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# Measuring reference price perceptions for new product categories: Which measure is best?

**Ben Lowe<sup>1</sup>**  
**Kent Business School**  
**University of Kent, UK**

**Frank Alpert**  
**School of Business**  
**University of Queensland, Australia**

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<sup>1</sup> Correspondence should be addressed to Ben Lowe at: B.Lowe@kent.ac.uk. The authors would like to acknowledge the help of Hume Winzar, Griffith Business School, Griffith University.

# Measuring reference price perceptions for new product categories: Which measure is best?

## Abstract

**Purpose** – The purpose of this paper is to provide guidance within the reference price literature by investigating which is the best measure of reference price for the as yet unstudied context of new product categories. Another reference price issue for the new product category context is also examined: whether greater price uncertainty in this context makes it worthwhile to measure consumer confidence in reference price perceptions.

**Design/methodology/approach** – This research uses the experimental method to determine which measures of reference price are best suited to the new product context, by removing all other confounding influences.

**Findings** – The findings confirm that consumers tend to evoke the fair price concept for new product categories and the expected price concept for existing categories. We also find that confidence in reference price measures, whilst theoretically useful, does not add to our understanding of reference price effects in new product categories, probably because respondents tended to be overly confident in their perceptions, despite lacking in more objective measures of product category knowledge.

**Originality/value** – Several studies in the literature have commented on the issue of fragmented measurement in the reference price domain. Some studies have offered theoretical guidance on measures to use. This is the *first* study to provide empirically tested theory on which measures to use and is the *first* study to examine reference price effects in new product categories including testing the usefulness of the confidence measure.

**Keywords** Reference price, Fair price, Expected price, Belief strength, New products.

**Paper type** Research paper

# Measuring reference price perceptions for new product categories: Which measure is best?

## Introduction

Behavioral pricing has attracted increased attention in the marketing literature recently (e.g., Estelami and Maxwell, 2003). One aspect of behavioral pricing with a long tradition in marketing is the study of reference price perceptions (Monroe, 1973; Winer, 1986), which has made important contributions to our understanding of consumer behavior (Biswas, Wilson and Licata, 1993; Kalyanaram and Winer, 1995; Mazumdar, Raj and Sinha, 2005).

However, a number of methodological challenges remain. For example, as the research stream reaches maturity, a plethora of studies have examined and called for greater integration of different measures of reference price, noting that the research area is highly context specific (Bearden *et al.*, 1992; Briesch *et al.*, 1997; Chandrashekar and Jagpal, 1995; Lowengart, 2002; Rajendran and Tellis, 1994) and that several operationalizations of the concept exist (Lowe and Alpert, 2002; Lowengart, 2002). Thus, there is a need for consensus and theory about which reference price measures to use under different circumstances. Yet, still this important measurement issue remains unresolved. For instance, in a recent review, Mazumdar, Raj and Sinha (2005 p. 99) state “The existence of multiple conceptualizations of reference price raises the question whether there are certain conditions under which one type of reference price is more likely to be evoked than others. ”

In particular, no research has examined reference price research in new product categories, despite obvious differences between new product and existing product contexts, and despite calls in the literature to do so (for instance, see Biswas and Sherrell, 1993 p.44). This study makes a contribution to the literature by testing different operationalizations of reference price, and other constructs, including reference price confidence, in *new* and *existing* product

categories. In particular, this research reports on two measurement issues associated with reference prices and new product categories:

- i. Which measures of reference price are evoked for innovative new product categories as opposed to existing product categories?
- ii. Are there other constructs such as reference price confidence that moderate reference price effects in new product categories?

Research in pricing has illustrated the value of understanding price setting processes for new products (Bergstein and Estelami 2002), but has yet to closely and empirically examine the micro issues of pricing relating to these research questions.

## **Reference price research for new products**

### **Reference prices for new products**

*New product* pricing decisions present a unique and difficult problem to managers. 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 (Dolan, 1995; Nagle and Holden, 2002).

Whilst a number of studies have examined pricing decisions for new product categories, few have studied *reference price effects* in new product categories. Reference price studies have traditionally used established, frequently purchased, supermarket product categories such as saltines (Rajendran and Tellis, 1994), coffee (Winer, 1986), yoghurt and many more (see Mazumdar, Raj and Sinha, 2005 for a more extensive list).

Some research (i.e. Doob *et al.*, 1969; Slonim and Garbarino, 1999) has examined reference price effects in new product categories. However, Doob *et al.* (1969) study reference price effects by examining sales changes for different new product pricing strategies, without specifically examining the measures consumers evoke when accessing their reference price perceptions. Slonim and Garbarino (1999) perform a similar study,

looking at how perceptions of expensiveness change for different new product pricing strategies, yet they also do not examine specific reference price measures, instead relying on measures of perceived expensiveness to overcome measurement difficulties with reference price. Further, their study was for incrementally new products. Thus, the literature on reference price for new products is sparse and concerns incrementally new products.

