4 Behavioral pricing

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Abstract

The focus is on 'behavioral aspects of pricing', or price effects that cannot be accounted for by the intrinsic price itself. After presenting a broad conceptual framework, I concentrate on two distinct streams of research. The first is composed of laboratory experiments examining the impact of price presentation (e.g. externally provided reference price, whether a deal is presented in absolute dollars off or in percentage off the original price) on perceived price savings. The second stream uses secondary data on consumer purchases (scanner data) and focuses on the effects of internal reference prices, reference prices that are created by consumers themselves, on consumer purchase behavior.

Introduction

Victoria's Secret frequently advertises 'Buy two, get one free'. Storewide sales in Talbots, The Gap, Benetton and others are often announced by signs proclaiming '20–50% off' or 'Up to 70% off'. Are price cuts presented in different ways perceived differently by consumers? If the consumer rationally computes his (her) savings, mental effort could be reduced by simply stating the dollar savings to the consumer. Yet, apparently, the presentation of the promotion has an impact on consumer deal evaluation and hence retail sales. In fact, much research in marketing attests to the effect of price presentation on deal perception (Das, 1992; Lichtenstein and Bearden, 1989; Urbany et al., 1988; Yadav and Monroe, 1993). Non-rational (in the traditional sense) processing of price information is further attested to by Inman et al.'s (1990) finding that the mere presence of a sale announcement, without a reduced price, increased retail sales. Hence, an understanding of price presentation effects is insightful for retailers as well as for brand managers.

In similar vein, if a consumer is fortunate in frequenting a store multiple times when a particular brand is on sale, and then visits the store when it is not on sale, will she be less likely to purchase it – i.e. will the fact that she has purchased the product at a lower price in the past reduce her probability of buying it at regular price in the future? What if she has bought it at regular price for many shopping trips, and now finds it on sale? Will her probability of purchasing the brand increase by the same extent as it would decrease in the previous scenario? Comprehension of internal reference price effects – reference prices that are created by consumers themselves – is important when deciding on price changes over time.

In this chapter, we focus on 'behavioral aspects of pricing' or price effects that cannot be accounted for by the intrinsic price itself. After presenting a broad conceptual framework, we concentrate on two distinct streams of research, price presentation effects and internal reference price effects, that have just been illustrated. The first typically uses laboratory experiments, whereas the second uses secondary data on consumer purchases (scanner data). For price presentation effects, we report results from a meta-analysis (Krishna et al., 2002) where results from past literature are examined to determine the relative importance of different presentation effects (Section 2). For internal reference

price effects, we provide a summary of the papers that have been contributed in that area (Section 3). We begin with the framework.

1. Conceptual framework

While much research in marketing and economics has focused on the effect of intrinsic price, only in the last three decades has research focused on behavioral aspects of pricing. However, the latter can be just as significant for consumer choice. We identify a few of the behavioral aspects of special relevance to marketing researchers. By no means is this meant to be an exhaustive review of the literature. Figure 4.1 illustrates our conceptual framework.

The final dependent variables in our conceptual framework are consumer choice among brands, purchase quantity and purchase timing. Two other intermediary dependent variables are identified – subjective price and price fairness. Subjective price is assumed to be affected by many factors, as can be seen in Figure 4.1. Price fairness has also been attributed with many antecedents. We talk about each in turn.

Subjective price

We elaborate in detail on price presentation effects (through a published meta-analysis) and on internal reference price effects in Sections 2 and 3. However, two other price presentation effects not included in the meta-analysis are worthy of mention – these are the effects of (i) '99 cent endings and (ii) temporal pricing and partitioned prices.

99 cent endings Schindler and Kirby (1997) made an analysis of the rightmost digits of selling prices in retail advertisements and found an overrepresentation of 0, 5 and 9. Using the same historical data, they show that this practice cannot be explained by consumers perceiving 9-endings as a round-number price with a small amount given back; instead, it is better explained by underestimation of 9-ending prices with left-to-right processing. Stiving and Winer (1997) provide further proof for the additional utility of 9-endings. Using scanner panel data, they show that 9-ending prices do indeed have additional utility for consumers and that predictive models need to account for this effect for more accuracy.

