PhD THESIS

LINE EXTENSIONS AND CANNIBALISATION: An evaluation of measures and methods based on longitudinal consumer panel data

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ABSTRACT

Practitioners, throughout the last two decades, have favoured line extension as the branding strategy for their new products. The use of an existing brand name for a new product has been fuelled by the appreciation that brands are assets, leading naturally to a desire to gain maximum benefit from them. This coupled with an increasing focus on effective resource allocation, has led to line extension developing into the marketing phenomenon of the 1980s and 1990s.

But attractive though the use of an existing brand name may be, it is not without its potential costs. Dominant among these is the risk of cannibalisation. Sharing a common brand name may benefit the extension but makes the parent brand vulnerable to share loss. The new line may succeed only, or at least partly, at the expense of parent brand sales.

The aim of the study is to enhance our understanding of the important effect of cannibalisation. Since most new product introductions are line extensions, a proper comprehension of this risk is critical in evaluating the success or potential success of much new product activity.

This study examines the fortunes of 17 line extensions in fmcg categories in Germany and the UK through the late 1980s and early 1990s. Consumer panel data is used to generate five measures of cannibalisation, not previously used in academic research. These measures are market share and gain loss analysis (both in common use by practitioners), and deviations from expected share shifts, duplication of purchase tables and buyer analysis (derived from academic theory).

The findings show that

1. The market shares of line extensions tend to be small
2. They almost always take share from the parent brand, ie cannibalise. But the range is considerable. Zero percent to 100% of the line extension's volume can come from the parent brand.

3. Despite this, in most cases the total brand benefits (in volume terms) from the launch of the line extensions

4. Buyers of the line extension buy the parent brand significantly more often than other category buyers before the launch of the line extension

5. They continue to buy the parent brand after the launch of the line extension

6. Predictably the Independence of Irrelevant Alternatives (IIA) axiom is not valid in the context of line extensions. This puts line extensions in a category distinct from other types of new products.

7. There is some evidence for product form loyalty which over-rides that for the common brand name. The UK detergent market shows powdered detergent parent brands resisting cannibalisation by their liquid line extensions.

8. Cannibalisation is a complex phenomenon to measure. The five measures used in this study show varying degrees of correlation, but none display total agreement and most have limited levels of association. The timing and the duration of the period of measurement has a significant effect on the result.

The implications of these results are that cannibalisation is a real risk of using an existing brand name. Although there are circumstances where share loss by the parent is not unwelcome eg for contribution or defensive reasons, it is still important to be able to quantify it. This research examines the measures currently available, and concludes there is a need for improvement. A new definition of cannibalisation is proposed, and a corresponding new measure of cannibalisation is outlined. This measure takes into account trends in the parental market share, and the importance of the timing and duration of this measure. For many line extensions, the immediate post-launch period may be of interest but perhaps even more important is the longer term effect on the parent brand.

As a result of this study, we are in a position to develop a definitive measure of this critically important effect.

Key words: Line extensions, brand extensions, cannibalisation

INTRODUCTION

Line extensions are the most common type of new product launch in established marketing environments. The benefits of using an existing brand name are widely claimed, but this quest for marketing efficiency needs to be tempered in the light of the potential disadvantages of extending a brand.

Popular through line extending undoubtedly is, there is little research on this phenomenon. Much academic activity focuses on brand extension, rather than line extension. The way consumers evaluate new extensions has been extensively researched, but usually in laboratory experiments. There has been as yet little empirical work on sales effects undertaken in this field. How does the market actually respond to a new line extension? Where does the new line's volume come from? What is the impact on the parent brand?

Line extension can derive sales from a number of sources - market increase, steal from competitors and cannibalisation. It is on this latter source which our study focuses. Our interest is in gaining an understanding of this effect, by examining a variety of measures which may be used to assess it.

Comprehension of the phenomenon is critical to effective management. Without being able to assess the likely impact of a line extension, the marketing manager is unable to judge the two thirds of new product activity which this strategy represents. Appreciation of how sharing a common brand name affects the source of volume of the new line, is critical to making a reasoned management decision. An insight into cannibalisation will affect many of the important management decisions surrounding the new product launch. Should the proposed new product use an existing brand name or develop a new one? How will the parent brand be affected if an existing brand name is used? What are the profit implications of the alternative strategies?

There are measures available to the interested manager to evaluate cannibalisation. Academic literature has used several but none consistently. The main practitioner measure used by the major market research agencies is of gains loss analysis. This is

based on an algorithm developed in the early 1960s by Rohloff, and has significant shortcomings which are examined in this study. We examine this and other methods of measuring cannibalisation to enable managers to make a more informed decision about the cannibalisation measure they choose.

Chapters 1 and 2 set the context for the research by evaluating previous studies. The first chapter discusses line extensions, defining the term and assessing the relevance of other studies. Brand extensions are divided into two types - category and line extension. A category extension stretches an existing brand name into a new-to-the-company category where a line extension uses an existing brand name in an existing category. Although practitioner activity has concentrated on the latter, academic focus has been on the former.

Chapter 2 looks at the relatively limited research on the cannibalisation effect, focusing in particular on previous attempts to measure it. Practitioner and academic definitions are discussed and linked to the measures used in previous studies. Conjoint analysis, preference modelling, ecological nicheing and regression analysis are explained and reviewed. All previous techniques have important shortcomings associated with them, which suggests considerable potential for an improved means of measuring this important effect. This chapter makes the distinction between measures and techniques - techniques are defined as the statistical routines used to define the outcomes (ie measures). Techniques have been the focus of previous research whereas measures form the basis of this study.

Consumer panel data is introduced here since it forms the basis of this study. The vexed question of how we actually measure cannibalisation is at the heart of the project. Because of the limitations of existing measures, it seems appropriate to focus on what has actually happened (rather than what might happen), and to do this we need to study actual sales within a category. The obvious data to use to do this is panel data since it provides a means of tracking events and share movements, at both the aggregate and individual household level. It has the additional benefit of being one of the most common data sources in use by fmcg companies, so that they are able to use any measure which is developed for it. The consumer panel data used in this

thesis is collected at the household level, so the purchasing information analysed reflects behaviour at the household rather than the individual consumer level.

Data gathered at the household level, while very commonly used in marketing practice, does have the potential to mask differences in consumption behaviour at the individual family member level, and therefore potentially hides in-home segmentations, usage-based segmentations, or individual family member loyalty to one brand.

However, for many products including most of those studied here, purchase is made by one person on behalf of the entire household, and therefore the data is appropriate. It is important to note that, for the purposes of this thesis, the terms "consumer" and "household" are used interchangeably to describe this behaviour.

Chapter 3 examines the measures to be tested on the consumer panel data base.

Five potential measures are presented for evaluation, ie those of market share, gains loss analysis, the Share Order Effect (SOE) model, duplication of purchase and buyer analyses. Their methods of calculation and theoretical underpinning are described. Each is tested on a consistent dataset of thirteen line extensions derived from longitudinal consumer panel data. The measures are the current practitioner benchmarks of market share and gains loss analysis, tested against three new academic measures: an SOE model, duplication of purchase tables and buyer analysis. Issues associated with the use of panel data are also discussed here, with advantages and potential problems being examined. The benefits of empirical validity, household level data and accuracy are weighed against possible biases inherent in this data gathering technique.

Chapter 4 expands on the objectives and methodology of this research. It covers the contribution of the study, the detailed objectives and research design. The predominance of line extension activity, and cannibalisation's place as the major risk associated with it, underline the significance of the research.

Chapter 5 looks at specific areas of the research procedure, specifically examining how the measures outlined will be operationalised in the full study. The findings of two pilot studies are presented, along with their implications for the final research procedure. Two important operational aspects of the study are emphasised, ie **when** to take the measures and for **how long.** The chapter explains the concept of stationarity in markets, which is critical in understanding the timing of the measures and the basis of the SOE model. The tests used for stationarity, the runs test and the Daniels' test are explained. These are used to determine when to take the measures since they tell us when stationarity has been re-established, following the launch of the extension. After testing a variety of time periods in the pilot studies, the duration of the measures is set at two quarters (26 weeks), in line with practitioner convention.

Chapters 6 and 7 review the results of using the measures, defined in Chapter 3 and refined in Chapter 5, on a sample of line extensions based on consumer panel data. The results are subdivided, according to the level of cannibalisation shown. Chapter 6 concentrates on those line extensions which demonstrate little share loss by the parent, Chapter 7 looks at those examples which create excessive cannibalisation. The results confirm that cannibalisation is a real risk of a line extension strategy. All except one line extension showed some evidence of share loss by the parent brand. Two other extensions showed only limited evidence of cannibalisation, with an additional extension displaying only the level of cannibalisation we would expect given the size of the parent brand. The remaining extensions, described in Chapter 7, all cannibalised their parent brands to an excessive extent.

Chapter 8 takes the findings from Chapter 6 and 7, and discusses their consistencies and variance. The reasons for these are explored. Each measure, and its associated results, is analysed in turn. The findings from the five different measures are correlated and show a perhaps predictable partitioning between those measures based on market share and those based on cross purchase. The market share measure, gains loss analysis and the SOE model all correlate quite closely. Duplication of purchase and buyer analysis results correlate very closely with each other, and to a limited extent with the SOE model. Recommendations are made for an improved measure of cannibalisation which resolves some of the problems experienced by existing methods.

A new definition of cannibalisation is proposed which limits cannibalisation to share loss by the parent brand, and includes the principle of trends in the parent market share.

Chapter 9 reviews the evidence for cannibalisation barriers, since testing for these was one of the objectives of this research. These barriers are tested on the crossover between liquid and powder detergent, since Buday (1989) specifically uses these subcategories as examples in his paper. Only limited evidence of these barriers is found within the UK detergent market. The results are not inconsistent with Buday's thinking, but neither are they strong enough to provide conclusive proof. Certainly, alternative explanations are possible for the relatively weak effects found.

Chapter 10 concludes the study by referring to the objectives set out in Chapter 3. The limitations of the present study are discussed, and directions for future research are outlined. In particular, it is suggested that future research needs to concentrate on understanding the relationship between the existing measures, validating the improved measure proposed, and on assessing the predictors of the direction and effect of cannibalisation.

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LINE EXTENSIONS

Brand extension has been the dominant marketing strategy of the last two decades. Its popularity has risen in parallel with corporate appreciation of brands as assets. A corollary of this esteem has been the urge to leverage these valuable (and increasingly, valued) assets by using existing brand names to reduce barriers to entry for new lines, with the implicit assumption that additional profit will be earned as a result.

But haunting the new product line is the spectre of cannibalisation. What if the new line is successful but only at the expense of the parent? Then additional costs may have been incurred without the benefit of incremental revenue.

