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THE LONGER-TERM EFFECTS OF PRICE PROMOTIONS

**A thesis presented in partial fulfilment of the requirements
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ABSTRACT

Retail price promotions are, arguably, the most prevalent promotional tool used by marketers today. In many markets, particularly those involving fast moving consumer goods, retail price promotions account for a large (and increasing) proportion of typical marketing budgets.

Yet despite the frequency with which price promotions are used, the price promotion literature represents a relatively new research field. In particular, the *longer-term* effects of price promotions remain under-researched, despite their salience to both marketing academics and practitioners. Given the ubiquity of price promotions, and the correspondingly large expenditures that are associated with them, redressing this lack of research would appear to be of considerable importance.

The research reported in this thesis replicated and extended a study which was conducted by UK researchers in 1994. Scanner panel data, collected over a period of six months, was used to investigate the longer-term effects of price promotions on consumer behaviour, for several fmcg brands. Overall, it was found that price promotions have negligible longer-term effects on sales levels, repeat buying behaviour, the introduction of new buyers, and average purchase frequencies.

The key implication that arises from these findings is that, generally, expenditure on price promotions should be reduced. Price promotions should be employed sparingly to allow greater emphasis on elements of the marketing mix that provide more lasting returns.

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CHAPTER ONE: INTRODUCTION

Although managers of fast moving consumer goods (fmcg) frequently use sales promotions to foster their brand's performance, the term itself is ambiguous. Numerous definitions of 'sales promotion' exist within the marketing literature; several formal definitions are cited in Table 1, below.

Table 1. Definitions of sales promotion

DEFINITION	SOURCE
"Sales promotion consists of short-term incentives to encourage purchase or sales of a product or service."	Kotler and Armstrong (1989, p.480)
"Sales promotions include all short-term offers (or incentives) directed at buyers, retailers, or wholesalers and designed to achieve a specific, immediate response."	Guiltinan and Paul (1991, p.285)
"Sales promotion comprises a wide variety of short-term, tactical promotional tools designed to generate an immediate market response."	Kumar and Leone (1988, p.178)
"Sales promotion is the direct inducement or incentive to the sales force, the distributor, or the consumer, with the primary objective of creating an immediate sale."	Schultz and Robinson (1992, p.8)
"Sales promotion is an action-focused marketing event whose purpose is to have a direct impact on the behaviour of the firm's customers."	Blattberg and Neslin (1990, p.3)

It is evident from these definitions that sales promotion activities are typically used to create immediate (i.e., short-term) increases in purchase behaviour. However, in addition to producing short-term sales increases, it is widely held that sales promotions have positive effects in the longer-term. Ehrenberg, Hammond and Goodhardt (1994, p.11) summarise this view:

There is also the firm expectation that the promotional sales spikes are due to extra buyers.....with the hope that some of these might then be converted into repeat buyers.....it has remained a hope which has helped to justify companies' large promotional expenditures.

Two distinct forms of sales promotion exist: trade promotions and consumer promotions. With the exception of the present chapter, this thesis is primarily concerned with consumer promotions and, in particular, price promotions. Price promotions¹ are ubiquitous, particularly within fmcg markets (Blattberg and Neslin, 1990). Figure 1 illustrates the prevalence of price promotions: of the total consumer expenditure that is associated with consumer promotion activity, 43 percent is attributable to temporary price reductions.

Figure 1. Consumer expenditure by promotion type



Source: Nielsen (1993, Exhibit 2).

¹ "Price promotions", "temporary price reductions", "price-related consumer promotions", "price discounts" and "cents-off deals" are synonymous and are used interchangeably throughout this thesis.

1.1 INCREASING EXPENDITURE ON SALES PROMOTIONS

Sales promotion expenditure has increased dramatically in recent years (McAlister, 1986; Farris and Quelch, 1987; Kumar and Leone, 1988; Addison, 1991; Joyce, 1991; Davis, Inman and M^cAlister, 1992; Gupta, 1993) and it is generally agreed that, in most fmccg markets, expenditure on sales promotion currently exceeds expenditure on advertising (Fulgoni, 1987; Kumar and Leone, 1988; Abraham and Lodish, 1990; Blattberg and Neslin, 1990; East, 1990; Jones, 1990; Ehrenberg, Hammond and Goodhardt, 1994; Blattberg, Briesch and Fox, 1995). Abraham and Lodish (1990) and Jones (1990) claimed that sales promotion expenditures had risen to account for approximately 66 percent of typical marketing budgets, a figure predicted to rise even further (Erickson and Dagnoli, 1989).

The increasing importance of sales promotion activities can be attributed to several factors. Perhaps of greatest importance is that sales promotions (particularly price promotions) often produce short-term sales increases. These extra sales are often necessary to ensure revenue or volume targets (such as quarterly sales goals) are achieved. Additionally, many manufacturers and retailers hope that 'new' buyers will be responsible for many of the additional sales, and that some of these buyers can be retained in the longer-term, boosting market share.

The difficulty of attributing clear and quantifiable sales increases to advertising is also likely to be a reason underlying the increasing expenditure on sales promotions (Jones, 1990).

As sales promotions encourage brand switching, transferring sales from non-promoted to promoted brands, some academics have suggested that sales promotions may be used defensively, to counter the effects of earlier promotions (Raju, 1992; Gijbrechts, 1995).

It is clear that sales promotions are employed extensively to achieve a variety of goals. Yet while the rationale underlying the use of sales promotions may be clear, the precise effects of sales promotions remain the subject of some debate.

1.2 THE NEED FOR RESEARCH

In 1977, Hodgson commented that "...relatively little attention appears to be given by either market researchers or by sales promotion executives to researching the effectiveness of this [sales promotion] expenditure." (p.18) Over a decade later, Blattberg and Neslin (1990) were moved to comment: "Given the expenditure devoted to retail [i.e., consumer] promotions, it is surprising that so little research has been conducted." (p.379)

The widespread use of electronic scanner systems, however, has captured data not previously available and has thus allowed closer scrutiny of sales promotions and their effects (Fulgoni, 1987; Blattberg and Neslin, 1990; Blattberg, Briesch and Fox, 1995). The enhanced research opportunities presented by scanner data have thus enabled more rigorous studies to be undertaken, particularly those relating to lengthy time periods.

1.2.1 Ehrenberg, Hammond and Goodhardt's (1994) Study

In an extensive study, Ehrenberg, Hammond and Goodhardt (1994) used scanner panel data (as well as some diary panel data) to investigate the after-effects of price promotions for the leading brands within 25 fmcg categories. Data from a number of panels, within four countries, were used in the study. These panels comprised the purchasing histories of 1,000 to 5,000 households over periods ranging from six months to two-and-a-half years.

Specifically, Ehrenberg et al compared the sales levels that preceded a (price promotion) sales peak with the sales levels that followed it. They also compared repeat buying rates

with theoretical norms² and established the proportion of people who bought the brand during a promotion who had previously purchased the brand. From these analyses, they concluded that, within established fmcg markets, price promotions seem to have little or no after-effect on sales levels or repeat buying patterns. The main implication to emerge from these findings was that, contrary to widespread belief, the longer-term value of price promotions would appear to be very limited.

1.3 THE CURRENT STUDY: AN OVERVIEW

The research outlined and discussed in this thesis replicates and extends Ehrenberg, Hammond and Goodhardt's (1994) research into price promotions, with the overall aim of exploring the longer-term effects of price promotions in a prominent fmcg category. In doing so, this research responds to the calls of several researchers for an increased emphasis on replication research (see for example Jacoby, 1978; Leone and Schultz, 1980; Lindsay and Ehrenberg, 1993; Hubbard and Armstrong, 1994).

Chapters two, three and four of this thesis review previous research relating to price promotions and detail the empirical findings which have emerged from this literature. Chapter five outlines and explains the study's methodology whilst chapter six presents the results and relates them to the findings discussed in chapters two to four. Finally, chapter seven summarises the study's key findings and the implications which arise from these.

² These theoretical norms were calculated using the negative binomial distribution (NBD) model. The NBD is statistically robust, has very good predictive validity and has been successfully applied within a great number (and variety) of markets. For a detailed discussion of this model, refer to section 5.3.1.

CHAPTER TWO: SHORT-TERM EFFECTS

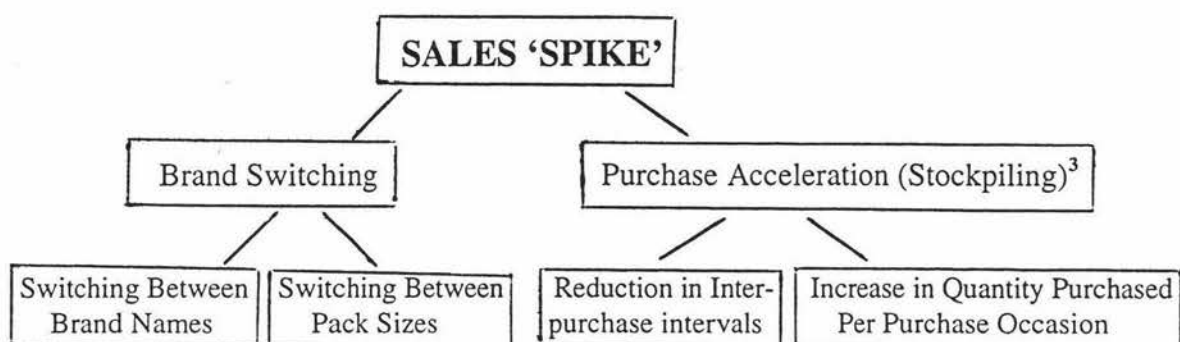
Abraham and Lodish (1993, p.250) define short-term sales arising from consumer promotions as “the sales volume that is generated in the promotion week [or period] in the promoting store, that is incrementally related to the promotion, and is incremental to ‘normal’ sales in that store during that week [or period] that would have occurred if the promotion had not been run”. This chapter examines the short-term effects of sales promotions and pays particular attention to sales ‘spikes’ and the competing explanations of these.

2.1 THE PRESENCE OF SALES ‘SPIKES’

Invariably, consumer promotions (particularly price promotions) produce substantial short-term sales increases (see Frank and Massy, 1971; Woodside and Waddle, 1975; Cotton and Babb, 1978; Dodson, Tybout and Sternthal, 1978; Guadagni and Little, 1983; Neslin, Henderson and Quelch, 1985; Moriarty, 1985; Doyle and Saunders, 1986; Blattberg and Wisniewski, 1987; Totten and Block, 1987; Gupta, 1988; Blattberg and Neslin, 1989; Jones, 1990; Hoek and Roelants, 1991; Davis, Inman and McAlister, 1992; Grover and Srinivasan, 1992; Baker, 1994; Ehrenberg, Hammond and Goodhardt, 1994; Andrews, 1995; Mulhern and Padgett, 1995). Blattberg, Briesch and Fox (1995, p.G123) describe this effect as “fundamental to virtually all research done in the area of promotions”.

Yet while the additional sales often created by consumer promotions is undisputed, the source of these additional sales has been the subject of much conjecture. Typically, the sales ‘spike’ resulting from a consumer promotion is decomposed into sales due to brand switching and sales due to purchase acceleration. Figure 2 illustrates this decomposition.

Figure 2. Decomposition of the sales 'spike'



2.1.1 Purchase Acceleration and Brand Switching

Purchase acceleration or stockpiling occurs when a product's regular consumers purchase different quantities of it or purchase it at different times than they usually do (Blattberg, Briesch and Fox, 1995). Any increase in sales resulting from purchase acceleration is thus attributable either to a reduction in consumers' inter-purchase intervals or to an increase in the quantity of product that consumers buy on each purchase occasion.

Many researchers, however, have argued that brand switching (and not purchase acceleration) accounts for most of the incremental sales that arise from a consumer promotion. Brand switching occurs when, on a given occasion, a consumer selects a different brand or size to that he or she last bought. It therefore encompasses switching between different sized offerings of the same product-form; switching between the same sized offerings of different product-forms; and switching between different sized offerings of different product-forms.

³ Within the promotion literature, the relationship between purchase acceleration and stockpiling has been subject to differing interpretations. Most researchers have used the term "stockpiling" synonymously with "purchase acceleration" (e.g., Blattberg, Eppen and Lieberman, 1981; Neslin, Henderson and Quelch, 1985; Blattberg and Neslin, 1990; Helsen and Schmittlein, 1992; Blattberg, Briesch and Fox, 1995; Gijsbrechts, 1995). The relationships illustrated in Figure 2 are consistent with this general consensus.

Brand switching is the antithesis of 'brand loyal' behaviour and it is a common occurrence in the *absence* of promotional activity. In fact, it has been well established that few purchasers of a given brand are loyal to only that brand; most purchasers of a given brand purchase several competing brands (they have a 'brand repertoire') and these purchases, collectively, account for almost all of their product category requirements (Ehrenberg, 1988; 1994b; East, 1990; Joyce, 1991; Phillips and Bradshaw, 1994). Consumer promotions are widely considered to increase normal levels of brand switching (from non-promoted brands to the promoted brand), thereby at least temporarily undermining the repeat purchasing ('brand loyalty') of any particular brand (Massy and Frank, 1965; Webster, 1965; Montgomery, 1971; Dodson, Tybout and Sternthal, 1978; Totten and Block, 1987; Gupta, 1988; Ehrenberg, Hammond and Goodhardt, 1994). Dodson et al's (1978) study has been cited particularly often and, for this reason, it is discussed below in some detail.

Dodson et al (1978) used panel data for margarine and flour brands to investigate the effect of three specific promotional activities (media-distributed coupons, cents-off deals and package coupons) on brand switching. They concluded that media-distributed coupons were the most effective promotional activity for obtaining brand trial (inducing switching). Cents-off deals were also found to encourage brand switching, although they were not as effective as media-distributed coupons. In contrast, package coupons were found to have no effect on brand switching for margarine (thereby maintaining the probability of a repeat purchase) whilst they *inhibited* brand switching for flour (i.e., they increased the probability of a repeat purchase).

It is hardly surprising that package coupons were shown to be the most 'switching-resistant' promotional tool of those studied since package coupons are specifically used to encourage repeat purchases. That is, many of the people redeeming a package coupon for a particular brand would be doing so *because* they purchased that same brand on the previous purchase occasion.

The claim that price reductions are less effective at inducing brand switching than media-distributed coupons is also misleading. Dodson et al's study *did* find that media-distributed coupons led to greater brand switching than price reductions (upon which the above claim was based). However, this claim is not valid because the magnitudes of these two promotional activities were dissimilar. Within the margarine and flour product categories, media-distributed coupons represented an average saving of 20 percent and 31 percent of a brand's regular (non-promoted) price, respectively. For cents-off deals, the comparable values were only three percent and 12.6 percent. As brand switching is strongly related to deal magnitude, and the media-distributed coupons and cents-off deals represented different savings levels, it is not possible to compare their relative effectiveness in this way.

Whilst it is generally agreed that a positive relationship between consumer promotions and brand switching exists, some uncertainty surrounds the relative contribution of brand switching and purchase acceleration to the promotional sales 'spike'. This issue is now addressed.

2.1.2 The Relationship Between Purchase Acceleration and Brand Switching

Gupta's (1988) study was among the first to address the relative contribution of brand switching and purchase acceleration to the promotional sales 'spike'. He used scanner panel data to model three consumer decisions: when, what and how much to buy, and concluded that over 80 percent of the recorded sales increases were due to brand switching.

The contribution of brand switching to the promotional sales 'spike' was even more pronounced when price promotions were analysed separately. Within the regular ground coffee market, brand switching accounted for almost all (more than 98 percent) of the incremental sales resulting from a temporary price reduction.

Several other studies have found the effects of purchase acceleration on promotional volume to be negligible. McAlister (1986) found that consumers readily switched brands in response to a promotion, though they did not accelerate their purchases. Neslin and Shoemaker (1983) and Moriarty (1985) also failed to find reasonable support for purchase acceleration, although these studies only investigated increases in the quantities purchased per purchase occasion (i.e., only one aspect of purchase acceleration).

Other studies, however, have produced conflicting conclusions. Blattberg, Eppen and Lieberman's (1981) investigation of price promotion effects in four product categories (aluminium foil, facial tissue, liquid detergent, and waxed paper) concluded that purchase quantity and timing were accelerated in every category. Increases in purchase quantity was the most dominant purchase acceleration effect, and Blattberg et al's conclusions imply that consumers' purchase acceleration contributes more to promotional sales increases than brand switching. However, closer examination of Blattberg et al's data suggests the size of any purchase acceleration effects was modest. Furthermore, despite having the necessary data to compare the relative contribution of purchase acceleration and brand switching to the promotional sales 'spike', the authors failed to do so.

Blattberg et al's study had several other limitations. First, they did not report the magnitude of the price reductions they noted, thus preventing an assessment of their representativeness within the categories studied. Second, the authors failed to provide adequate information about the characteristics of the sample used. If the sample for each product category consisted of its heaviest users (many samples are selected from panels on this basis), then it is likely that this would have exacerbated the purchase acceleration effects. Finally, the data for the study came from the *Chicago Tribune* panel and were collected during the period 1958-1966. As price promotions were considerably less prevalent during this time than they are today, it is likely that consumers' behavioural responses to these promotions differed. The (relative) infrequency and unpredictability with which these promotions were held may have led to greater purchase acceleration during promotional periods.

Neslin, Henderson and Quelch's (1985) work is also often cited as evidence of marked purchase acceleration. Like Blattberg et al, they used scanner panel data to investigate purchase timing and purchase quantity acceleration, and how different promotional activities affected these. However, like Blattberg et al, the *magnitude* of the purchase acceleration that was attributable to consumer promotions was small.

Given that the studies discussed in this section are the main ones to explore purchase acceleration effects, and given the modest effects recorded and the methodological limitations affecting much of this work, it seems reasonable to conclude that promotional sales 'spikes' are mostly due to brand switching. Ehrenberg, Hammond and Goodhardt (1994, p.12) sum up the overall consensus: "for frequently bought goods, any bringing forward of future purchases of the brand tends at best to be small".

While short-term sales spikes are a regular consequence of consumer promotions, and are widely attributed to brand-switching, the longer-term effects of consumer promotions remain less clear. Chapter three examines the research evidence relating to this question.

CHAPTER THREE: LONGER-TERM EFFECTS

At least some of the uncertainty about the longer-term effects of consumer promotions must arise from the relative paucity of studies undertaken; as Ehrenberg, Hammond and Goodhardt (1994, p.12.) noted: “Relatively few studies of the *after-effects* of consumer promotions have been carried out so far...” (italics in original). Even without any research, it is clear that the after-effects of consumer promotions can be positive, negative, or non-existent; this chapter discusses the literature relating to each of these outcomes.

3.1 POSITIVE AFTER-EFFECTS

Section 1.1 suggested that manufacturers’ and retailers’ belief that consumer promotions have positive effects in the longer-term may have contributed to the growth of consumer promotion expenditure. Aaker (1973, p.595) summarises this view:

A promotion can increase sales by enticing present users to increase their purchases and by obtaining sales from highly price-sensitive buyers. However, the dominant purpose of most promotions involves a longer time horizon. The hope is to entice new customers to the brand, who will ultimately develop some level of loyalty [i.e., repeat purchasing behaviour] toward it, and to increase the loyalty of existing customers. Thus, the promotion is largely an investment expected to return future sales that would not materialise without it.

According to Aaker, positive after-effects can be manifested as: increased repeat purchasing rates (i.e., increased loyalty among existing customers) or increased penetration (i.e., the attraction of new customers who ultimately develop some level of loyalty toward the brand). In addition to these, category expansion (i.e., increased primary demand) has also been posited as a positive after-effect of promotional activity. The following sections examine the evidence relating to each of these outcomes.