### **Guidance on measurement**

Several studies have shown a consistent link between a consumer's reference price for a product and brand choice or behavioral intentions, establishing the importance of this discipline to consumer decision making (see Mazumdar, Raj and Sinha, 2005 for a comprehensive review). Yet, if the reference price term is not measured correctly then any reference price effect may be obscured at best, or misleading at worst. Some studies have made inroads into this issue by comparing measures (i.e. Bearden *et al.*, 1992; Briesch *et al.*, 1997, Chandrashekar and Jagpal, 1995; Garbarino and Slonim, 2003; Rajandran and Tellis, 1994). For example, using direct measures (i.e., questionnaire approaches), some researchers have compared measures of reference price by correlating them with measures of Transaction Value (TV) and Acquisition Value (AV)<sup>2</sup>. However, little consensus emerges in these studies (Bearden *et al.* 1992; Chandrashekar and Jagpal, 1995; Garbarino and Slonim, 2003). The lack of resolution could be because studies have not considered the context of the research.

The most commonly used measures of reference price, 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 (Chandrashekar and Jagpal, 1995; Kalwani and Yim, 1992; Kalyanaram and Winer, 1995; Puto, 1987; Thaler, 1985; Urbany *et*

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<sup>2</sup> Reference prices have generally been discussed in the context of two related but distinct notions of value – Transaction Value (TV) and Acquisition Value (AV). AV relates to the ‘get’ relative to ‘give’ component of value (Dodds, Monroe and Grewal, 1991), and can be defined as  $P_h - P$ , where  $P_h$  is the highest price a consumer would be willing pay and  $P$  is the products actual price. TV (Thaler, 1985) represents a more 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 the TV for a product. Studies typically operationalize the concept as  $P_r - P$ , where  $P_r$  is the reference price or price that the product *should* cost and  $P$  is the actual price.

*al.*, 1997). We now try to gain more clarity on the concepts of fairness and expectations by reviewing key literature to distinguish between the two measures.

### **Distinguishing between fair and expected prices**

The concept of fairness has attracted increased research attention in marketing and the social sciences (Campbell, 1999b; Kahneman, Knetsch and Thaler, 1986; Xia, Monroe and Cox, 2004) stemming from Thaler's (1985) seminal work into transaction utility, and relates to a normative belief about what a product *should* cost (Bearden *et al.*, 1992 p. 630; Mazumdar, Raj and Sinha, 2005) based on judgments about what is reasonable, acceptable or just (Bolton, Warlop and Alba, 2003; Xia, Monroe and Cox, 2004). Xia, Monroe and Cox (2004) provide a more detailed discussion of the concept of fairness in their comprehensive review of the fairness construct 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). In essence, 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.

Fair prices are distinct from competing models based on expectations which, by definition, relate to a positivistic belief about what the product *does* cost. 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. Typical models of expected price involve some average based on past prices with different time lags and different weightings (for a review of such models of expectations see Mazumdar, Raj and Sinha, 2005). That is, reference price is some function of past prices with adjustment for recency effects and reflects what is believed to be, rather than what should be.

The categorization literature, originating in the psychology of learning, is useful to help determine which reference price will be used in which situation. It suggests that consumers learn about new products by analogy with existing products, applying existing knowledge structures to radically new products (Gregan-Paxton and Roedder John, 1997; Moreau, Lehmann and Markman, 2001). This knowledge transfer process has been shown to significantly influence expectations about a new product category (Moreau, Markman and Lehmann, 2001), but it is unclear whether or not these processes extend to prices.

The learning mechanism appears to be moderated by the discrepancy between the new category and the existing category (Gregan-Paxton and Roedder John, 1997; Ozanne, Brucks and Grewal, 1992). 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 innovative 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 two key hypotheses of this study:

**H<sub>1a</sub>: When perceived innovativeness is higher, fair price is more likely to be used as a reference price by consumers than expected price.**

**H<sub>1b</sub>: When perceived innovativeness is lower, expected price is more likely to be used as a reference price by consumers than fair price.**

#### **The effect of reference price belief strength**

For radically new products, because consumers have less experience with the new 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 belief strength has a long tradition in consumer research (Fishbein and Ajzen, 1975; Smith and Swinyard, 1983). Yet, it has received limited attention in the reference price literature.