Cannibalisation is one of the major concerns facing a marketer who line extends, and yet there has been relatively little study of this area by marketing academics. This study seeks to redress this balance by developing our understanding of this important effect.

The first two chapters set the context for the research study by examining our current state of knowledge of line extensions and the associated risk of cannibalisation. This chapter defines the term line extension, reviews the relevant literature and summarises the risks associated with this popular strategy.

1.1 Definition of Extensions

This section defines the related terms of brand, line and category extensions.

A superficial examination of the area would suggest that the definition of a brand extension is deceptively simple - the use of an existing brand name in a new field. But more detailed analysis of the literature shows a disparity in the views of authors as to what constitutes a "new" field.

Doyle (1994 p175) uses one of the narrowest definitions.

" A brand extension means using a brand name successfully established for one segment or channel to enter another one in the same broad market.....Brand stretching means transferring the successful brand name to quite different markets."

This concept of brand **stretching** is very similar to Aaker & Keller's (1990) definition of brand **extension** as

" the use of an established brand name to enter a new product category"

Aaker & Keller make a distinction between brand extensions and line extensions. A line extension uses an existing brand name to enter a new market segment within the existing product class eg Liquid Tide. Doyle's definition is closer to a line extension within Aaker & Keller's typology.

Kotler (1991 p447) makes no such distinction between line and brand extensions. He includes the concept of line extensions within the overall umbrella of brand extensions.

" A brand extension strategy is any effort to extend a successful brand name to launch new or modified products or lines."

Tauber (1981) attempts a more comprehensive evaluation of " new opportunities from the company's viewpoint". He categorises these opportunities according to the product category entered and brand name used. With continuing supply pressures and demand stagnation, Tauber sees four major opportunities for the firm. Figure 1 updates Tauber's original classification by renaming franchise extensions as category extensions. The matrix makes a clear distinction between these opportunities, although in reality the distinction between new and existing product categories can become blurred. The use of sub brands with corporate endorsement can also make the issue of definitions more contentious. For example, was the launch of Findus Lean Cuisine a line extension of the Findus brand or effectively a new brand?

However, the dominant paradigm for most authors is that of a single-line product extending to a new-to-the-company category. It is this definition which is used implicitly to describe brand extensions. There is little or no attempt to distinguish between types of brand and perhaps this has led to some of the inconsistencies in research findings. As Laforet & Saunders (1994) note, there are limitations to the paradigm of the brand as a single entity with 50% of products in their study carrying more than one brand name.

Figure 1 : Types of New Product From the Company's Viewpoint

		PRODUCT CATEGORY: New	PRODUCT CATEGORY: Existing
BRAND NAME	New	NEW PRODUCT	FLANKER BRAND
	Existing	CATEGORY EXTENSION	LINE EXTENSION

After Tauber (1981)

Where a company name or logo is strongly identified with a number of brands, always appearing prominently and recognised as an attribute of the individual brands, it is often reasonable to treat the company association as a form of branding eg Nabisco, Nestlé. Smith & Park (1992) suggest that new products carrying the company name in a similar manner to other products in the company portfolio may, with some caution, be treated as brand extensions.

Since Tauber provides one of the most comprehensive frameworks for the definition of brand extensions then his definitions will be used.

Brand extension will therefore be used as a **generic term** to cover both category and line extensions. Category extensions involve the stretching of a brand into a **new category,** and line extensions comprise those new lines which extend the brand but **within the same product category.** An example of **category** extension would be

Virgin moving from a record company to an airline. A line extension would be Lemon Fairy Liquid. Both are brand extensions.

However it is important to note that although the examples given fall very clearly into the chosen classification, not all brand extensions are quite so clearly assigned. For many extensions there is at least an element of grey - is Persil Liquid Detergent so different to Persil Washing Up Liquid? Similarly as Laforet & Saunders (1994) point out, mono branding is no longer the convention in many categories.

This ambiguity could create potential problems for research within this area. Hence great care has been taken to select examples which fall clearly within the line extension category, and which have only one brand name. These constraints were workable given the dataset available.

1.2 Typologies of Brand Extensions

Extensions can be classified by reference to criteria other than same/different category; these classifications of extensions are important when studying their performance (Hardie 1994), and when attempting to provide guidelines for future development (Loden 1992). One of the more comprehensive typologies is provided by Tauber (1988). He defines seven categories of brand extension after a study of 276 extensions covering 115 brands. The typology is as follows:

1. Same products in a different form.
2. A distinctive taste/ ingredient /component in the new item
3. Companion products
4. Same customer franchise
5. Expertise
6. Benefit/ attribute/ feature owned
7. Designer image status

It should be noted that these categories are not mutually exclusive and show some similarities to Aaker & Shansby's (1982) typology of positioning strategies. Line extensions tend to fall into the first two categories, with the remaining five attributes more typical of category extensions.

Lawrence (1993) examines only *line extensions,* and finds four groups:

1. varieties
2. improved formulation
3. new packaging
4. new sizes

These would appear intuitively correct, although many improved formulations would tend to be replacement products rather than additional lines. Perhaps a better category would be *new* formulations eg liquid detergents which exist alongside powdered variants. Once again there is no consensus, Loden (1992) does not consider new pack sizes or different flavours as line extensions, as a result of his alternative definition of line extensions. His view is likely to be at variance with most practitioners, who would see any additional SKU (Stock Keeping Unit) under the parent brand as a line extension.

Hardie (1994) takes a more strategic view of line extensions, classifying in terms of their basis for line extension. He defines seven classes of attribute found in SKUs.

1. Brand
2. Aesthetic
3. Flavour
4. Form/Type
5. Formula
6. Packaging
7. Size

He argues that most line extensions can be defined on the basis of one dominant attribute level, eg a new flavour or pack size. If we take this view then line extensions can be defined by their attributes. So, if a line extension

1. Introduces a new attribute to the category, it is *innovative.*
2. Uses an existing attribute but one which is new to the brand it is *imitative.*
3. Is a new combination of existing attribute levels which are already associated with the brand, it is *filling-in.*

Predicting the performance of innovative line extensions is the most challenging.

1.3 Importance of Brand Extension Strategies

Brand extension has grown in importance as a strategy throughout the 1980s and into the 1990s. It is a natural approach for a firm aiming to achieve its growth targets by exploiting its existing assets. As Tauber (1988) pointed out,

" Brands have become the barrier to entry, but also the means to entry"

The extent to which brand names (and corporate names) add value has been tested by Saunders & Guoqun (1996). They use conjoint analysis to demonstrate that both types of name add value, although some add more value than others. Their study of confectionery brands showed a price threshold above which much of the advantage gained by the use of these familiar names was negated.

More specific reasons for the proliferation of brand extensions have been well documented, and are summarised in Table 1 below.

Table 1: Advantages of A Brand Extension Strategy

ADVANTAGE	AUTHORS
Strong and positive associations	*Aaker & Keller (1990), Sunde & Brodie (1993)*
Awareness and presence	*Aaker (1990), Tauber (1988)*
Encouragement of trial purchase	*Claycamp & Liddy (1969), Aaker & Keller (1990), Doyle (1989)*
Cost savings	*McWilliam (1993), Smith & Park (1992)*
Enhancement of core brand	*Keller & Aaker (1992)*
Avoidance of advertising restrictions	*Lyle (1992)*
Higher success rate	*Sullivan (1992)*
Defence of the brand name	*Kapferer (1992), Farquar, Han,Herr & Ijiri (1992)*

Much of this research has focused on category extensions, although many of the findings also apply to line extensions. Academic activity has largely neglected line extensions, despite a succession of authors emphasising the dominance of this strategy within the arena of new product launches. Table 2 presents their findings as percentages of new product types.

Table 2: Types of New Product

Source	TYPE OF NEW PRODUCT (%)		
	Line Extension	Category Extension	New Brand
Aaker (1991)	89	6	5
Lawrence (1993)	67	2	31
Miller (1993)	c70		

Two diametrically opposed views of the effectiveness of this strategy are cited by Hardie (1994). As one prominent practitioner (D. Wayne Calloway, Chairman of PepsiCo Inc) enthuses,

" Line extensions are marketing magic. For example Cool Ranch Doritos not only account for sales of $ 150 million by themselves - they've boosted the sales of the entire Doritos line to over a billion dollars. We've created a Fortune 1000 company just by changing the seasoning at the end of the bake line."

However, not all his colleagues share his unmitigated enthusiasm. Many are concerned about the effects of line extensions on the parent brand. Herb Baum's view from his position as President of Campbell's USA is far more restrained.

" Line extensions tend to cannibalise the existing brand."

1.4 Risks Associated with Brand Extension

Cannibalisation is only one of the risks facing the company which opts for a brand extension strategy. Others are included in Table 3 below and emphasise the need for careful thought before extending a brand. Although the dangers faced by the extension itself are of concern, perhaps even more worrying are the potential hazards to the parent brand and the company itself. There is a real possibility of reducing the brand equity rather than enhancing it.

Table 3: Risks Associated with A Brand Extension Strategy

	RISKS	AUTHORS
Risks for the parent brand	Cannibalisation	*Buday (1989)* *Fader, Hardie & Walsh (1994)* *Reddy, Holak & Bhat (1995)*
	Negative effects on image	*Ries & Trout (1986)* *Kapferer (1992)* *Keller & Aaker (1992)*
	Dilution of brand image	*Ries & Trout (1986)* *Park & Smith (1992)* *Kapferer (1992)* *Keller & Aaker (1992)* *John & Loken (1992)*
	Image spillover effects	*Sullivan (1990)*
Risks for the company	Opportunity cost	*Ries & Trout (1986)*
	Restrictive vision	*Kapferer (1992)*
	Stifling product innovation	*Bennett & Cooper (1981)*
Risks for the extension	Inappropriate associations	*Aaker & Keller (1990)* *Park, Milberg & Lawson (1991)*
	Consumer confusion	*Ries & Trout (1986)* *McWilliam (1993)*
	Inadequate / inappropriate support	*Kapferer (1992)* *Barwise (1993)*
	No significant point of difference	*Kapferer (1992)* *Murphy (1992)*

1.5 When is Extension Appropriate?

The principles for deciding between brand extensions and individual brand names should be the similarities between positioning strategies (Doyle 1994). Where the target market and differential advantage are the same, the company can safely apply the same brand name to different products. Even if the target market is different companies may be able to use the same brand name provided they specify the different 'grade' eg Mercedes 200 and 500 series.

Doyle's reasoned approach contrasts with the more evangelistic outbursts of Ries & Trout (1986 p124) who suggest that line extension can only work,

"If your competitors are foolish. If your volume is small. If you have no competitors. If you don't expect to build a position in the prospect's mind. If you don't do any advertising."