3.1.1 Increased Repeat Purchasing Rates

Although many fmcg manufacturers aim to increase their product's usage rate (Blattberg and Neslin, 1990; Guiltinan and Paul, 1991) by using consumer promotions, there is little evidence that promotional activity enhances the repeat purchasing of a product (Gijbrenchts, 1995). An exception is Cotton and Babb's (1978) work which is frequently cited as evidence that increased repeat purchasing rates follow a promotion. Their study, based on diary data from a 1,000 member panel, investigated consumers' responses to promotional deals for a variety of dairy products (fluid milk, cottage cheese, yoghurt, ice cream, ice milk, novelties, process cheese, natural cheese, butter, frozen toppings and cream products). Four types of promotional deals were analysed: price promotions (referred to in the study as 'in-store specials'), coupons, multiple-item discounts, and free gifts.

Consumers' responses to the promotional deals was determined by comparing their purchase behaviour in the period immediately preceding a promotional purchase (Period I) to their purchase behaviour in the period immediately following the promotional purchase (Period III). Consumers' behaviour in these periods was then compared to their purchase behaviour during the promotional purchase period (Period II). The three analysis periods were of the same length for any given product but this length differed depending upon the particular product that was being studied.⁴

The analysis included all of the households which purchased the product at least once on a promotional deal (i.e., purchased during Period II). This group of households was referred to as the "all" sample. A sub-sample of this, the "regular" sample, was analysed separately. The "regular" sample consisted of households which, in addition to their purchase in Period II, had purchased the product in question during periods I and III. As the "all" sample comprised the "regular" sample and those households which did not

⁴The analysis period was 14 days for products with short storage lives (e.g., fluid milk) and 30 days for products with longer storage lives (e.g., butter).

purchase as regularly⁵, any differences in aggregate purchasing behaviour between these two samples were attributed to variations in the behaviour of the irregular group of households. Table 2 summarises Cotton and Babb's key findings.

⁵ These households either purchased exclusively during the promotional period or, in addition to a promotional purchase, purchased in *either* Period I *or* Period III (but not in both periods).

Table 2. Average quantities of selected dairy products purchased by households before, during and after purchase on a promotional deal - U.S., May 1972 - April 1973^a

Product and Situation ^b	Average Quantity Purchased				Percentage Change From Period I ('Before')	
	Before	During	After	# of Hshlds	During	After
Fluid Milk (Half gals.)^c						
All	5.9	7.5	5.9	623	28%	0%
Regular	7.0	8.4	7.0	550	20%	1%
Cottage Cheese (lbs.)^c						
All	1.3	3.5	1.6	453	169%	23%
Regular	3.4	4.7	3.8	117	38%	12%
Yoghurt (half-pts.)^c						
All	1.5	5.4	2.0	195	258%	33%
Regular	5.1	9.2	6.1	36	80%	20%
Ice Cream (half gals.)^d						
All	1.3	2.8	1.5	907	114%	12%
Regular	2.7	4.0	3.1	324	46%	13%
Ice Milk (half-gals.)^d						
All	0.7	2.2	0.7	292	207%	0%
Regular	2.8	3.7	2.9	45	32%	2%
Novelties (Half-gals.)^d						
All	0.3	1.0	0.4	334	221%	21%
Regular	0.8	1.2	1.1	67	42%	38%
Process Cheese (lbs.)^c						
All	0.7	2.8	0.7	457	400%	0%
Regular	1.6	2.7	2.1	94	42%	38%
Natural Cheese (lbs.)^c						
All	0.7	2.4	1.0	315	243%	43%
Regular	1.2	1.7	1.2	78	42%	0%
Butter (lbs.)^d						
All	1.3	2.6	1.2	350	100%	-8%
Regular	2.6	3.7	2.8	123	42%	8%
Frozen Toppings (half-pts.)^{c,e}						
All	0.4	1.2	0.1	101	200%	-75%
Cream Products (pts.)^{c,e}						
All	1.1	1.9	1.2	125	71%	6%

Source: Cotton and Babb (1978, Exhibit 1).

^aPercentage figures indicate change from the period before purchase on deal (% calculated before data rounded). Purchases during the promotional period were significantly greater than those before promotions for all products, at the 1% level of probability using a paired t-test. None of the purchases after the promotional period were different than those before promotion at the 5% level.

^bThe two situations were: **all** - indicates those households that were included regardless of whether they purchased the product prior to a purchase on deal; **regular** - indicates those households that were included only if they purchased in all three periods.

^cThe period for average purchase was two weeks.

^dThe period for average purchase was 30 days.

⁶No data was provided for the “regular” sample for this product. Presumably, the sample size was too small.

A cursory examination of Table 2 would suggest that, for the majority of products studied, there was substantially higher repeat purchasing in the post-promotion period (Period III) when compared to the pre-promotion period (Period I).⁶ However, these figures are misleading. The differences between the average quantity purchased before and after the promotional periods are negligible for almost all of the products. Yet when these small variations in average purchase quantities are expressed as percentages, they appear to be substantial because of the small bases from which they have been calculated. (For example, the average quantity of the ‘novelties’ product that was purchased by the “all” sample increased from 0.3 half-gallons in the pre-promotion period to 0.4 half-gallons in the post-promotion period. The corresponding percentage increase is 21 percent).

Subsequent researchers who have claimed that Cotton and Babb’s study provides evidence that promotions produce increased repeat purchasing rates appear to have based their claim upon these percentages. They have also ignored the final sentence of footnote ‘a’ which reads “None of the purchases after the promotional period were [significantly] different than those before promotion at the 5% level [of probability]”. This failure to appreciate the impact of the footnote is perhaps not surprising, since Cotton and Babb do not spell out the implication of this result. In addition to this ambiguity, two important methodological issues relating to Cotton and Babb’s study require clarification.

First, it is not clear whether the sales recorded within the pre- and post-promotion periods were representative of ‘normal’ (baseline) periods. When Ehrenberg, Hammond and Goodhardt (1994) sought to establish baseline sales periods, they typically used periods which did not immediately precede/follow the promotional period because the weeks surrounding the promotional period often displayed substantial sales fluctuations. These fluctuations may have resulted from the stockout of a competing brand (thereby causing

⁶ Refer to the final column. This column represents the percentage change in sales between the pre- and post-promotion periods.

an abnormal sales peak) or they may have been due to a competitor's promotion or to a stockout of the brand being analysed (visible as an abnormal sales trough). Ehrenberg et al chose pre- and post-promotion analysis periods that were as close as possible to the promotional period and free of any 25 percent or greater sales fluctuations (referred to as "clean" periods). Often, these "clean" periods were many weeks before and after the promotional period. Cotton and Babb (1978) do not appear to have considered this issue as they have used the period immediately preceding the sales promotion as the 'norm' to which they compare subsequent periods. If, for a particular brand, this period produced considerably fewer sales than usual, the promotion's carry-over effects (such as increased purchase rates) would be exaggerated. The distortion this could create would be exacerbated if atypical circumstances (such as the stockout of a competitor's product) characterised the post-promotion period.

Second, even if the pre- and post-promotion periods in Cotton and Babb's study were representative of baseline periods, inaccurate results may still arise because only one before-to-after sales comparison was made for each brand. Ideally, for each brand in the study, pre- and post-promotion sales data would have been available for several promotions and the average difference in sales calculated. When only one comparison is conducted, a chance variation in 'other' factors (e.g., weather, stockouts, sampling error, etc.) could produce a result which is not indicative of the promotion's 'true' effects. Ehrenberg et al (1994) analysed as many before-to-after sales sequences as possible for the brands in their study. For example, their first analysis of Folgers Instant Coffee revealed a before-to-after sales increase of 8 units. However, two subsequent analyses produced before-to-after sales decreases of 5 units and 1 unit, respectively. The average increase was therefore near-zero (.67 units).

3.1.2 Increased Penetration

Marketers often use consumer promotions in an attempt to attract and retain consumers who have never before bought the brand (Abraham and Lodish, 1990). To validate this objective, it is necessary to show that consumer promotions attract consumers who had

never bought the brand before, and that the new buyers become repeat buyers of the promoted brand (i.e., are retained).

Cotton and Babb (1978) found that during the promotional period, the “all” households increased consumption more than the “regular” households. From this they concluded: “This [finding] lends support to the proposition that promotional deals are effective in attracting households not regularly in the market.” (p.110). However, Cotton and Babb had households’ purchasing records for only 14 or 30 days prior to the promotional period. If a household did not purchase a particular brand within these very short time periods, they were considered to be “not regularly in the market”. It is very likely that many of these households would include this brand in their repertoire, buying it less frequently than every 14 or 30 days. This is supported empirically (Ehrenberg, 1988) and would explain Cotton and Babb’s failure to observe any positive after-effects.

Evidence to date suggests that consumer promotions generally do not attract new buyers who then repeat purchase to produce longer-term increases in penetration levels. Abraham and Lodish’s (1990) meta-analysis of single-source studies concluded that, for established brands, sales during a promotion are attributable either to current buyers who would purchase the brand anyway, or to switchers who ‘bounce’ from one promoted brand to another. Bawa and Shoemaker’s (1987a) comparison of the coupon redemption behaviour of “users” and “non-users” also concluded that a negligible number of new buyers are attracted and retained by coupon promotions.

Ehrenberg et al (1994) provided compelling evidence that price promotions fail to attract and retain new buyers. They found that of the households which purchased a brand during a price promotion, approximately 70 percent had purchased it within the previous six months, 80 percent within the previous year, and 93 percent within the previous two-and-a-half years. Ehrenberg, Hammond and Goodhardt concluded:

Buying a brand during a promoted period therefore appears to reflect a deliberate form of selective consumer reaction: when a brand is available at a

reduced price (or with a coupon), some consumers respond if the bargain is for a familiar brand, i.e., one already in their usage portfolio, but very rarely, if ever, if it is for a previously untried brand. (p.17).

In summary, consumer promotions appear to be unable to produce longer-term increases in a brand's penetration level; it is unusual if a consumer purchases a previously untried (established) brand on deal and then continues to purchase it regularly. Overall, the effect of consumer promotions on consumer behaviour would appear to parallel advertising: "Real conversion from virgin ignorance to full-blooded, long-term commitment does not happen often." (Ehrenberg, 1974, p.32).

3.1.3 Category Expansion

Blattberg, Briesch and Fox (1995) noted that few researchers have explored whether product categories expand following price discounts. Whilst pertinent to brand manufacturers, this issue is of particular interest to retailers because their income is dependent on total category demand (Moriarty, 1985; Raju, 1992).

Although some studies have claimed to detect evidence of increases in primary demand, closer scrutiny of these results suggests these effects may be more ambiguous than first thought. For example, Ward and Davis' (1978) finding that coupons led to an increase in consumption among redeemers has been extrapolated to support claims that these promotions increase primary demand (see Blattberg and Neslin, 1990). Yet as Cheong (1993) noted, redeemers represent a very small proportion of total buyers, and so can have only a small effect on aggregate demand. More importantly, the Ward and Davis study examined only short-term effects; assertions about longer-term effects are thus speculative (and inconsistent with subsequent empirical studies).

Moriarty's (1985) investigation of promotions on store-level sales also concluded that primary demand increased during the promotional period, but was marred by similar methodological flaws. Without long-term panel data it is impossible to establish whether

primary demand increased, or whether irregular purchasers bought the brand while it was on promotion.

Empirical support for the argument that promotions increase primary demand is scarce, and the available studies have flaws which undermine their conclusions. Raju (1992) noted that compelling evidence of increases in primary demand may be difficult to obtain because of the clear evidence of brand switching. He also noted that managers often used promotions defensively, particularly in competitive categories, to counter the effects of competitors' promotions. According to Raju, the net effect of these decisions was to promote brand switching (and return) among existing users.

Competitive intensity is also often related to the frequency of promotions (Hauser and Wernerfelt, 1990; Raju, Srinivasan and Lal, 1990). Frequent promotions have been shown to reduce variability in product category sales (Helsen and Schmittlein, 1989, cited in Raju, 1992; Assuncao and Meyer, 1990; Raju, 1992). Such results appear to have a very simple and logical explanation: if the brands within a particular product category are promoted on a regular basis and most consumers have a brand repertoire, there would appear to be little incentive for a consumer to accelerate their purchasing of a particular brand on any given purchase occasion. Within such markets, consumers are assured of being able to make a promotional purchase of a brand within their repertoire (or a readily substitutable alternative) on most purchase occasions, making purchase acceleration behaviour unnecessary.

The most compelling reason why empirical evidence of promotion-induced category expansion effects is likely to remain scarce is the empirical fact that the majority of markets fail to exhibit any appreciable growth from one time period to the next (Ehrenberg, 1988; Jones, 1990); growing markets are exceptional.⁷ As a result, category expansion due to **any** cause is a reasonably infrequent phenomenon. This would suggest

⁷ The general lack of (longer-term) variability within established fmcg categories is implied by the findings of sections 3.1.1 and 3.1.2. Established markets typically exhibit negligible long-term increases in purchase frequency and penetration, yet at least one of these variables must increase before product category sales can expand.

that evidence supporting category expansion as a specific consequence of consumer promotions is likely to remain isolated.

3.2 NEGATIVE AFTER-EFFECTS

Blattberg et al (1995) noted the controversial idea that promotions may have negative after-effects, such as reduced repeat purchase probabilities and purchase acceleration. The following sections explore these effects in more detail.

3.2.1 Reduced Repeat Purchase Probabilities

It is widely agreed that past behaviour is, generally, a very good predictor of future behaviour (see for example Foxall, 1983; Ehrenberg, 1988); strong and consistent relationships exist between consumers' purchase histories and their repeat purchase behaviour (see also Kuehn, 1962; Carman, 1966; Massy, Montgomery and Morrison, 1970; and Shoemaker and Shoaf, 1977). Table 3 contains a summary of Shoemaker and Shoaf's findings on repeat purchase probabilities.

Table 5. The relationship between the last two brand choices and repeat purchase probability

Past Two Purchases**	Repeat-Purchase Probability*			
	Kuehn ^a	Carman ^b	Massy et al. ^c	Shoemaker and Shoaf ^d
11	.736	.513	.847	.759
01	.446	.453	.622	.355
10	.347	.433	.557	.278
00	.065	.172	.414	.035

^aFigures are derived from Kuehn (1962).

^bData apply only to "nonloyal" purchasers (see Carman, 1966).

^cData refer to a buyer's "favourite brand" (see Massy et al., 1970).

^dStated figures are the average of 30 brands in five product classes.

*These (aggregate) repeat purchase probabilities are conditional on the purchase histories (which are two purchase occasions in length). The two most recent brand purchases (within a particular product category) were used to establish purchase histories, resulting in four different purchase histories.

**A '1' denotes a purchase of the subject brand whilst a '0' denotes a purchase of any "other" (i.e., competing) brand within the product category. Thus, a 01 purchase history represents a scenario in which a competing brand was purchased on the penultimate purchase occasion and this was followed by a purchase of the subject brand

Source: Shoemaker and Shoaf (1977, Table 3).

In all of the studies reported in Table 3, repeat purchase probabilities are highest when the past two purchases are of the subject brand and lowest when the past two purchases are of other brands. If only one of the past two purchases was of the subject brand, the repeat purchase probabilities are highest if it was the most recent purchase. This pattern suggests that the repeat purchase probability of the subject brand (i.e., the chance that the subject brand is going to be purchased on the next purchase occasion) is conditional on the frequency and recency with which it has been previously purchased.

Shoemaker and Shoaf extended these analyses to explore the effects of price promotions on conditional probabilities. Table 4 reproduces their findings. Shoemaker and Shoaf used the following classification system: a purchase of the subject brand was denoted by a

1, a purchase of a competing brand was denoted by a 0, and if the purchase was on deal, a prime sign (') would follow the 1 or 0. From this, a total of 16 possible purchase history classifications eventuated (11, 1'1, 11', 1'1', etc.).

Table 4. Weighted average of repeat rates for 30 brands

Past Purchase Sequence ^a	Probability of Repurchasing Brand 1	Reduction in Probability ^b	Sample Size	Standard Error of Estimate
11	.806	-----	5,337	.005
1'1	.708	.098 ^c	681	.018
11'	.691	.017	695	.018
1'1'	.635	.056 ^c	1,345	.013
0'1	.427	.208 ^c	804	.017
01	.412	.015	2,196	.010
0'1'	.296	.116 ^c	1,675	.011
01'	.271	.025 ^c	998	.014
10'	.338	-.067 ^c	837	.016
10	.277	.061 ^c	2,204	.020
1'0'	.270	.007	1,724	.010
1'0	.243	.027 ^c	970	.014
0'0'	.042	.201 ^c	22,574	.002
00'	.043	-.001	12,782	.002
0'0	.042	.001	12,377	.002
00	.029	.013 ^c	63,439	.001

^a1 indicates a purchase of the subject brand. A prime sign (') indicates that the purchase was on deal.

^bThis column indicates the reduction in probability from the preceding sequence.

^cThe difference in repeat purchase probability is significant at the .16 level or less based on a one-tailed test.

Source: Shoemaker and Shoaf (1977, Table 5).

Table 4 shows that the likelihood of purchasing the subject brand is higher if it has not been purchased on deal, or if competing brands have been purchased at deal prices (Shoemaker and Shoaf, 1977). For any given brand, there is a negative relationship between the recency and frequency of deal purchases and repurchase probabilities. Although Shoemaker and Shoaf stopped short of concluding that their study detected

negative after-effects, several later researchers (e.g., Dodson et al, 1978; Blattberg and Neslin, 1990) have taken this view.

Dodson et al (1978) used panel data for margarine and flour to study purchases associated with three promotional activities: media-distributed coupons, cents-off deals and package coupons. They aimed to investigate the effect of each promotional activity on brand switching and to establish the effect of deal retraction on repeat purchase rates ('brand loyalty').⁸

To investigate the effects of deal retraction on subsequent brand loyalty, Dodson et al examined purchase histories extending over three purchase occasions. Figure 3, below, details this.

Figure 3. Dodson et al's methodology for examining promotional after-effects

	Deal transaction			No deal comparison		
Purchase occasion	1	2	3	1	2	3
Transaction type	No deal	Deal	No deal	No deal	No deal	No deal

As can be seen, the three (consecutive) purchases that were examined consisted of a deal purchase that was preceded and followed by nondeal purchases. These were compared with purchase histories in which all three purchases were non-deal. The proportion of people who had purchased a particular brand on deal and who had repurchased it on the next purchase occasion was compared with the proportion of nondeal purchasers who

⁸ Within the marketing literature, repeat purchase probabilities or rates are often considered to be a measure of brand loyalty (see for example Ehrenberg, 1988). The closer the repeat purchase probability is to 1, the greater the brand loyalty and the lower the probability of switching brands (1-repeat purchase probability). Conversely, the closer the repeat purchase probability is to 0, the lower the brand loyalty and the higher the probability of switching. Dodson et al share this view, regularly using the terms 'brand loyalty' and 'repeat purchase probability' interchangeably.

repurchased it on their next purchase occasion. In doing this, the effect of a deal retraction on repeat purchase behaviour could be established.

On the basis of this analysis, they concluded that people who purchased brands promoted by media-distributed coupons or cents-off deals were less likely to repurchase the brand after the deals were retracted than were people in the no-deal group. This finding applied to people who had switched to the promoted brand and to those who were 'loyal' to the promoted brand (i.e., those who had purchased the promoted brand on the previous purchase occasion). It also applied to both of the product categories that were studied.