Typical model specifications for prior research assume that some measure of brand choice or purchase intention is affected by a reference price term which is a discrepancy between actual price and the reference price. But what if a consumer is unsure what the reference price should be? Modeling of the reference price term in this sense assumes that beliefs are held with the same degree of confidence. Inclusion of confidence in such models may enhance the link between attitude and behavior when subjects are differentiated in terms of their confidence ratings (Smith and Swinyard, 1983). This is more likely to be the case for new as opposed to existing products. Subjects exposed to an existing product are likely to be more confident than subjects exposed to a newer product.

We can appreciate this intuitive relationship with a simple example. Suppose one consumer has a reference price for a product of about \$80. 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 highly confident about their reference price would be less likely to revise their reference price, and if discrepant from the true price, less likely to purchase.

In the reference price literature, confidence in reference price has been used to study consumer reactions but in different contexts to new products. 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, Urbany *et al.* (1997 p. 46) make reference 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 confidence or belief strength is an important component of reference price models and mediates the reference price effect.

Reference price confidence has been treated in the literature more explicitly with regard to merchant supplied External Reference Prices (Biswas and Blair, 1991; Biswas and Sherell, 1993; Yadav and Seiders, 1998). In particular, most of these studies empirically test how consumers revise their internal reference price standards based upon ERP claims, finding that consumers are more likely to rely on ERP claims when they are less highly confident in their internal price standards, or have lower knowledge.

However, 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. 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. 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.**

## **Method and instrument development**

### **The experimental method in reference price research**

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. A further benefit of this design is direct measurement of constructs, as opposed to inferred measurement. For scanner data,

modeling of the reference price term would lead to a price equal to the pioneer's price. Instead, a better way to determine what consumer perceptions really are at the initial stages of market entry would be to directly ask respondents.

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".

### **Experimental design**

The experiment was designed to compare responses given by respondents for an existing category to responses given by respondents for an innovative product category. Subjects were either asked their fair price perceptions or their expected price perceptions (2 experimental groups) and were exposed to an innovative new product category or an existing product category (2 experimental groups). This forms a 2x2 experimental design which was further replicated over two product categories for external validity.

To keep subjects from focusing on the price questions in the questionnaire, and to estimate the effects of the two reference prices independently, subjects were asked *either* their fair or expected price estimates depending on which experimental group they were allocated to (but not both). Too much focus on price could considerably bias the results of the study. Thus, independently measuring the two different reference price constructs limits the demand artifacts of carryover effects (Janiszewski and Lichtenstein, 1999). Though the experimental method offers a number of advantages over other research designs, a number of other challenges must be overcome to realistically construct the instrument.

## **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 functions and attributes.

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 numerous other experimental studies in consumer behavior (see Carpenter and Nakamoto, 1989; Kardes *et al.*, 1993; Moreau, Markman and Lehmann, 2001; Ozanne, Brucks and Grewal, 1992).

### *Stimulus design and the concept statements*

To minimize potential confounds product categories for testing were selected and had to satisfy certain criteria including:

- 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 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.

One challenge that emerged in selecting new products to test was finding a new product category that was sufficiently similar to an existing product category in all aspects, other than the innovative benefit being provided.

After brainstorming many possibilities of product categories and possible innovations within them, the final two product categories, which to us best satisfied the above criteria,

were a new sunscreen – Super Sunscreen – and a new set of earphones – Sonicphones XD-37. Novel brand names were chosen to control for familiarity and prior knowledge (Kardes *et al.*, 1993). The products representing the existing manipulations were designed from products which currently exist in the market. The products representing the innovative manipulations had the same attributes as the existing manipulations but differed on one attribute. For the innovative sunscreen this attribute was 8-hour protection versus standard 4-hour protecting sunscreens. For the innovative earphones this attribute was a wireless connection using Bluetooth technology versus standard earphones which are connected with wires. These attributes were further tested as a manipulation check.

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 these specific products within the selected categories had to be different enough to be perceived as *innovative* versus *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 by 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.

Through several pilot studies and in-depth interviews with respondents, the concept statements for Super Sunscreen and Sonicphones XD-37 were drafted. To minimize confounds, they only differed in the following ways: 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.

Following Niedrich, Sharma and Wedell (2001), the prices of the existing products were selected to be representative of marketplace prices, having surveyed several pharmacies and electronic shops in the local area. The modal price was \$15.95 (per 250ml) for the existing sunscreen and \$49.95 for the existing earphones. 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. Thus, the price charged for the innovative sunscreen was \$28.95 and the price charged for the innovative earphones was \$109.95, rounded for consistent price endings (Stiving and Winer, 1997; Thomas and Morwitz, 2005).

#### *Measurement*

Measures of transaction and AV were adapted from Urbany *et al.* (1997) and Bearden *et al.* (1992). The measures for TV were three seven point scales with bipolar adjectives (low-high, inexpensive-expensive, underpriced-overpriced) following the statement "Compared to what I expect [brand name] would normally sell for, the advertised price of [brand name] is.....". The measures for AV were three seven point scales measuring consumer value perceptions illustrated by, "Overall, the price of [brand name] is....." anchored by very poor value for money and very good value for money.