Temporal pricing and partitioned prices Another area of behavioral pricing research where many puzzles remain unresolved is that of partitioned pricing and temporal pricing. Gourville (1998) shows in his paper that pennies-a-day pricing is a better appeal to consumers for charitable donations than a larger amount paid per month. Similarly, Morwitz et al. (1998) show that separating the total price of a product into the base price and shipping charge is better than presenting it as one combined price. In both the temporal-price-framing case (Gourville, 1998) and the partitioned pricing case, consumers are being asked to pay a larger number of smaller dollar amounts, and this is found to be better valued by consumers. These cases go against Thaler's (1985) segregate losses rule. One explanation may be that very tiny amounts are ignored by consumers – in the pennies-a-day case, all payments are deemed trivial, and in the partitioned pricing case, the shipping charge is small in comparison with the base price and is ignored. Thus, Thaler's arguments do not extend to these cases. Such a hypothesis nevertheless needs further research.

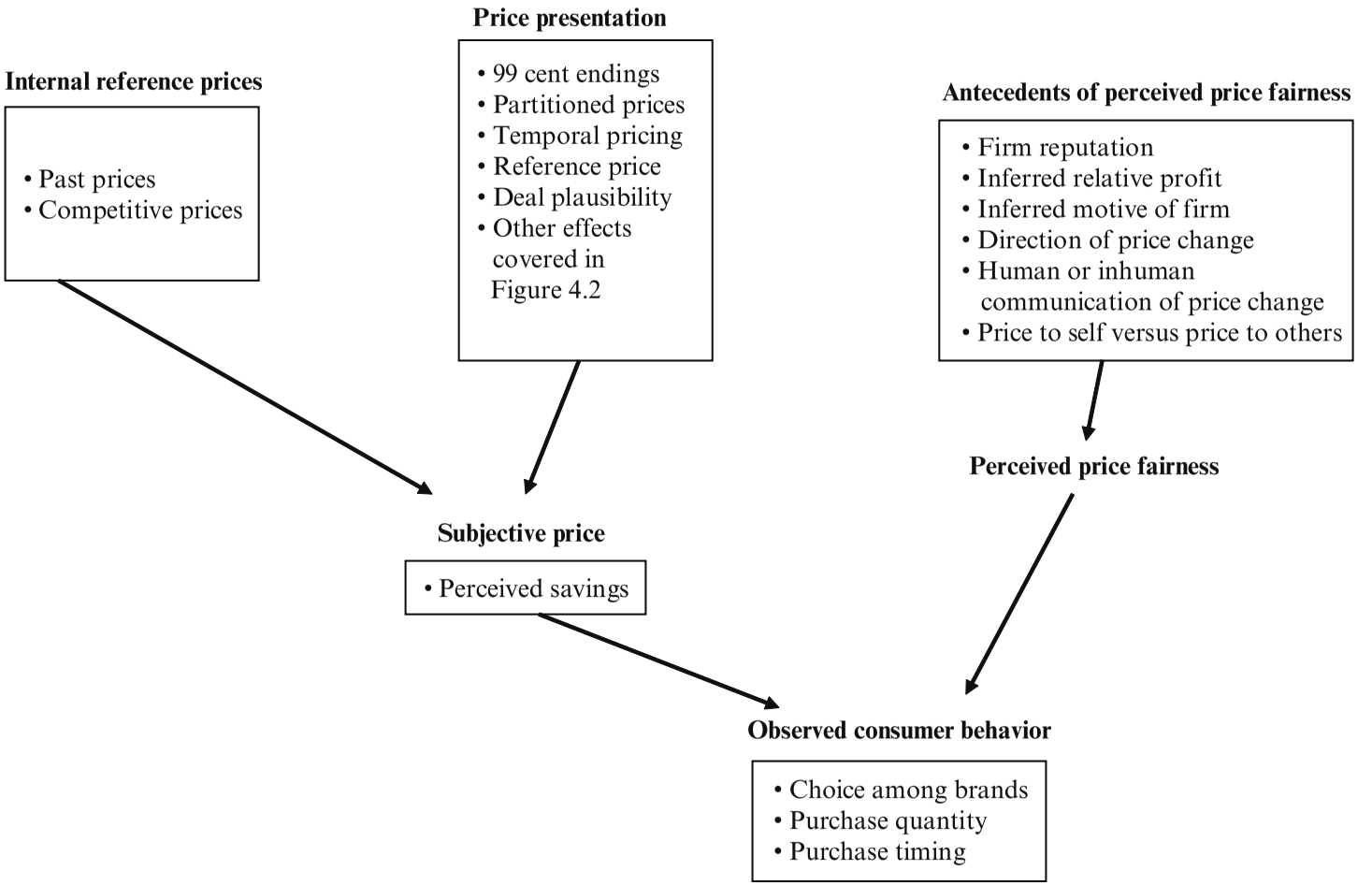


Figure 4.1 Conceptual framework

Price fairness

Campbell (1999) provides a rigorous structure for the antecedents and consequences of perceived price fairness. She sets up a scenario where a firm intends to sell a doll by auction just before Christmas because of its rarity. The auction implies a sudden price change (i.e. price increase) compared to the doll's normal market price. Campbell shows in this context that the auction is perceived as more unfair when the firm actually makes more profit than it normally does. Furthermore, when consumers impute a negative motive to the firm (e.g. the firm is making extra profit), the auction is perceived as