Dodson et al's finding that media-distributed coupons and cents-off deals reduced repurchase rates (or 'loyalty') corroborated Shoemaker and Shoaf's (1977) conclusions. However, although Dodson et al noted a reduction in repurchase rates, they suggested that media-distributed coupons and cents-off deals may positively influence demand through increased retailer support/shelf facings. The basis of this claim and the extent to which any off-setting effects occurred, is unclear. Overall, the clear conclusion from this, and other studies, is that the retraction of media-distributed coupons and cents-off deals adversely affects demand.

3.2.2 Purchase Acceleration (Stockpiling)

Promotion-induced purchase acceleration is generally considered to produce negative after-effects as (regular-price) sales in subsequent periods are depressed while the additional units purchased during the promotional period are consumed.⁹ Essentially, sales are brought forward from a later period to the (less profitable) promotional period, producing what Nielsen calls a "mortgaging effect" (Jones, 1990).

⁹ Purchase acceleration can be beneficial to retailers under circumstances in which longer-term profit considerations are of little concern. For example, the stockpiling of a perishable product that is approaching its "best before" date, the stockpiling of a product that is being discontinued, or using stockpiling to pre-empt a competitor's anticipated actions are likely to be viewed favourably by retailers/brand manufacturers (Webster, 1971, cited in Neslin, Henderson and Quelch, 1985; Blattberg and Neslin, 1990).

Within the consumer promotion literature, there is considerable debate over the prevalence and magnitude of purchase acceleration, and its effects on post-promotion sales levels. These issues are discussed below.

The Prevalence and Magnitude of Purchase Acceleration

Most studies investigating consumers' purchase behaviour in response to promotional activities have found some form of purchase acceleration (Blattberg, Eppen and Lieberman, 1981; Litvack, Catalone and Warshaw, 1985; Neslin, Henderson and Quelch, 1985; Gupta, 1988; Assuncao and Meyer, 1990; Grover and Srinivasan, 1992; Helsen and Schmittlein, 1992; Raju, 1992) although, inevitably, there are exceptions (Moriarty, 1985; McAlister, 1986; McIntyre and Smith, 1990).

However, whilst it is generally accepted that consumer promotions stimulate purchase acceleration to *some* degree, considerable debate has surrounded two issues:

- i) How much of the additional volume during a promotional period can be attributed to purchase acceleration? and
- ii) Which aspect of the purchase acceleration phenomenon (timing acceleration or quantity acceleration) is the more dominant?

Section 2.1.2 reviewed these questions as they related to short-term effects and concluded that brand switching - not purchase acceleration - accounted for most of the additional sales generated by a promotion. Where purchase acceleration did occur, it was affected by: large deal magnitudes (Blattberg, Eppen and Lieberman, 1981; Meyer and Assuncao, 1990; Helsen and Schmittlein, 1992; Raju, 1992); a reduction in promotional frequency (Gupta, 1988; Bolton, 1989; Krishna, Currim and Shoemaker, 1990; Meyer and Assuncao, 1990; Krishna, 1992; Helsen and Schmittlein, 1992; Raju, 1992; Assuncao and Meyer, 1993); brand loyalty (Neslin, Henderson and Quelch, 1985; Gupta, 1988; Grover and Srinivasan, 1989, cited in Helsen and Schmittlein, 1989; Raju, 1992); and heavy users (Blattberg, Eppen and Lieberman, 1981; Neslin, Henderson and Quelch, 1985).

Closer examination of marketplace realities suggests that these factors rarely prevail. For example, deal magnitudes are typically small; the frequency of promotions is high; the number of users of a particular brand that exhibit a high degree of brand loyalty is low; and the proportion of a brand's customer base that are 'heavy users' is small. Additionally, product characteristics such as bulkiness (Litvack, Catalone and Warshaw, 1985; Gupta, 1988; Raju, 1992) and perishability (Gupta, 1988; Raju, 1992) and the consumer characteristic of purchasing from a brand repertoire (Ehrenberg, 1988, 1994; East, 1990; Joyce, 1991; Phillips and Bradshaw, 1994) further reduce the likelihood of substantial purchase acceleration. Apparently, within current fmcg markets, there is little reason for consumers to accelerate their purchases.

Although purchase acceleration effects are small, the evidence thus far suggests they are attributable to *quantity* acceleration (Shoemaker, 1979, cited in Helsen and Schmittlein, 1992; Blattberg, Eppen and Lieberman, 1981; Neslin, Henderson and Quelch, 1985; Helsen and Schmittlein, 1992). A notable exception to these findings is Gupta's (1988) conclusion that less than 14 percent of a brand's additional sales during a typical promotion were due to acceleration of purchase timing whilst less than two percent were due to acceleration of purchase quantity. However, as these findings pertain to the regular ground coffee market, it is likely that perishability was a factor which inhibited quantity acceleration - an issue which Gupta acknowledges.

Within contemporary fmcg markets, purchase acceleration does not appear to affect promotional sales greatly. That is, the volume of sales "brought forward" from future time periods, as a proportion of the additional sales that arise from a typical promotion, is not very large. Consequently, purchase acceleration should not be expected to have a substantial "mortgaging effect" on sales levels in the periods following a promotion. However, purchase acceleration is still expected to have *some* effect on a brand's post-promotion sales levels. Interestingly, this negative after-effect, which is referred to as a 'trough' within the sales promotion literature, has been very difficult to identify and is explained in more detail in section 3.3.3.

3.3 NEUTRAL AFTER-EFFECTS

3.3.1 An Alternative Explanation for Reduced Repeat Purchase Probabilities

Whilst the studies of Shoemaker and Shoaf (1977) and Dodson, Tybout and Sternthal (1978) have provided evidence supporting reduced repeat purchase probabilities, the validity of this evidence is doubtful. An alternative explanation is that individual repeat purchase probabilities do not change, despite the lower repeat purchase probabilities that are observed in the aggregate: this explanation suggests that promotions attract a larger than usual number of households with low non-promotion purchase probabilities. When the repeat rates of these households are combined with the repeat rates of households who would have bought the brand anyway, the average rate after a promotion purchase is lower (Neslin and Shoemaker, 1989). Restated, lower average repeat rates for post-deal purchases can result from *statistical aggregation*. Neslin and Shoemaker provided several examples of the statistical aggregation effect, one of which has been reproduced in Appendix A.

As Neslin and Shoemaker surmised that this effect arose because promotions attracted a disproportionately large number of low-probability consumers, they suggested that to investigate this effect, *prepurchase* probabilities of deal purchasers and nondeal purchasers should be compared with *postpurchase* probabilities. The inclusion of this variable represents a methodological advance over the studies discussed in earlier sections.

Using scanner panel data for regular and instant coffee, Neslin and Shoemaker compared *prepurchase* probabilities (PPP) and repeat rates (REP) relating to deal and nondeal purchase occasions. Table 5 presents these probabilities for each of the five brands that were studied.

Table 5. Average prepurchase probabilities and repeat rates for deal versus nondeal purchases (1)

Brand	Prepurchase probabilities* (PPP) for:		Repeat rates* (REP) after:	
	Deal purchases (D = 1)	Nondeal purchases (D = 0)	Deal purchases (D = 1)	Nondeal purchases (D = 0)
R-A	.386 (3178)	.623 (2497)	.383 (3178)	.664 (2497)
R-B	.471 (4040)	.712 (3512)	.500 (4040)	.744 (3512)
I-A	.409 (1151)	.515 (1068)	.389 (1151)	.528 (1068)
I-B	.554 (1135)	.694 (1849)	.515 (1135)	.714 (1849)
I-C	.494 (1519)	.613 (1435)	.471 (1519)	.628 (1435)

* The number of purchase occasions are in brackets.

Source: Neslin and Shoemaker (1987, Table 2).

The third and fourth columns of Table 5 reproduce the results of Shoemaker and Shoaf (1977) and Dodson, Tybout and Sternthal (1978); the aggregate repeat rates of households that purchase on deal are substantially lower than the aggregate repeat rates of those households which do not purchase on deal. However, the first two columns indicate that a similar discrepancy in *prepurchase* probabilities existed between deal and nondeal purchases (Neslin and Shoemaker, 1989). The first and third columns are based on the same set of households (households purchasing on deal), as are the second and fourth columns (households purchasing on nondeal occasions). As can be seen, the prepurchase probabilities and repeat rates for households purchasing on deal are very similar, as are the prepurchase probabilities and repeat rates for households purchasing on nondeal occasions. The discrepancy in repeat rates between households buying on deal and nondeal occasions therefore appears to be attributable to the discrepancy in these households' prepurchase rates, and not to changes in repeat purchasing behaviour.

Bawa and Shoemaker (1987a) examined the effects of a manufacturer coupon on brand choice behaviour by comparing individual household's pre-redemption purchase probability with their post-redemption purchase probability (the same procedure as Neslin and Shoemaker). Households that had redeemed the coupon (i.e., bought on deal) and had purchased the promoted brand (brand A) on at least six occasions prior and subsequent to this redemption were included in the analysis ($n = 371$). All purchases of competing brands by these households were also recorded; hence Brand A's market share (among the 371 households that were studied) could be determined. In the period from the sixth purchase occasion before redemption until the redemption, brand A had a market share of 11.2 percent. In the period from the redemption until the sixth subsequent purchase occasion, brand A had a market share of 11.9 percent. From this, the authors concluded that purchasing behaviour was largely unaffected by coupon redemption.

Bawa and Shoemakers' study corroborates the earlier work of Aaker (1973). Using panel data Aaker found that several consumer promotion tools (coupons, contests, premiums and cents-off deals) did not alter the repeat purchasing behaviour of the category's buyers. Abraham and Lodish (1990) also concluded "the probability that consumers who buy an established brand on promotion will purchase it the next time is about the same as their likelihood of doing so even if no promotion had taken place." (p.56). Further support is provided by Totten and Block (1987).

Comparable results to those outlined above have been reported by Charlton and Ehrenberg (1976), Adams (1987) and Bawa and Shoemaker (1989). Ehrenberg et al (1994) have provided further support for the lack of promotional after-effects. For each of the brands within the 25 product categories included in their study, they compared the sales levels that preceded a sales peak (resulting from a temporary price reduction) with the sales levels that followed it.¹⁰ They also compared repeat purchasing rates with theoretical norms and ascertained the proportion of people who bought the brand during a

¹⁰ This 'before-to-after' analysis consisted of comparing sales during the closest "clean" 4-week period prior to a sales peak with sales during the closest "clean" 4-week period following this peak. "Clean" periods were defined as those which were free of any 25 percent or greater sales peaks (i.e., periods in which no abnormal sales activity occurred).

promotion who had previously purchased the brand. From this they concluded that, within established fmcg markets, price promotions seem to have no after-effects on brands' sales or repeat buying patterns.

3.3.2 Evidence Against Increased Repeat Purchase Rates

Overall, very few studies have supported the hypothesis that consumer promotions enhance the repeat purchasing of a product. Moreover, the 'evidence' associated with these studies has been shown to be confounded by methodological constraints and misinterpretation. However, because of known patterns in consumers' buying behaviour, it is very unlikely that much legitimate support for this after-effect will ever arise.

Ehrenberg's work has consistently established that, within any (established) fmcg category, the average purchase frequencies of competing brands are very similar. Typically, only small differences exist between competing brands: a brand with a high penetration level will have a *slightly* higher average purchase frequency than a brand with a lower penetration level (a double jeopardy effect). Furthermore, these average purchase frequencies show little variation over time (Ehrenberg, 1988). The major practical implication that arises from this regularity is explained by Ehrenberg (1988, p.35):

This uniformity in buying rates imposes a major constraint on marketing action - it is unlikely that the existing buyers of a brand will turn (or can be turned) into much heavier buyers of it: any major change in average purchase frequency would be out of line with the general pattern.

This finding can appear to be counter-intuitive as, in principle, there is no reason why a brand's buyers should not purchase more of it - in a period of reasonable length, only 30 percent of a consumers' total product category purchases are usually attributed to any one brand (Ehrenberg, 1994b). Ehrenberg (1988) suggests that an explanation for this "apparent paradox" could be conceptual; he recommends that a given brand's customer

base be thought of as comprising mostly buyers of competing brands who occasionally also buy that brand.

The only way that a brand's average purchase frequency could be appreciably increased would be if new uses for it were found and they were then adopted by the brand's existing customers. Ehrenberg, Goodhardt and Barwise (1990) documented several attempts (within UK markets) to achieve this. These attempts included Arm & Hammer baking soda for deodorising refrigerators, Johnson's baby oil and talc for adults, and Schweppes Tonic Water as a soft drink on its own. Successful attempts would create a dynamic situation while the brand's average purchase frequency increased. It would then be expected to stabilise at a permanently higher level. Within established fmcg markets, however, this occurrence is rare. Even in the exceptional instances in which product usage can be increased, the new use(s) will probably carry over to competing brands. As a result, the double jeopardy effect will be re-established and hence the brand which initiated the increased usage rates will not increase its market share.

3.3.3 Explanations for the Absence of Sales 'Troughs', Despite the Presence of Purchase Acceleration

The prevalence of brand switching (see sections 2.1.2 and 3.2.2) means that purchase acceleration is very unlikely to create substantial sales troughs. The likelihood of a reasonably small but distinct sales trough is then negated by the dominance of purchase quantity acceleration over purchase time acceleration. The existence of a noticeable sales trough is largely dependent upon purchase time acceleration because this phenomenon brings forward sales from weeks that immediately follow a promotion. Restated, purchase time acceleration is greatest among those consumers who only need to alter their purchase timing slightly in order to capitalise on the promotional deal (i.e., those who were very close to repurchasing anyway). In contrast, if a consumer accelerates his or her purchase quantity during a promotional week, the additional sales are drawn from one interpurchase period after the promotion (Blattberg and Neslin, 1990). For any given product, very few

consumers would have an interpurchase period of one or two weeks¹¹ and a great deal of variation between these consumers would exist, spreading out the effect of purchase quantity acceleration over many weeks.

Sales in the weeks immediately following quantity acceleration are therefore largely unaffected; the sales reductions are mainly distributed across later weeks. The magnitude of these reductions reflect the relative frequencies of the consumers' interpurchase periods. For example, if consumers who accelerated their purchase quantities during the promotional week had a modal interpurchase period of six weeks, the greatest reduction in post-promotion sales would be expected in the sixth week after the promotion.

Blattberg and Neslin (1990) provide a table with hypothetical sales data which illustrates the effect of timing and quantity acceleration. This data has been reproduced in Table 6.

Table 6. Hypothetical data illustrating the effect of purchase timing and purchase quantity acceleration on post-promotion sales levels (A)

Period (weeks)	Timing Displacement	Quantity Displacement	Total Sales
1	0	0	2000
2	0	0	2000
3	0	0	2000
4 (promotion)	1000	1000	4000
5	-300	0	1700
6	-275	0	1725
7	-200	-100	1700
8	-125	-150	1725
9	-50	-220	1730
10	-30	-200	1770
11	-20	-150	1830
12	0	-125	1875
13	0	-55	1945
14	0	0	2000
15	0	0	2000

Source: Blattberg and Neslin (1990)

¹¹ This would only occur if a product was very fast moving and a high proportion of its consumers were sole brand loyal.

Table 6 shows that the 2,000 additional units that were sold in week 4 were “borrowed” from weeks 5 to 13. As a result, a large sales trough appeared after the promotion. In this particular example, purchase acceleration is responsible for *all* of the additional promotional sales, and purchase timing acceleration has been credited with having the same influence as purchase quantity acceleration. A more realistic example would attribute the majority of the 2,000 additional units to brand switching and the majority of the (limited) purchase acceleration effect to increases in purchase quantity. This (hypothetical) data is presented in Table 7.

Table 7. Hypothetical data illustrating the effect of purchase timing and purchase quantity acceleration on post-promotion sales levels (B)

Period (weeks)	Timing Displacement	Quantity Displacement	Total Sales
1	0	0	2000
2	0	0	2000
3	0	0	2000
4 (promotion)	100	300	4000
5	-40	-10	1950
6	-30	-20	1950
7	-15	-35	1950
8	-10	-65	1925
9	-5	-60	1935
10	0	-45	1955
11	0	-35	1965
12	0	-20	1980
13	0	-10	1990
14	0	0	2000
15	0	0	2000

Clearly, the dominance of brand switching coupled with the prevalence of purchase quantity acceleration (vis-à-vis purchase time acceleration) prevent a discernible sales trough from appearing.

Additional Factors Affecting Post-Promotion Sales Levels

By explaining why sales troughs do not follow purchase acceleration, the preceding section suggests that post-promotion sales levels are only slightly depressed, but remain this way for many weeks. It is likely, however, that several phenomena prevent this (small but systematic) reduction in sales from being detected, thus producing an even flatter post-promotion sales graph.

First, transient increases in consumption rates (Moriarty, 1985), slight increases in repeat buying and the introduction of a small number of 'new' buyers may cancel out the negative effect of purchase acceleration.

Second, an appreciable amount of 'noise' will often exist within competitive fmcg markets. 'Noise' refers to sales fluctuations caused by uncontrollable or unquantifiable factors such as the lagged effects of a brand's previous promotions, competitors' activities, and changes in economic conditions. The resulting variability in weekly sales may confound the comparatively small purchase acceleration effect.

Finally, to determine the effect of a promotion on subsequent sales levels, post-promotion sales are compared with a 'baseline' that is calculated from historical sales data. This baseline may also be affected by purchase acceleration and be permanently depressed. Specifically, in pre-promotion periods, it is possible that the sales levels have been marginally reduced as a result of the purchase acceleration that occurred during the most recent promotion. This is likely to occur for brands that promote often (a characteristic of many fmcg brands). Additionally, baseline sales may also be depressed by purchase *deceleration*: consumers may delay repurchasing a particular product in anticipation of a promotion (Doyle and Saunders, 1985; Blattberg and Neslin, 1990). Whilst little empirical evidence relates to this phenomenon, it would seem plausible, particularly for brands which promote frequently or at fixed intervals.

3.4 PROFITABILITY

3.4.1 The Short-Term Profitability of Promotions

It would appear that consumer promotions may often be unprofitable despite the large 'spikes' that they produce. Jones (1990) comments that "Despite a good deal of talk about the importance of profit, the actual pursuit of profit appears to have given way de facto to a search for growth in naked sales volume" (p.146). This sentiment is supported by Hardy (1986) who found that marketing executives consider increases in sales volume to be a more important objective of promotions than increases in profitability. Further support for the pre-eminence of volume over profitability is provided by Abraham and Lodish (1990) who found that for a large number of promotions, it cost more than one dollar to obtain an incremental dollar of sales.

Jones (1990) produced a table illustrating how large short-term increases in a brand's sales, resulting from a price promotion, can adversely effect the profitability of the brand. Table 8 reproduces these calculations.

Table 8. Sales and profit outcomes of a 10% price reduction

Variable Cost (as a percent of NSV)	Price Elasticity Level	Effect on Sales	Effect on Net Profit (if 5% of NSV)	Effect on Net Profit (if 10 % of NSV)
40%	-2.2	+22%	+20%	+10%
50	-2.2	+22	-24	-12
60	-2.2	+22	-67	-34
40	-2.0	+20	No change	No change
50	-2.0	+20	-40%	-20%
60	-2.0	+20	-80	-40
40	-1.8	+18	-20	-10
50	-1.8	+18	-56	-28
60	-1.8	+18	-92	-46
40	-1.6	+16	-40	-20
50	-1.6	+16	-72	-36
60	-1.6	+16	-104	-52

Source: Jones (1990, p.148)

The three variable cost alternatives, the four price elasticities, and the two net profit figures produce ranges which Jones claims are representative of 'typical' brands within 'typical' markets.