Measures for behavioral intentions were also taken from past research (Bearden *et al.*, 1992; Urbany *et al.*, 1997) and refined for testing. The initial scales from these studies were used but, as the Cronbach's Alpha for these items was so high during pretesting (i.e. 0.972), this would confirm some of the qualitative comments made by subjects that the scales were repetitive. Therefore, in the interests of parsimony and creating a shorter questionnaire with no apparent loss of accuracy, three of the initial four items were deleted (Rossiter, 2002), leaving the following statement "Please indicate how likely or how certain you would be to purchase this product" anchored by very unlikely to very likely.

Measures of expected price, fair price and highest price were open ended questions asking respondents "What is your best estimate of a fair price for this product?", "What do you expect to pay for this product?" and "What would be the highest price you would be willing to pay for this product?".

The scale for confidence in reference/highest price was a single item seven point numerical scale asking respondents how confident they were in the price estimates they gave, anchored by not at all confident to very confident (Vaidyanathan *et al.*, 2000).

For the manipulation check, innovativeness was measured using a 7-point single item scale, adapted from Olshavsky and Spreng (1996) asking "How innovative is [brand]" anchored by 1 (minor variation of an existing product) and 7 (completely new product).

For the product category knowledge covariate, the multi-item scales used by Cowley and Mitchell (2003) were used. Respondents were asked how much knowledge they had about the category and how familiar they were with it. These scales were anchored by 1 (not very knowledgeable/familiar) and 7 (very knowledgeable/familiar).

### **Sampling**

The experiment was promoted in undergraduate and postgraduate marketing classes at a metropolitan university. Participation was voluntary but encouraged with incentives. The

student sample 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 first testing causal relationships it is the effect of a certain manipulation which is of interest to researchers, not so much the generalizability of the effect (Kardes, 1996). Further, studies using similar procedures and with similar objectives often use a student sample (see Carpenter and Nakamoto, 1989; Grewal, Monroe and Krishnan, 1998; Kardes *et al.*, 1993). The final sample size totaled 276 and was allocated evenly across treatments.

### **Stimulus administration**

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 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. Finally, some basic demographic questions were asked.

Respondents were unaware that this was an experiment and it was promoted as a survey. A broad explanation for the purpose (i.e. to study product perceptions) was provided, but the specific purpose was not made known to them to reduce demand artifacts.

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 at their own



pace suggesting more accurate answers. In addition, using the ‘Full Window’ Java Script code, subjects were unable to move back and forth in the experiment. After clicking the ‘Next’ button on the introductory web page Java Script code was activated that randomly assigned each participant to one of the treatments.

## **Analysis**

### **Reliability and validity**

For the multi-item scales (i.e. TV, AV and product category knowledge) all Cronbach’s Alpha values were above 0.85 providing evidence of internal consistency. For the TV and AV scales exploratory factor analysis was performed producing two empirically distinct factors in the way hypothesized.

### **Manipulation checks for innovativeness**

Mean innovativeness for the existing earphones was 3.35, and for the innovative earphones was 4.96. Mean innovativeness for the existing sunscreens was 2.94, and for the innovative sunscreen was 4.50. Independent samples t-tests indicated that these differences were statistically significant (earphones:  $t_{151}=-6.683$ ,  $p=0.000$ ; sunscreen:  $t_{159}=-6.382$ ,  $p=0.000$ ), confirming differences in perceived innovativeness between the treatments.

### **Hypotheses 1a and 1b – Determining the best measure of reference price**

To analyze  $H_{1a}$  and  $H_{1b}$ , correlation coefficients were calculated for each measure of reference price with the scaled TV measure for each of the experimental conditions (Bearden *et al.*, 1992). Given the model predicts TV is a direct function of reference price, then the reference price measure which correlates most highly with the scaled measure of TV will be the better measure of reference price. The final correlation coefficients are presented in Table I, with the significance value from comparing the coefficients directly beneath the pair of coefficients under comparison.

**TAKE IN TABLE I HERE**

For H<sub>1a</sub> the assertion that fair price is a better predictor of TV than expected price 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.  $\text{corr}_{\text{fair.}} = 0.806$ ;  $\text{corr}_{\text{exp.}} = 0.550$ ) and the sunscreens (i.e.  $\text{corr}_{\text{fair.}} = 0.829$ ;  $\text{corr}_{\text{exp.}} = 0.322$ ) and these differences are statistically significant using Fisher's Z-transformation (Cohen and Cohen, 1983 p. 53).