But they do offer guidance if companies insist on the line extension "trap". They outline the following requirements:

1. Expected volumes are small
2. There is lots of competition
3. Little advertising support
4. Little innovation
5. No personal selling

These conditions apply to most line extensions, particularly in fmcg markets. The products tend to be incremental additions to product ranges in very competitive markets. They are given half the promotional support of new brands (Kapferer 1992) and personal selling is not an issue.

Arnold (1992 p154-155) suggests that the following guidelines will apply in most cases when deciding whether line extension as a strategy is appropriate.

1. When the proposed extension is in a closely allied product area
2. When repertoires are important
3. When variety is one of the clearly defined consumer wants in a market

He also makes suggestions as to how to decide whether a particular line extension is an appropriate one for the brand. The following questions are proposed to ensure that the variant is consistent with the essence, value and properties of the brand.

1. Is the brand essence still applicable?
2. Is the brand property transferable?
3. Can the variants can be promoted and distributed together?

Whilst these criteria seem to be sensible, the first two present problems in definition. His argument is also undermined by his choice of example. He claims that Ribena is unable to escape from its indelible association with blackcurrants, when in fact the brand has launched very successful variants in other fruit flavours such as Orange & Apricot, Fruits of the Forest and Strawberry. Before you can decide whether a brand property is transferable, it is necessary first of all to decide what the brand property is. This is a non trivial task. Arguably Ribena's brand property is of high quality fruit, which allows for considerably more stretching than blackcurrants. The more abstract the values, the greater the potential for stretching (Kapferer 1992).

Barwise (1993) argues for three bases for effective brand extensions - fit, brand strength and effective marketing. It is this last factor which is often ignored. The need to post rationalise failure among marketing practitioners is strong, as is the need to find a reason more abstract than implementation skills. Poor marketing is the least acceptable cause of failure, and rationalisations are likely to focus on fit or brand inadequacy.

1.6 Cognitive Processes and Line Extensions

An insight into how line extensions work may be gained from cognitive processes - the view that thought and feeling can produce changes in action directly. This is in opposition to the more traditional behaviourist approach which sees thought and feelings as effects, not causes and hence with only predictive power, rather than explanatory.

Cognitivism holds that experience is interpreted and used to modify attitudes and knowledge, which then control behaviour. There is some evidence that this explanation is valid within fmcg markets, which form the basis of this study. An early study by Bird and Ehrenberg (1966) suggested that usage precedes intention to buy with frequently purchased brands. Two thirds of those who have used the brand at some time express an intention to buy it again. Other studies also suggest that brand attitudes follow the purchase of fmcgs. Barnard (1987) found that people were more

likely to associate positive attitudes with a brand if they are currently using it. Particularly relevant to this research is Sandell's (1981) study based on panel data. He found that attitudes were aligned with purchase immediately after buying, but then, over time, reverted to the pre-purchase pattern.

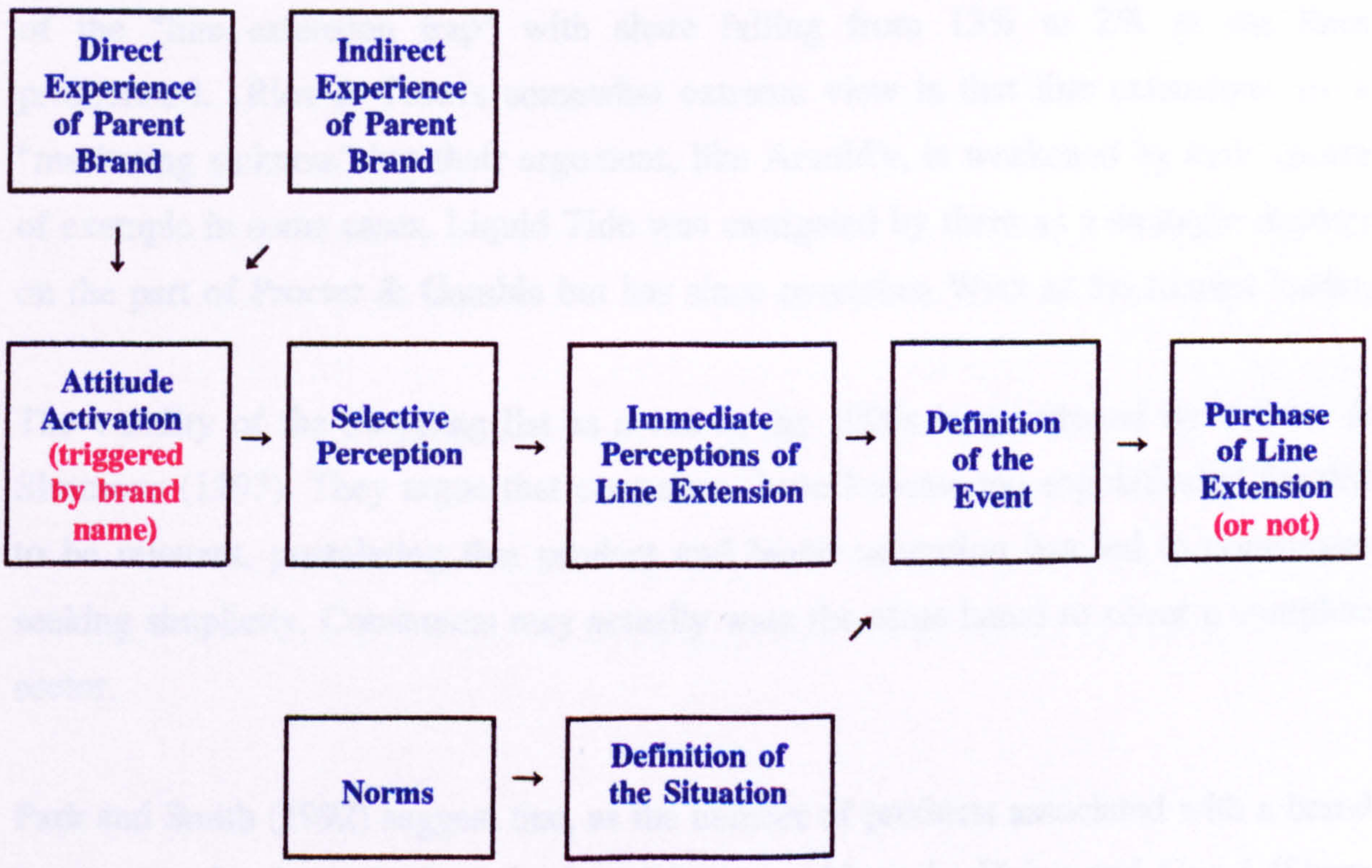
One of the difficulties of this approach is in untangling the direction of causality between attitudes and behaviour. It seems likely that attitude and behaviour changes overlap, and there is no simple B→A or A→B explanation which applies universally. Causal priority will depend on the person, action and context. It is likely, however, that the degree of involvement will affect the direction of causality; low involvement products are more likely to show the B→A direction of causation where as the reverse may be true for high involvement categories.

If we accept that the relationship between behaviour and attitude is important, then we would expect that consumer attitudes towards the brand will affect their purchase or otherwise of the line extension. Similarly their experience of the line extension will affect their attitude towards the brand. Research suggests that direct experience such as trial (Smith and Swinyard 1983) changes attitudes more, and that direct experience leads to more strongly learned associations between attitudes and behaviour (Fazio & Zanna 1978).

This tendency, of direct experience to produce more predictable and consistent attitudes and action, is explained by Fazio (1986) as a result of the greater accessibility or strength of attitudes formed in this way. This could imply that consumers with direct experience of the parent brand, will more easily access their positive attitude towards the brand name which should lead to an increased propensity to buy a line extension bearing the same name. Another feature of this research is that attitudes can be strengthened by repetition (Powell & Fazio 1984). This could suggest that more frequent purchasing of the parent would prompt greater purchasing of a line extension. Both these implications suggest that cross-purchase between parent brand and line extension would be greater than we might expect if they did not share a common name, increasing the risk of substitute purchase.

The figure below amends Fazio's (1986) generalised view of the attitude-behaviour process to the specific context of line extensions. Fazio suggests that attitudes are automatically activated by observation of the attitude object, although not all objects have the ability to generate associated attitudes. The object and its evaluation need to be well established in memory, usually by direct experience. This would be true where the consumer is already purchasing the parent brand. In this situation the familiar brand name would trigger an attitude. This attitude would then guide the consumer's perception, for example the brand might be seen as an acceptable example of the category. The individual would then become aware of related parts of the environment. The definition of the event then occurs as these perceptions are related to a normative understanding of the event. Behaviour then follows.

Figure 2: Simplified Attitude-Behaviour Process for Line Extension Purchase (after Fazio 1986)



The idea that accessibility of positive attitudes towards a brand, and indeed of the brand name itself, is important, has great intuitive appeal. Ries & Trout's (1986) concept of product ladders is consistent with this, and underlines the importance of

share of mind and position on the hierarchy of brand names within a category. But they warn of the dangers of being attracted to the line extension trap.

1.7 The Line Extension Trap

Clarity of brand image is important. Ries and Trout (1986 p208) warn of the dangers of weakening the overall brand image.

" You can't be all things to all people and still have a powerful position."

They advocate the use of a shopping list (or bartender) test as a test for the strength of the brand, suggesting the brand name should be able to stand alone for the product category. Protein 21, a shampoo brand from Mennen, is cited as the classic example of the "line extension trap" with share falling from 13% to 2% as the lines proliferated. Ries & Trout's somewhat extreme view is that line extensions are a "marketing sickness" but their argument, like Arnold's, is weakened by their choice of example in some cases. Liquid Tide was castigated by them as a strategic disaster on the part of Procter & Gamble but has since overtaken Wisk as the market leader.

The validity of the shopping list as a test in the 1990s is questioned by Bunten & Simmons (1993). They argue that consumers have become too sophisticated for this to be relevant, postulating that product and brand saturation has led to consumers seeking simplicity. Consumers may actually want the same brand to cover a complete sector.

Park and Smith (1992) suggest that, as the number of products associated with a brand increases, the "meaning" of the brand becomes blurred. Heinz and Gucci (Sharp 1991) could be viewed as brands which may have been stretched too far, losing a distinct and appealing image in the process. Gucci could be found on 14,000 different products at one stage, which he argues has diluted beyond redemption a once exclusive brand name. But it is not entirely clear that this is an issue of consumer acceptance. It could be a managerial problem, as operationally it would become

impossible to police the quality of so many products. In consequence the quality falls objectively and reflects back on the core brand.

1.8 The Pitfalls of Proliferation

Little research has been undertaken specifically on line extensions although Quelch & Kenny (1995) expound the following pitfalls of range proliferation.