significantly less fair than the same auction when the firm's motive is seen as positive (e.g. the money is going to a charity). Furthermore, firms with good reputations are more likely to be given the benefit of the doubt by consumers about their motive. More recently, Campbell (2007) further studies the antecedents of price (un)fairness by incorporating the effects of the source of price information and affect on consumers' perceived price (un) fairness. The research shows that whether the price change (increase or decrease) is communicated by human or nonhuman means (e.g. price tag) moderates consumers' fairness perception. This is because the imputed motive of the marketer and affect elicited by such price information both mediate the effect of the price change.

Other authors have studied the effects of perceived price unfairness arising from targeted pricing whereby firms offer different prices to different consumers. Krishna and Wang (2007) demonstrate experimentally that consumers will leave money rather than interact with firms that are perceived to engage in targeted pricing that is believed to be unfair. Feinberg et al. (2002) show that, in this context, the competitive equilibrium will not necessarily be one where firms offer lower prices to new customers to attract them, but can be one where firms offer lower prices to old customers to retain them. Krishna et al. (2007) find a similar result in the context of increasing prices where a constant price is perceived as a deal. Most competitive models in marketing are based on the assumption that consumers are rational utility-maximizers who are motivated only by 'self-regarding preferences'. That is, they care only about their own payoffs. In the papers incorporating fairness, it is shown that consumer behavior may also be affected by 'social preferences'.