An alternative explanation for the results in H<sub>1a</sub> could be that fair price is a better predictor of TV, regardless of whether the product is innovative or existing. Thus H<sub>1b</sub> extended H<sub>1a</sub> 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.  $\text{corr}_{\text{fair.}} = 0.573$ ;  $\text{corr}_{\text{exp.}} = 0.821$ ), 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<sub>1b</sub> for the sunscreen data but no statistically significant support for the earphones data.

### **Hypothesis 2 – The effect of reference price confidence**

H<sub>2</sub> was analyzed by calculating correlation coefficients for the reference price terms and the scaled measures of TV and AV and comparing these to the correlation coefficients calculated using reference price belief strength as an interaction term. Of the coefficients calculated, 28 of the 32 were statistically significant. These correlation coefficients are compared in Figure 1 for the existing category.

#### **TAKE IN FIGURE 1 HERE**

Figure 1 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<sup>3</sup>. The first four groups are for the earphones data and the final four groups are for the sunscreen data. A visual comparison of the coefficients suggests they are relatively similar. There does not appear to be any difference in predictive power by adding the confidence term to the equation for the existing products. This is what we would expect because these correlations are for the *existing* product categories. The difference between correlations was statistically compared, using Fisher's Z-transformation, and there was no statistical difference between the coefficients. We now compare correlation coefficients for the innovative product categories in

Figure 2.

#### **TAKE IN FIGURE 2 HERE**

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. Again, the difference between correlations was statistically compared using Fisher's Z-transformation but the results were inconsistent. Three of the pairs of coefficients were statistically different, 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 H<sub>2</sub>. There is no strong evidence to show that including confidence improves or detracts from explanations of value perceptions.

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<sup>3</sup> The coefficients for TV have been given negative signs for ease of comparison.

## **Discussion and implications**

### **Measures of reference price for new product categories**

This is the *first* study to provide empirically tested theory on the use of reference price measures for a specific context, in this case for new products. H<sub>1a</sub> and H<sub>1b</sub> were confirmed for the sunscreen and the earphones data and provided 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 utilization is product category specific (Lowengart, 2002; Slonim and Garbarino, 1999; Yadav and Seiders, 1998). This is important and *stresses the need to consider contexts* as opposed a to a ‘one size fits all’ approach. It appears that consumers go through different processes when assessing value for new and existing products and understanding these better is important in influencing these value perceptions.

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 emphasizing the high cost of R&D and the benefits of the new product over the prior product generation, to promote dual entitlement (Campbell, 1999a, b; Kahneman, Knetsch and Thaler, 1986). 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 catch lines such as “we spend a lot on developing our products to benefit you”.

### **The role of confidence and reference price perceptions**

Including confidence in models of reference price effects for innovative products does not significantly *add* to the explanation of variability in value perceptions and in some cases 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), a moderately strong, statistically significant correlation between confidence and product knowledge, indicating convergent validity (i.e. earphones:  $\text{corr} = 0.481$ ; sunscreens:  $\text{corr} = 0.350$ ).

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 respondents have low confidence, as predicted by Urbany *et al.* (1997). To test this assertion the lower and upper quartiles of the confidence measures were calculated for the earphones and the sunscreens to reflect low and high confidence. The data set was segmented by confidence and the influence of TV on purchase intention was calculated with bivariate correlation coefficients. The coefficients for the high confidence respondents (earphones:  $\text{corr}=-0.598$ ,  $p=0.000$ ; sunscreens:  $\text{corr}=-0.712$ ,  $p=0.000$ ) were higher than the coefficients for the low confidence respondents (earphones:  $\text{corr}=-0.349$ ,  $p=0.029$ ; sunscreens:  $\text{corr}=-0.541$ ,  $p=0.000$ ). 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 in the model with other areas of research suggests sound measurement of the constructs.

Another explanation could be that the confidence ratings tended to be relatively constant with very 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. Yet another explanation for the results could be that confidence did not differ between the existing and innovative categories as expected. Indeed an examination of mean confidence by level of innovativeness showed that *confidence did not differ between the innovative and existing product treatments*. The means for the confidence measures were all relatively high and exhibited small differences but these were statistically insignificant. 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 the discrepant results. After all, only *perceived* confidence (i.e. self reported confidence) was measured.

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 correlated with knowledge about that category (i.e. earphones:  $\text{corr}=0.283$ ,  $p=0.000$ ; sunscreens:  $\text{corr}=0.312$ ,  $p=0.000$ ). Thus it is not confidence which moderates TV between the existing and innovative categories, but rather perceived product category knowledge – a distinct but somewhat related construct.