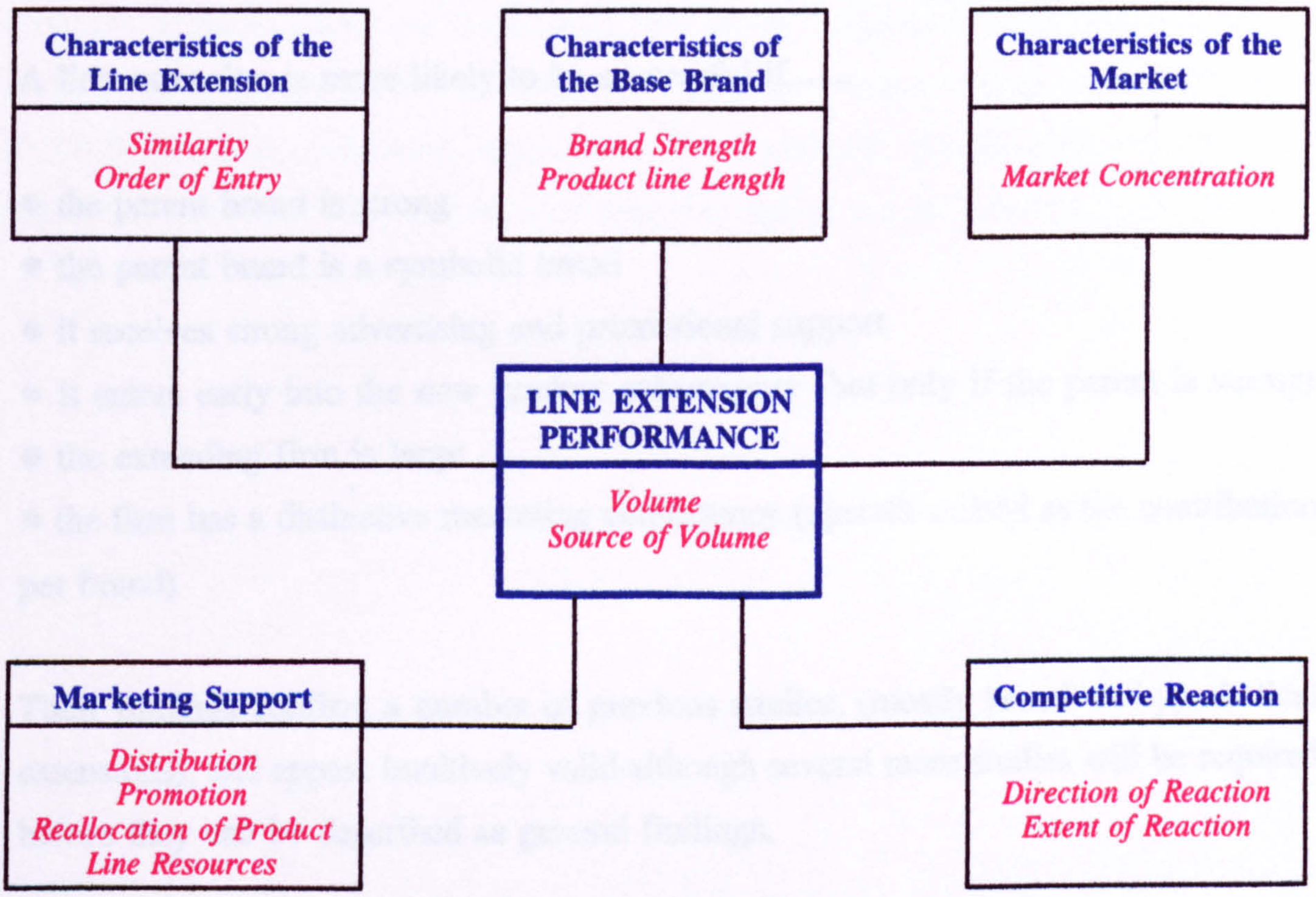
1. **Weaker line logic** as oversegmentation leads to confused consumers.
2. **Lower brand loyalty** as line extensions encourage switching
3. **Underexploited ideas** as short term risk management overwhelms the possibility of the longer term profitability of a new brand.
4. **Stagnant category demand** as line extensions fail to add incremental revenues.
5. **Poorer trade relations** as manufacturers' credibility declines in the face of successive insignificant extensions.
6. **More competitor opportunities** as reduced profit per SKU leads retailers to focus on those brands with the most popular line extensions.
7. **Increased costs** as unit costs for multi-item lines are 25-45% higher than the theoretical cost of producing only the most popular SKU.

Managers' expectation of higher success rates has fuelled the growth in extensions. But what factors are important in encouraging the success of line extensions?

1.9 Success Factors for Line Extensions

Drawing on insights from the new product development, marketing strategy and marketing science literature, Hardie (1994) develops a conceptual model of line extension performance from the factors likely to influence the success of the new product.

Figure 3: A Conceptual Model of Line Extension Performance



Source: Hardie (1994)

Figure 3 illustrates the factors identified, grouped into five areas - the characteristics of the line extension, base brand and market at the top of the diagram and marketing support and competitive reaction at the bottom. Each of these five is further subdivided to highlight the specific factors likely to impinge on the extension's success, which Hardie examines on two levels - volume and its source. Cannibalisation occurs when the source of volume is the base brand or other brands in the company's portfolio. The factors shown here to affect product line success

could also arguably be expected to affect the level of cannibalisation to a greater or lesser extent.

Reddy, Holak & Bhat (1994) give some empirical evidence in this area. Their study of line extensions in the US cigarette industry suggests several influences on a line's likely success. Their findings are limited by their dataset - annual data on one atypical industry - but their findings are a worthy attempt to add empirical validity to previous experimental work. These are in summary:

A line extension is more likely to be successful if.....

- the parent brand is strong
- the parent brand is a symbolic brand
- it receives strong advertising and promotional support
- it enters early into the new product subcategory (but only if the parent is strong)
- the extending firm is large
- the firm has a distinctive marketing competency (operationalised as the contribution per brand)

Their findings confirm a number of previous studies, (mostly based on hypothetical extensions), and appear intuitively valid although several more studies will be required before they can be described as general findings.

1.10 Summary

Brand extensions can be divided into two types - category and line extension. A category extension stretches an existing brand name into a new-to-the-company category whereas a line extension uses an existing brand name in an existing category, For practitioners, a line extension is a new SKU under a parent brand. Whilst practitioner activity has concentrated on line extending, the reverse is true of academic research. Much of this research has focused on the predicted reactions of business undergraduates to hypothetical extensions determined by research

methodologies which foster an artificially high level of involvement. To a large extent the behaviour of consumers in real life has been ignored. The work of Sullivan (1990, 1992), Hardie (1994, 1995) and Reddy, Holak & Bhat (1994) are exceptions to this.

The explosion in extension activity, particularly at the line level has stemmed from a belief in a win-win scenario ie higher success rates at lower cost. The risks associated with these strategies are often underplayed by practitioners. It is easier to argue the case for capitalising on brand equity by extending its use than achieving the promised return (Laforet and Saunders 1994). Little empirical research has been done to help practitioners assess the risks of using an existing brand name. A major problem in line extension, aggravated by continued proliferation, is that of cannibalisation. The next chapter examines the limited research in this area.

CHAPTER 2
CANNIBALISATION

Chapter 1 defined line extensions, quantified their prevalence and the drivers of that popularity. It concluded with a review of the risks associated with a line extension strategy. This chapter focuses on the most important of those risks - cannibalisation. Here we review the cannibalisation literature, examining definitions,and other aspects of the phenomenon. A particular focus is on the techniques and measures used in previous research. These are evaluated in depth to set the context for this research study. Another important aspect of the context of this study is panel data, on which this research is based. This data source is introduced as an attractive means to determine cannibalisation levels.

2.1 Definition of Cannibalisation

There is no one generally accepted definition of cannibalisation. Many authors use the term without clarification, implicitly assuming a commonality of understanding which is far from true. However others do attempt to be more precise in their use of the term. Kerin, Harvey & Rothe (1978) use Heskett's (1976) definition

"the process by which a new product gains sales by diverting them from an existing product."

Mason and Milne (1994) use Copulsky's (1976) definition and are less concerned with process than with magnitude. They define cannibalisation as

"the extent to which one product's customers are at the expense of other products offered by the same firm."

But it is difficult for any manager to determine this - managers tend to take a more aggregate approach and look at sales volumes and shares, not at individual's buying

patterns. This more pragmatic view is echoed in Ambler's (1996 p74) definition which focuses on share, seeing cannibalisation as

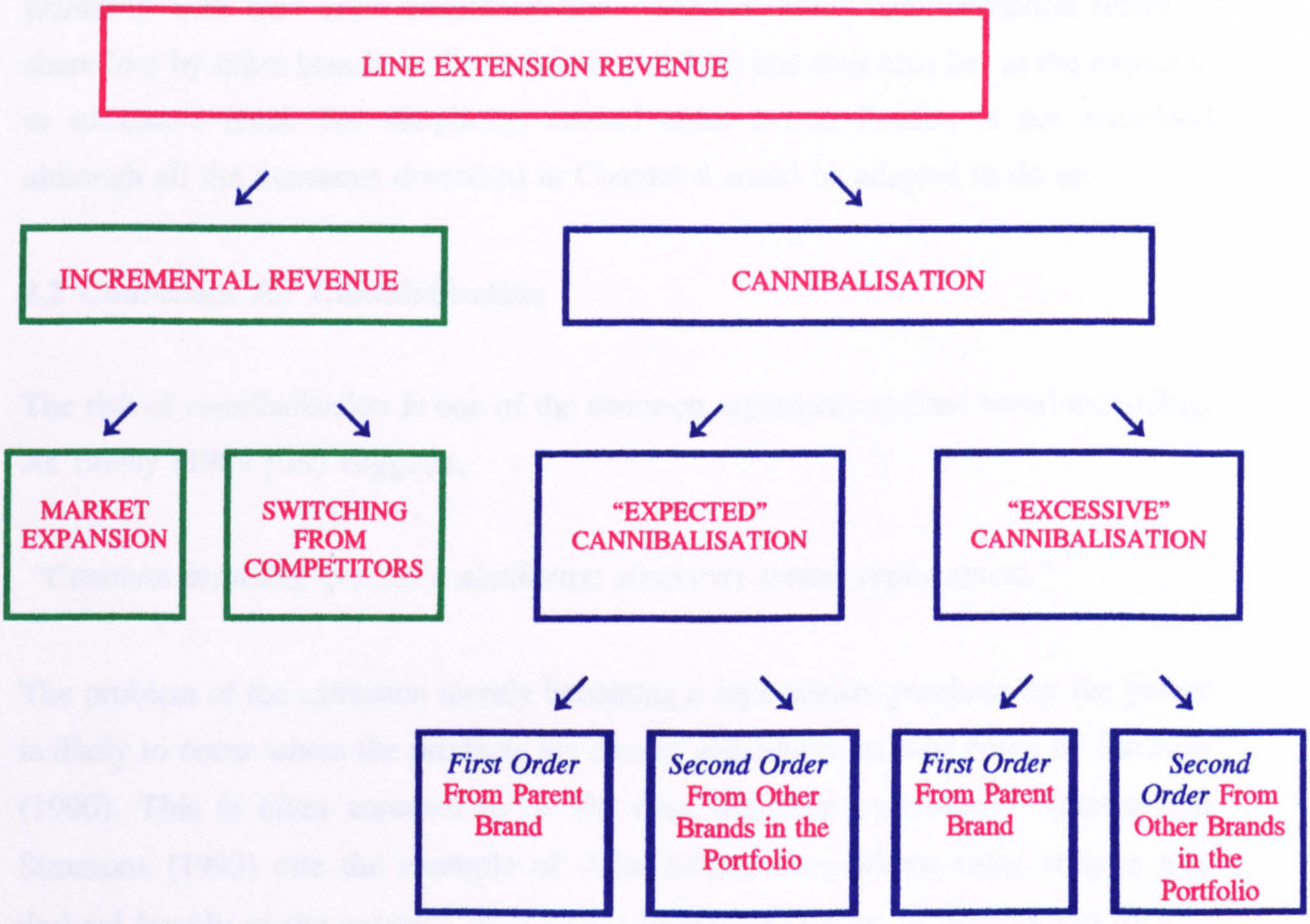
"the market share of the existing brand if the extension had not been launched less what it turned out to be"

This simple definition is relatively difficult to operationalise, since there are problems in knowing what the share of the parent would have been without the new line, and in deciding when to take the post launch measure.

