Some studies define reference price as some sort of average of other prices (Briesch et al. 1997; Jacobson and Obermiller 1990; Winer 1986), whereas others define reference price as some fixed standard such as the price of the last product purchased (Kalwani et al. 1990; Kumar, Karande and Reinartz 1998; Mayhew and Winer 1992). This study provides evidence that reference price effects are some average (contextually and temporally) rather than some other fixed price as suggested by other researchers. This finding is important because it experimentally substantiates a number of other key studies which use inferred measures based upon some sort of average of past and current prices. Thus it also contributes to justifying model specifications in the econometric reference price literature.

9.4.3 The Brand Specificity of Reference Price
Reference prices have been studied in a variety of contexts. The results presented here strongly indicate the brand specific nature of reference prices. In markets with a prototypical brand, such as the pioneer, perceptual prominence is strong enough to influence reference price (i.e. experiment 3); and when there are no competing brands (i.e. experiment 2), the pioneer can be strong enough to become the reference price. However, this perceptual prominence is not strong enough to dictate the reference price in the face of competition from later entrants. Theory from the categorisation literature suggests that consumers may simplify the information they are provided with, by coming up with a category reference price, rather than thinking about each brand separately. However, this does not appear to be the case. Whilst a category reference price exists, and this is the first study to measure it directly, it does not appear to improve over brand based measures, even when there are gains to made in information processing (i.e. due to brand similarity). Consistent with other studies (i.e. Briesch et al. 1997) we find that reference price utilisation is a brand specific phenomenon.
9.4.4 Pioneer Brand Advantage: A Robust Phenomenon
Although recent literature has questioned the true extent of a pioneer’s advantage (Golder and Tellis 1993; Tellis and Golder 1996; Tellis and Golder 2002), this study further substantiates several other seminal works in the area which suggest a psychological advantage accrues to the brand that enters first (Alpert and Kamins 1995; Carpenter and Nakamoto 1989; Kardes and Kalyanaram 1992; Kardes et al. 1993). Further to this, in responding to a pioneer’s perceptual prominence a number of studies now assert that price competition is not the best way to do this (Carpenter and Nakamoto 1989; Hardie, Johnson and Fader 1993; Lowe and Alpert 2003). Whilst not original, this is the first study to assess pioneer brand advantage effects in this respect over the last decade, suggesting the robustness of this inimitable behavioural advantage.

9.5 Theoretical, Practical and Methodological Contributions
This thesis is the first such study to examine reference price effects for new product categories. In doing so, it makes the following contributions.

9.5.1 Theoretical Contributions
- *Experimental evidence for reference prices effects in new product categories.*
  
  Because of the experimental method used, and the direct questioning approach, this thesis contributes by providing the first explicit test of the reference price mechanism in the early stages of category introduction. That is, from an epistemological perspective, addressing the concerns of Kalyanaram and Winer (1995, p. G167), this thesis provides strong evidence that consumers do form reference prices and that it is not a spurious association, as a function of correlational studies with particular assumptions about human memory.
- *Value is not necessarily fixed.* We know from prior reference price studies that reference price, and thus TV, is a function of past prices and can change based on context. However, conventional economic and marketing theory assumes that AV is fixed and is some ratio of benefits to costs (Grewal, Monroe and Krishnan 1998; Monroe 2003). This study provides evidence that AV is not fixed and, also, can be defined by context.

- *Skimming strategies are preferable to penetration strategies.* Everything else equal, and depending upon brand objectives, a skimming strategy is optimal. Skimming price strategies positively frame future price decreases, whereas penetration price strategies negatively frame future price increases. Whilst past studies have touched on this (i.e. Doob et al. 1969; Slonim and Garbarino 1999), they either make these implications from interpretation of other results (i.e. Doob et al. 1969), or test these findings for marginally new products and with fairly unrealistic assumptions about firm pricing behaviour (i.e. Slonim and Garbarino 1999). No studies, other than this one, have tested these effects for radically new products.