Given this, it is apparent that in almost every instance, greater profit would have resulted if there had been *no* reduction in price. These adverse effects on profitability result from the lower selling price of each unit, coupled with the increased costs that are associated with the promotion. Collectively, these two factors are too large to be offset by the additional sales volume. As a result, when summarising the data contained within Table 8, Jones stated "...it seems clear that in most circumstances, manufacturers that promote heavily are deliberately exchanging profit for volume..." (p.148).

3.4.2 The Longer-Term Profitability of Promotions

The literature suggests that consumer promotions often fail to produce incremental profits in the short-term. As a consequence, if consumer promotions are to produce any incremental profits, they must generally do so in the longer-term. Yet the examination of these promotions' after-effects suggests longer-term changes are rare, if they occur at all.

If consumer promotions were able to attract new users to a brand (permanently), to increase repeat purchase rates among current users, or to create increases in primary demand, they would be directly responsible for longer-term profits. However, there is increasing evidence that these effects do not usually occur within established fmccg markets. Consequently, it is unreasonable to expect a promotion's poor short-term profitability to be offset by positive long-term effects.

Obviously, reduced repeat purchase rates will compound any adverse effect which a promotion may have had in the short-term. Many researchers have also expressed the view that purchase acceleration adversely affects profitability by bringing forward sales from a high margin to a low margin period (e.g., Blattberg and Neslin, 1990; Helsen and Schmittlein, 1992; Marsden, 1994; Raju, 1995). However, negative after-effects do not

usually arise; it is unreasonable to expect the lack of profitability exhibited by a promotion in the short-term to be exacerbated by negative after-effects.

There is compelling evidence that, generally, negligible after-effects are associated with price promotions. Thus it would seem that the profitability of price promotions is largely dependent upon the profits that are generated in the promotional period. Bawa and Shoemaker (1987a), who evaluated the profitability of media-distributed coupons, support this assertion: "...if a coupon promotion for an established brand is to be profitable, most of the profit must be made on the coupon redemption purchase" (p.376). Recalling that few incremental profits are in fact produced by consumer promotions in the short-term, it is evident that consumer promotion tools generally do not represent profitable marketing expenditures.

3.5 CHAPTER SUMMARY

Logically, the longer-term effects of consumer promotions can be either positive, negative or non-existent. A review of the consumer promotion literature, however, reveals that there are only a small number of studies which claim to provide support for either positive or negative after-effects. Furthermore, these studies have typically been subject to methodological flaws or their claims have been exaggerated.

In contrast, a body of sound empirical evidence is being formed that suggests consumer promotions (particularly price promotions) have negligible longer-term effects. Collectively, this evidence challenges claims that, within established fmcg markets, promotional activity can appreciably alter repeat purchasing and penetration rates, or encourage category expansion or stockpiling.

An important practical issue which arises from these findings is that the profitability of consumer promotions is largely dependent upon the profits that are generated in the promotional week/period (i.e., the short-term). However, in many cases, no incremental profit is produced by consumer promotions in the short-term.

CHAPTER FOUR: THEORETICAL EXPLANATIONS

As discussed in chapter three, there is evidence within the consumer promotion literature that supports positive, negative and neutral promotional after-effects. Whilst the evidence for each possible after-effect varies in quantity and credibility, it has been sufficient to encourage a number of theories to be advanced, all of which attempt to explain (and, to a lesser extent, predict) these after-effects.

Specifically, self-perception theory and reference price theory have been linked to negative after-effects, behavioural learning theory has been applied to positive after-effects, and repeat buying theory has been associated with neutral after-effects. Collectively, these theories are frequently referred to within the consumer promotion literature and the purpose of this chapter is to establish the relevance of each theory to consumer promotions within established fmcg markets.

4.1 SELF-PERCEPTION THEORY

Developed by Bem (1965; 1967; 1972), self-perception theory posits that individuals engage in a particular behaviour and then, by inference, attribute this behaviour to a disposition or attitude that is consistent with it. As Bem (1965, p.217) states: "...self-descriptive statements known as beliefs and attitudes are often under the partial control of the individual's overt behaviour and its apparent controlling variables."

The theory of self-perception, as used in the consumer promotion literature, is not entirely consistent with Bem's work. Bem's work had a behaviourist ideology; he explicitly stated: "[the theory of self-perception] eschews any reference to hypothetical internal processes and seeks, rather, to account for observed functional relations between current stimuli and responses in terms of the individual's past training history." (Bem, 1967, p.184). According to Bem, 'attitudes' (and related cognitive constructs) are merely verbal descriptions of past behaviour which have no directive influence on future behaviour.

Within the consumer promotion literature, 'self-perception' has also been used to suggest that hypothetical constructs (favourable brand attitudes) can be attributed to prior behaviours (product purchase). However, an underlying premise of the theory as it is used in the consumer promotion literature is that these attitudes are not merely verbal descriptions of past behaviour; they are considered to be legitimate entities that are precursors to future behaviour.¹²

Within a consumer promotion context, self-perception theory has been advanced to explain the reduction in repeat purchase probabilities that appear to follow some promotional activities. For example, Blattberg and Neslin (1990) suggest that individuals who purchase a product at its regular price (and without any associated incentive) will attribute the purchase to favourable brand attitudes. However, self-perception theory predicts that when an individual purchases a product on promotion, they will often attribute the purchase to the promotional incentive (external causes) rather than to favourable brand attitudes (internal causes). For example, individuals who purchase a product without any promotional incentive are considered to be more likely to repurchase it ("I must have bought Brand X because I like it") than are individuals who purchase a product on deal ("I must have bought Brand X because of the promotion"). Thus Blattberg and Neslin (1990) noted that the withdrawal of the promotion means consumers no longer have a firm cognitive reason to continue purchasing.

Self-perception theory predicts that consumers are unlikely to attribute their purchasing behaviour to a small incentive; it is unlikely to be seen as a "controlling variable" that influenced the purchase (even if it was) and so the behaviour is more likely to be attributed to internal motivations (and thus be more likely to be repeated). An application of this phenomenon is the "foot-in-the-door" technique whereby a person who complies with an initial, small request is thought to be more likely to agree to a subsequent, larger request

¹² Therefore, within the sales promotion literature, 'self-perception theory' is cognitively-oriented (attitudes are used to explain behaviour). However, in its original form, 'self-perception theory' has a behaviourist orientation ('attitudes' are inferred from past behaviour).

than is someone who is only asked to comply with the larger request (Freedman and Fraser, 1966; Schwarzwald, Bizman and Raz, 1983).

Within the consumer promotion literature, Scott (1976) conducted an experiment to "...determine the relative effectiveness of the foot-in-the-door technique when various levels of incentive are used to induce trial, and to assess the efficacy of self-perception theory in explaining these findings." (p.263) whilst Dodson, Tybout and Sternthal (1978) used self-perception theory to predict the effect of deal retraction on repeat purchasing behaviour. Neither study provided unequivocal support for self-perception theory, and there are two compelling reasons why this may have been so. First, proponents of self-perception theory have assumed that consumers process a considerable amount of price-related information. However, many studies have found that, generally, consumers do not accurately recall the prices (or other point-of-purchase information) of the goods which they purchase (Russo, Staelin, Nolan, Russel and Metcalf, 1986; Achabal, McIntyre and Smith, 1990; Dickson and Sawyer, 1990). Dickson and Sawyer's (1990) study was the first field study to investigate shoppers' knowledge about the presence and size of price deals. It found that "...less than half of the shoppers could recall the price of the item they had just placed in their shopping basket, and less than half were aware they had selected an item that was selling at a reduced price. Only a small minority of those who bought on special knew both its price and the amount of the price reduction." (p.49).

Second, and more importantly, the theory of self-perception is predicated upon the existence of reduced repeat purchasing rates following the retraction of deals such as temporary price reductions and media-distributed coupons. However, there are compelling arguments (and accumulating evidence) that this phenomenon may not be as prevalent as has hitherto been thought (see Section 3.2.1). In view of this, the applicability of self-perception theory to sales promotions would seem to be very limited.

4.2 REFERENCE PRICE THEORY

Within fmCG markets, promotions which reduce prices directly (such as temporary price reductions) or indirectly (such as coupons) are commonplace. Reference price theory suggests that if a brand's price changes, perceptions of the brand will be affected. This, in turn, is expected to influence purchasing behaviour. Reference prices are generally thought of as an internal standard (i.e., "fair" or "appropriate" prices) which are developed in response to the variability of observed prices. Gijbrechts (1995) describes these expected prices as "multidimensional constructs composed of more than the actual (retail) price. They are compared with the observed levels, and the discrepancy between anticipated and actual prices affects brand choice and purchase quantity." (p.119). Like self-perception theory, reference price theory has been used to support the claim that price-related consumer promotions lead to reductions in purchasing rates.

Definitions of Reference Prices

Within the literature, researchers tend to use the term "reference price" to cover a wide range of definitions, not all of which are related to actual prices. For example, the term "aspiration price" describes a reference price that has been determined by factors such as budget constraints or expenditure targets (Jacobson and Obermiller, 1990). The vast majority of definitions, however, consider reference prices to be based upon *actual prices*; that is, formed from consumers' experiences. Thus consumers' reference prices for a particular brand may be synonymous with, or closely related to, a number of 'actual prices'. These include: the last price paid for the brand (Gabor, 1977); the price consumers' anticipate the brand is selling for at present (Winer, 1986); consumers' expectations of the brand's future price (Jacobson and Obermiller, 1990; Kalwani et al, 1990; Assuncao and Meyer, 1990); the modal price of numerous past prices which have been stored in memory (Olander, 1969); and the average price of all competing brands (Monroe, 1973). An obvious implication of all these definitions is "...the variety is such that it is impossible to use the term unambiguously." (Jacobson and Obermiller, 1990).

The Interaction Between Reference Prices and Price Promotions

Since reference prices are usually derived from actual prices, the relationship between reference price and actual price is considered to be positive. Consequently, some researchers have argued that promotions which lower a brand's price (particularly temporary price reductions) will result in the lowering of consumers' reference prices for the brand. Reference price theory predicts that of the consumers who have their reference prices lowered by the promotional price, a proportion will perceive the brand's "regular" price as being too high. Accordingly, it is expected that these consumers will not purchase this brand when it reverts to its "regular" price after the promotional period, thus explaining negative after-effects of price promotions.

Despite its apparent logic, this conclusion depends on a number of assumptions, not all of which are well supported. These weaknesses, which challenge the validity of using reference price theory to explain the negative after-effects of price-related promotions, are discussed in the remainder of this section. Some of these limitations are also associated with self-perception theory.

Limitations of Reference Price Theory

Almost invariably, researchers consider reference prices to be "unobservable variables" (Gijsbrechts, 1995). Consequently, the direct measurement of reference prices is not tenable; instead they have to be inferred from verbal reports, or approximated on the basis of assumed (i.e., untestable) relationships with actual prices and consumers' expectations. Reference prices are therefore unfalsifiable and their internal validity cannot be established.

It is likely that the untestable, unfalsifiable nature of the reference price concept has contributed to the numerous definitions that were discussed previously. Consequently, the research programme that is associated with reference price theory appears to be uncoordinated and fragmented. More importantly, no practical guidance is available when choosing between alternative reference price measures.

Reference price theory is also predicated upon consumers being aware of the prices of commodities. However, as noted in section 4.1, a number of studies have found that consumers do not accurately recall the prices (or other point-of-purchase information) of the goods which they purchase (Zeithamal, 1982; Russo et al, 1986; Dickson and Sawyer, 1986; 1990; Conover, 1986; Achabal et al, 1987; McGoldrick and Marks, 1987; Dickson and Sawyer, 1990). Overall, these studies suggest that considerably less price information is processed by consumers than has hitherto been assumed by proponents of such theories as reference price theory and self-perception theory. As a result, the validity of such theories (particularly within fmcg markets) is questionable.

A further limitation of reference price theory is that it has been applied to price-related promotions to explain the reduced repeat purchasing rates that may follow deal retraction. However, the evidence on which this premise is based is contentious and compelling arguments that promotions do not produce negative after-effects have been presented (e.g., Neslin and Shoemaker, 1989). Furthermore, even if this evidence was sound, reference price theory is predicated upon a high level of cognitive activity and this would seem to make it inappropriate for low-involvement, repeat purchase situations.

4.3 BEHAVIOURAL LEARNING THEORY

Behavioural learning theory provides an alternative explanation for the longer-term effects of consumer promotions. A key aspect of behavioural learning theory is operant conditioning. Operant conditioning is a process in which the frequency of a particular behaviour is modified by the consequences of the behaviour (Reynolds, 1975). If the consequences of a particular behaviour increase the probability that behaviour will occur again, they are reinforcing. A positive reinforcer strengthens any behaviour that produces it whilst a negative reinforcer strengthens any behaviour that reduces or eliminates it (Skinner, 1993). Operant conditioning is thus a generic term used to refer to a range of more specific activities.

The Application of Behavioural Learning Theory to Price Promotions

The central tenet of behavioural learning theory is that positively reinforced behaviour is more likely to recur than behaviour that is not reinforced (Rothschild and Gaidis, 1981). An obvious implication of this is that positive reinforcement facilitates repeat purchasing behaviour. As repeat purchasing behaviour is strongly associated with the success of a brand (Rothschild and Gaidis, 1981; Ehrenberg, 1988; Nielsen, 1993), behavioural learning theory would appear to be particularly relevant to the marketing discipline. Moreover, behavioural learning theory, primarily via the concepts associated with operant conditioning, can be used to explain positive promotional after-effects.

Behavioural learning theory suggests that a brand has a greater probability of being repurchased if the preceding purchase was on deal than if the preceding purchase was not on deal, because the promotional incentive and the consumption of the brand are expected to act as positive reinforcers, increasing the brand's average purchase frequency. Positive after-effects are expected to be greatest if the reinforcement from the incentive is less than the reinforcement obtained from consuming the brand (Rothschild and Gaidis, 1981; Blattberg and Neslin, 1990), although measuring this effect is likely to be very difficult. To achieve positive after-effects, Rothschild and Gaidis (1981) propose that incentives should be: immediate; not be too large; used intermittently, and that they emphasize the product. Behavioural learning theory also suggests that a brand's penetration level can be increased via shaping.

However, as positive longer-term effects of consumer promotions have rarely been documented within established fmcg markets, it would appear that behavioural learning theory is either inappropriate for these markets or it is being incorrectly applied. The former explanation - that operant conditioning mechanisms are largely ineffective within an established fmcg environment - would seem to be the better one. Such mechanisms would be likely to produce positive after-effects within an environment in which a brand (say Brand X) had competitors that offered very similar consumption-related reinforcement but did not engage in promotional activity (whilst Brand X did). It would

also be reasonable to expect that in an environment in which Brand X's competitors promoted rarely and, when they did, they used incentives which acted as primary reinforcers, Brand X could achieve positive promotional after-effects by employing 'consumer franchise building' techniques. In these scenarios, behavioural learning theory would seem to be able to account for increases in repeat purchasing upon the retraction of promotional deals. These scenarios, however, are inconsistent with the realities of most markets: most markets, particularly those associated with fmcgs, are characterised by a large number of similar brands and the majority (if not all) of these brands engage in regular (and similar) promotional activity.

It is therefore unlikely that consumer promotions, via the operant conditioning mechanism, are able to produce positive after-effects. Instead "People form stable propensities to act in particular ways [i.e., they form habits] which are unaffected by minor variations in the reinforcement experience" (East, 1990, p.24). East's comment is strongly supported by repeat buying theory, which is discussed in the following section.

4.4 REPEAT BUYING THEORY

Ehrenberg (1988) and colleagues have developed a theory of repeat buying which has primarily (but not exclusively) been applied to fmcg markets. The theory was developed to explain and predict a number of empirical regularities that were associated with repeat buying behaviour, using models such as the NBD.¹³

The basic premise of repeat buying theory is that the general repeat buying structure of stationary (or static) markets exhibits little variation between successive time periods of equal length. This lack of variability arises because all repeat buying indices for a particular brand/product category can be predicted from the brand's penetration and average purchase frequency and, within established fmcg markets, these values are relatively constant from one period to the next.

¹³ For a discussion of the NBD model, refer to section 5.3.1.

The (empirically-based) explanation for this phenomenon is that previous purchases have little effect on purchase probabilities (and thus subsequent purchases). Brand choice within stationary fmcg markets is therefore considered to be “zero-order” - no appreciable “learning” or “purchase event feedback” occurs (see for example Bass, Givon, Kalwani, Reibstein and Wright, 1984; Ehrenberg, 1988, Bass, 1993). Rather, buyers within such markets typically form habits in order to simplify the repetitive choice process: “The unifying tendency towards some more or less “habitual” buying behaviour...is therefore what seems to dominate actual buyer behaviour” (Ehrenberg, 1988, p.5-6).

Repeat buying theory predicts the overall sales levels and buying structure of most fmcg markets will remain stationary in the longer-term (despite various marketing and non-marketing influences). This, in turn, suggests that the longer-term effect of consumer promotions within these markets will be negligible. Ehrenberg, Hammond and Goodhardt's (1994) study supported this contention: in the longer-term, repeat purchasing rates were found to be largely unaffected by price promotions. The failure of price promotions to alter repeat buying rates, despite the large sales increases which they produced, was explained by the fact that almost all of the additional buyers during the promotional week had bought the (promoted) brand before.

The apparent inability of price promotions (and presumably other forms of consumer promotion) to attract ‘new’ buyers is consistent with actual buying behaviour. Within established markets, consumers generally purchase several of the brands that are available (i.e., they have a ‘brand repertoire’). They pay little attention to the brands excluded from this repertoire and, consequently, they rarely purchase such brands. Furthermore, on occasions when these ‘new’ brands are purchased, it is unlikely that a strong repeat buying habit will ensue.

Ehrenberg et al's findings indicate that price promotions encourage many consumers to choose a different brand from their repertoire than they otherwise would have chosen (hence sales ‘spikes’); they prompt increased switching among familiar brands in what appears to be “a deliberate form of selective consumer reaction” (Ehrenberg et al, 1994,

p.17). However, upon purchasing the promoted brand (regardless of whether the promotion had influenced the timing of the purchase), consumers' purchase propensities are unaffected as established fmcg markets are typically "zero-order". Subsequently, Ehrenberg et al failed to observe any positive or negative repeat buying after-effects - price promotions were found to have neutral after-effects.

4.5 CHAPTER SUMMARY

This chapter has critiqued several theories that have been advanced to explain (and, to a lesser extent, predict) the after-effects of consumer promotions: self-perception theory, price perception theory, behavioural learning theory and repeat buying theory. Of these, self-perception theory, price perception theory, and behavioural learning theory (the first two are associated with negative after-effects and the latter with positive after-effects) have been found to be problematic. Specifically, these theories are predicated upon assumptions that are inconsistent with the realities of most fmcg markets and are reliant upon relationships which are very difficult (if not impossible) to accurately measure. As a result, these theories lack empirical support and it would appear that they are of little use or relevance.

In contrast, repeat buying theory is falsifiable, generalisable, and has very good predictive validity. The assumptions upon which it is based usually hold, particularly within fmcg markets. Finally, repeat buying theory predicts and explains that, in the longer-term, consumer promotions will have neutral effects - an outcome that is gaining increasing empirical support.