## **Limitations and future research**

The experimental method offers a number of advantages over research methods used in prior research, particularly in the new product context. However, due to the experimental nature of this study, it is limited by external generalizability from artificial simulation of an emerging market. Likewise, the student sample used, whilst likely to be homogenous, is not necessarily generalizable beyond this sample. As with other studies of this type these limitations mean a trade off between internal and external validity. Nonetheless, this artificial environment is useful for eliminating confounds during initial studies.

Future research could start by examining these effects in different contexts and with different samples. For instance, testing the effect of confidence on a broader sample and a broader range of products could be fruitful. Furthermore, 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, 1999b; Xia, Monroe and Cox, 2004). However, still little is understood about the underlying elements of fairness. Future research might examine ways in which marketers can communicate fairness to consumers.

## **Conclusion**

In conclusion, this study provided the first empirical test of different reference price measures for different contexts. The study found that fair price, as opposed to expected price was most likely to be evoked for new product categories and expected price, as opposed to fair price was most likely to be evoked for existing product categories. Clearly, choosing the incorrect measure of reference price obscures or weakens the reference price effect, thus studies in particular contexts should begin by first testing competing measures. This study also provides further evidence on the phenomenon of overconfidence in the consumer behavior literature.

## References

- Alba, J. W. and Hutchinson, J. W. (2000), "Knowledge calibration: What consumers know and what they think they know", *Journal of Consumer Research*, Vol. 27 No. 2, pp. 123-157.
- Bearden, W. O., Kaicker, A., Smith-de-Borrero, M. and Urbany, J. E. (1992), "Examining alternative operational measures of internal reference prices", in Sherry, John and Sternthal, Brian (Eds.), *Advances in Consumer Research*, Vol. 19, Provo, UT: Association for Consumer Research, pp. 629-635.
- Bergstein, H. and Estelami, H. (2002), "A survey of emerging technologies for pricing new-to-the-world products", Vol. 11 No. 5, pp. 303-318.
- Biswas, A. and Blair, E. A. (1991), "Contextual effects of reference prices in retail advertisements", *Journal of Marketing*, Vol. 55 No. 3, pp. 1-12.
- Biswas, A. and Sherrell, D. L. (1993), "The influence of product knowledge and brand name on internal price standards and confidence", *Psychology and Marketing*, Vol. 10 No. 1, pp. 31-46.
- Biswas, A., Wilson, E. J. and Licata, J. W. (1993), "Reference pricing studies in marketing: A synthesis of research results", *Journal of Business Research*, Vol. 27 No. 3, pp. 239-256.
- Bolton, L. E., Warlop, L. and Alba, J. W. (2003), "Consumer perceptions of price (un)fairness", *Journal of Consumer Research*, Vol. 29 No. 4, pp. 474-491.
- Campbell, M. C. (1999a), "'Why did you do that?' The important role of inferred motive in perceptions of price fairness", *Journal of Product and Brand Management*, Vol. 8 No. 2, pp. 145-152.
- Campbell, M. C. (1999b), "Perceptions of price unfairness: Antecedents and consequences", *Journal of Marketing Research*, Vol. 36, pp. 187-199.
- Carpenter, G. S. and Nakamoto, K. (1989), "Consumer preference formation and pioneering advantage", *Journal of Marketing Research*, Vol. 26 No. 2, pp. 285-99.
- Chandrashekar, R. and Jagpal, H. S. (1995), "Is there a well defined internal reference price?", Kardes, Frank R. and Suja, Mita (Eds.), *Advances in Consumer Research*, Vol. 22, Provo, UT: Association for Consumer Research, pp. 230-235.
- Chang, K., Siddarth, S. and Weinberg, C. B. (1999), "The impact of heterogeneity in purchase timing and price responsiveness on estimates of sticker shock effects", *Marketing Science*, Vol. 18 No. 2, pp. 178-192.
- Cohen, J. B. and Cohen, P. (1983), *Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences*, Hillsdale, NJ: Erlbaum.
- Cowley, E. and Mitchell, A. A. (2003), "The moderating effect of product knowledge on the learning and organization of product information", *Journal of Consumer Research*, Vol. 30 No. 3, pp. 443-454.
- Dolan, R. J. (1995), "How do you know when the price is right?", *Harvard Business Review*, Vol. 73 No. 5, pp. 174-181.
- Doob, A., Carlsmith, J. M., Freedman, J. L., Landauer, T. K. and Soleng, T. (1969), "Effect of initial selling price on subsequent sales", *Journal of Personality and Social Psychology*, Vol. 11 No. 4, pp. 345-50.
- Estelami, H. and Maxwell, S. (2003), "Introduction to special issue: The behavioral aspects of pricing", *Journal of Business Research*, Vol. 56 No. 2, pp. 353-354.
- Fishbein, M. and Ajzen, I. (1975), *Belief, Attitude, Intention and Behaviour: An Introduction to Theory and Research*, Reading, MA: Addison-Wesley.