- *Further evidence of pioneer advantage.* Pioneer advantage is a robust phenomenon and discounting by followers is not an effective strategy to account for later entry. This backs up several other studies in this area (Carpenter and Nakamoto 1989; Hardie, Johnson and Fader 1993; Lowe and Alpert 2003).

- *Reference prices are formed by an averaging process.* Whilst consumers may rely on some brands more than others when determining their reference price (i.e. the pioneer or some other dominant brand), they do not exclusively use the pioneer’s price as their reference price. Instead, the dominant brand acts as a strong anchor and averages appear to be biased based on how prototypical this brand is.
- **Reference prices are brand specific.** Despite the apparent simplification of categorising brands by reference price, the best predictor of a brand’s value is that brand’s reference price, not some reference price for the category.

- **AV has a greater influence on behavioural intentions than TV.** Other studies have also tested and noted the relative strength of these coefficients (i.e. Bearden et al. 1992; Grewal, Monroe and Krishnan 1998; Urbany et al. 1997). Whilst not original, this finding provides independent corroboration of these other two studies and represents an important implication for reference price research.

Perhaps too much emphasis is placed on TV as a predictor of purchase intention than AV. Firstly in these three studies the strength of the correlation coefficient between TV and purchase intention is generally small (around 0.2-0.3), explaining about 4% to 9% of the variation in purchase intention. Even though the coefficient is statistically significant, it only marginally affects behavioural intentions. AV, on the other hand, generally has a correlation coefficient ranging from 0.5-0.6, which explains 25% to 36% of the variation in purchase intention, a higher degree of variation in purchase intentions.

### 9.5.2 Practical Contributions

- **Conduct rigorous market research to determine the right price.** If value is not fixed, as suggested by this research and others, then marketers responsible for setting price should use rigorous market research methods to ensure price is set correctly the first time. The first price that consumers see frames perceptions of value. Therefore, this first price is crucial in determining longer term perceptions of value.

- **Only use penetration strategies if necessary.** Penetration pricing strategies should only be used in very specific contexts. For instance, to attract initial customers when
switching costs are high. The penetration strategy will ultimately undercut longer term value perceptions and thus profit margins, particularly if switching costs are low. If a penetration strategy is used, marketers should go to extra effort to communicate the short-run nature of the initial low price.

- **Promotional efforts should take account of a brand’s price relative to the price of other brands.** If consumers average reference prices within a category to form a reference price for a brand, this implies that the cheaper brand should focus promotional efforts on the price of the brand and value for money. Likewise, the more expensive brand should focus promotional efforts on the benefits of that brand over other alternatives, not price.

- **Promotional efforts should focus on overall value.** Several studies have found that AV is a stronger predictor of purchase intention than TV. Recall from the discussion in chapter 2 that AV relates to the total benefits of the brand in relation to the costs of the brand, rather than TV which relates more to short term gains or initial positive feelings associated with getting a good deal. If this is the case then promotional efforts should focus on what the consumer gets when they buy the product and the benefits provided by that product. Only for short term reasons (i.e. getting rid of overstock, seasonal fluctuations etc.) should brands promote a sale price.

### 9.5.3 Methodological Contributions

- **Empirically tested and parsimonious scales of TV and AV.** Study 1 provides measures of two useful constructs, TV and AV, which are empirically distinct. Past research (i.e. see Urbany et al. 1997) has struggled to do this. Other studies have also successfully managed to do this (i.e. Grewal, Monroe and Krishnan 1998) but the measures they used are for more specific contexts, such as measuring value...
perceptions for sale prices, and tend to use a large battery of items. The measures used in this thesis are more refined, use a smaller set of scales, apply to more general contexts (i.e. prices in general, not just sale prices) and are valid and reliable measures based on empirical testing. Likewise, in this research a link was found between the highest price and AV as hypothesised. Grewal, Monroe and Krishnan (1998) also empirically establish this link, yet prior research (i.e. Bearden et al. 1992) fails to do so. This is important because it validates the measures used and provides further empirical substantiation of a largely theoretical construct.