CHAPTER FIVE: METHODOLOGY

This study replicates and extends the work of Ehrenberg, Hammond and Goodhardt (1994) who used scanner and diary panel data to investigate the after-effects of price promotions for 25 fmcg markets within four countries. Their data collection periods were between six months and two-and-a-half years in length, and sample sizes ranged from 1,000 to 5,000 consumers. Several analyses were conducted to establish the effect of price promotions on sales levels, repeat purchasing rates and the introduction of new buyers. On the basis of these analyses, Ehrenberg, Hammond and Goodhardt (1994, p.17) concluded:

This study has confirmed previous more isolated evidence, and also our own prior expectation, that large price-related consumer promotions (or other large sales peaks) for leading brands of established packaged grocery products appear to have no after-effect on the brand's sales or repeat-buying loyalty.

The current study determined the extent to which these findings applied to a prominent fmcg market in New Zealand. In addition, this study extended earlier work by examining whether variations among 'light' and 'heavier' buyers' behaviour existed.

5.1 PROCEDURE

The Data

The data for this study consisted of weekly household-level purchase records for five margarine brands.¹⁴ For each of the households included in the study, weekly purchasing records were obtained for a period of 24 consecutive weeks (June to December, 1996). Specifically, the households studied made regular purchases from Foodtown, Palmerston

¹⁴ Data was obtained for brands within several other product categories but, due to data collection errors, the integrity of this data was questionable. Consequently, this data had to be excluded from this thesis.

North, using a 'Foodtown card'. The Foodtown card scheme is a loyalty programme; many of the discounts that are offered within Foodtown supermarkets are available solely to Foodtown cardholders. Foodtown cardholders present their card at the point-of-sale and their purchases are electronically recorded. From this, discounts are calculated and then subtracted from the cardholder's total purchase and, as each card has an identification number, purchasing histories of individual households can be established and monitored.

Within the context of this study, the importance of the Foodtown card programme was that analyses of purchasing behaviour could be conducted at various levels of aggregation. For example, the total sales level of a product category or brand could be compared from one time period to the next or, at lower levels of aggregation, the incidence of repeat purchasing and brand switching could be determined, new buyers could be identified and households could be grouped into 'heavy' and 'light' buyers (in addition to many other indices of purchasing behaviour).

The price of each brand in the study (as well as additional information such as displays and stockouts) was recorded from Foodtown (Palmerston North) for weeks 6-24 of the data collection period. When matched with the scanner panel data, this information enabled sales peaks due to price promotions to be identified. This aspect of the current study's methodology overcame a comparative weakness of the Ehrenberg, Hammond and Goodhardt (1994) study wherein large sales peaks were often used as surrogates for price promotions.¹⁵

The Product Category and Brands Studied

Every household in the study had their purchases of the following brands of margarine captured and totalled on a weekly basis: Meadowlea, Miracle, Sunrise, Praise and

¹⁵ This was necessary because a lot of the panel data used in the study had no corresponding price-related information. For a given brand, a "large sales peak" was defined as being 25 percent above average sales levels and, according to Ehrenberg et al (1994), such sales peaks are almost always the result of price-related promotions. The current study also had to use large sales peaks as surrogates for price promotions during the first four weeks of the data collection period; this was because no pricing data was collected during this time.

Foodtown (a house brand). Margarine was selected for several reasons. It was included for replication purposes (i.e., it was examined in the Ehrenberg, Hammond and Goodhardt (1994) study); it was also selected because it was expected to have a short consumption cycle (and thus to be bought frequently); and because it was expected to be purchased by a high proportion of the sample. Additionally, margarine was selected because it contained a reasonably small number of variants - the product category was not too fragmented.

5.2 SAMPLE

The population from which the sample was drawn was all Foodtown (Palmerston North) customers who use a Foodtown card. Initially, the sample consisted of 1,000 Foodtown (Palmerston North) cardholders. These cardholders were specifically selected due to their weekly expenditure at Foodtown (this expenditure was high when compared with the mean of all Foodtown cardholders). This criterion was imposed to increase the likelihood that the households in the sample made the majority of their grocery purchases (and, by implication, the majority of their purchases of the brands being studied) at Foodtown.¹⁶ This is an important consideration, because if a large proportion of the sample were making many purchases at other supermarkets, the recorded purchase histories of these cardholders would have been misrepresented. Furthermore, the detection of regularities in purchasing behaviour may have been inhibited.

Within the initial sample of 1,000, sample members were identified as businesses, Foodtown employees and households. Businesses and Foodtown employees were eliminated from the sample; 902 households remained. The sample was then further reduced by eliminating sample members who had not used their Foodtown card since October 1, 1996. Without doing this, it would be unclear whether an individual's failure to purchase or repurchase the brands in the study was due to a change in their purchasing

¹⁶ Through the provision of special discounts to Foodtown cardholders, the Foodtown card encourages 'store loyalty'. It would therefore seem reasonable to assume that the highest-spending Foodtown cardholders *do* make the majority of their grocery purchases at Foodtown.

behaviour or because their purchases were no longer being recorded. Twenty-nine sample members had not used their Foodtown card since October 1, 1996. Consequently, the final sample size was 873.

5.3 ANALYTICAL TOOLS

5.3.1 The Negative Binomial Distribution (NBD)

The NBD is a mathematical model which can be used to predict a number of repeat buying indices within stationary markets. Data relating to the penetration, the average purchase frequency, and the time period under consideration are inputs to the NBD model. Fundamental to the model is the requirement that, over time, the purchase frequencies of a brand's individual buyers follow a Poisson distribution (i.e., they are "as if" random and independent of each other). Secondly, the model assumes that the averages associated with these (individual) purchase frequencies (i.e., the means of the Poissons) follow a Gamma distribution (Chatfield and Goodhardt, 1970; Schmittlein, Bemmaor and Morrison, 1985; Ehrenberg, 1988; East, 1990). From this it can be deduced that, across consumers, "the distribution of purchases in any single time period should follow the negative binomial distribution" (Ehrenberg, 1988, p.63).

As observed purchase frequency distributions *do* typically follow a negative binomial distribution, the Poisson and Gamma assumptions of the NBD model appear to be valid. However, much greater support for the NBD arises from the fact that many additional deductions (such as those regarding repeat buying from one period to the next) are also confirmed when tested empirically: estimates obtained from using the NBD are very close to the figures obtained from panel data (East, 1990). Consequently, "The justification of the theory is therefore not the absolute truth of the theory in itself but that it works in practice and helps us to know and understand a good deal about empirical buyer behaviour and its essential simplicities" (Ehrenberg, 1988, p.80).

Appendix B contains the specific NBD formulae that were used in the current study. For each formula, the calculation of a theoretical value is illustrated.

5.4 CHAPTER SUMMARY

Figure 4, on the following page, summarises the methodology used in this study and compares and contrasts it with Ehrenberg, Hammond and Goodhardt (1994) - the study which this research replicated and extended.

Figure 4. A comparison of the current study with Ehrenberg, Hammond and Goodhardt (1994)

	Ehrenberg, Hammond and Goodhardt (1994)	Dunnett (1997)
SAMPLE SIZE:	1,000 to 5,000	873
DATA:	<ul style="list-style-type: none"> - Scanner panel and diary panel data. - Weekly shelf prices corresponding to some of the panel data were recorded 	<ul style="list-style-type: none"> - Scanner panel data. - Weekly shelf prices corresponding to almost all of the panel data were recorded
DATA COLLECTION PERIOD:	6 months to two-and-a-half years	6 months
PRODUCT CATEGORIES:	Catsup, cheese, chocolate cookies, cooking oil, crackers, margarine, milk puddings, RTE cereals, sauces, soup, yoghurt, carbonated drinks, coffee (ground), coffee (instant), tea bags, cleaners, detergents, paper towels, toothpaste	Margarine
COUNTRIES:	United Kingdom, United States, Germany, Japan	New Zealand

CHAPTER SIX: RESULTS AND DISCUSSION

The results of a number of analyses, relating to the longer-term effects of price promotions, are presented and discussed in the following sections. The analyses are at varying levels of aggregation and, whenever possible, are conducted for each of the five brands from which data was available.

The first section compares brands' sales levels prior to and following price promotions. Using the same 'before' and 'after' periods, the next section investigates the effect of price promotions on repeat buying rates. Following this, *general* repeat buying rates, across different time periods of equal length, are established for each brand and compared with their predicted values. Next, the effect of price promotions on repeat purchasing probabilities and the introduction of 'new' buyers is investigated. Finally, the work of Ehrenberg et al (1994) is extended by comparing the observed and theoretical repeat buying rates and average purchase frequencies of 'light' and 'heavier' buyers.

6.1 BEFORE-TO-AFTER SALES COMPARISONS

When investigating the longer-term effects of a price promotion for a particular brand, a simple yet very important procedure is to compare the brand's sales before the promotional week to the brand's sales after the promotional week. Ehrenberg et al compared the average weekly sales of 4-week "clean" periods that were situated before and after a promotion. As mentioned previously, a "clean" week is indicative of 'normal' weekly sales; thus a "clean" period refers to a number of (consecutive) weeks in which there are no abnormal sales fluctuations.

The pairs of (4-week) clean periods which Ehrenberg et al compared were those which were closest to a particular promotional week, and they were defined as being periods

which were free of any 25 percent or greater sales peaks.¹⁷ The decision to exclude weeks with sales that were at least 25 percent higher than usual is subjective and could thus be seen as a methodological flaw. However, this subjectivity would appear to be unavoidable and, more importantly, the general procedure used by Ehrenberg et al would appear to be a logical and pragmatic means by which to compare before-to-after sales.

In the current study, only two before-to-after sales comparisons were able to be made using 4-week clean periods (one for Meadowlea and one for Praise).¹⁸ Meadowlea was promoted in weeks 9, 11 and 13 and the same pair of clean periods applied to each of these promotional weeks (see Appendix C). Prior to these promotions, weeks 2 to 5 yielded average weekly sales of 49 units whilst after these promotions, weeks 16 to 19 produced average weekly sales of 47 units. Between these two periods, therefore, the sample data shows a decrease in average weekly sales of 2 units. Similarly, the before-to-after sales comparison for Praise's week 10 promotion (involving weeks 6 to 9 and weeks 11 to 14, respectively) showed a decrease in average weekly sales of 1 unit. These results are displayed in the upper section of Table 9.

¹⁷ Ehrenberg et al did not state whether or not they also excluded periods that were at least 25 percent *lower* than usual weeks. However, as excluding large sales troughs would seem to be just as relevant as excluding large sales peaks, the current study has done so.

¹⁸ These clean periods were defined as being periods in which there were no 25% or greater sales fluctuations.

Table 9. The variability in sales from before-to-after a price promotion sales peak - 25% "clean" periods

Brand	Promotional Week(s)	Sales ^a before	Sales ^a after	Before-to-after sales difference
4 week "clean" periods				
Meadowlea	9, 11 & 13	49	47	-2
Praise	10	23	22	-1
3 week "clean" periods				
Meadowlea	9, 11 & 13	47	47	0
Praise (1)	4	22	24	2
Praise (2)	10	22	22	0
Praise (3)	15	22	22	0
TOTAL		185	184	-1

^aSales figures are the average weekly unit sales of the relevant "clean" period.

Ideally, several such before-to-after sales comparisons would be able to be made for every margarine brand. By calculating the mean before-to-after sales discrepancy for each brand, a more reliable estimate is likely to result. However, for this to occur, very long data collection periods, shorter clean periods, and markets with very few sales fluctuations are needed. Reducing the length of clean periods to three weeks enabled four before-to-after sales comparisons to be made. As three of these comparisons related to Praise, a more robust estimate of the effect of price promotions on sales levels *was* able to be gained for this brand.

Reducing the length of clean periods would usually be expected to increase the magnitude of before-to-after sales discrepancies. However, as the lower section of Table 9 illustrates, the before and after average weekly sales figures are very similar. In fact, only one before-to-after sales comparison (Praise (1)) resulted in any discrepancy at all. Consequently, a feature of Table 9 is that despite being promoted regularly, Praise's sales

exhibit a great deal of stability throughout the data collection period: the average before-to-after sales difference was .67 units. (Aggregating the three before-to-after comparisons results in a discrepancy of two units and $2/3 = .67$).

Ehrenberg et al did not produce results relating to specific brands; they reported the before-to-after sales results of product categories. Typically, individual product categories exhibited only very small before-to-after sales discrepancies. These were both positive and negative and, overall, the average sales across the 25 product categories studied increased by 1 percent. This result is corroborated by the present study as the margarine product category also produced a near-zero difference in before-to-after sales (a 0.54% decrease). The final ("Total") row of Table 9 summarises the negligible effect which price promotions had on the sales of margarine; only one fewer unit was sold in the periods after the various price promotions than in the periods before them.

Ehrenberg et al claimed that their study's results were not substantially affected if sales peaks were defined more stringently as being at least 50 percent higher than average weekly sales. By implication, Ehrenberg et al suggested that similar results to those in Table 9 should be produced if "clean" periods include weeks with sales that are up to 50% higher or lower than average. Table 10 shows the results of this analysis. The more liberal definition of a "clean" period enabled many more weeks to be included (see Appendix C, pages 113 and 114). Consequently, a greater number of before-to-after sales comparisons were able to be made (including several 5-week comparisons and comparisons for the "Sunrise" brand).

Table 10. The variability in sales from before-to-after a price promotion sales peak - 50% "clean" periods

Brand	Promotional Week(s)	Sales^a before	Sales^a after	Before-to-after sales difference
5 week "clean" periods				
Meadowlea	9, 11 & 13	45	40	-5
Praise (1)	10	23	24	1
Praise (2)	15	23	22	-1
Praise (3)	19	24	22	-2
4 week "clean" periods				
Meadowlea	9, 11 & 13	49	41	-8
Praise (1)	10	23	22	-1
Praise (2)	15	22	22	0
Praise (3)	19	24	22	-2
Sunrise	18	26	23	-3
3 week "clean" periods				
Meadowlea	9, 11 & 13	47	35	-8
Praise (1)	10	22	22	0
Praise (2)	15	22	22	0
Praise (3)	19	22	23	1
Sunrise (19)	18	25	23	-2
TOTAL		397	363	-34

^aSales figures are the average weekly unit sales of the relevant "clean" period.

Overall, 34 fewer units of margarine were sold in the periods after the various price promotions than in the periods before them. This represents an 8.6 percent decrease - appreciably larger than the near-zero average difference that resulted when "clean" periods were defined as being within $\pm 25\%$ of average weekly sales. The majority of this decrease, however, is attributable to the before-to-after comparisons for Meadowlea. The less stringent definition of clean periods led to weeks 14 and 15 being included in each of Meadowlea's "sales after" calculations. The sales in these weeks were substantially lower

than usual as they immediately followed a 5-week period in which Meadowlea had three very large sales peaks (due to three price promotions). Meadowlea's sales in weeks 14 and 15 were the lowest of the (24-week) data collection period. These sales are included in Meadowlea's 3, 4 and 5-week post-promotion clean periods and thus exaggerate the before-to-after sales discrepancies for the entire margarine category. If the Meadowlea comparisons are omitted, the 11 remaining before-to-after comparisons result in a difference of 3.5 percent. In comparison, the average deviation for the product categories reported by Ehrenberg et al (1994) was four percent.

6.2 BEFORE-TO-AFTER REPEAT BUYING RATES

The previous section showed that, within the margarine product category, weekly sales levels are largely unaffected by price promotions. It is possible, however, that these price promotions affected the margarine product category in other ways. Specifically, repeat buying rates may have been altered by the promotions, despite the near-constancy of before-to-after sales levels. For example, a promotion may temporarily remove a large number of a brand's regular buyers from the market by encouraging purchase acceleration. Consequently, the period following the promotion would have fewer repeat buyers than usual. However, the reduced sales that would normally follow the lower repeat buying rates of 'regular' buyers could be offset by 'new' buyers who, having purchased the brand during the promotional week, also purchase it following the retraction of the deal.

To determine whether the incidence of repeat buyers after a sales peak is normal, before-to-after repeat purchasing rates can be compared with the predictions of the NBD model. Unfortunately, the "clean" periods which were used in Tables 9 and 10 are inadequate for deriving accurate repeat buying predictions using the NBD: the NBD systematically underestimates repeat buying rates when short time periods are used (Ehrenberg, 1988). As Ehrenberg et al (1994) had sales data over very long time periods (up to two-and-a-half years), they were able to overcome this problem by using 8-week clean periods instead of the 4-week clean periods which they had used when comparing before-to-after sales.

Using the same “clean” periods as for the before-to-after sales comparisons, Tables 11 and 12 show the percentage of people who purchased the different margarine brands before these were promoted and who also purchased these brands after the promotion period. These observed repeat buying rates are then compared with the theoretical repeat buying rates.

Table 11. Repeat buying from before-to-after a price promotion sales peak - 25% “clean” periods

Brand	Observed repeat-buying percentage	Theoretical repeat-buying percentage	Mean Absolute Deviation
4 week “clean” periods			
Meadowlea	48	43	5
Praise	58	49	9
3 week “clean” periods			
Meadowlea	43	32	11
Praise (1)	63	45	18
Praise (2)	64	43	21
Praise (3)	65	45	20
AVERAGE	57	43	14

Table 12. Repeat buying from before-to-after a price promotion sales peak - 50% "clean" periods

Brand	Observed repeat-buying percentage	Theoretical repeat-buying percentage	Mean Absolute Deviation
5 week "clean" periods			
Meadowlea	45	49	4
Praise (1)	57	58	1
Praise (2)	59	58	1
Praise (3)	80	60	20
4 week "clean" periods			
Meadowlea	40	43	3
Praise (1)	58	49	9
Praise (2)	81	55	26
Praise (3)	76	54	22
Sunrise	56	50	6
3 week "clean" periods			
Meadowlea	34	30	4
Praise (1)	64	43	21
Praise (2)	65	45	20
Praise (3)	74	44	30
Sunrise	63	42	21
AVERAGE	61	49	13

As expected, the theoretical repeat buying rates are substantially lower than the observed repeat-buying rates and, as the clean periods are shortened, the discrepancies become larger. Comparing these values provides little insight into the effect of price promotions on repeat buying rates as it is unclear whether the disparity between the values can be attributed to 'real' differences. Perhaps of greatest interest, therefore, is the consistency of Praise's observed repeat buying rates in Table 11: despite several price promotions, variations in the incidence of repeat buyers for Praise were small.

6.3 GENERAL REPEAT BUYING RATES

A more general approach to establishing the effect of price promotions on repeat buying rates is to compare repeat buying levels, for each brand, across *all* available periods (regardless of whether they are “clean” or not). These general repeat buying levels indicate how stable a market is; any large discrepancies can be investigated to see if they were *likely* to have been caused by promotional activity.¹⁹ Repeat buying levels in subsequent periods can then be calculated to determine whether the market’s repeat buying structure continues to be affected in the longer-term.

Ehrenberg et al established general repeat buying levels by comparing observed and theoretical repeat buying across non-consecutive 8-week periods. To illustrate, the theoretical repeat buying rate for weeks 17 to 24 was computed (using the NBD model) from the penetration and average purchase frequency of weeks 1 to 8²⁰. This ‘norm’ was then compared with the percentage of buyers within weeks 1 to 8 who also bought the brand/product category in weeks 17 to 24 (i.e., the ‘actual’ or ‘observed’ repeat buying rate).