Ambler is describing cannibalisation from a practitioner's view, but Hardie (1994), as an academic, uses a very similar definition. However, he extends the measurement of cannibalisation by looking at the proportion of the line extension's share which is due to cannibalisation ie the ratio of the cannibalised share (given by Ambler's definition) to the line extension's share. This gives a different perspective to the effect by looking at the source of volume of the line extension, whereas the cannibalised share alone demonstrates what the parent has lost. Hardie divides this source of volume into category expansion and cannibalisation. But this decomposition can be taken further.

As Figure 4 illustrates, any line extension can potentially gain revenue from a number of sources. Ideally the sales would be derived from the incremental revenues described in the left half of the figure which may be as a result of market expansion or switching from competitor brands, or a combination of the two. Line extensions may inflate market size by increasing weights of purchase or bringing in new consumers, as a result of the greater variety offered. This is rarely the case in mature markets (Quelch & Kenny 1994). They may also play an important defensive role as "Me too" products, designed to match a competitor's breadth of range. This type of extension is more likely to gain volume from competitor brands.

Figure 4: Levels of Abstraction of Cannibalisation



But another distinct possibility is that the new product's sales may take from the existing corporate portfolio to a greater or lesser extent. Indeed it is important to appreciate that for most line extensions, some cannibalisation is almost inevitable. The work of Ehrenberg (1988) and others would suggest that any new product entering a market will take share from all the existing players in proportion to their size. This effect we term 'expected' cannibalisation and should be higher for larger brands, and lower for small ones. So to expect no cannibalisation at all is perhaps idealistic and will only be achieved by a few. A prudent manager might expect some share loss by the parent brand, and indeed all other brands in the portfolio as inevitable. His efforts should be directed towards preventing 'excessive' cannibalisation, i.e. disproportionate share loss by either the parent brand or others within the company's portfolio. Any cannibalisation of the parent brand's revenue is termed "first order" cannibalisation: this may be expected (i.e. in line with the size

of the parent), or excessive (i.e. disproportionate share loss). This thesis is concerned primarily with first order cannibalisation. "Second order" cannibalisation refers to share loss by other brands in the corporate portfolio and may also be at the expected or excessive level. For simplicity, second order cannibalisation is not examined although all the measures described in Chapter 4 could be adapted to do so.

2.2 Conditions for Cannibalisation

The risk of cannibalisation is one of the common arguments against brand-extending. As Buday (1989 p29) suggests,

"Common branding implies a similarity: similarity invites replacement."

The problem of the extension merely becoming a replacement purchase for the parent is likely to occur where the products are clearly substitutes, as was noted by Sullivan (1990). This is often assumed to be the case with line extensions - Bunten and Simmons (1993) cite the example of Alka Seltzer Plus whose sales volume was derived largely at the expense of the core brand. Excessive cannibalisation on this scale is aggravated by retailers' tendency to operate a "one in, one out" policy. The new line extension may take the fixture space from one of its sibling lines, so that cannibalisation becomes inevitable.

However cannibalisation effects can also be seen operating in the reverse direction. Birds Eye Walls' rationalisation of their Arctic Roll range, from two red berry flavours, Strawberry and Raspberry, to one, had a negligible impact on sales. Previous purchases of Raspberry were replaced with Strawberry, consumers apparently demonstrating indifference to the flavour change. This effect might be termed negative cannibalisation.

Managers are usually keen to minimise cannibalisation. An ideal situation would be when a new product draws all its customers from competing firms. By contrast, the worst case is when all new line sales come from the parent brand.

If a new product is perceived as even a partial substitute, then by definition we would expect to see the sales volumes of one or more existing products reduce. The combined conclusions of Buday (1989) and Kerin, Harvey & Rothe (1978) suggest that this loss will be greater if the following conditions are met:

- the product offers a competitive advantage at a price similar to competitor offerings, eg AlkaSeltzer Plus
- the product is a line extension, eg Macleans Sensitive toothpaste
- the usage occasion is similar, eg Mars Ice Cream and Twix Ice Cream
- the new product itself has attributes which are similar to existing offerings, eg Walls Strawberry Arctic Roll and Wall's Raspberry Arctic Roll. This is particularly true in markets where the consumers tend to be variety seeking, eg snack foods.

Ironically this loss could also be aggravated by the strength of the company. It has been observed by Saporito (1988), and also by Ries (1988) that a share ceiling of 40% exists in many markets. Once this level is achieved, it becomes difficult to make further gains. The firm can be in a no-win situation with NPD. If a new product offers a distinct competitive advantage by different features then the brand equity may not readily transfer, if the variation is only minor then cannibalisation is likely to result.

Line extensions rarely expand the total category demand which exacerbates the possibility of cannibalisation. Indeed Quelch & Kenny (1994) argue that if anything there is an inverse effect. Categories contract if manufacturers attempt to reverse their decline through insignificant line extensions.

Kerin, Harvey & Rothe (1978) note the managerial decisions which foster cannibalisation.

- pressure for growth from new products
- belief in the importance of a full range
- inadequate differentiation between products
- excessive market segmentation
- aggressive promotion favouring new rather than existing products

2.3 How to Minimise Cannibalisation

Copulsky (1976) notes that cannibalisation results from too close identification of a new product with the launching company's older products. New lines therefore need new appeals to new segments eg Lucozade Sport attracts a different market to the traditional convalescent drink.

Another possible strategy is to take account of "cannibalisation barriers" as introduced by Buday (1989). He defines this concept as perceptual or physical boundaries found around many consumer segments that restrict the shifting of sales volumes.

He categorises two types of barrier:

1. Boundaries separating user groups between which crossover is rare, eg product form such as dry vs canned catfood. He asserts that form loyalty, at least within usage occasion, is very high.

2. Boundaries between usage occasions. eg product categories, he cites the example of Ivory soap, detergent and dishwashing liquid.

Although his proposition of cannibalisation barriers is not counter-intuitive, there is no evidence of research underpinning his assertion. One of the objectives of this study is to determine if there is any evidence to justify his belief in this first type of barrier. If they do exist, they would provide excellent guidance to a brand manager keen to minimise cannibalisation.

2.4 When To Encourage Cannibalisation

However, it is important to remember that cannibalisation is not always unwelcome. It may be that the new product delivers a higher profit margin, so cannibalisation actually enhances profits as the buyers switch. The launch of new products may also fulfil a strategic role beyond that of the economics at product line level. Such a

strategy may be used to deter competition or even be essential to survival, particularly in high technology industries. Gow (1994) argues that companies operating in the computer industry must "*cannibalize to survive*" and that IBM has recognised the value of cannibalising its own business. IBM acquired an $800 million business that helps software developers package their products on any hardware platform, whether it is made by IBM or not. In this type of high technology industry, it is important to distinguish between cannibalisation and replacement products. Arguably some cannibalisation may be beneficial where the intention is to ultimately replace the old with the new.

But there is a danger that companies can hide behind this strategic role, and use strategic logic as an excuse for poor financial logic.

2.5 Techniques and Measures Used To Qnantify Cannibalisation

Since there is no agreed definition of cannibalisation, there can be no one standard measure of the concept. Authors predictably use techniques and measures which are consistent with their definition, which gives rise to a wide degree of variation in measures and results. It is important at this stage to make clear the distinction between the terms "techniques" and "measures" since the two can be confused. It is helpful to refer to the basic defininitions of these terms as provided by the Collins Concise English dictionary.

"***Technique*** *1. A practical method, skill or art applied to a particular task. 2. Proficiency in a particular or mechanical skill.*

Measure *1. The extent, quantity, amount or degree of something as determined by measurement or calculation. 2. A device for measuring distance, volume..... 3. A system of measurement... 4. A standard used in a system of measurement... 5. A basis or standard for comparison."*

So, in our terms techniques are the statistical routines which are used to generate an outcome(ie a measure). Measures are the outcomes produced by these techniques and provide the basis for comparison.

This section examines the techniques used previously to quantify cannibalisation (ie the means to measure it), and the measures produced. These are summarised in Table 3a below.

Table 3a Techniques and Measures Used to Quantify Cannibalisation in Previous Research

Technique	Measure	Authors
Conjoint Analysis	Discrete attribute utilities	Green & Kreiger 1987, Page & Rosenbaum 1987
Preference Modelling	Preference x purchase probability	Silk & Urban 1978 Fader & Hardie 1996
Pairwise Comparison to define ecological niches	1. Proportion of each variant's core customers that are cannibalised from each other variant's core niche 2. Percentage of core customers for any variant within a brand which are also in the core niche 3. The percentage of a brand's core customers which are also in the core niches of at least one other of the manufacturer brands	Mason & Milne 1994
Dummy Variable Regression	The percentage variation of the parent brand's actual sales from those predicted	Reddy, Holak & Bhat 1994

Finally this section evaluates the contribution which the use of panel data can make to the debate.

2.5.1 Conjoint Analysis

Conjoint analysis emerged in the 1970s (Green & Wind 1975, Green & Srinivasan 1979), as a method of modelling consumer's decisions as a trade-off between the attributes of multi-attribute products. It is based on the premise that consumers evaluate the value or utility of a product by combining the separate utilities of each attribute. So if a product is described as a collection of attributes, then conjoint analysis can be used to derive the total utility for the bundle of attributes, based on the individual utilities (or part worth functions) of the various levels of attribute and any interaction part worths. It is a flexible technique allowing consumers to express preferences for hypothetical products, and hence generating estimates of market shares. The measure it provides of cannibalisation is the utilities of the discrete attributes.