In study 2, due to issues of repetitiveness and recent calls in the literature about the pitfalls of multi-item measures (Rossiter 2002), the scales for TV and AV were reduced to single-item measures. These items correlated with their dependent variables in the manner seen in study 1. Thus the reduced set of scales performed just as well as the larger multi-item set, with no sacrifice to predictive ability.

- *The first measure of category reference price.* This study provided the first direct measure of category reference price. This measure correlated highly with behavioural intentions.

- *An objective method to determine preference differences using Monroe’s (2003) sequential preferences approach.* During the pilot studies, a commonly-used procedure for estimating demand, Monroe’s (2003) sequential preferences approach, was used to determine different levels of price sensitivity. However, Monroe (2003) provides no guidance on how to objectively determine where the curve (see figures 7.7 and 7.8) flattens out. This study provides a statistical procedure for objectively determining differences and similarities in preference.
A practical procedure for simulating consumer response to new products. The method employed in this research provides a useful tool to test consumer response to price changes for new products and existing products. As a research tool, this method of simulating an emerging market can be used by researchers in a variety of settings to test the likely impact of changes to different marketing strategies.

9.6 Limitations
The experimental method offers a number of advantages over research methods used in prior research, as discussed in chapter 4 and chapter 7, particularly in the new product context. However, because of the experimental nature of the studies in this thesis, they are limited by external generalisability from artificial simulation of an emerging market. Likewise, the student sample used, whilst likely to be homogenous, is not necessarily generalisable beyond this sample. Similarly, this type of experimental research is limited by the effects and environments which can be tested. In particular, all the experiments were only able to analyse effects through two product categories and experiment 3 was limited by an examination of me-too followers, not other differentiated followers. As with other studies of this type there is a trade off between internal and external validity. Nonetheless, this environment is useful for such initial studies examining experimental effects.

A further limitation, similar to other experimental studies in the pioneer brand advantage, literature relates to the generalisability of the effects being tested. In particular, during the experiment respondents were exposed to a pioneer and then a follower to simulate market entry order. Thus in this experimental setting, it was clear to respondents which brand was the pioneer and which brand was the follower. However, in the field consumers may be exposed to both brands at the same time, or the brands in a different order, and may not know which brand is the pioneer, so confounding or even counteracting the pioneer effect. One study has examined this issue and found that consumer misperception of pioneership
can lead to brands misperceived as the pioneer accruing the benefits of the pioneer brand even though they were not the pioneer (i.e. Alpert, Kamins and Perner 2003). Thus the effect is predominantly also a function of the pioneer’s ability to alert consumers to its inimitable position in order to maintain its distinctiveness.

9.7 Further Research

9.7.1 Methodological Considerations
Future research could start by examining these effects in different contexts and with different samples. In particular, whilst no additional effect from using confidence was found in experiment 1, this may be the result of the context in which this study was conducted. For instance, student samples such as these are generally composed of younger, more educated “Generation Xers” who might be less accepting and more cynical of marketing messages (Wolburg and Pokrywcynski 2001). Therefore, testing the effect of confidence on a broader sample and a broader range of product types could be fruitful. Likewise, it was found that consumers tend to average when forming reference prices, as opposed to relying on a referent brand as suggested by other research. This could be a function of the similarity between brands used here and may not be the case if these effects were tested for more differentiated followers which occupy their own perceptual space. Thus future research could be conducted using a broader range of manipulations, such as different types of follower brands (i.e. differentiated followers, market leaders etc.). One would suspect this would weaken the pioneer’s effect.

9.7.2 Understanding Fairness
A key element of this research establishes that the fairness construct is crucial in the underlying decision making process for new products. Recent research in marketing has begun to examine this construct in more depth (Bolton, Warlop and Alba 2003, Campbell 1999a, b; Xia, Monroe and Cox 2004). However, still little is understood about the
underlying elements of fairness. Future research could examine different ways in which marketers may communicate fairness and a fair price to consumers.