When replicating Ehrenberg et al’s analysis, the current study had to use 6-week periods so that two non-consecutive repeat buying comparisons could be made. Repeat buying levels were also investigated across consecutive 6-week periods, consecutive 8-week periods, and consecutive 12-week periods. The results of these four analyses are shown in Tables 13, 14, 15 and 16, respectively. These tables appear on the following four pages.

¹⁹ As this study has a non-experimental design, it precludes the establishment of causal relationships between different variables (such as price promotion activity and repeat buying rates).

²⁰ An example of an NBD computation, for determining a theoretical repeat buying rate, is provided in Appendix B.

Table 13. The general level of repeat buying across non-consecutive 6-week periods

Brand	Observed repeat-buying percentage	Theoretical repeat-buying percentage	Mean Absolute Deviation
Meadowlea			
Period I to III	57	53	4
Period II to IV	58	58	0
Miracle			
Period I to III	29	53	24
Period II to IV	52	44	8
Sunrise			
Period I to III	74	58	16
Period II to IV	56	65	9
Praise			
Period I to III	55	60	5
Period II to IV	69	62	7
Foodtown			
Period I to III	50	33	17
Period II to IV	70	52	18
AVERAGE*	60	54	9

*As it is a particularly marked exception, Meadowlea's Period I to III comparison was excluded when calculating these figures.

Table 14. The general level of repeat buying across consecutive 6-week periods

Brand	Observed repeat-buying percentage	Theoretical repeat-buying percentage	Mean Absolute Deviation
Meadowlea			
Period I to II	75	53	22
Period II to III	58	58	0
Period III to IV	61	53	8
Miracle			
Period I to II	19	53	34
Period II to III	60	44	16
Period III to IV	56	56	0
Sunrise			
Period I to II	63	58	5
Period II to III	74	65	9
Period III to IV	47	54	7
Praise			
Period I to II	60	60	0
Period II to III	64	62	2
Period III to IV	78	61	17
Foodtown			
Period I to II	56	33	23
Period II to III	54	52	2
Period III to IV	67	53	14
AVERAGE*	62	54	9

*As it is a particularly marked exception, Meadowlea's Period I to II comparison was excluded when calculating these figures.

Table 15. The general level of repeat buying across consecutive 8-week periods

Brand	Observed repeat-buying percentage	Theoretical repeat-buying percentage	Mean Absolute Deviation
Meadowlea			
Period I to II	72	62	10
Period II to III	58	61	3
Miracle			
Period I to II	27	55	28
Period II to III	56	58	2
Sunrise			
Period I to II	71	64	7
Period II to III	63	66	3
Praise			
Period I to II	57	64	7
Period II to III	78	66	12
Foodtown			
Period I to II	42	50	8
Period II to III	75	59	16
AVERAGE*	64	61	8

*As it is a particularly marked exception, Meadowlea's Period I to II comparison was excluded when calculating these figures.

Table 16. The general level of repeat buying across consecutive 12-week periods

Brand	Observed repeat-buying percentage	Theoretical repeat-buying percentage	Mean Absolute Deviation
Meadowlea Period I to II	69	69	0
Miracle Period I to II	35	59	24
Sunrise Period I to II	72	71	1
Praise Period I to II	59	69	10
Foodtown Period I to II	66	60	6
AVERAGE*	67	67	4

*As it is a particularly marked exception, Meadowlea's Period I to II comparison was excluded when calculating these figures.

6.3.1 The 6-week Analyses

Tables 13 and 14 show that every margarine brand has at least one period in which its (observed) repeat buying rate is either abnormally high or abnormally low and some of this volatility in repeat buying rates can be directly attributed to price promotion activity. A number of the abnormally high repeat buying rates resulted when the second of the two periods being considered contained greater promotional activity than the first. For example, Meadowlea was promoted twice in Period II (in weeks 9 and 11) but was not promoted in Period I (see Table 14). Consequently, the number of buyers in Period II was substantially greater than the number of buyers in Period I. It would appear that some of these additional buyers were repeat buyers who, in the absence of the promotion, would *not* have repurchased in this period (e.g., the promotion may have deterred them from switching brands or encouraged them to repurchase earlier than usual).

Conversely, one of the (two) abnormally low repeat buying rates resulted when the first of the two periods being considered contained greater promotional activity than the second. For example, Miracle was almost certainly promoted during at least three of the weeks in Period I²¹, resulting in many more people purchasing Miracle during this period than in periods II, III or IV. It would appear that a disproportionately large number of these buyers had low non-promotion purchase probabilities (Neslin and Shoemaker, 1989), resulting in a (comparatively) small proportion of Miracle's Period I buyers repurchasing it in subsequent periods.

A further finding that is illustrated by Tables 13 and 14 is that many of the observed repeat buying percentages are predicted to a reasonable degree of accuracy, particularly considering that the analysis periods are still rather short. Furthermore, despite the large discrepancies between the abnormal repeat buying percentages and their theoretical equivalents, the average observed and theoretical repeat buying percentages for the entire product category are very similar.

6.3.2 The 8-week Analysis

Generally, the discrepancies in the observed repeat buying rates shown in Table 15 are less pronounced than for the shorter, 6-week comparisons. However, these discrepancies remain large, and two of them can be directly attributed to price promotions. Again, Meadowlea's Period II contains greater promotional activity than Period I (three price promotions were held between weeks 9 and 16 whilst no price promotions were held between weeks 1 and 8). This has resulted in an abnormally high (observed) repeat buying percentage from periods I to II.

²¹ As mentioned in the methodology section, pricing data was not collected for the first five weeks of the data collection period. In Tables 13 and 14, "Period I" refers to weeks 1-6 and, as a result, pricing data is only available for the final two weeks of this period. This data reveals that there was a price promotion in week 5 and, by using sharp sales peaks as surrogates for price promotions for weeks 1-4 (a procedure adopted by Ehrenberg et al (1994)), at least two further price promotions appear to have been run for Miracle in Period I.

Similarly, Miracle's higher level of promotional activity in Period I as compared to Period II continues to produce an abnormally low repeat buying percentage from Periods I to II (at least three price promotions were held between weeks 1 and 8 whilst only one price promotion was held between weeks 9 and 16).

Consistent with Tables 13 and 14, the Foodtown house brand's discrepancy has resulted from depressed sales and Praise's discrepancy appears to be attributable to extraneous "noise" - no specific cause is evident.

Finally, most of the observed repeat buying percentages are predicted with great accuracy. The greater congruity between the observed and theoretical values (in comparison with the 6-week analyses) is illustrated by the product category averages in Table 15. The average observed and theoretical values differ by three percentage points (64 and 61 percent, respectively): a closer agreement than for the previous analyses. This finding is consistent with Ehrenberg et al's results: using 8-week analysis periods, the typical theoretical percentage for the product categories in their study differed by *one* percentage point from the typical observed percentage.

6.3.3 The 12-week Analysis

As expected, analysis periods of 12 weeks further improve the prediction of observed repeat buying rates. The theoretical and observed repeat buying percentages in Table 16 are very similar: the only exception is for Miracle which, due to very intense promotional activity, attracted an abnormally high number of buyers in the initial weeks of Period I, many of whom failed to repurchase in Period II. Whilst the effect of Miracle's early price promotions remains large, they had a far greater impact on repeat-buying within the shorter analysis periods.

The close agreement between the observed and theoretical repeat buying rates that are shown in Table 16 is a very important finding. As the theoretical values are computed from the NBD model, they represent the repeat buying percentages that would be

expected if the market had remained near-stationary from one (three month) period to the next. Because the observed repeat buying rates are so similar to these 'norms', it would appear that, for all but one of the brands, the market *did* remain near-stationary. So whilst price promotions contributed to the lack of stationarity evident in Tables 13-15, this short-term volatility is cancelled out in the longer-term (and it is the longer-term effects with which this study is concerned).

The main implication that arises from this finding is that the observed repeat buying rates are essentially the same as those that would have been expected if no price promotions had occurred. With the exception of Miracle, the various price promotions that occurred throughout the data collection period had a negligible effect on repeat buying in the longer-term. Price promotions thus seem unable to alter the predominantly zero-order buying process that characterises this market.

6.4 EXPLANATIONS FOR THE LACK OF AFTER-EFFECTS

During this study's six-month data collection period, price promotions led to large increases in sales volume as well as to large increases in the number of people who bought the promoted brands. However, the preceding analyses have shown that these effects failed to lead to appreciable (positive or negative) longer-term effects. This section examines why marked longer-term effects did not occur.

6.4.1 Explaining the Failure to Observe Negative After-Effects

Chapter three discussed Shoemaker and Shoaf's (1977) and Dodson, Tybout and Sternthal's (1978) studies. These researchers claimed that price promotions lowered repeat purchase probabilities - a claim that has been widely disseminated. Also discussed within chapter three is Neslin and Shoemaker's (1989) alternative explanation of these findings. Neslin and Shoemaker argued that individual purchase probabilities remained the same before and after a promotion purchase, *despite* aggregate repeat rates for post-deal purchases being lower than for pre-deal purchases. They supported this argument with

evidence that the prepurchase and postpurchase probabilities of deal and nondeal purchasers hardly change.

Using the margarine sales data, Table 17 replicates Neslin and Shoemaker's analysis.

Table 17. Average prepurchase probabilities and repeat rates for deal versus nondeal purchases (2)

Brand*	Pre-Purchase Probability		Repeat Purchase Rates	
	Non-deal	Deal	Non-deal	Deal
Meadowlea	.7849	.5449	.8571	.6232
Miracle	.7256	.5181	.8462	.4688
Sunrise	.8552	.4018	.9024	.3571
Praise	.9342	.8289	.9524	.8800
AVERAGE	.8250	.5734	.8895	.5823

*The Foodtown brand has not been included in this table as it was not promoted during the data collection period.

The relationships shown in Table 17 are very similar to those found by Neslin and Shoemaker for regular and instant coffee. The third and fourth columns reproduce the results of Shoemaker and Shoaf (1977) and Dodson et al (1978): repeat rates after deal purchases are substantially lower than the repeat rates which follow non-deal purchase occasions. However, similar discrepancies exist between the *prepurchase* probabilities of deal and nondeal purchase occasions. The first and third columns are based on the same households (households purchasing at regular price) as are the second and fourth columns (households purchasing on deal). Table 17 clearly shows that the prepurchase probabilities of households purchasing on deal are very similar to their repeat rates, as are the prepurchase probabilities and repeat rates for households that purchase on nondeal occasions. Therefore, consistent with the major finding of section 6.4, this finding suggests that (in the longer-term) households' repeat purchasing rates are largely unaffected by price promotions.

6.4.2 Explaining the Failure to Observe Positive After-Effects

A common assumption associated with price promotions is that they attract many buyers who have never purchased the (promoted) brand before. A reasonable proportion of these buyers are then expected to be converted into repeat buyers of the brand (i.e., to add the brand to their repertoire). From this perspective, it would seem anomalous that price promotions attracted large numbers of additional buyers who had no lasting effect on repeat buying. The failure to observe this (positive) after-effect is, however, readily explained by the finding that almost all of the buyers during a sales peak had bought the brand previously. Table 18 illustrates this finding.

Table 18. Percent of households, purchasing during the price promotion week, who had purchased the brand previously

Brand*	Price promotion week	% of buyers who had bought the brand previously**
Meadowlea	22	89
	13	76
	11	71
	9	69
Miracle	21	74
	14	83
	5	50
Sunrise	23	70
	18	45
Praise	19	97
	15	88
	10	62

*The Foodtown brand has not been included in this table as it was not promoted during the data collection period.

**A person was considered to have "bought the brand previously" if they had purchased the brand on at least one occasion between the beginning of the analysis period (week 1) and the promotional week being considered.

As expected, price promotions that occurred later in the data collection period had fewer 'new' buyers than did earlier price promotions. The only exception to this general pattern was for the Miracle brand: 83 percent of its week 14 buyers had bought it previously compared with only 74 percent of its week 21 buyers. In comparison with week 14, a far greater *number* of Miracle's week 21 buyers had previously bought the brand. However, the sales peak in week 21, which was twice as large as that in week 14, had a comparatively large proportion of 'new' buyers. As a result, when compared with week 14, a lower *percentage* of Miracle's week 21 buyers had previously bought the brand.

The general pattern shown in Table 18 is even clearer when the percentage of repeat purchasers during a promotional week is compared across increasingly large periods, and when these periods are separated by intervals of equal length. Table 19 summarises these results.

Table 19. The incidence of 'new' buyers during a price promotion: A comparison between brands

Brand*	% who had bought the brand in the previous n weeks				
	4	8	12	16	20**
Meadowlea	57	69	80	89	89
Miracle	43	53	66	68	74
Sunrise	42	53	53	55	70
Praise	66	75	93	97	---
AVERAGE	52	63	73	77	83

*The Foodtown brand has not been included in this table as it was not promoted during the data collection period.

**To provide the necessary data for these calculations, brands had to have been promoted in Week 21 (or later). As Praise's last price promotion was in Week 19, a percentage for n=20 was unable to be calculated.

For the column representing 20 previous weeks of purchases, Sunrise's value of 70 means that 70 percent of the people who bought Sunrise during week 24 (a week in which it was on deal) had already purchased it between weeks 3 and 23. As many promotions as possible were involved in calculating the percentages in Table 19. For example,

Meadowlea's 8-week percentage is the average of those calculated from week 9 (using weeks 1-8), week 11 (using weeks 3-10), week 13 (using weeks 5-17), and week 22 (using weeks 14-21).

Table 19 clearly shows that in time periods of reasonable length, price promotions attract few 'new' buyers. On average, 83 percent of a brand's buyers during a promotional week had purchased it within the previous 20 weeks.²² Moreover, it is very likely that tracking purchase histories across periods in excess of 20 weeks would reveal that price promotions attract a negligible number of legitimately new (i.e., first-time) buyers. Support for this claim is provided by Ehrenberg et al: they found that an average of 93 percent of the buyers during a sales peak had bought the brand within the previous two-and-a-half years.

6.5 GENERAL REPEAT BUYING RATES AMONG LIGHT AND HEAVIER BUYERS

The analysis of 12-week period-to-period repeat buying rates in section 6.4 revealed that price promotions have a negligible effect on the overall repeat buying structure of the margarine market. It is possible, however, that the repeat buying rates of certain sub-groups of a brand's buyers are affected by price promotions but, when aggregated, this variability is cancelled out.

This section addresses this issue by comparing observed and theoretical repeat buying rates for 'light' and 'heavier' buyers of each margarine brand, across 12-week periods.²³ The analyses within this section therefore disaggregate the general repeat buying pattern that was illustrated in Table 16 and, in doing so, they extend the work of Ehrenberg et al (1994).

²² When calculating this average, the value for Praise was estimated as being 97 percent.

²³ Consistent with section 6.4, weeks 1-12 comprise 'Period I' whilst weeks 13-24 comprise 'Period II'.

Table 20. Repeat buying by light and heavier buyers

Brand	New		Once only		More than once	
	O	T	O	T	O	T
Meadowlea	6	11	51	50	80	84
Miracle	4	9	25	45	61	76
Sunrise	7	3	47	48	90	87
Praise	2	3	28	47	85	85
Foodtown	3	4	53	44	82	78
AVERAGE	4	6	41	47	80	82

The first column in Table 20 shows, for each brand, the percentage of non-buyers in Period I who made at least one purchase in Period II (i.e., “new” buyers). The third and fifth columns show, for each brand, the percentage of Period I’s light (“once only”) and heavier (“more than once”) buyers who purchased on at least one occasion in Period II (i.e., repeat purchased). The observed percentages for the “new”, “once only” and “more than once” buyers are paired with their theoretical values in columns two, four and six, respectively.

“New” buyers

Unlike the “once only” and “more than once” columns, the observed and theoretical “new” percentages are not associated with repeat buying. However, the inclusion of these figures shows that the proportion of Period I’s non-buyers who entered the market in Period II was very similar to that which would have been expected if no price promotions had occurred. However, *some* support for the ability of price promotions to attract greater than expected numbers of “new” buyers, in the medium-term, is evident from these figures. The discrepancies for Miracle and Sunrise both appear to have arisen from a high degree of promotional activity in Period I and Period II, respectively. Consequently, Miracle’s Period II prediction was too high whilst Sunrise’s Period II prediction was too low (and these discrepancies, in turn, cancelled out when averaged). However, as illustrated in Table 19, if the purchase histories of these buyers were able to be tracked

over longer periods, it would be highly likely that most of these “new” purchasers had in fact bought the brand previously.

“Once only” buyers

Overall, the observed repeat buying rates among light (“once only”) buyers in Period II were similar to the predicted repeat buying rates. This is illustrated by the figures in the final row of Table 20: for the brands studied, an average of 41 percent of the buyers who purchased on only one occasion during Period I purchased again during Period II, as compared to an average repurchase rate of 47 percent.

Despite the reasonably close agreement between the observed and theoretical averages, two brands - Miracle and Praise - exhibit very large discrepancies (and were therefore responsible for much of the variability that did exist between these averages). Specifically, the observed repeat buying rate among the light sub-group was substantially lower than the corresponding ‘norms’ for both of these brands. It would appear that much of the variability associated with Miracle’s light buyers can be attributed to its far greater price promotion activity in Period I than in Period II; an explanation that is supported in the following paragraph.

It has been established in this study (see Table 17) and in others (e.g., Neslin and Shoemaker, 1989), that price promotions encourage a disproportionately large number of infrequent buyers to enter a market. When compared to the average buyer, these buyers purchase rarely and, when they do, it is usually during a promotion. As a result, they have low non-promotion purchase probabilities. The “once only” results relating to the Miracle brand are consistent with this work. The reason why fewer than expected light buyers in Period I repurchased in Period II may be because of the comparatively high level of price promotion activity, which meant a proportionately large number of these buyers had low repeat purchase probabilities. Restated, many of the “once only” (light) buyers in Period I were very irregular buyers who, because of a price promotion, had been induced to switch from other brands within their repertoire. Following this purchase, many of these buyers

continued to purchase other brands within their repertoire for the remainder of the data collection period (i.e., they “lapsed”).

Unlike Miracle, the very low observed repeat buying rate among Praise’s light buyers cannot be readily explained. For Praise, the degree of price promotion activity in Period I was comparable to that in Period II. Similarly, sales levels, the number of purchasers and the number of purchase occasions showed little variation between Periods I and II - the market for Praise was largely stationary. Furthermore, Praise’s buyers exhibited a higher average purchase frequency loyalty than did the buyers of any other margarine brands that were studied, despite having a below-average penetration rate. One explanation of the abnormally high level of switching by Praise’s light buyers between Periods I and II might be that promotions associated with other brands induced a larger-than-expected number of “once only” buyers to purchase these other brands.

It should be noted that the repeat buying discrepancies for the light buyers of all of the brands studied would be expected to decrease as the analysis periods increase. That is, the vast majority of Period I buyers who failed to repurchase in Period II would probably have purchased again but, as their interpurchase periods are of a length which precludes them from repurchasing in the next 12-week period, they are considered to have “lapsed”. Therefore, analyses involving comparisons across longer (such as 24- and 48-week) periods would be expected to result in increasingly closer agreement between the observed and expected repeat rates of “once only” buyers.

“More than once” buyers

The close agreement between the average observed and theoretical repeat buying rates among light buyers, coupled with the earlier finding that the average observed and theoretical repeat buying rates among all buyers (see Table 16) were also very similar, suggests that this relationship must also hold for the ‘heavier’ sub-group. The fifth and sixth columns of Table 20 confirm this: for the brands studied, 80 percent of the buyers

who purchased on at least two occasions during Period I purchased again during Period II. The corresponding 'norm' was 82 percent.