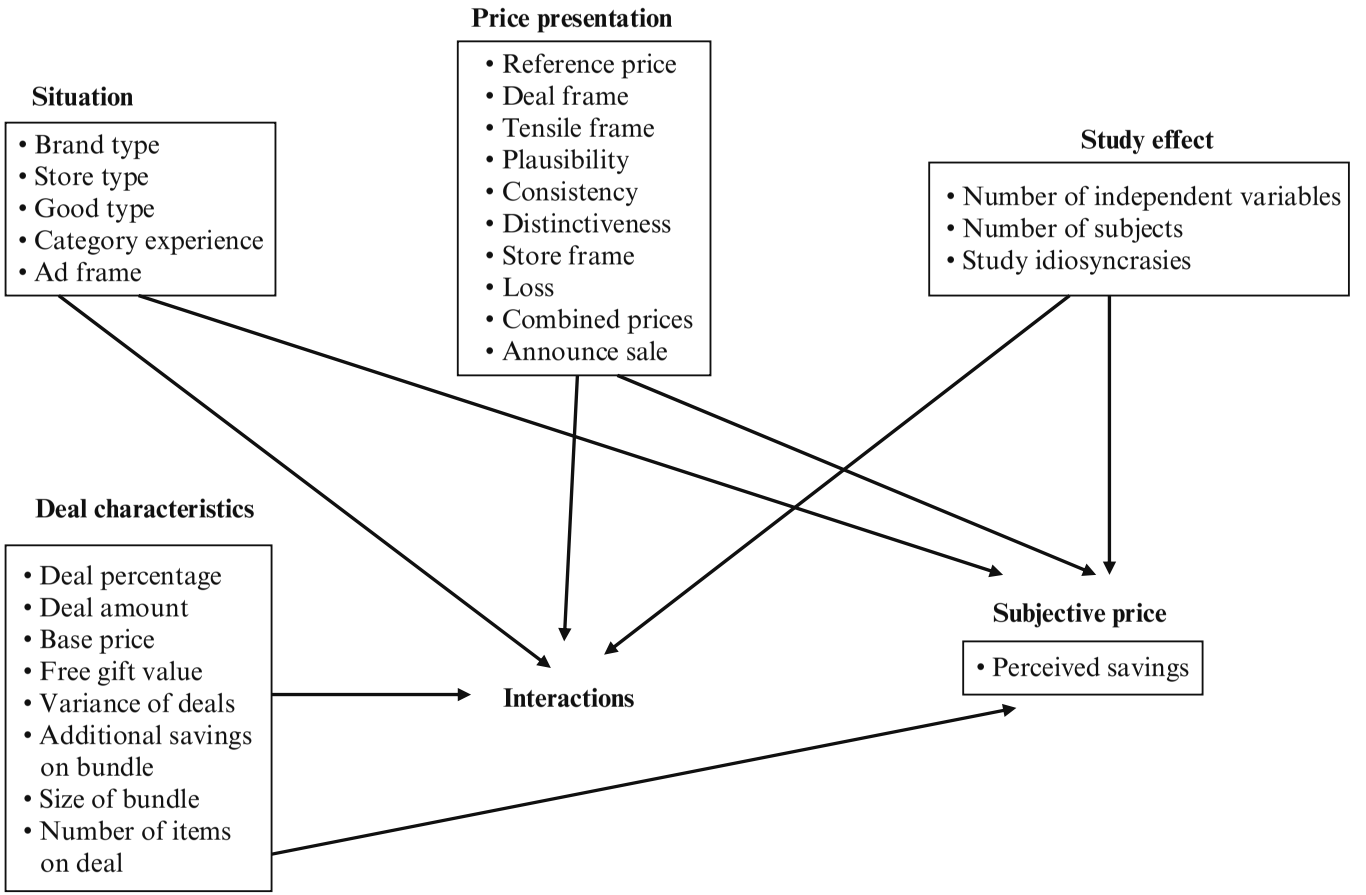
We now discuss the meta-analysis of price presentation effects.

2. Meta-analysis of price presentation effects[1]

Krishna et al. (2002) offer a fairly broad meta-analysis of price presentation effects. Their coverage of effects is shown in Figure 4.2. It can be seen that they examined the impact of four broad categories of price presentation factors on consumers' perceived price savings from purchasing on price promotions (see Zeithaml, 1982; Dickson and Sawyer, 1990).

The first set of factors is situational. These factors encompass the overall situation for the price promotion, e.g., is the evaluation for a national brand or a private label brand, is it within a discount store or a specialty store, are consumers comparing prices within or between stores, and/or is this kind of promotion distinct (versus competition) and/or consistent (over time) or not? The second set of factors, presentation effects, addresses whether it matters how the promotions are communicated, and are some ways of doing

[1] This part of the chapter is based upon Krishna et al. (2002).



Note: See Table 4.1 for a discussion of the variables.

Figure 4.2 Variables in meta-analysis done by Krishna et al. (2002)

so better than others? For instance, is a tensile claim of 'save up to 70%' better than a claim of 'save 40%'? The third set of factors is the deal characteristics, e.g. how much of a discount is offered to the consumers. The final set of factors relates to the specific studies used in this research and attempts to control for any idiosyncratic effects from a study.

The conceptual model in Figure 4.2 posits that the above four factors may also interact in their effect on the perceived savings. For instance, the type of brand (national or local) may interact with the size of the deal to influence consumers' perceptions of the savings. According to Zeithaml's (1982) conceptual schema, the consumer acquires and encodes the 'objective price' (stimulus) to form the 'subjective price'. In Figure 4.1, the objective price is represented by the 'deal characteristics' and the 'subjective price' by 'perceived savings'. For the meta-analysis, 'perceived savings' was the dependent variable, and 'deal characteristics, situation, price presentation' and 'study effect' were the independent variables.