Along with prior research (i.e. Doob et al. 1969; Slonim and Garbarino 1999), this thesis established that setting the right price the first time around is crucial. However, often marketers need to increase prices. Future research could seek to analyse how best to communicate price increases to consumers. Some research in the reference price area suggests small increases below the JND threshold as consumers will not notice small increases (i.e. Gupta and Cooper 1992). However, related to the fairness concept, how else can marketers communicate price rises to consumers with limited negative repercussions? Some research has begun to examine this (i.e. Homburg, Hoyer and Koschate 2005) but the area remains underresearched, and a fruitful area, given that anecdotal research suggests that many products are underpriced and do not reflect true value to customers (Marn, Roegner and Zawada 2003; Urbany 2001).

9.7.3 Innovativeness
Another interesting finding was to note the differences in results between product categories. Generally the hypotheses were supported for the earphones data but not for the sunscreens data. We might speculate that this is because these categories are inherently different in terms of their apparent reliance upon technology. Even though both categories were perceived as new in the manipulation checks, consumers may perceive them as new in different ways. That is, the construct of newness may be multifaceted and underexplored (Chandy and Tellis 2000). For instance, the earphones are a ‘high tech’ product and explicitly relied on technology to promote the product benefit. Assuming the sunscreens were real, this high tech factor was not so apparent with the sunscreens. Even though there may be as much, if not more of a reliance of technology for the sunscreens, consumers did not explicitly see this — it was still a type of sunscreen. This may suggest a
need to revisit measurements of innovativeness because consumers may have certain perceptions towards products which seem high tech. Furthermore, there are important implications here for researching how to frame new products in terms of the prior product generation. Marketers can utilise knowledge of the prior product generation to stimulate knowledge and thinking about a new product category (Gregan-Paxton and Roedder John 1997; Moreau, Lehmann and Markman 2001). For instance, in new product categories brands may be promoted with reference to the prior product category to assist consumer learning. However, association with the older product category may be confounded by carry over effects in terms of value and prior price perceptions. Which is most important for marketers? The positive benefits of association with a prior product category to stimulate learning about the new product’s attributes, or the negative effects of association with a prior product category, which will give consumers greater price knowledge?

9.7.4 The Role of Prior Product Categories
How do consumers integrate prices from prior product generations to form a reference price for a new product? Some work in the new product learning literature has begun to analyse the analogical processes of internal knowledge transfer (i.e. Moreau, Lehmann and Markman 2001). However, little is known about how consumers incorporate price information from prior categories and the weighting processes that are used to form initial price perceptions. This thesis makes a start, but it would be useful for marketers to understand more about how to price new products relative to value.

9.8 Conclusion
Reference price research is an important and growing area of research in marketing, as evidenced by recent articles in the discipline’s top journal, the Journal of Marketing (see Mazumdar, Raj and Sinha 2005 for a comprehensive review), special issues in other journals such as the Journal of Product and Brand Management and a wide array of
studies focusing on this problem area in other top journals. In particular, its dissonance with conventional economic theory (Monroe and Lee 1999; Skouras, Avlonitis and Indounas 2005) stemming from the Nobel Prize winning work of Daniel Kahneman and Amos Tversky brings this research discipline to the forefront of research in marketing, further establishing reference price research as a substantial and unique perspective on pricing and decision making.

This thesis set out to extend this growing body of research by understanding reference price effects in new product contexts, addressing the question of how reference price perceptions form and evolve in new product categories. To address this central issue, experiment 1 was designed to examine which measures of reference price were most appropriate for the study of new products, stemming from repeated calls within the literature that reference price utilisation was largely context specific. It found that fair price perceptions, as opposed to expected price perceptions were most instrumental in understanding reference price effects for new products.

Following on from this initial measurement study the main research question was examined with two further experiments. These two experiments examined how reference price perceptions formed and evolved with a simulated market for two novel products. In conclusion it found, based on a pioneer advantage that pioneers can form the reference price and to some extent become the anchor by which other reference prices evolve. It further found value, a central concept to the marketing discipline, is not necessarily fixed and can, to some extent, be defined by the price that is set. This chapter concluded by noting limitations to the studies conducted suggesting fruitful areas for future research.
APPENDIX 1: DIFFERENCES IN INNOVATIVENESS — PRETEST 1

Appendix 1 demonstrates the issues involved using the multi scale adapted from Olshavsky and Spreng (1996). In particular, one scale item did not appear useful and confounded the innovativeness results. Therefore, this item was removed and a single item scale was used instead, providing a more parsimonious and useful scale.
Differences in Innovativeness — Pretest 1

Differences in innovativeness for pretest 1 are presented in table A1.1 below.