The extremely close agreement between the average observed and theoretical repeat buying rates among heavier buyers has resulted from four of the five brands having very small (if any) discrepancies between their individual observed and theoretical percentages. Miracle is the only brand that exhibits a large discrepancy and, consistent with its "once only" and aggregate comparisons, this discrepancy is a substantial one. If the Miracle brand had been excluded when calculating the averages for these heavier buyers, they would have been identical (84 percent observed *and* theoretical).

Also consistent with Miracle's "once only" and aggregate discrepancies, the variability of the "more than once" sub-group would appear to be attributable to a much higher level of price promotion activity in Period I than in Period II. That is, Miracle's high degree of promotional activity in Period I would seem to have caused a larger than expected number of irregular buyers to make two or more purchases of the brand in Period I. Following these purchases, many of these buyers returned to buying other brands during Period II (i.e., they "lapsed"). As expected, this phenomenon was more pronounced among light buyers²⁴ and would be likely to have very little (if any) effect upon very heavy buyers. In addition to its apparent logic, this expectation has been confirmed empirically (Ehrenberg, 1988). Ehrenberg explained it thus: if a brand's buyers are divided into sub-groups based upon purchase frequency, the sub-groups with higher purchase frequencies (i.e., heavier buyers) will have a far smaller representation of irregular buyers than will the sub-groups with lower purchase frequencies (i.e., lighter buyers). This is because, relative to a brand's average buyer, irregular buyers will typically purchase on very few occasions.

Despite having a repeat buying discrepancy among its light buyers that was very similar to Miracle's, Praise's observed and theoretical repeat buying percentages for its heavier buyers were identical. So, whilst there was an abnormally high level of brand switching

²⁴This is illustrated by comparing the deviation between Miracle's "once only" observed and theoretical repeat buying rates (20 percentage points) with its "more than once" equivalent (15 percentage points).

among light buyers of Praise between Periods I and II, its heavier buyers were totally unaffected. These findings suggest that the apparent shortfall of repeat buyers in Table 16 (59 percent observed versus 69 percent predicted) was somewhat misleading; the discrepancy was caused by an excess of occasional buyers, *not* by a weakness in Praise's ability to attract repeat buyers.

The more detailed repeat buying analysis reported in this section provides even stronger support for the claim that price promotions have a negligible effect on a market's longer-term repeat buying structure: generally, no (repeat buying) after-effects will ensue.

6.6 THE AVERAGE PURCHASE FREQUENCIES OF LIGHT AND HEAVIER REPEAT BUYERS

This section compares the observed average purchase frequencies of light and heavier buyers (above) with their theoretical 'norms'. Table 16 and Table 20 have shown that, for the brands studied, the proportion of repeat buyers is largely unaffected by price promotions (or any other factors). However, it is possible that whilst the repeat purchasing rates in Period II were essentially the same as those that were predicted, those households which repurchased in Period II may have done so with a much higher or lower frequency than expected. The analysis conducted within this section examines variations in the purchase frequencies of these repeat buyers, and helps clarify the *general* longer-term effects of price promotions on purchase behaviour.

Table 21. The average purchase frequencies of light and heavier buyers

Brand	New		Once only		More than once	
	O	T*	O	T	O	T
Meadowlea	1.3	1.4	1.8	1.9	3.5	3.9
Miracle	1.3	1.4	1.5	1.7	3.6	2.8
Sunrise	1.3	1.4	1.9	1.9	4.5	5.1
Praise	1.8	1.4	2.1	1.9	5.1	4.5
Foodtown	1.4	1.4	2.2	1.7	3.9	3.2
AVERAGE	1.4	1.4	1.8	1.9	4.1	3.9

*It is an empirical regularity that, for any brand, the theoretical norm for the average purchase frequency per “new” buyer is about 1.4. This occurs regardless of the average purchase frequency of *all* the brand’s buyers (w), the brand’s penetration rate (b), or the length of the analysis period being considered (Ehrenberg, 1988). The theoretical average purchase frequencies per “new” buyer in this column provide further support for this phenomenon.

The first column in Table 21 shows, for each brand, the average purchase frequency (in Period II) of households that were classified as “new” buyers in the preceding analysis (Table 20). The third and fifth columns show, for each brand, the average purchase frequency (in Period II) of the light (“once only”) and heavier (“more than once”) buyers who repeat purchased in Period II. The observed average purchase frequencies for “new”, “once only”, and “more than once” buyers are paired with their theoretical values which appear in columns two, four and six, respectively.

“New” buyers

The observed and theoretical average purchase frequencies for “new” buyers are very similar for all of the brands studied. The overall consistency between the observed and theoretical values within the “new” subgroup is shown by the averages in the final row of Table 21 - they are identical.

“Once only” buyers

For all of the brands studied, the observed average purchase frequencies of light (“once only”) buyers were also very similar to their theoretical values. Again, this close

agreement is illustrated by the averages in the final row of Table 21: the discrepancy between these averages is negligible. More specifically, Table 21 shows that despite a substantial repeat buying discrepancy among their light buyers (refer to Table 20, p.75), Miracle and Praise were bought with normal frequency by the (far fewer than expected) households which did repurchase.

“More than once” buyers

Overall, there is also much consistency between the observed and theoretical average purchase frequencies of the heavier (“more than once”) sub-group; the average brand had an observed average purchase frequency of 4.1 and a theoretical average purchase frequency of 3.9. The largest discrepancy for an individual brand was associated with Miracle. Interestingly, whilst Table 20 showed that the number of Miracle’s (Period I) heavier buyers who repurchased in the following period was considerably lower than expected, Table 21 shows that these households purchased at a considerably higher frequency than predicted. As a result of this, the total sales contribution of Miracle’s heavier repeat buyers was almost exactly the same as that which was expected from these households. Restated, the expected loss in sales arising from Miracle’s shortfall of heavier repeat buyers was offset by the higher purchase frequency of those who did repeat purchase.²⁵

6.7 CHAPTER SUMMARY

The preceding analyses have shown that, within the (500g) margarine category, price promotions have little effect on brands’ sales levels and repeat buying rates in the longer-

²⁵ A more detailed explanation of this point, using the relevant data from Tables 20 and 21, follows. Seventy households (of the 873 in the sample) purchased Miracle on at least two occasions in Period I. Of these, 43 also purchased in Period II, producing an observed repeat buying rate of 61 percent. During Period II, the 43 repeat-buying households purchased on a total of 154 occasions, producing an observed average purchase frequency of 3.6. The corresponding predictions were that 53 of Period I’s “more than once” buyers would repurchase in Period II, producing a theoretical repeat buying rate of 76 percent. Subsequently, these repeat buyers were predicted to purchase at an average purchase frequency of 2.8, resulting in a (theoretical) total of 148 purchase occasions - very similar to the actual number (154).

term. The lack of longer-term effects seems to be explained by the general inability of price promotions to alter repeat purchasing probabilities and the fact that the vast majority of people who buy a brand during a price promotion have bought it before.

By comparing the observed and theoretical repeat buying rates among 'light' and 'heavier' buyers, it was established that when discrepancies did occur in overall repeat buying rates, their primary cause was an excess of occasional buyers - not a shortfall of repeat buyers. Moreover, the average purchase frequencies of these 'light' and 'heavier' buyers were typically unaffected by price promotions.

CHAPTER SEVEN: CONCLUSION

7.1 Conclusions

It is widely accepted that price promotions can produce large sales increases in the short-term. Furthermore, it is generally agreed that the vast majority of this additional volume is due to brand switching. In contrast, the longer-term effects of price promotions have been debated within the marketing literature for some time. A review of this literature suggests that evidence for either positive or negative after-effects of price promotions is weak, at best, and reveals a growing body of evidence to support neutral after-effects.

The research reported in this thesis lends further support to claims that, typically, price promotions have negligible effects in the longer-term and, in doing so, it confirms the findings of Ehrenberg, Hammond and Goodhardt (1994) - the study which it replicated. Specifically, for the brands studied, price promotions had little effect on longer-term sales levels, repeat buying behaviour, the introduction of new buyers, or average purchase frequencies. The most pronounced (longer-term) effect which price promotions were found to have was that they occasionally led to a greater than expected number of occasional buyers purchasing in a given period, a phenomenon which has been widely documented.

7.2 Implications

The major implication that arises from this study is that, generally, the increasing expenditure on price promotions (outlined in chapter one) is unwarranted. This is because, typically, price promotions fail to enhance brands' sales levels or repeat buying rates in the longer-term and, in the short-term, they are often unprofitable despite the large sales 'spikes' which they regularly produce (Abraham and Lodish, 1990; Jones, 1990). Consequently, the increasing emphasis on price promotions is resulting in an increasingly inefficient allocation of marketing resources.

In view of this, Ehrenberg et al (1994) recommended that expenditure on price-related consumer promotions be reduced to allow greater emphasis on elements of the marketing mix which are expected to provide at least *some* longer-term benefits. Specific examples include advertising (of which longer-term benefits are largely manifested via 'brand maintenance'), product development and improving product quality. In addition to the greater likelihood of lasting returns, it has been claimed that, for a given brand, increased expenditure on media advertising leads to greater differentiation. This, in turn, makes the brand less vulnerable to price-related competition as increased differentiation leads to a lower price elasticity of demand (Abraham and Lodish, 1990; East, 1990; The Economist, 1994). Presumably, this claim also applies to other differentiating elements such as product development and quality improvement.

Practical Issues Related to Reducing Price Promotion Expenditure

In practice, reducing price promotion expenditure may be problematic for a given manufacturer or retailer. Specifically, the decision to run price promotions is often likened to the prisoner's dilemma (Blattberg and Neslin, 1990). The prisoner's dilemma²⁶, applied to promotional activity, can be explained as follows: it is often optimal if all brands or retailers within a given market do not promote but, should one or a small number of brands/retailers stop promoting whilst the remaining brands/retailers continue, the brands/retailers which stopped will invariably lose market share.

The above scenario may still be acceptable if increased profitability is the primary objective - overall profits may increase despite the reduction in market share (Abraham and Lodish, 1990; Blattberg and Neslin, 1990). However, for market share to be maintained whilst profits are increased, the majority of brands or retailers must co-operate. To achieve this, various forms of 'signalling' can be attempted. For example, brands may decide to match the actions of the market leader, or retailers may state in a press release that they are going to reduce price promotions as they believe they are detrimental to the industry (Blattberg

²⁶ For an explanation of the prisoner's dilemma, refer to Appendix D.

and Neslin, 1990). Whether such signals prove to be effective obviously depends on whether competitors interpret them in this way and, if so, whether they are willing to co-operate in view of the prisoner's dilemma which they face.

A further problem associated with reducing promotional spending (from a brand manager's perspective) is that retailers may interpret such actions as reflecting a lack of support for the brand. This may adversely affect the brand's distribution as the retailer may reduce its shelf-space in favour of competing brands which do promote. This outcome is also possible in situations where the manufacturer incurs the majority of the costs associated with the promotion, resulting in the retailer receiving a similar profit margin for both discounted and regular-priced brands. As more units of a discounted brand will typically be sold than a regular-priced brand of comparable market share, the retailer may allocate more shelf-space to the discounted brand during the promotional period (and this partiality could even continue after the deal has been retracted).

A pragmatic solution to such problems was offered by Ehrenberg et al (1994). They suggested that expenditure on consumer price promotions be reduced gradually (about five percent annually). For many brands within fmcg markets, expenditure on consumer price promotions has been steadily increasing and so reversing this trend would result in substantial savings, particularly over the medium to longer-term. As suggested earlier, these savings could be reallocated to aspects of the marketing mix which are more likely to produce lasting returns.

It is possible that expenditure on price promotions can be reduced without an equivalent reduction in sales volume. For example, a manufacturer or retailer may maintain the frequency with which it runs price promotions, but reduce the average magnitude of the discounts (Ehrenberg et al, 1994). As many consumers have limited price awareness and many consumers switch to brands (within their repertoire) that are on deal, it is likely that small reductions in deal magnitudes will have little effect on sales volume. Price promotion expenditure could also be reduced by only employing price promotions

defensively. For example, the scheduling of price promotions may be dictated by the promotional actions of the largest and most direct competitor(s) (Jones, 1990).

Possible Exceptions to the Call for Reduced Price Promotion Expenditure

The suggestion that, generally, price promotions should be used more sparingly is not undermined by the specific benefits which price promotions are known to provide (such as temporarily increasing demand in times of excess inventory). However, there may be specific instances in which price promotions may produce longer-term benefits and thus should be encouraged.

One such instance may be for the smallest brands within a given product category. Small brands have been found to have higher price elasticities than their larger competitors (McAlister, 1985, cited in East, 1990; Jones, 1990; The Economist, 1994) and, as a result, they are claimed to benefit proportionately more from price promotions (McAlister, 1985, cited in East, 1990). The specific nature of this benefit is unclear from East's discussion. However, it is possible that it merely refers to small brands exhibiting higher short-term percentage sales increases than larger brands. If so, it does not represent any real benefit - it merely reflects the disparity in the penetration rates of the brands that are being compared (i.e., low versus high base levels).

Another instance in which price promotion expenditure could be encouraged is when new brands are launched. New brands need to encourage trial and then be repurchased, on an ongoing basis, by a sufficient proportion of those who trialled it. As new brands have been found to have higher price elasticities than established brands (Hinkle, 1965), it is likely that price promotions would increase the trial of a new brand in comparison with no price reduction or other promotional tools. However, many of the difficulties that established brands attempting to increase their penetration and average purchase frequency experience also apply to new brands. Consumers rarely purchase a brand that is excluded from their brand repertoire and, when they do, they are unlikely to develop a strong repeat

buying loyalty toward it. Consequently, despite the fact that many new brands run price promotions, three out of four fail (Ehrenberg, 1974).

Perhaps price promotions are of greatest use (and should therefore receive greatest emphasis) for brands within new markets. Price promotions may play an important role in establishing a brand's longer-term penetration and average purchase frequency by encouraging trial and discouraging switching among consumers who are in the process of forming their brand repertoires. In such markets, it is likely that the "zero-order" (i.e., no learning) assumption does not hold (Frank, 1962) and that, in general, marketing actions have a greater influence on buyer behaviour than in stationary (established) markets. Additionally, price promotions may be able to be used defensively by the earliest brand(s) to enter a market. This brand(s) could run extensive price promotions whenever a new brand enters the market, in an attempt to minimise its acceptance.

Summary

Overall, within established fmcg markets, it would seem prudent to use price promotions sparingly. Specifically, price promotions should not be used for 'brand-building' purposes as their impact is limited to the short-term. Some expenditure on price promotions may be necessary for defensive purposes (such as to inhibit the switching that results when a brand's most direct competitor runs a price promotion) or in situations of excess inventory but, overall, expenditure on price promotions should be substantially reduced.

Certain practical difficulties are likely to be associated with reducing price promotion expenditure. These difficulties include the prisoner's dilemma and, from a manufacturer's perspective, the possibility that retailers may misinterpret such actions and limit or withdraw their support of the brand. To overcome these difficulties, the reduction in price promotion expenditure should be gradual and, if possible, competing brands should be encouraged to do the same.

Finally, a strong emphasis on price promotions may be justifiable in some instances. These instances include small brands, new brands, and brands within new markets. However, the arguments in support of these exceptions are largely speculative and thus further research is needed to determine whether these arguments can be supported empirically.

7.3 Limitations

A limitation associated with this study is its lack of generalisability. Only one product category was studied when, ideally, data relating to several other product categories (including at least one which was non-stationary and/or included a new brand(s)) would have been available. This would have enabled comparisons between product categories to have been made and, from this, the representativeness of the margarine brands would have been able to be established.

As noted in section 5.1, this limitation resulted from data collection problems and not from a lack of foresight. In addition to margarine, data relating to 250g packs of loose-leaf tea, 420-430g 'cream-style' corn (canned), non-carbonated mineral water (1.5lt) and non-carbonated sports drinks (500ml and 1lt)²⁷ was also received. Unfortunately, the files for these product categories contained a lot of missing data which prevented any meaningful analyses being conducted.

If this study had not closely replicated the extensive Ehrenberg, Hammond and Goodhardt (1994) study and produced very similar findings, this limitation would be a major one. By doing so, however, this study increases the generalisability of these findings. Also, there would appear to be no *a priori* reason to expect buyer behaviour within New Zealand fmcg markets to differ greatly to that within the UK, USA, Germany and Japan. This expectation, which is supported empirically by the margarine analyses, implies that the results reported in this study are indicative of most of New Zealand's established fmcg markets.

²⁷ The non-carbonated mineral water (1.5lt) and non-carbonated sports drinks (500ml and 1lt) were selected because they were relatively new (and rapidly growing) product categories.

A *potential* limitation that is associated with this study is that error may have been introduced by the sample selection procedure. The sample was selected on the bases that i) sample members were Foodtown cardholders and ii) their expenditure, relative to all Foodtown cardholders, was high. Whilst these selection criteria were necessary (refer to section 5.2), it is possible that they produced a sample that had purchasing behaviour that was not representative of the population. However, the fact that the findings corroborated those of an earlier study which did not have this potential limitation suggests that the sample's selection did not confound this study's results.²⁸

7.4 Directions for Future Research

Several important directions for future research have emerged from this study's findings, implications and limitations. First, as suggested in section 7.2, research should be undertaken to establish whether there are certain contexts in which price promotions can produce longer-term gains in penetration or average purchase frequency. Specifically, this study could be extended by investigating the longer-term effects of price promotions on small brands, new brands, and (in particular) brands within rapidly expanding markets.

Future research could also investigate the longer-term effects of the many non price-related consumer promotions so that, for a given brand within a given market, the relative effectiveness of different consumer promotion tools can be known with some confidence. Further studies may enable the development of additional empirical generalisations which, in turn, will provide greater practical guidance to both brand managers and retailers.

²⁸ Of course, it could be argued that the findings of this study only corroborated those of Ehrenberg et al (1994) *because* of the error introduced by the sample selection procedure. This, however, would seem unlikely given Ehrenberg et al's finding that, across 25 markets within four countries, few such exceptions occurred.

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APPENDICES

APPENDIX A - A Mathematical Example of the Aggregation Effect

Analysis 1. A Price Promotion in a Simple Two-Segment Market²⁹

Consider a simplified example consisting of two market segments. Twenty percent of the households are in segment 1 and 80% are in segment 2. We also assume that each household buys from the category once each period and that all purchases of brand A when it is on price promotion are reduced-price purchases.

When a price promotion is not being offered, we assume that buyers in segment 1 have a purchase probability for Brand A of .7 and buyers in segment 2 have a purchase probability of .1. Thus purchase probabilities differ between the two segments but all households within each of the two segments are assumed to have the same purchase probability. We also assume that brand A purchase probabilities increase for both segments when the price promotion is offered. In particular, when the price is reduced, the purchase probabilities are assumed to increase from .7 to .8 for segment 1 and from .1 to .3 in segment 2 (see Table 1A, p.101).

By using these assumptions one can apply Bayes' rule to calculate the percentage representation of each segment among brand A's buyers in both nonpromotion and promotion periods. These percentages are reported in Table 1B (p.101). We see that in periods when brand A is not on promotion, 64% of its buyers come from segment 1. In contrast, only 40% come from segment 1 when it is on promotion. Thus the mix of brand A buyers is very different depending on whether brand A is or is not being promoted in that period.