Data, models and results

Krishna et al. (2002) use published literature where 'perceived savings' was the dependent variable. Further, they required that deal evaluation be actually measured as opposed to inferred. Hence the focus is on experimental and not on scanner-based research (these are considered in Section 3). The ABI Inform and Psychlit indices from 1980 until 1999 were used to search for articles. In addition, they searched through *Journal of Marketing*, *Journal of Marketing Research* and *Journal of Consumer Research*, *American Marketing Association* proceedings and *Association of Consumer Research* proceedings that had been published before December 1999. Twenty articles passed their screening criteria (see Table 4.2). If an author conducted a 2 X 2 experiment, they treat this as four observations. Across all 20 articles, they have 345 observations, i.e. data points.

Across the articles, authors used different measures of 'perceived savings'. To make the different scales comparable, Krishna et al. transformed them to a percentage. Definitions of independent variables and the values of categorical independent variables appear in Table 4.1. The categorical independent variables are coded using dummy variables.

We elaborate on one typical study included in the meta-analysis. Berkowitz and Walton (1980), for instance, asked subjects to evaluate three newspaper advertisements taken from local papers. Subjects were assigned to one of four semantic (price presentation) cues – 'compare at $1.25, now $1.00', 'regular $1.25, sale $1.00', 'total value $1.25, sale $1.00', '20% off, now only $1.00'. Subjects then rated the item in the advertisement on various seven-point scales, e.g. perceived savings, willingness to buy.

Krishna et al. (2002) estimated various models on the data, e.g. a main effects model with all (45) main effects of the design variables plus the study average of 'perceived savings' (to account for idiosyncrasies of each study), and a model with all main effects plus significant interactions. At the aggregate level, all models explained more than 70 percent of the variance. Here we present the major findings from their analysis (detailed results can be obtained from their paper). Table 4.2 summarizes these findings.

- The most important factors influencing consumers' perception of the deal are the deal characteristics and price presentation effects – factors that the manager has the most control over.

Table 4.1 Independent variables

Independent variables and variable levels[a]	Definition	Articles with variance across independent variables[b]
DEAL CHARACTERISTICS		
% of deal[c]		Most studies
Amount of deal		Most studies
Additional savings on bundle		Low and Lichtenstein (1993); Yadav and Monroe (1993); Das (1992)
Base price of item		Between-article variation[d]
No. of items on deal/ no. of deals observed	Number of observations provided to subjects	Between-article variation
Size of the bundle	Number of items in the bundle presented to the subjects	Low and Lichtenstein (1993); Buyukkurt (1986)
Variance of deals	How deal amount varies over time/ uncertainty in deal price	Buyukkurt (1986)
High		
None/low		
Free gift value		
Low	• Value of free gift is small relative to base price of product	Low and Lichtenstein (1993)
High or none	• High if there is a free gift and none if there is no free gift	
SITUATION VARIABLES		
Brand type		
Fictitious		Blair and Landon (1981)
Generic		Dodds et al. (1991)
National		Berkowitz and Walton (1980)
Private		Bearden et al. (1984)
None specified		
Store type		
Department		Dodds et al. (1991)
Discount		Berkowitz and Walton (1980)
Specialty		Buyukkurt (1986)
Supermarket		
None specified		
Type of good		
Packaged		Berkowitz and Walton (1980)
Other	• Durable or soft good	Das (1992)
Category experience		
High	High versus low consumer knowledge/experience with the category	Some between-article variation
Low		
Not specified		

Table 4.1 (continued)