Cannibalisation can also be estimated by systematically evaluating different scenarios (Green & Krieger 1987). A study in the same year describes how Sunbeam uses conjoint analysis to redesign their food processor range. The company compares market shares with and without a new alternative, allowing the source of the line's share to be determined (Page & Rosenbaum 1987).

Although popular, conjoint analysis has a number of weaknesses. It implies rationality and high involvement in product choice, which is unlikely to be true of habitual purchases such as grocery items. The choice of attributes is critical, they should be relevant but not "fuzzy"; they must not have perceptual differences in definition between respondents. The number of attributes is also important since it directly affects statistical efficiency and reliability. Respondent fatigue is likely if too many factors and levels are included. With hypothetical examples, particularly those outside the consumer's range of experience, the respondent may find it difficult to assess the utility.

2.5.2 Preference Modelling

A related technique is preference modelling.

ASSESSOR (Silk & Urban 1978) predicts the share of a new brand through two models - one relates preference to purchase probability while the other which predicts the trial and repeat purchase process. It is the preference model which is of interest here since it is used to estimate the sources of the new brand's share - in terms of *cannibalisation* of the firm's existing brand(s) and *draw* from competitors' brands.

Table 4 shows the variables which are inputs into the preference model and the means by which they are elicited from the respondents.

Table 4: Variable Input into ASSESSOR Preference Model

Variable	*Method of Elicitation*	*Rationale*
Brands in relevant set	Unaided recall	Allaire (1973)
Attribute importance rating		
Brand beliefs/perceptions	Bipolar satisfaction scales	
Preferences	Constant sum paired comparison ratings	Axelrod (1968) Haley (1970) Torgerson (1958)

The variables of attribute importance weights, brand beliefs (the extent to which a brand has an attribute), and preferences are taken pre and post usage. The pre measure examines only those brands in the respondent's relevant set, following Allaire's (1973) research showing that perception and preference can be distorted by the inclusion of unfamiliar stimuli. The post measures cover the relevant set of established brands plus the new brand. The timing of the post measure is determined by the estimated average usage rate of the new product.

Silk & Urban use the model to initially estimate individual purchase probabilities, and

then aggregate these across individuals to give an estimate of the total share. Cannibalisation and draw are calculated by comparing the expected market share for each established brand with its prior market share.

There are two important assumptions underpinning the model.

1. Luce's (1969 p9) Axiom of the Irrelevance of Independent Alternatives which requires that the ratio of the probability of choosing one alternative to the probability of choosing the other should not depend upon the total set of alternatives available. As Silk & Urban acknowledge, this assumption will not hold where "the set of alternatives is sufficiently heterogeneous that choices are made in a hierarchial manner"; the use of relevant sets helps to reduce this possibility since the respondent is focusing on a relatively homogeneous group of brands.
2. Brand choice is regarded as a heterogeneous, stationary, zero order Bernoulli process. This is a reasonable assumption for markets with stable market share, accompanied by substantial brand switching (Ehrenberg 1972, Bass 1974).

ASSESSOR therefore only measures cannibalisation at what we term the Second Order level, ie steal from other brands in the portfolio. The research design is based explicitly on the evaluation of new brands rather than new lines. Although it is theoretically possible to modify ASSESSOR to handle line extensions, there are a number of problems. The IIA Axiom would be suspect. Put simply, if we have a red brand and a blue brand, we would expect a new blue brand to draw disproportionately from the existing blue brand, thus violating IIA. The sample size would need to be increased to gain meaningful results on a line basis, rather than at the aggregate level of the brand. The number of attributes is likely to increase, possibly making the respondents' task unworkable.

It is important to note that the validity of the model is dependent on a return to equilibrium when estimates of share are made. The timing of the post usage measure is therefore critical. ASSESSOR uses an estimate of the usage rate of the new product which does not seem very robust, given the inherent inaccuracy of consumer predictions of their own behaviour.

A welcome emphasis on SKUs is provided by the work of Fader and Hardie (1996). They model the derived preferences for SKU attributes, rather than the direct preferences for each SKU. So, for example, a consumer's preference for 4.6 oz tubes of mint tartar control Crest gel is assumed to derive from his preferences for each of the relevant SKU attributes ie 4.6 oz, tube, mint, tartar control, gel as well as Crest. This concept is similar in many ways to the part worths of conjoint analysis, but differs by its derivation from real products (rather than hypothetical ones) and by being feature-based (rather than continuous).

The authors use a latent class framework, using a jointly determined preference model. Here preferences over attributes are assumed to be jointly determined, within a segment. So rather than each attribute being defined separately, segments comprise preferences over all relevant attributes simultaneously.

Hardie & Fader (1996) develop preference models to predict the market share which will be achieved by a new line extension, and the source of volume of that share. The model is restricted to predicting the volumes of only imitative or filling in line extensions (see page 23) since all attributes need to be pre-existing.

Model-based predictions of cannibalisation are derived by simulating the parent brand volume at two levels - both with and without the line extension. The difference is the cannibalised volume. The percentage of the line extension's share which is due to cannibalisation is calculated by dividing the cannibalised volume by the predicted volume of the line extension. In the two examples they use, this figure varies between 46.8% and 4.8%. Their predictions differ greatly from estimates provided by gains loss analysis. However, this could be due to the problems with the algorithm underpinning gains loss analysis which will be discussed in Chapter 8.

Fader & Hardie note that there are two assumptions which allow this modelling framework to be used to predict line extension performance, and therefore cannibalisation. Their first assumption of no category expansion is reasonable in mature categories, and given that their predictions are restricted to imitative and filling-in extensions. Reddy et al (1994) found some expansion effects, but this was

limited to early entrants which are likely to be innovative in Hardie's classification. The second assumption is that preferences for SKU attributes are stable over time. This is likely to be true for attributes which have been in the category for a significant period of time.

2.5.3 Ecological niches

Mason & Milne (1994) measure the percentage of core customers drawn from existing brands. The core customers are defined as the 75% of consumers closest to the average consumer of the brand, operationally defined as the 75% closest to the centroid of the hypersphere defined by the brand's consumer characteristics.

Cannibalisation is measured at three levels.

1. Between Variants of the Same Parent

The micro level of cannibalisation between variants of the same brand is derived from a pairwise comparison. The level of cannibalisation is the proportion of each variant's core customers that are cannibalised from each other variant's core niche. (Mason & Milne use the term niche in the ecological sense rather than the more typical marketing interpretation). A matrix of cannibalisation values can therefore be derived with high values denoting potential cannibalisation problems. The figures vary between 10.8% of non-filter cigarettes' core customers being cannibalised from Low Tar 100s, to 73.3% of Lights 100s core customers falling into the Lights Kings core niche.

2. Of the Parent

This is calculated in a similar way to the above. The cannibalisation rate for a brand is the percentage of core customers for any variant within the brand which are also within the core niche. Zero cannibalisation was found, unsurprisingly, for single product line brands. As the number of line extensions in the brand increases, so does the average rate of cannibalisation although with some variation. For example, if two five-variant brands are compared, the cannibalisation rate varies between 45% for one to 76% for the other. This level of cannibalisation we have termed first order.

3. Of Other Brands of the Same Manufacturer

Mason & Milne use the same method to assess the potential cannibalisation by manufacturer, ie they calculate the percentage of a brand's core customers which are also in the core niches of at least one other of the manufacturer's brands. This is second order cannibalisation within our classification. In general, these figures are very high with most brands demonstrating cannibalisation at over 80%, rising to 96%. The authors explain this as a result of the unusually high number of line extensions in the market. As Ries & Trout (1981 p100) remark,

"..... cigarette brands have been line extended to death"

This has been fuelled, at least in part, by the need for a defensive strategy to discourage brand switching.

But another possible interpretation is the probability that there are no real demographic differences between the buyers of these directly competing brands (Ehrenberg & Hammond 1994). If this were to be true, then this creates major problems for this method of measuring cannibalisation with this type of product.

There are other concerns. Mason & Milne's approach, whilst imaginative, only measures *potential* cannibalisation rather than actual. This means that their figures

are likely to be over stated, since they show the upper limit of cannibalisation. Even at this inflated level, their figures will only be useful if the core customers are defined appropriately and accurately. Demography is unlikely to be useful here, and panel data tends to be light on other detail about respondents. Additionally, the method does not cope well with portfolio purchasing which is a feature of many product categories. This is probably less of an issue with cigarettes, but would create problems with more typical packaged goods products.

2.5.4 Dummy Variable Regression

Reddy, Holak & Bhat (1994) also use data from the cigarette industry. But where Mason & Milne use survey data, this study uses pooled time series data which is annually reported (1950-84). Cannibalisation is defined as the difference between the projected sales of the parent (had the extension not been launched) and the actual sales. If the actual sales of the parent were higher than those projected, then this would be an expansion of the brand. All line extensions can therefore either cannibalise or expand the parent. Both effects are measured as the percentage variation of parent brand's actual sales from those projected.

Reddy et al use a dummy variable regression to provide an estimate of the cannibalisation effect as a constant shift in the intercept term. The expression (shown below) specifying the cannibalisation coefficient includes a quadratic component designed to capture the diminishing aspects of cannibalisation over time.

$$\lambda = \beta_0 + \beta_1 T + \beta_2 T^2 + \sum_j \beta_j^D D_t^j + e_t$$

where λ is the cannibalisation coefficient,

T is the time since the introduction of the extension into the subcategory

D^j_t is the dummy variable which equals one if, and only if extension I is introduced into category j

Although early extensions into a category show expansion effects, Reddy et al find that later categories showed average cannibalisation coefficients varying between 1.4% and 4.7%. These figures are obviously dramatically lower than the potential cannibalisation rates found by Mason & Milne in their study of the same industry. The factors which may explain at least some of the variance are:

1. Differences in data.
   Reddy et al use annual data covering potentially 24 years. Such an extended time period is likely to lead to a reduced cannibalisation effect
2. Differences in definition.
   Mason & Milne look at potential cannibalisation on an individual basis, whereas Reddy et al examine actual cannibalisation at an aggregate level.
3. Differences in measure.
   Mason & Milne use percentage of overlap between core customers, Reddy et al uses percentage of parental market share.

But this large discrepancy does raise questions about how best to measure cannibalisation. A greater convergence in the results would have given greater confidence in both measures.