Table 1C (p.101) shows that the average probability of purchasing brand A in period t is lower among $t - 1$ promotion purchasers than period $t - 1$ nonpromotion purchasers. This finding holds whether or not brand A is on promotion in period t . The averages are

²⁹ This analysis has been reproduced from Neslin and Shoemaker (1989, p.207-208).

calculated by using the purchase probabilities in Table 1A and weighting them by the fraction of the appropriate population from segment 1 or segment 2 as calculated in Table 1B. For example, of buyers whose prior purchase was brand A not on promotion and who are buying in the current period when A is not being promoted, 64% are from segment 1 with a nondeal purchase probability of .7 and 36% are from segment 2 with a nondeal purchase probability of .1. The weighted average repeat rate is .484. If brand A is not being promoted in the current period and the previous purchase was on promotion, the average purchase probability is .340, which is lower than .484. Similarly, if brand A is on promotion in the current period, the average purchase probability is .500 after a promotion purchase of A and .620 after a nonpromotion purchase of A.

This example shows how aggregate repeat rates after a deal purchase can be lower than those after a nondeal purchase, even if individual purchase probabilities are the same before and after a promotion purchase. Thus the process of calculating aggregate repeat rates among all buyers of brand A can produce the result that has been observed in several prior empirical studies.³⁰

³⁰Two notable studies are Shoemaker and Shoaf (1977) and Guadagni and Little (1983).

Table 1
A Numerical Example Demonstrating the Aggregation Effect

A. The Assumed Population of Consumers

Segment	% of population	Probability of buying A when:	
		Brand A not on promotion	Brand A on promotion
1	20	.7	.8
2	80	.1	.3

B. Representation of Segments 1 and 2 Among Brand A Buyers

Segment	Percentage of Brand A buyers from segment j	
	Nonpromotion periods	Promotion periods
1	64 ^a	40 ^b
2	36	60

C. Probability of Repeat Purchasing Brand A

Promotion status of brand A at time t - 1	Promotion status of brand A at time t	
	Not on promotion	On promotion
Not on promotion	.484 ^c	.620
On promotion	.340	.500

^a64% is the posterior probability (from Bayes' rule) of being from segment 1, given that the household just bought brand A during a nonpromotion period. That is, $.64 = (.7)(.20)/[(.7)(.20) + (.1)(.80)]$.

^b40 = $(.8)(.20)/[(.8)(.20) + (.3)(.80)]$.

^c.484 is the probability of buying brand A given the buyer is from segment 1 times the probability of being from segment 1 plus the probability of buying brand A given the buyer is from segment 2 times the probability of being from segment 2. These probabilities are obtained from parts A and B of the table, yielding: $(.7)(.64) + (.1)(.36) = .484$.

APPENDIX B - NBD Calculations³¹

The Incidence of Repeat Buying

The primary use of the NBD in chapter six was for calculating theoretical values for the incidence of repeat buying. These calculations were required for the theoretical values in Tables 11, 12, 13, 14, 15 and 16. The NBD formula for the proportion of the population who are repeat buyers (b_R) is:

$$b_R = 1 - 2(1 + a)^{-k} + (1 + 2a)^{-k}$$

The value of k is derived by dividing m by a (i.e., $k = m/a$). m , which is the mean number of purchases per sample member within a given time period, is the product of the penetration rate and average purchase frequency within that period (i.e., $m = bw$). Using Table 22 (p.110), the value of a can be found if the quantity $c = -m/\ln(p_0)$ has been calculated. To do this, the value of p_0 (which represents the proportion of non-buyers in the period under consideration) must be calculated. This is achieved by subtracting the proportion of households who did buy (b) from the total number of households being studied (i.e., $p_0 = 1 - b$). An example of this procedure, **using the data for Sunrise's 12-week analysis** (Table 16) follows.

Seventy-one out of 873 households purchased the Sunrise brand at least once in Period I (weeks 1-12); the penetration rate was therefore 8.13% ($b = .0813$). Collectively, these households purchased on 239 occasions, resulting in an average purchase frequency (w) of 3.37. The proportion of non-buyers, p_0 , was therefore:

$$\begin{aligned} p_0 &= 1 - b \\ &= 1 - .0813 \\ &= .9187 \end{aligned}$$

³¹ The calculations and commentary within this Appendix have been adapted from Ehrenberg (1988, Appendix A).

Whilst the average purchase frequency per sample member, m , is:

$$\begin{aligned} m &= bw \\ &= .0813 \times 3.37 \\ &= .2740 \end{aligned}$$

Having found the values of m and p_0 , the quantity $c = -m/\ln(p_0)$ can be calculated:

$$\begin{aligned} c &= -m/\ln(p_0) \\ &= -.2740/\ln(.9187) \\ &= 3.23 \end{aligned}$$

Following this, a is determined by finding the value in Table 22 (p.110) that corresponds with 3.23. In this instance, the value of a lies between 6.41 and 6.76 and must be found by intrapolation ($a = 6.515$).

Finally, k can be calculated:

$$\begin{aligned} k &= m/a \\ &= .2740/6.515 \\ &= .0421 \end{aligned}$$

Now that the parameters a and k have been determined, the theoretical proportion of households (out of the 873 being studied) who bought Sunrise in Periods I and II (i.e., the proportion who purchased Sunrise between weeks 1-12 and weeks 13-24) can be determined.

$$\begin{aligned}
b_R &= 1 - 2(1+a)^{-k} + (1+2a)^{-k} \\
&= 1 - 2(1+6.515)^{-.0421} + (1+2 \times 6.515)^{-.0421} \\
&= 1 - 2 \times .9186 + .8948 \\
&= .0576
\end{aligned}$$

Dividing this figure by Sunrise's penetration rate (b) in the first period gives the ratio of those repeat buying to those who bought in the first period (i.e., the "theoretical repeat buying percentage").

$$\begin{aligned}
b_R/b &= .0576/.0813 \\
&= .7085 \text{ or } 70.85\%
\end{aligned}$$

This result, rounded to two significant figures, is shown in Table 16.

The Repeat Buying Rates and Average Purchase Frequencies of 'New', 'Light' and 'Heavier' Buyers

The NBD was also used in chapter six to predict the repeat buying rates and average purchase frequencies of 'new', 'light' and 'heavier' buyers (see Tables 20 and 21). The procedures associated with calculating these values are detailed below and, again, Sunrise's data has been used in order to provide specific examples of these procedures.

With regard to Table 20, the proportion p_{Jr} who buy at all (i.e., at least once) in the second period of those who made r (i.e., 0, 1 or 2+) purchases in the first period must first be determined. This is found by subtracting $p_{0/r}$ (the proportion of those buying r times in the first period who did *not* buy in the second period) from 1:

$$p_{Jr} = 1 - p_{0/r}$$

$p_{0/r}$ is a specific example of the expression $p_{s/r}$ - the proportion of those buying r times in the first period who buy s times in the second period - in which $s = 0$.

$$p_{s/r} = (1+a')^{-k'}$$

where

$$k' = k+r \quad \text{and} \quad a' = a/(1+a)$$

Therefore, if $s = 0$:

$$\begin{aligned} p_{./r} &= 1 - p_{0/r} \\ &= 1 - (1+a')^{-k'} \\ &= 1 - (1+a')^{-(k+r)} \end{aligned}$$

Next, $(1+a')^{-1}$ and $(1+a')^{-k}$ have to be determined. Using the value of a and k for Sunrise between weeks 1 and 12 (Period I) these are:

$$a = 6.515$$

$$a' = 6.515/1 + 6.515 = .8669$$

$$\begin{aligned} (1+a')^{-1} &= (1.8669)^{-1} \\ &= .5356 \end{aligned}$$

$$\begin{aligned} (1+a')^{-k} &= (1.8669)^{-.0421} \\ &= .9741 \end{aligned}$$

A numerical value for $p_{./r}$ can now be calculated using the expression

$$1 - (1+a')^{-k} \{(1+a')^{-1}\}^r$$

For Table 21, the theoretical average purchase frequency in the second period for the households that made r purchases (i.e., 0, 1 or 2+) in the first, m_{Jr} , is given by:

$$m_{Jr} = a'(k+r)$$

From these general expressions for p_{Jr} and m_{Jr} , specific repeat buying rates and average purchase frequencies can be calculated for any value of r . For example, the percentage of Sunrise's Period I non-buyers (i.e., $r=0$) who purchased at least once in Period II is:

$$\begin{aligned} p_{J0} &= 1 - (1+a')^{-k} \\ &= 1 - .9741 \\ &= .0259 \text{ or } 2.59\% \quad (\text{see Table 20, column 2}) \end{aligned}$$

The average purchase frequency in Period II for those who did not purchase in Period I, m_{J0} , is:

$$\begin{aligned} m_{J0} &= a'k \\ &= .8669 \times .0421 \\ &= .0365 \end{aligned}$$

The (theoretical) average purchase frequency for those buying in the second period, w_{J0} , is therefore:

$$\begin{aligned} w_{J0} &= m_{J0}/p_{J0} \\ &= .0365/.0259 \\ &= 1.41 \quad (\text{see Table 21, column 2}) \end{aligned}$$

Next, for Sunrise's "once only" ($r=1$) buyers in Period I:

$$\begin{aligned}
p_{J1} &= 1 - (1+a')^{-k-1} \\
&= 1 - (1+a')^{-k} (1+a')^{-1} \\
&= 1 - .9741 \times .5356 \\
&= 1 - .5217 \\
&= .4783 \text{ or } 47.83\% \quad (\text{see Table 20, column 4})
\end{aligned}$$

and

$$\begin{aligned}
m_{J1} &= a'(k+1) \\
&= .8669 \times 1.0421 \\
&= .9034
\end{aligned}$$

Hence

$$\begin{aligned}
w_{J1} &= m_{J1}/b_{J1} \\
&= .9034/.4783 \\
&= 1.88 \quad (\text{see Table 21, column 4})
\end{aligned}$$

To find the theoretical repeat buying rates and average purchase frequency among the “more than once” buyers, the values for $r=0$ and $r=1$ have to be subtracted from the *total* number of buyers and the *total* number of purchases in Period II. Firstly, however, all values must be expressed on a “per informant” basis so as to avoid explicitly introducing sample size. The theoretical value for those who purchased in Period II but did not in Period I (i.e., ‘new’ buyers), expressed as a proportion of *all* informants (households), is found by:

$$.0259 \times .9187 = .0238 \text{ or } 2.38\%$$

where .9187 is the proportion of non-buyers in Period I (i.e., $p_0 = 1 - b$). As these particular households are expected to buy at a rate of 1.41 (w_{10} above), the theoretical mean number of purchases per informant is:

$$1.41 \times .0238 = .0336$$

Whilst the proportion of households which did not buy in the first period ($r=0$) was readily available (i.e., $p_0 = 1 - b$), theoretical values usually have to be calculated for values of r that are greater than zero. In this instance, however, this calculation is unnecessary; a feature of the NBD is that “the number of purchase occasions in the second period made by those households who bought r times in the first period is numerically the same as the sheer *number* of households who bought $r+1$ times in the first period!” (Ehrenberg, 1988, p.306; italics in original). Subsequently, the theoretical proportion of households that bought “once only” in Period I is .0336. As 48% of these “once only” buyers in Period I were expected to repurchase in Period II (p_{11} above), the repeat buying rate among “once only” buyers expressed on a “per informant” basis is:

$$.4783 \times .0336 = .0161 \text{ or } 1.61\%$$

As these repeat buyers are expected to buy at a rate of 1.88 (w_{11} above), the theoretical mean number of purchases per informant is:

$$1.88 \times .0161 = .0303$$

Only **now** can the theoretical repeat buying rates and average purchase frequency for the households who bought “more than once” (i.e., $r \leq 2$) be calculated. This is done by subtraction.

As Sunrise’s theoretical penetration (i.e., total number of buyers, b) in Period II is the same as the observed penetration in Period I (due to the NBD’s stationarity assumption),

the expected proportion of buyers in Period II accounted for by “more than once” buyers is:

$$.0813 - .0238 - .0161 = .0414 \text{ or } 4.14\%$$

Following this, the number of purchases that these “more than once” buyers are expected to make, expressed on a “per informant” basis, is:

$$.2740 - .0336 - .0303 = .2101$$

where .2740 is the theoretical total number of purchases, per informant, adopted from the observed value in Period I (i.e., $m = bw$).

By subtraction, it can also be found that the proportion of informants (households) that bought on more than one occasion in Period I is:

$$1.000 - .9187 - .0336 = .0477$$

From this, the theoretical repeat buying percentage can be calculated.

$$.0414/.0477 = .8679 \text{ or } 86.79\% \quad (\text{see Table 20, column 6})$$

Finally, the theoretical average purchase frequency of these buyers in Period II can also be found:

$$(.2101 \times 100)/4.14 = 5.07 \quad (\text{see Table 21, column 6})$$

Table 22. Values of the NBD parameter a

NBD: Values of $a = m/k$ for various values of $c = -m/\ln p_0 = -wb/\ln(1-b)$.

Values of c for the NBD										
	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
1	0.00	0.21	0.43	0.66	0.89	1.14	1.40	1.67	1.94	2.22
2	2.51	2.81	3.11	3.42	3.73	4.05	4.37	4.70	5.03	5.37
3	5.71	6.06	6.41	6.76	7.12	7.48	7.85	8.22	8.59	8.97
4	9.35	9.73	10.11	10.50	10.89	11.29	11.69	12.09	12.49	12.89
5	13.30	13.71	14.13	14.54	14.96	15.38	15.80	16.22	16.65	17.08
6	17.51	17.94	18.38	18.81	19.25	19.69	20.14	20.58	21.03	21.48
7	21.93	22.38	22.83	23.29	23.74	24.20	24.66	25.12	25.59	26.05
8	26.52	26.99	27.46	27.93	28.40	28.87	29.35	29.83	30.30	30.79
9	31.27	31.75	32.23	32.72	33.20	33.69	34.18	34.67	35.16	35.65
10	36.15	36.64	37.14	37.64	38.14	38.64	39.14	39.64	40.14	40.65
11	41.15	41.66	42.17	42.68	43.19	43.70	44.21	44.73	45.24	45.75
12	46.27	46.79	47.31	47.82	48.35	48.87	49.39	49.91	50.44	50.96
13	51.49	52.01	52.54	53.07	53.60	54.13	54.66	55.19	55.73	56.26
14	56.80	57.33	57.87	58.41	58.95	59.48	60.02	60.57	61.11	61.65
15	62.19	62.74	63.28	63.83	64.37	64.92	65.47	66.02	66.57	67.12
16	67.67	68.22	68.77	69.33	69.88	70.43	70.99	71.54	72.10	72.66
17	73.22	73.78	74.34	74.90	75.46	76.02	76.58	77.15	77.71	78.27
18	78.86	79.40	79.97	80.54	81.11	81.67	82.24	82.81	83.38	83.95
19	84.53	86.10	85.67	86.24	86.82	87.39	87.97	88.54	89.12	89.70
	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0
20	90.3	96.1	101.9	107.9	113.8	119.9	125.9	132.1	138.2	144.4
30	150.6	156.9	163.2	169.6	176.0	182.4	188.9	195.4	201.9	208.4
40	215.0	221.6	228.3	234.9	241.6	248.4	255.1	261.9	268.7	275.5
50	282.3	289.2	296.1	303.0	309.9	316.9	323.9	330.9	337.9	344.9
60	352.0	359.1	366.2	373.3	380.4	387.6	394.7	401.9	409.1	416.3

Source: Ehrenberg (1988, p.328).

APPENDIX C - Sales Data

MARGARINE (500g)

Weekly Sales Data

Week	Sunrise	Meadowlea	Miracle	Praise	Foodtown
1	37	31	86	22	9
2	19	54	37	24	20
3	23	58	39	21	0
4	0	44	44	28	3
5	24	38	85	22	14
6	29	62	28	26	35
7	23	79	21	27	28
8	27	55	0	18	21
9	21	106	14	21	6
10	23	44	17	38	24
11	27	115	11	20	9
12	30	55	15	26	19
13	20	125	17	19	6
14	29	29	35	22	17
15	17	32	22	32	22
16	28	43	26	25	17
17	30	60	37	22	26
18	67	38	22	18	18
19	21	46	33	39	29
20	28	53	24	30	35
21	21	42	70	23	13
22	20	91	23	16	16
23	64	46	21	19	20
24	0	36	0	22	17

MARGARINE (500g)

Weekly Sales Data

Bold figures denote weeks in which there were price promotions.
No pricing data is available for the first five weeks but it would appear that Miracle was promoted extensively during this time and that Sunrise was promoted in week 1.

Week	Sunrise	Meadowlea	Miracle	Praise	Foodtown
1	37	31	86	22	9
2	19	54	37	24	20
3	23	58	39	21	0
4	0	44	44	28	3
5	24	38	85	22	14
6	29	62	28	26	35
7	23	79	21	27	28
8	27	55	0	18	21
9	21	106	14	21	6
10	23	44	17	38	24
11	27	115	11	20	9
12	30	55	15	26	19
13	20	125	17	19	6
14	29	29	35	22	17
15	17	32	22	32	22
16	28	43	26	25	17
17	30	60	37	22	26
18	67	38	22	18	18
19	21	46	33	39	29
20	28	53	24	30	35
21	21	42	70	23	13
22	20	91	23	16	16
23	64	46	21	19	20
24	0	36	0	22	17

MARGARINE (500g)

Clean Weeks (25%)*

Week	Sunrise	Meadowlea	Miracle	Praise
1				22
2	19	54		24
3	23	58		21
4		44		
5	24	38		22
6	29		28	26
7	23		21	27
8	27	55		18
9	21			21
10	23	44		
11	27			20
12	30	55		26
13	20			19
14	29			22
15			22	
16	28	43	26	25
17	30	60		22
18		38	22	18
19	21	46		
20	28	53	24	
21	21	42		23
22	20		23	
23		46	21	19
24				22

*The Foodtown brand has not been included in this table as it was not promoted during the data collection period.

MARGARINE (500g)

Clean Weeks (50%)*

Week	Sunrise	Meadowlea	Miracle	Praise
1	37	31		22
2	19	54		24
3	23	58		21
4		44		28
5	24	38		22
6	29	62	28	26
7	23		21	27
8	27	55		18
9	21		14	21
10	23	44	17	
11	27		11	20
12	30	55	15	26
13	20		17	19
14	29	29		22
15	17	32	22	32
16	28	43	26	25
17	30	60		22
18		38	22	18
19	21	46		
20	28	53	24	30
21	21	42		23
22	20		23	16
23		46	21	19
24		36		22

*The Foodtown brand has not been included in this table as it was not promoted during the data collection period.

APPENDIX D - The Prisoner's Dilemma³²

The prisoner's dilemma refers to a situation in which unco-operative behaviour is fostered. In the case of two prisoners - prisoner A and prisoner B - it is best if both do not confess to the crime with which they have been charged. However, the situation encourages both prisoner A and prisoner B to confess (it is to prisoner A's advantage if he or she confesses regardless of the decision which prisoner B makes (and vice versa)). Because of this, both prisoners will typically confess, despite the fact that the consequences will be worse than if both prisoners had refused to confess. This scenario is illustrated below.

	Prisoner B confesses	Prisoner B does not confess
Prisoner A confesses	5 years imprisonment (Prisoner A) 5 years imprisonment (Prisoner B)	0 years imprisonment (Prisoner A) 20 years imprisonment (Prisoner B)
Prisoner A does not confess	20 years imprisonment (Prisoner A) 0 years imprisonment (Prisoner B)	1 year imprisonment (Prisoner A) 1 year imprisonment (Prisoner B)

³² The following discussion has been adapted from Kalat (1993).