Independent variables and variable levels[a]	Definition	Articles with variance across independent variables[b]
Ad frame		
Advertisement	Catalogue format versus advertisement format versus shopping simulation	Blair and Landon (1981) Grewal et al. (1996) (lots of between-study variance)
Catalogue		
Shopping		
PRICE PRESENTATION VARIABLES		
External reference price		
Manufacture suggested price (MSP)		Blair and Landon (1981); Urbany et al. 1988)
Regular price		Burton et al. (1993); Das (1992)
None		Bearden et al. (1984); Berkowitz and Walton (1980) Della Bitta et al. (1981)
Objective (non-tensile) deal frame		
Coupon	• Deal given as a coupon	Berkowitz andWalton (1980); Della Bitta et al. (1981)
Dollar	• e.g. $__ off	Biswas and Burton (1993, 1994); Burton et al. (1993)
Free gift	• e.g. a free premium	Low and Lichtenstein (1993); Das (1992)
%	• e.g. __% off	Bearden et al. (1984); Chen et al. (1998)
X-For	• e.g. 2 for the price of 1	
None (final price given)		
Tensile deal frame		
Maximum	• Save up to __	Biswas and Burton (1993, 1994)
Minimum	• Save __ and more	Mobley et al. (1988)
Range	• Save __ to __	
Non-tensile (objective) deal frame	• No tensile deal frame	
Plausibility		
Implausible		Lichtenstein and Bearden (1989); Urbany et al. (1988)
Plausible – small		Grewal et al. (1996); Suter and Burton (1996)
Plausible – large		Dodds et al. (1991); Berkowitz and Walton (1980)
Plausible		Low and Lichtenstein (1993); Lichtenstein et al. (1991)

Table 4.1 (continued)

Independent variables and variable levels[a]	Definition	Articles with variance across independent variables[b]
Store frame		
Between stores	• e.g. our price, compare with _ at __	Urbany et al. (1988); Grewal et al. (1996)
Within store	• e.g. regular price __, sale price __	Berkowitz and Walton (1980); Burton et al. (1993)
Both		Lichtenstein et al. (1991)
Consistency		
High	• Of deals over time	Lichtenstein and Bearden (1989)
Low	Three articles specifically discuss manipulating 'consistency'. Lichtenstein and Bearden (1989) manipulate high and low consistency through high and low deal frequency. Burton et al. (1993) and Lichtenstein et al. (1991) depict high consistency by using a within-store frame (was $__, now only $__)	Burton et al. (1993) Lichtenstein et al. (1991)
Neither (not applicable)		
Distinctiveness		
High	• Of deal versus other brands	Lichtenstein and Bearden (1989)
Low	Three articles specifically discuss manipulating 'distinctiveness'. Of these three, Burton et al. (1993) and Lichtenstein et al. (1991) manipulate high distinctiveness through a between-store frame (seen elsewhere for $__, our price $__)	Burton et al. (1993) Lichtenstein et al. (1991)
Neither (not applicable)		
Sale announced?		
Yes	• Offered price is termed a sale	Yadav and Monroe (1993)
No	• Offered price does not state that it is a sale	Burton et al. (1993)
Free gift value		
Low	• Value of free gift is small relative to base price of product	Low and Lichtenstein (1993)
High or none	• High if there is a free gift and none if there is no free gift	
Bundle frame		
Loss		Kaicker et al. (1995)

Table 4.1 (continued)

Independent variables and variable levels[a]	Definition	Articles with variance across independent variables[b]
Mixed (gain and loss)		
Gain		
Combined prices?		
Yes	Single price for bundle	Kaicker et al. (1995);
No	Each item has its own price	Some between-study variation
STUDY EFFECT		
Number of variables manipulated		Between-article variation only
Number of subjects in cell		Within- and between-article variation
Study average		Between-article variation only
Multiple scales for DV		
Yes	• DV is measured as a sum of multiple-scale items	Between-article variation only
No	• DV is measured as a single-scale item	

Notes:
[a] Default level is given in italics.
[b] Some independent variables had variation across articles and some had variation both across and within articles.
[c] Variable is continuous.
[d] Variation in the independent variable occurred across articles, not within the same article.
[e] Variance of deals is coded with dummy variables with none/low as the base case.

- Within deal characteristics, the most important factors are the additional savings on a bundle and the deal percentage. However, as the size of the bundle increases, consumers perceive the deal less favorably. Thus small bundles with high percentage discounts are most significant for consumers.
- Within price presentation effects, Krishna et al. (2002) found several interesting interactions. First, the plausibility of the deal (or size of the deal) interacts with whether or not regular price is given. 'Implausibility' of a deal makes it less attractive. However, a large deal amount more than compensates for its lower plausibility, so that larger deals are evaluated more favorably than smaller deals. A second interesting interaction is that within-store frames (e.g. regular price $1.99, sale price $1.59) are more effective when the consumer is shopping, but between-store frames (e.g. our price $1.59, compare with $1.59 at Krogers) are more effective when communicating with consumers at home.
- Within situational effects, the most important factors are brand (both store and item). Deals on national brands are evaluated more favorably than those on private brands and generics; and consumers value deals less in stores that have higher deal frequency (discount stores) compared to stores perceived to have lower deal frequency (e.g. specialty stores).