Reddy et al do suggest intervention analysis (Box & Tiao 1975) as an alternative technique. However an investigation of this suggests more problems inherent in its use than it solves. The definition of what constitutes an intervention is problematic. On the same theme one firm's actions are, by definition, intervention on another firm's actions so separating these becomes contentious. Measurement problems are also created the fact that the desired outcome of marketing actions is not always constant, ie sales is not the only outcome criterion. In summary, although the model does have some conceptual merit, it does need to be validated in marketing conditions. Their paper limits the application to economic and environmental problems.

2.6 Consumer Panel Data

The research study, described in this thesis, is based on consumer panel data. This section examines the issues relating to its use, adding to our discussion of the context of this research.

This data source is unique in providing the depth of purchasing data which we need to measure cannibalisation with confidence (ie at category, brand, line and household level) and being in common use amongst practitioners. Its popularity adds greatly to the relevance of this research since any findings will be able to be implemented by managers.

This section defines the concept of consumer panels and examines the issues arising from their use as a data source. Panel data are discussed in general terms; the sample to be used in this research is detailed in Chapter 4.

Consumer panels are defined by Kent (1989 p89) as

"representative samples of individuals or households taken from the population that constitutes the market being estimated, and whose purchase or use of a defined group of products is recorded at regular intervals"

The use of consumer panel data is an important feature of this study and the next section deals with issues associated with the use of this type of data. We begin by examining the advantages which the database offers.

2.6.1 Advantages in The Use of Panel Data

There are a number of significant advantages to the use of panel data in a study of this type. These are as follows:

1. It lends empirical validity to the findings

2. It allows purchase behaviour to be tracked at the individual household level, unlike for example retail audit data which has the store as the lowest level of aggregation.
3. It records actual purchase behaviour rather than predicted.
4. The sample attempts representativeness, unlike laboratory experiments on students for example.
5. It provides continuity of data

Parfitt (1986 p194) adds two more

6." Panels have a marked advantage in the amount and accuracy of the data that can be obtained from one source, compared with the normal alternative of single call interview techniques."
7." The depth of analysis of the dynamics of consumer behaviour possible from the continuous nature of panel measurements offers unique opportunities to understand the ways in which the consumer behaves under given stimuli."

Work by Parfitt (1967a, 1967b) compares the responses of 1000 housewives interviewed about their purchasing behaviour in 12 product fields with the data recorded by the same housewives in the panel to which they belonged. His results demonstrate the marked tendency of respondents when interviewed to exaggerate their purchases. This exaggeration factor is inversely linked to their purchase frequency which leads to products with a high average purchase frequency being exaggerated the least in interview surveys. Conversely low purchase frequency buyers exaggerate the most leading to an artificial narrowing of the gap between the two groups. Brand switching behaviour is also oversimplified as respondents tend to equate their "most recent" brand with their "normal" brand over time, regardless of whether or not this is accurate.

Broadbent & Mooney (1968) in a follow-on study noted that the exaggeration factor did not alter the rank order of purchase volume too seriously but even so the data from panels benefit greatly from not suffering from these distortion and exaggeration effects.

Parfitt (1986) expands on the value of the increased amount of information available from a panel compared with a single call interview. Ancillary data, such as extended consumer classification information and any other factor believed to have an impact on consumer behaviour such as readership habits, benefit from the extended time period available for their collection.

2.6.2 Validity of Panel Results

However it is important to be aware of the potential errors that may affect the validity of the panel results.

As we already noted in the introduction, data gathered at the household level, while very commonly used in marketing practice, does have the potential to mask differences in consumption behaviour at the individual family member level. It may hide in-home segmentations, usage-based segmentations, or individual family member loyalty to one brand.

However, for many products including most of those studied here, purchase is made by one person on behalf of the entire household, and therefore the data is appropriate.

Kent (1989) defines six potential errors affecting the validity of panel results, some of which are more concerning than others.

"● *biases in the composition of the sample*

● *lack of coverage by the panel of the total market being estimated*

● *random sampling error*

● *'pickup' errors that arise from unintended respondent oversights or exaggerations of purchases made*

● *interviewer/auditor error*

● *errors in processing, coding or analysis of the data"*

The first three of these are sampling error, the last three are non-sampling error. It is

important at this stage to note that the data used in this study were collected by a method which has now been superseded by superior technology. Self completion diaries have since been replaced by home and store scanning. So pickup and interviewer error have been reduced in more recent data.

1. Sample bias

The sample bias may arise intentionally or unintentionally. Some groups may be over sampled to allow for detailed reporting on them eg recent home movers. Other groups are traditionally difficult to recruit eg the very prosperous, the very poor and also fluctuating and transitory households composed of young single people living particularly in the centres of large cities. It is likely that these groups are under-represented in virtually all market research samples (Parfitt 1986 p209).

Although consumer panels may be unrepresentative on a demographic level, there is evidence that on a psychographic level they tend to be more robust. Research on the Attwood Consumer Panel reported by Parfitt (p206-7) compares attitude groupings in a random sample of the total housewife population and among Attwood panel members. The results show remarkable similarity between the groups. As Parfitt points out

"It is not unreasonable to assume that if the consumer panel sample was fundamentally unrepresentative of the domestic population then significant differences would appear in these attitude scales and in its turn in purchasing behaviour."(p206)

Leeflang and Olivier (1985) suggest that there may be behaviouristic differences between consumers who join the panel and those who do not. Their findings, based on a Dutch oligopolistic market of a frequently purchased low priced non durable consumer good, show a higher response rate for those who buy relatively cheap brands. This conclusion has yet to be shown to generalise but is consistent with Parfitt's observation on the difficulty of recruiting more prosperous respondents.

The market research companies tend to deal with sample biases in two ways, either

by panel balancing or by post stratification weightings. Panel balancing involves actively recruiting households with the desired characteristics and is obviously a long term solution. Post stratification weightings are often applied at the final reporting stage to deal with imbalances within the sample particularly at the region level.

Since the panel data used in this study are at the raw panel level, they will be unaffected by these weightings but may therefore be unrepresentative, at least on a demographic level, of the packaged goods purchasing population.

2. Lack of coverage

A recurring problem with consumer panels is the fact that their estimate of total sales is almost always understated.

This is due to a number of reasons but the main ones are that the panel by definition only includes private households (and not for example organisations) and excludes out-of-home consumption. This makes it difficult to check the external validity of the panel by the most obvious method, i.e. to compare it with data from other sources.

Field weights are often applied to compensate for this under-reporting but again this will not affect the data at the raw level. Under-coverage is not viewed as a problem within this research study, although it may have a restricting effect on cohort analysis.

3. Random sampling error

The effect of random sampling error may be considerable where estimates are based on relatively small numbers of observations. The random nature of these fluctuations means that weightings cannot be used to correct for them.

However, within continuous panel research the lack of independence of the samples will reduce the standard error. Since the same individuals will often repeat purchase,

there is often a high degree of association in purchasing behaviour between time periods. An estimate of the extent of this reduction in error can be derived from the NBD (Negative Binomial Distribution) model. This distribution has been found to fit well with consumer purchases of frequently purchased goods (Ehrenberg 1982,1988).

4. Non sampling errors

These panel errors arise from three sources:

- the respondent
- the interviewer
- the research company

Since the panel data is used in this study is based on self-completion diaries interviewer error can be discounted.

However, pickup error is likely to occur to some extent either by recording or response errors. Respondents may recall inaccurately the detail such as quantity purchased, or may be unaware of purchases which other members of the household have made or they may deliberately falsify information.

The tendency to deliberately falsify responses is likely to be related to two factors: the complexity, length and style of the data collection and the degree of commitment of the respondent. There is also a danger that consumers may suffer fatigue or develop atypical purchasing behaviour as a result of the somewhat artificial situation of heightened awareness of their buying habits.

However, there is very little evidence of any marked panel conditioning effect. Studies by Buck, Fairclough, Jephcott & Ringer (1978), Ehrenberg (1960) and Parfitt & Collins (1968) have found no significant correlation between the length of time on the panel and either store choice, total purchases or brand penetration. Buck et al did find a bias relating to weight of purchase but its effect on pickup was very small (less than

0.5% p.a.).

Research reported by Parfitt (1986) looked for a conditioning effect in three different consumer panels - STAFCO in France, Attwood in Germany and Attwood in Great Britain. All studies examined two potential types of conditioning - greater brand loyalty and increased price consciousness. The French and German studies compared two demographically matched samples of panel households: one sample was of long-serving members (5+ years) and the second with more recently recruited members. The behaviours of both groups were virtually identical but obviously conditioning might occur before the 5 year barrier. The British study looked at changes in the first year of membership but again no basic differences were found.

These non sampling errors have the effect of varying pickup across product fields. A study by Bowles and Blyth (1985) shows a variation in pickup of between 50% and 200% of independent trade estimates. For most product fields this level is fairly constant and, as such, should not affect the validity of this research.

Processing errors are another source of non-sampling error. This is minimised by the use of optical character recognition facilities for recording the marks on a diary and electronic coding devices which allow only valid responses. Home scanning obviously limits the opportunity for coding errors.

Some of the analytical procedures such as the use of weightings can lead to error, but again will not affect the LBS database since the panels are unweighted.

2.6.3 Continuity of reporting

As continuity of data is one of the principal advantages of panel data over other market research techniques, continuity of reporting is vital. More sophisticated examination of the database involves cohort analysis, which can be based on worryingly small samples if the drop out rate is high. A drop out rate of 25-30%p.a is not unusual for a consumer panel particularly one based on self-completion (Parfitt

1986). This could create problems particularly if the sample is analysed over a long time period. The sample analysed would be minus drop outs and potentially unrepresentative. Our concern is not about representativeness in the sense of demographics, but behaviourally. It is possible that respondents who remain on the panel may be more routinised and potentially less responsive to new products such as line extensions. Details of the panel data used in this study are given in Chapter 4 (see page 85).

2.7 Summary

Cannibalisation is one of the major arguments against line extending. As lines proliferate, a law of diminishing returns would be expected to apply. The effect has been defined and measured in a variety of ways.

The work of Ehrenberg (1988) and others would suggest that the parent (ex line extension) would lose share on the launch of the line extension in proportion to its share pre launch. If we accept this view, cannibalisation can be decomposed (see Figure 2.1) into two types - **expected** and **excessive. Expected** cannibalisation is share loss in line with the share of the parent pre launch; **excessive** cannibalisation is that share loss above the degree of magnitude expected. Both these types are considered in this study.

We can also examine cannibalisation according to whether the share loss is experienced by the parent (**first order**) or by other brands in the portfolio (**second order**). This study will focus on first order cannibalisation.

Several different techniques have been used in previous studies, namely conjoint analysis, preference modelling, regression analysis and ecological nicheing. The differences in measures and methods have led to different results with no consensus emerging. The only consistent factor is that all studies have identified cannibalisation.

This study uses five new measures of cannibalisation based on consumer panel data.