<table>
<thead>
<tr>
<th></th>
<th>Earphones (Existing)</th>
<th>Sunscreen (Innovative)</th>
<th>t-value (sig.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I1</td>
<td>4.14 (1.83)</td>
<td>5.50 (1.51)</td>
<td>−2.464 (0.028)</td>
</tr>
<tr>
<td>I2</td>
<td>3.14 (1.99)</td>
<td>5.00 (2.04)</td>
<td>−3.189 (0.007)</td>
</tr>
<tr>
<td>Summated Scale</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean (st. dev.)</td>
<td>3.64 (1.67)</td>
<td>5.25 (1.66)</td>
<td>−3.446 (0.004)</td>
</tr>
<tr>
<td>N=14</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In pretest 1, the sunscreen (the innovative treatment) was perceived as more innovative than the earphones (the existing treatment), for each of the single item measures (i.e. I1 and I2) and for the summated scale. These differences were statistically significant. Initially only these treatments were tested. More rigorous testing of all treatments was left until pretest 2 and is shown in tables A1.2 and A1.3.

<table>
<thead>
<tr>
<th></th>
<th>Earphones (Existing)</th>
<th>Earphones (Innovative)</th>
<th>t-value (sig.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I1</td>
<td>2.92 (1.32)</td>
<td>5.20 (1.08)</td>
<td>5.015 (0.000)</td>
</tr>
<tr>
<td>I2</td>
<td>2.69 (1.49)</td>
<td>3.20 (1.93)</td>
<td>0.768 (0.450)</td>
</tr>
<tr>
<td>Summated Scale</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean (st. dev.)</td>
<td>2.81 (1.23)</td>
<td>4.20 (1.19)</td>
<td>3.033 (0.005)</td>
</tr>
<tr>
<td>N=13</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Sunscreen (Existing)</th>
<th>Sunscreen (Innovative)</th>
<th>t-value (sig.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I1</td>
<td>1.87 (1.19)</td>
<td>5.31 (0.85)</td>
<td>−8.673 (0.000)</td>
</tr>
<tr>
<td>I2</td>
<td>2.73 (1.53)</td>
<td>4.77 (1.42)</td>
<td>−3.621 (0.000)</td>
</tr>
<tr>
<td>Summated Scale</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean (st. dev.)</td>
<td>2.30 (1.28)</td>
<td>5.30 (1.28)</td>
<td>−6.047 (0.000)</td>
</tr>
<tr>
<td>N=15</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

The difference between I2 for the existing earphones and I2 for the innovative earphones was not as large as the difference between I1 for the existing earphones and I1 for the
innovative earphones (the same was the case for the sunscreens). This implies a possible measurement issue with I2 and would seem to further confirm the speculation made in section 4.4.3.1 about the ‘impact’ measure not being a useful indicator of innovativeness for such products. Thus, omitting I2 from the summated scale for each product category, independent samples t-tests were run between the existing and innovative products (i.e. using only I1 for each product category).
APPENDIX 2: EMPIRICAL DISTINCTION BETWEEN TV AND AV FROM PRETEST 1

For pretest 1 one of the TV scales loaded onto the AV factor, signifying an imperfect distinction between the factors. Using exploratory factor analysis, these tests are described in appendix 2. Further confirmation of empirical distinction in the way hypothesised was made in pretest 2 and experiment 1 (see section 4.4.4.2).
Pretest 1 — Discriminant Validity

In pretest 1, for the earphones, a factor analysis with a Varimax rotation produced a two factor solution with empirical distinction between the two constructs, although one of the items had a low communality and the two factor solution shown in table A2.1 was not entirely consistent with the two hypothesised factors. Despite the low communality for TV3 the item was left in at this stage due to theoretical justification.