Table 4.2 Important findings from the meta-analysis

Variables studied	Effect on dependent variables
Deal characteristics	
Amount of deal, % of deal	Both positively influence perceived saving
Variance of deals	High deal variances lead to lower perceived savings
Situational effects	
Brand type: national brands versus private brands and generics	Deals on national brands yield higher perceived savings
Type of good: packaged goods versus other (durable, soft) goods	Deals on packaged goods yield higher perceived savings
Store type: discount store versus department and specialty stores	Deals in discount stores lead to lower perceived savings
Price presentation effects	
External reference price: regular price	Presence of regular price increases perceived savings
Minimum tensile claim versus non-tensile claim	Minimum tensile claims yield lower perceived savings
Plausibility: small and plausible deals versus large but plausible deals and implausible deals	Small and plausible deals yield higher perceived savings
Consistency	Less consistent deals yield higher perceived savings
Distinctiveness	More distinctive deals yield higher perceived savings
Interactions[a]	
Regular price and deal percentage	Presenting a regular price as an external reference price reduces perceived saving when the deal percentage is extremely large
Regular price and plausibility	The presence of a regular price enhances the perceived savings of large but plausible deals and implausible deals but not small plausible deals
MSP and brand type	Presenting MSP increases perceived savings more for national brands than for other brands
Brand type and plausibility	Large but plausible deal on a national brand results in higher perceived savings as opposed to a large plausible deal on other brands
Deal percentage and store type	Large deals in department store yield higher perceived savings than those in discount, specialty stores, or supermarkets

Note: [a] The effects of interactions are explained considering the interaction effect and both the main effects.

The meta-analysis shows that many price features, other than the intrinsic price, significantly influence perceived savings and hence should be taken into account by managers in structuring deals. Another synthesis of reference pricing research has been done by Biswas et al. (1993). In addition to a narrative review, their article presents a meta-analysis based on 113 observations from 12 studies. A major difference between this earlier study and Krishna et al.'s (2002) is that the former study concentrates on statistical significance and variance explained, whereas the latter focuses on the magnitude of the effects. Second, the former study analyzes one variable at a time, whereas the latter analyzes data in a multivariate fashion. A second important reference is an integrative review of comparative advertising studies done by Compeau and Grewal (1998). This review builds upon the meta-analysis done by Biswas et al. (1993) and has 38 studies. This analysis also focuses on statistical significance and variance explained, and does so one variable at a time.

We now turn to a discussion of 'scanner data'-based research that incorporates consumers' internal reference prices.

3. Prediction models incorporating consumer reference prices

As will be clear from this *Handbook*, much research in marketing has focused on predicting consumer choice. These models typically do not use experimental data (and, as such, do not fall within the purview of our meta-analysis), but use scanner data, secondary data on consumer purchases over time. Starting with Winer's (1986) work, some choice models have tried to incorporate the notion of an 'internal reference price' – we call this body of research 'reference price effects in choice models'. Internal reference prices are constructed by consumers themselves and are 'an internal standard against which observed prices are compared' (Kalyanaram and Winer, 1995). They are used to gauge how 'good or fair' the observed price is. Conceptually, they can be construed as a 'fair price' or an 'expected price'. Note that the internal reference price is different from an 'external reference price' provided by the retailer; an external reference price is provided along with a (lower) price the retailer is offering and is used as a means to encourage consumers to purchase the product (or service). The external reference price can be, for example, a manufacturer-suggested retailer price, what the price was, what other retailers are charging, etc.

Operationally, internal reference prices have taken many forms, so that they can be based on current prices (e.g. current price of the last brand purchased), past prices (e.g. the brand's price on the last purchase occasion), or on past prices and other variables (such as market share of the brand). Briesch et al. (1997) offer a comparative analysis of reference price models that use different operationalizations of reference price – they find that models based on past prices do best in terms of fit and prediction.