- Garbarino, E. and Slonim, R. (2003), "Interrelationships and distinct effects of internal reference prices on perceived expensiveness", *Psychology and Marketing*, Vol. 20 No. 3, pp. 227-248.
- Gregan-Paxton, J. and Roedder-John, D. (1997), "Consumer learning by analogy: A model of internal knowledge transfer", *Journal of Consumer Research*, Vol. 24 No. 3, pp.266-284.
- Grewal, D., Monroe, K. B. and Krishnan, R. (1998), "The effects of price comparison advertising on buyers' perceptions of acquisition value, transaction value, and behavioural intentions", *Journal of Marketing*, Vol. 62 No. 2, pp. 46-59.
- Harvey, J. T. (1998), "Heuristic judgment theory", *Journal of Economic Issues*, Vol. 32 No. 1, pp. 47-64.
- Janiszewski, C. and Lichtenstein, D. R. (1999), "A range theory account of price perception", *Journal of Consumer Research*, Vol. 25 No. 4, pp. 353-368.
- Kahneman, D., Knetsch, J. L. and Thaler, R. H. (1986), "Fairness and the assumptions of economics", *The Journal of Business*, Vol. 59 No. 4, pp. 285-301.
- Kalwani, M. U. and Yim, C. K. (1992), "Consumer price and promotion expectations: An experimental study", *Journal of Marketing Research*, Vol. 29 No. 1, pp. 90-100.
- Kalyanaram, G. and Winer, R. S. (1995), "Empirical generalizations from reference price research", *Marketing Science*, Vol. 14 No. 3 Part 2, pp. G161-G169.
- Kardes, F. R. (1996), "In defense of experimental consumer psychology", *Journal of Consumer Psychology*, Vol. 5 No. 3, pp. 279-296.
- Kardes, F. R., Kalyanaram, G., Chandrashekar, M. and Dornoff, R. J. (1993), "Brand retrieval, consideration set composition, consumer choice and the pioneering advantage", *Journal of Consumer Research*, Vol. 20 No. 1, pp. 62-75.
- Lowe, B. and Alpert, F. (2002), "Reference price research: A critical review, recent developments and future directions", in Tynan A. C. *et al.* (Eds.), *Academy of Marketing Annual Conference Proceedings*, July 2-5, University of Nottingham, UK.
- Lowengart, O. (2002), "Reference price conceptualisations", *Journal of Marketing Management*, Vol. 18 No. 1-2, pp. 145-171.
- Mazumdar, T., Raj, S. P. and Sinha, I. (2005), "Reference price research: Review and propositions", *Journal of Marketing*, Vol. 69 No. 4, pp. 84-102.
- Monroe, K. B. (1973), "Buyers' subjective perceptions of price," *Journal of Marketing Research*, Vol. 10 No. 1, pp. 70-80.
- Moreau, C. P., Lehmann, D. R. and Markman, A. B. (2001), "Entrenched knowledge structures and consumer response to newproducts", *Journal of Marketing Research*, Vol. 38 No. 1, pp. 14-29.
- Moreau, C. P., Markman, A. B. and Lehmann, D. R. (2001), "What is it" Categorization flexibility and consumers' responses to really new products", *Journal of Consumer Research*, Vol. 27 No. 4, pp. 489-498.
- Nagle, T. T. and Holden, R. K. (2002), *The Strategy and Tactics of Pricing: A Guide to Making Profitable Decisions*, 3<sup>rd</sup> Edition, Upper Saddle River, NJ: Prentice Hall.
- Olshavsky, R. W. and Spreng, R. A. (1996), "An exploratory study of the innovation evaluation process", *Journal of Product and Innovation Management*, Vol. 13 No. 6, pp. 512-529.
- Ozanne, J. L., Brucks, M. and Grewal, D. (1992), "A study of information search behavior during the categorization of new products", *Journal of Consumer Research*, Vol. 18 No. 4, pp. 452-463.
- Peterson, R. A. (2001), "On the use of college students in social science research: Insights from a second order meta analysis", *Journal of Consumer Research*, Vol. 28 No. 3, pp. 450-461.