<table>
<thead>
<tr>
<th>Question</th>
<th>Item</th>
<th>Communality</th>
<th>Factor 1</th>
<th>Factor 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q9a</td>
<td>TV1</td>
<td>0.875</td>
<td>-0.076</td>
<td>0.932</td>
</tr>
<tr>
<td>Q9b</td>
<td>TV2</td>
<td>0.694</td>
<td>-0.458</td>
<td>0.696</td>
</tr>
<tr>
<td>Q9c</td>
<td>TV3</td>
<td>0.521</td>
<td>-0.706</td>
<td>0.149</td>
</tr>
<tr>
<td>Q10</td>
<td>AV1</td>
<td>0.907</td>
<td>0.924</td>
<td>-0.230</td>
</tr>
<tr>
<td>Q11</td>
<td>AV2</td>
<td>0.808</td>
<td>0.866</td>
<td>-0.243</td>
</tr>
<tr>
<td>Q12</td>
<td>AV3</td>
<td>0.846</td>
<td>0.904</td>
<td>-0.168</td>
</tr>
</tbody>
</table>

Factor analysis for the sunscreen data in table A2.2 revealed a more confirmatory picture of the hypothesised distinction between these constructs. All communalities were high and a Varimax rotation produced two distinct factors for TV and AV as hypothesised. There was still a similar loading upon the two factors for the item TV3 and the difference between their loadings was marginal. However, the results were as predicted providing more promise for the empirical distinction between these constructs.

<table>
<thead>
<tr>
<th>Question</th>
<th>Item</th>
<th>Communality</th>
<th>Factor 1</th>
<th>Factor 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q24a</td>
<td>TV1</td>
<td>0.897</td>
<td>-0.376</td>
<td>0.869</td>
</tr>
<tr>
<td>Q24b</td>
<td>TV2</td>
<td>0.959</td>
<td>-0.062</td>
<td>0.977</td>
</tr>
<tr>
<td>Q24c</td>
<td>TV3</td>
<td>0.729</td>
<td>-0.569</td>
<td>0.636</td>
</tr>
<tr>
<td>Q25</td>
<td>AV1</td>
<td>0.916</td>
<td>0.949</td>
<td>-0.122</td>
</tr>
<tr>
<td>Q26</td>
<td>AV2</td>
<td>0.899</td>
<td>0.916</td>
<td>-0.244</td>
</tr>
<tr>
<td>Q27</td>
<td>AV3</td>
<td>0.798</td>
<td>0.701</td>
<td>-0.554</td>
</tr>
</tbody>
</table>
APPENDIX 3: SAMPLE INSTRUMENT FOR EXPERIMENT 1

The following is a sample of the final instrument used for experiment 1. This sample was for the treatment with the existing earphones, the innovative sunscreen, and which measured fair price perceptions. The other stimuli used were exactly the same differing only in terms of the concept statement respondents were exposed to and whether or not they were asked about their fair or expected price perceptions.
Pages 224 – 246 have not been published in this digital copy. These pages are available in the original document held in the Griffith University Library.
Appendix 5 shows the instrument used for pilot study 1a in study 2. Pilot study 1a was a small exploratory study designed to generate possible brand names for use in experiment 2 and experiment 3. The brand names generated were then included in pilot study 1b (appendix 6) to examine preference.
On the following pages you will be asked to provide some suggestions about possible brand names for two different potential new products. There are no right or wrong answers. This research is not being conducted for any commercial purpose. The results will be used in a follow up study.

Participation in this project is voluntary. However, if you choose to participate, your assistance will be greatly appreciated. Every respondent will also be given a Cadbury chocolate bar for participation. The brand names will be compiled and evaluated in a further survey. The respondents who come up with the two most popular brand names for each product category will receive two movie tickets to Birch, Carroll and Coyle cinemas. Winners will be determined with a subsequent survey asking respondents to rate the different brand names generated in this research. The brand names which score highest and satisfy the criteria mentioned overleaf will be the winners. Please provide your name, student number and email address so you can be contacted if you win.