Reference-price choice models are constructed so that, if the observed price is lower than the reference price, then choice probability increases; if the observed price is higher, then the choice probability decreases. While Winer (1986) incorporated a reference price effect, Lattin and Bucklin (1989) introduced a reference promotion effect so that there is a reference level of promotion frequency which dictates how the consumer responds to a promotion. Kalyanaram and Little (1994) estimate a latitude of acceptance around the reference price, and show that it is wider for consumers with higher average reference price, lower purchase frequency, and higher average brand loyalty.

Some researchers have taken the notion of reference prices one step further and have

built the concepts of prospect theory on top of reference price effects, since they lend themselves quite easily to such interpretation. A lower observed price versus the 'reference price' is seen as a 'gain' whereas a higher observed price is seen as a 'loss'. Further, 'gains' and 'losses' are predicted to have different effects on choice. According to prospect theory, 'losses loom larger than gains', i.e. losses have stronger effects compared to equivalent gains. This is tested within the context of brand-choice models by Kalwani et al. (1990) and Hardie et al. (1993), and both brand-choice and purchase and quantity models by Krishnamurthi et al. (1992). Different parameters are estimated for the effect of 'gains' versus 'losses' on choice. Most researchers find significant and predicted effects for gains and losses (losses have larger negative than gains have positive effects). Krishnamurthi et al. (1992) also show that sensitivity to gains and losses is a function of loyalty toward the brand for both choice and quantity models, and is also a function of household stock-outs for quantity models. Hardie et al. (1993) also introduce the notion of a reference brand, so that the current price of any brand is compared to the current price of the referent brand. While the aforementioned articles focus on empirical estimation, Putler (1992) incorporates the effects of reference price into the traditional theory of consumer choice and then tests it on egg sales data. Like other researchers, he too finds asymmetry for egg price increases versus decreases.

For more detailed and excellent summaries of research on reference price effects, the reader should consult Kalyanaram and Winer (1995) and Mazumdar et al. (2005).

4. Future research

This chapter shows that the price of a product can affect observed consumer behavior in various ways other than through the actual price. Both subjective price and price fairness affect consumer choice of product, purchase quantity and purchase timing. Subjective price is affected by price presentation and internal reference price, which are each composed of a host of factors, and also by '99 cent' endings, partitioned prices and temporal pricing. Similarly, perceived price unfairness has several antecedents.

We focus on price presentation effects and summarize a meta-analysis of 20 published articles in marketing that focus on price presentation. We also provide a summary of the effect of internal reference price (formed as a function of observing different prices over time) on consumer behavior.

In terms of predictive models, besides price presentation effects, there is much scope for incorporating other behavioral effects – internal reference price is just one single behavioral pricing aspect. Thus an important direction for future research is to see how price presentations affect 'consumer behavior' as opposed to 'consumer perceptions'. The studies in the meta-analysis were based upon laboratory experiments. Few studies have assessed the effect of different price presentations on consumer behavior (for an exception, see Dhar and Dutta, 1997). Of course, a major reason for this is lack of data. While scanner data record a host of information, price presentation is still not included in the data. Future research should try to obtain these additional data within the context of scanner data, and replicate the laboratory-experiment results in the field. Additionally, future research should incorporate other behavioral aspects, besides internal reference prices and price presentation effects, within predictive models.

While normative models have begun to incorporate the effects of perceived price fairness (e.g. Feinberg et al., 2002), predictive models have still not followed suit and this is

another area for future research. Yet another area fruitful for research is the behavioral aspects of online shopping, e.g. how shopping bots may have altered price response behaviors online as well as influenced responses in physical stores. Researchers could also further examine the lower relevance of price when the product is linked to a 'cause' (e.g. part of proceeds from the sales of the product go towards AIDS research). Arora and Henderson (2007) show that these 'embedded premiums' are in a sense a price deal not to the consumer but to the cause. This needs additional work. Besides brand choice, purchase quantity and timing, another construct to focus on is consumption and how perceived price affects it. Clearly, there is much left to study in the area of behavioral pricing.

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