- Puto, C. P. (1987), "The framing of buying decisions", *Journal of Consumer Research*, Vol. 14 No. 3, pp. 301-315.
- Rajendran, K. N., and Tellis, G. J. (1994), "Contextual and temporal components of reference price", *Journal of Marketing*, Vol. 58 No. 4, pp. 22-35.
- Rossiter, J. R. (2002), "The C-OAR-SE procedure for scale development in marketing", *International Journal of Research in Marketing*, Vol. 19 No. 4, pp. 305-335.
- Slonim, R., Garbarino, E. (1999), "The effect of price history on demand as mediated by perceived price expensiveness", *Journal of Business Research*, Vol. 45 No. 1, pp. 1-14.
- Smith, R. E. and Swinyard, W. R. (1983), "Attitude-behavior consistency: The impact of product trial versus advertising", *Journal of Marketing Research*, Vol. 20 No. 3, pp. 257-267.
- Stiving, M. and Winer, R. S. (1997), "An empirical analysis of price endings with scanner data", *Journal of Consumer Research*, Vol. 24 No. 1, pp. 57-67.
- Thaler, R. (1985), "Mental accounting and consumer choice", *Marketing Science*, Vol. 4 No. 3, pp. 199-214.
- Thomas, M. and Morwitz, V. (2005), "Penny wise and pound foolish: The left digit effect in price cognition", *Journal of Consumer Research*, Vol. 32 No. 1, pp.54-64.
- Tversky, A. and Kahneman, D. (1974), "Judgment under uncertainty: Heuristics and biases", *Science*, Vol. 185, pp. 1124-1131.
- Urbany, J. E., Bearden, W. O., Kaicker, A. and Smith-de-Borrero, M. (1997), "Transaction utility effects when quality is uncertain", *Journal of the Academy of Marketing Science*, Vol. 25 No. 1, pp. 45-55.
- Vaidyanathan, R., Aggarwal, P., Stern, D. E. Jr., Muehling, D. and Umesh, U. N. (2000), "Deal evaluation and purchase intention: The impact of aspirational and market based internal reference prices", *Journal of Product and Brand Management*, Vol. 9 No. 3, pp. 179-192.
- Vaidyanathan, R. and Aggarwal, P. (2003), "Who is the fairest of them all? An attributional approach to price fairness perceptions", *Journal of Business Research*, Vol. 56 No. 6, pp. 453-463.
- Winer, R. S. (1986), "A reference price model of brand choice for frequently purchased products", *Journal of Consumer Research*, Vol. 13 No. 2, pp. 250-256.
- Xia, L., Monroe, K. B. and Cox, J. L. (2004), "The price is unfair! A conceptual framework of price fairness perceptions", *Journal of Marketing*, Vol. 68 No. 4, pp. 1-15.
- Yadav, M. S. and Seiders, K. (1998), "Is the price right? Understanding contingent processing in reference price formation", *Journal of Retailing*, Vol. 74 No. 3, pp. 311-329.

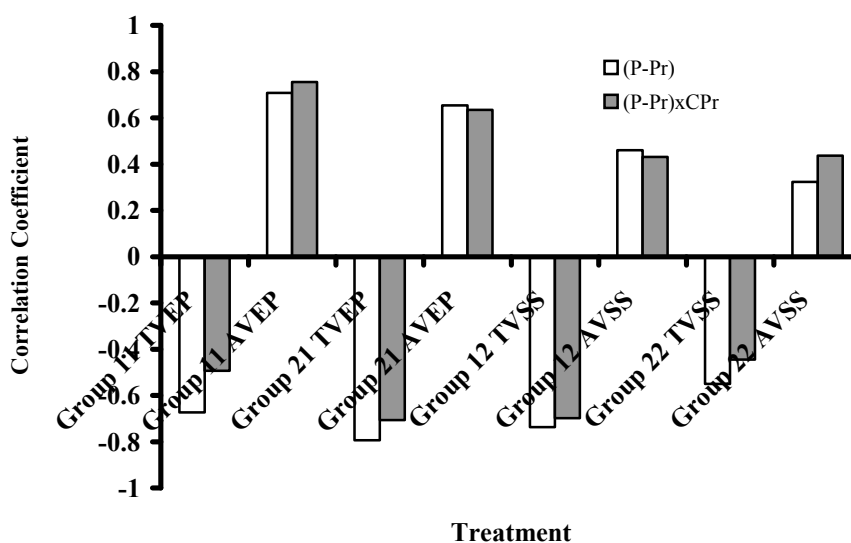
**Table I: Differences in Correlation Coefficients by Treatment**

	Earphones		Sunscreen	
	Fair	Expected	Fair	Expected
<b>Existing</b>	0.674** n=27	0.737** n=39	0.573** n=34	0.821** n=37
<b>Sig.</b>	<b>0.653</b>		<b>0.0408</b>	
<b>Innovative</b>	0.806** n=33	0.550** n=38	0.829** n=26	0.322* n=39
<b>Sig.</b>	<b>0.045</b>		<b>0.0014</b>	

\* Significant at the 5% level

\*\* Significant at the 1% level

**Figure 1: Comparing Correlation Coefficients for the Existing Product Categories**



**Figure 2: Comparing Correlation Coefficients for the Innovative Product Categories**