Ethical Conduct of Research
Completion and submission of the questionnaire will be accepted as an expression of consent. Griffith University conducts research in accordance with the National Statement on Ethical Conduct in Research Involving Humans. As a participant in this research, should you have any complaint concerning the manner in which this research is conducted, please do not hesitate to contact any of the researchers listed below:

Doctoral Researcher: Ben Lowe B.Lowe@griffith.edu.au (07)387 53716
Supervisor: Professor Frank Alpert F.Alpert@griffith.edu.au (07)387 57344

Alternatively, if an independent person is preferred then please do not hesitate to contact The Manager, Research Ethics on (07) 387 55585 or research-ethics@griffith.edu.au:

The conduct of this research involves the collection, access and/or use of your identified personal information. At the end of the questionnaire you will be asked for your student number so that you can be placed in a prize draw. Your student number is only collected for the purpose of identifying prize winners. It is not compulsory to provide your student number but if you do not provide it then you cannot be entered into the prize draw. The information collected is confidential and will not be disclosed to third parties without your consent, except to meet government, legal or other regulatory authority requirements. A de-identified copy of this data may be used for other research purposes. However, your anonymity will at all times be safeguarded. For further information consult the University’s Privacy Plan at www.gu.edu.au/ua/aa/vc/pp or telephone (07) 3875 5585.

Thank you for your participation in this study!
Task 1

Suppose there is a new type of sunscreen about to be introduced. It lasts for 8 hours as opposed to the usual 2-4 hours which other sunscreens last for. List as many brand names as you can for this new type of sunscreen.

The names should satisfy the following criteria:

It should be brief
It should be easy to pronounce
It should be dissimilar to existing brand names

<table>
<thead>
<tr>
<th>Brand Name</th>
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<td></td>
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</tbody>
</table>
Task 2

Suppose there is a new type of earphones about to be introduced. The earphones do not have wires like other earphones. Therefore, there is no physical connection to the audio device and there is no headband between the earphones. List as many brand names as you can for this new type of earphones.

The names should satisfy the following criteria:

It should be brief
It should be easy to pronounce
It should be dissimilar to existing brand names

<table>
<thead>
<tr>
<th>Brand Name</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
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</tbody>
</table>

To be contacted should you win a prize, please supply your name and contact details below:

Name: ________________________________________________

Student number: ________________________________________

Email: ________________________________________________
Appendix 6 shows the instrument used for pilot study 1b in study 2. Pilot study 1b extends pilot study 1a by evaluating the brands generated so that brand names of equal preference can be used in experiment 3 to minimise naming effects as potential confounds.
Brand Name Evaluation Exercise

On the following pages you will be asked to evaluate a list of possible brand names for two different new product concepts. There are no right or wrong answers. This research is not being conducted for any commercial purpose. The results will be used in a follow up study.

Participation in this project is voluntary. However, if you choose to participate, your assistance will be greatly appreciated. Every respondent will also be given a Cadbury’s chocolate bar for participation.

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Alternatively, if an independent person is preferred then please do not hesitate to contact The Manager, Research Ethics on (07) 387 55585 or research-ethics@griffith.edu.au:

Thank you for your participation in this study!
Task 1

Suppose there is a new type of sunscreen about to be introduced. It lasts for 8 hours as opposed to the usual 2-4 hours which other sunscreens last for. Please evaluate the following list of potential brand names for this sunscreen by choosing five from the list that you most prefer. With the five brand names that you choose, please rank them in order of preference (1 being most preferred and 5 being least preferred).

<table>
<thead>
<tr>
<th>Potential Brand Names</th>
<th>Order of Preference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar Wall</td>
<td>UV Armour</td>
</tr>
<tr>
<td>Protect Skin</td>
<td>Sun Protect</td>
</tr>
<tr>
<td>UV Protect</td>
<td>Ray Block</td>
</tr>
<tr>
<td>Sun Mate</td>
<td>Fun-in-the-Sun</td>
</tr>
<tr>
<td>Skin Armour</td>
<td>Stop and Block</td>
</tr>
<tr>
<td>Swim Easy</td>
<td>Great for Eight</td>
</tr>
<tr>
<td>Solar</td>
<td>Once Only</td>
</tr>
<tr>
<td>Blockout</td>
<td>Stay On</td>
</tr>
<tr>
<td>Apply Once</td>
<td>Once</td>
</tr>
<tr>
<td>Super Solaire</td>
<td>Skin Lover</td>
</tr>
<tr>
<td>Super Safe</td>
<td>Skin Cover</td>
</tr>
<tr>
<td>After Eight</td>
<td>Skin Safe</td>
</tr>
<tr>
<td>Power Block</td>
<td>Linger Longer</td>
</tr>
<tr>
<td>Sun Safe</td>
<td>Solar Guard</td>
</tr>
<tr>
<td>Once-a-Day</td>
<td>Super Sun</td>
</tr>
<tr>
<td>Sun Block</td>
<td>Solar Block</td>
</tr>
<tr>
<td>Sun Free</td>
<td>Sun Shield</td>
</tr>
<tr>
<td>WOW Sunscreen</td>
<td>Ray-Banned</td>
</tr>
<tr>
<td>All Day</td>
<td>Power Screen</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Brand Name</th>
<th>Order of Preference</th>
</tr>
</thead>
<tbody>
<tr>
<td>(please write in the cells below)</td>
<td>(1=most preferred; 5=least preferred)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Task 2

Suppose there is a new type of earphones about to be introduced. The earphones do not have wires like other earphones. Therefore, there is no physical connection to the audio device and there is no headband between the earphones. Please evaluate the following list of potential brand names for these earphones by choosing five from the list that you most prefer. With the five brand names that you choose, please rank them in order of preference (1 being most preferred and 5 being least preferred).

<table>
<thead>
<tr>
<th>Potential Brand Names</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freedom Fones</td>
</tr>
<tr>
<td>2WL</td>
</tr>
<tr>
<td>Headmates</td>
</tr>
<tr>
<td>BSIM</td>
</tr>
<tr>
<td>No Wires</td>
</tr>
<tr>
<td>Sound Muffs</td>
</tr>
<tr>
<td>Break Free</td>
</tr>
<tr>
<td>Wireless Gear</td>
</tr>
<tr>
<td>No Strings</td>
</tr>
<tr>
<td>Free State</td>
</tr>
<tr>
<td>Ear Ace</td>
</tr>
<tr>
<td>Airphones</td>
</tr>
<tr>
<td>Shock Wave</td>
</tr>
<tr>
<td>Free and Easy</td>
</tr>
<tr>
<td>Ear Wave</td>
</tr>
<tr>
<td>No More Wire</td>
</tr>
<tr>
<td>Sonic Wave</td>
</tr>
<tr>
<td>Wireless Fones</td>
</tr>
<tr>
<td>Sound Wave</td>
</tr>
<tr>
<td>Sonic Fones</td>
</tr>
<tr>
<td>Boom Fones</td>
</tr>
<tr>
<td>Ear Gear</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Brand Name (please write in the cells below)</th>
<th>Order of Preference (1=most preferred; 5=least preferred)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

Thank you for your participation in this study!
APPENDIX 7: DISTRIBUTION OF PRICE PERCEPTIONS

Experiment 2 found substantive differences in price perceptions between Freedom Fones and Air Fones. However, after running a t-test, these differences, whilst large, were not statistically significant. These findings suggest the differences occurred as a result of heterogenous samples rather than naming effects. Appendix 7 examines this in more depth by examining the distribution of responses between brands and more robust measures of average, such as the median.
Pages 261 - 312 have not been published in this digital copy. These pages are available in the original document held in the Griffith University Library.
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Thomas, Manoj and Vicki Morwitz (2005), Penny Wise and Pound Foolish: The Left Digit Effect in Price Cognition,” Journal of Consumer Research, 32 (June), 54-64.


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