The decision to break new ground in this way, rather than use the four previous measures and associated techniques described in this chapter, requires some explanation.

Conjoint analysis, the first of the four techniques used in previous research, requires the elicitation of utilities at an attribute level from consumers. It is weakened by its assumption of rationality and high involvement, which is unlikely to be true of most habitual purchases. As Trout & Rivkin (1996) comment,

"The average person doesn't think too deeply about anything much beyond money, sex, gossip and their weight."

An associated problem is of respondent fatigue, as the number and level of attributes increases. A particular problem in relation to this study is that it is unsuitable for use with consumer panel data.

Preference modelling, as incorporated into the ASSESSOR model, is constrained by its dependence on the IIA axiom for validity. This assumption is suspect for line extensions. This restricts its application to other types of new product. The Fader and Hardie (1996) application, of preference modelling, is limited to predicting new SKUs which are bounded by existing attributes. This restricts its use to datasets where all the relevant attributes are specified. Unfortunately, this is not true of the datasets available for this study, and therefore preference modelling could not be applied without supplemental data.

Ecological nicheing is only able to predict potential cannibalisation. Its reliance on the use of demographics to predict purchasing may be suspect, care needs to be taken in the choice of predictive variables since demographics may not be appropriate.

Regression analysis works at the aggregate level and does not benefit from the richness of panel data. Its effectiveness is dependent on the inclusion of the right predictive variables.

Since all these techniques have shortcomings, it makes sense to go back to first principles. Before we can get better at predicting future behaviour, we need to understand what has gone on in the past. The best way to do this is to look at actual behaviour. To understand cannibalisation, we need to examine behaviour at the category, brand, line and individual household level; panel data allows us to do this. Given access to panel data, we can then study the source of new sales for the line extension and measure the actual level of cannibalisation. This offers advantages over methods which just attempt to predict cannibalisation, without reference to what actually happened.

The next chapter introduces five different measures to be used to gauge cannibalisation. These new measures have been chosen specifically for their suitability for use on consumer panel data, and for their ability to provide different perspectives on the cannibalisation issue.

CHAPTER 3
MEASURES OF CANNIBALISATION

The aim of this study is to extend our understanding of the cannibalisation effect which may occur when a line extension is launched under an existing brand name. Critical to our achievement of this objective is the development of appropriate measures to allow us to evaluate the effect with confidence. In this chapter we define five measures which can be used on consumer panel data.

An important feature of this study is its choice of data source, ie panel data. This previous chapter explored the use of this, acknowledging its limitations,- which are minor when compared with the benefits conferred. The decision to use panel data has important implications for this research since the type of data source, to a great extent, determines the techniques and measures which can be used.. For example, none of those used in previous research (Chapter 2) are suitable for the panel data available for this study. Different measures of the effect need to be developed, using the richness which panel data provides. Five measures, appropriate for use on panel data, are outlined in this chapter. These are market share, gains loss analysis (GLA), deviations from expected share movements (SOE model), duplication of purchase analysis and buyer analysis. The first two are the measures most commonly used by practitioners, the latter three are based on existing academic theory. The relevant techniques used to calculate these measures are also explained here.

3.1 The Measures

Our interest in this study is the measurement of cannibalisation. We will now define how this study will measure the effect in line extensions selected from a consumer panel data base.

This section explains the five measures of cannibalisation which are used in this study. They have been chosen for four reasons. Specifically they:

1. Benefit from/need a consumer panel database
2. Represent a mix of practitioner and academic perspectives. Two of them - market share and Gain-Loss Analysis - are used by practitioners to assess the level of

cannibalisation. The latter trio - deviations from a Share Order Effect model, Duplication of Purchase tables and Buyer Analysis - are derived from academic theory, specifically the IIA Axiom and Duplication of Purchase Law.

3. Approach the effect from different viewpoints enhancing our understanding of cannibalisation.

4. Measure the effect at different levels. All measures will be used to assess the degree of **first order** cannibalisation and between them cover three levels - **total, expected** and **excessive** (see figure 4, page 39).

The five measures are discussed in turn. The first and simplest of these is of market share.

3.1.1 Market Share

Both Ambler (1996) and Copulsky (1976) favour share as the means to measure cannibalisation, although neither are specific as to whether volume or value is more appropriate. Share is probably the most commonly used measure of cannibalisation by practitioners who tend to compare the market share of the parent brand before launch with its share after launch (ex line extension). There are three issues here:

1. We really need to know what the share of the parent would have been if the line extension had not been launched.
2. The timing of the measure is critical - when is the market judged to have settled down?
3. Since share is an aggregate measure, it can hide shifts in purchasing at a household level. Also while a line extension's share is directly observable, its sources of volume are not.

Despite its shortcomings, this measure is included here since it is so commonly used. It will be used to demonstrate that cannibalisation is a far more complex phenomenon that can be captured by such a crude measure. The share parameter used in this study will be share of purchase occasions of households purchasing in both the pre and the

post launch period.

3.1.2 Gain-Loss Analysis

An alternative means of estimating the total level of cannibalisation is Gain-Loss Analysis. This algorithm was originally developed by Rohloff (1963). It is used by IRI to produce brand-shifting reports and is based on panel data. A very similar (if not identical) methodology is used by Nielsen and TNAGB in the UK, but trade sensitivity means that these companies will not release details of the exact algorithm. The explanation of the methodology which follows is based on Hardie's (1994) summary.

Let us take a simple market with three brands - A, B and C. Brand A launches a line extension LxA; we want to know to what extent this extension's sales volume is as a result of cannibalising the parent.

Gain-Loss Analysis uses slightly different calculations depending on whether the household purchase volume has remained static or shifted over the time periods chosen. These time periods are typically consecutive. There are obviously three possibilities.

1. The purchase volume has remained static.
2. The purchase volume has increased.
3. The purchase volume has decreased.

Let us examine the simplest scenario first - that of a stable volume purchasing over two consecutive periods.

No change in category volume

Table 5 (Columns 1-3) shows the purchasing behaviour of household X over the period of the launch of the line extension. The line extension is purchased but makes no difference to the overall volume consumption of the household.

Columns 4-6 attempt to untangle the brand shifting which has occurred. Column 4 shows the number of purchases of a particular brand in period 2 (column 3) which were repeats of purchases of that same brand in Period 1(column 2). So we can see that Household X bought 15 units of brand A (the parent) in Period 1, and 12 in Period 2. Of these, 12 units can be regarded as repeats (column 4), and 3 units have been "lost" (column 6). By contrast, the line extension has no repeats (since it was unavailable in Period 1) but has gained 4 (column 5). Brand B has also lost 3 units (column 6) whereas Brand C has gained 2 (column 5).

Table 5: Gain-Loss Calculation for Household X With Stable Volume Purchasing

Brand (1)	Period 1 (2)	Period 2 (3)	Repeat (4)	Gain (5)	Loss (6)
A	15	12	12		-3
LxA	-	4	-	4	
B	15	12	12		-3
C	10	12	10	2	
Total	40	40	34	6	-6

To calculate the level of cannibalisation we need to re-allocate these gains and losses. Table 5 shows total volume gains of 6 units (column 5), of which two thirds (4/6) are attributable to LxA (column 5). Brands A and B are the losers, and we can attribute two thirds of their losses to LxA.

If we re-calculate on this basis, Table 6 is the final Gain-Loss analysis for this household.

Table 6: Gain-Loss Table for Household X

Brand Gaining	Brand Losing			
	A	**LxA**	**B**	**C**
A				
LxA	**2**		**2**	
B				
C	**1**		**1**	

For household X then we can see that 50% of the line extension's sales can be viewed as cannibalisation of the parent brand. The table shows LxA as gaining 2 units at the expense of Brand A ie half its total sales volume of 4. If we assume that brand B is produced by another manufacturer, 50% of LxA's volume is draw. Alternatively, if brand B was produced by the same company as Brand A, then cannibalisation would be 100% - 50% first order and 50% second order.

Decrease in Category Volume

The situation becomes more complicated if there is a change in sales volume, either up or down. This change must be controlled for. In the case of a decline in volume, the period 1 sales figures are revised downwards to give a total volume which is consistent with period 2.

Table 7 shows the impact of a decrease of 5 units on the period 1 sales for a hypothetical household Y. The sales of each brand are revised downwards by the same percentage as the market decline, in this case 10%.

Table 7: Revision of Period 1 Sales of Household Y due to Decrease in Sales Volume

Brand	Period 1	Period 2	Δ Volume Reallocation	Revised Period 1
A	10	8	-1.0	9.0
LxA	-	3	-	-
B	22	20	-2.2	19.8
C	18	14	-1.8	16.2
Category Tot	50	45	-5.0	45.0

If the analysis is now carried out comparing the period 2 sales with the revised period 1 sales the following Gain-Loss scenario results.

Table 8: Brand Switching Analysis for Household Y

Brand	Repeat	Switching	
		Gain	Loss
A	8.0		-1.0
LxA	-	3.0	
B	19.8	0.2	
C	14.0		-2.2

If the "losing brands' volume is reallocated to the gaining brands in the same way as the no change example then the following table results.

Table 9: Gain-Loss Table for Household Y

Brand Gaining	Brand Losing			
	A	LxA	B	C
A				
LxA	0.94			2.06
B	0.06			0.14
C				

This analysis, for Household Y in isolation, attributes only 31% (ie 0.94/3.0) of the line extension's sales volume to cannibalisation.

Increase in Category Volume

Finally we analyse a household whose purchase volume has increased over the two periods. Household Z's volume has risen by 20 units. This is compensated for with a very similar calculation to that described in the previous example. However this time the period 2 figures are revised. These are brought down to be in line with the period 1 volume.

Table 10: Revision of Period 2 Sales of Household Z due to Increase in Sales Volume

Brand	Period 1	Period 2	Δ Volume Reallocation	Revised Period 2
A	27	30	-7.50	22.50
LxA	-	10	-2.50	7.50
B	20	25	-6.25	18.75
C	13	15	-3.75	11.25
Category Tot	60	80	-20	60.00

The resulting gain-loss table is calculated as in the previous two examples and is shown in Table 11 below.

Table 11: Gain-Loss Table for Household Z

Brand	Brand Losing			
Gaining	A	LxA	B	C
A				
LxA	3.86		3.64	
B				
C	0.64		0.61	

This suggests that over 51% (ie 3.86/7.5) of the line extension's volume is at the expense of its parent ie cannibalisation.

Total Gains and Losses

The final stage is to aggregate these analyses to give a total gain-loss table. This is achieved by a simple process of summation of the individual household results.

For this simple example the aggregate result is given by Table 12 below.

Table 12: Aggregate Gain-Loss Table for Households X, Y, and Z

Brand Gaining	Brand Losing			
	A	LxA	B	C
A				
LxA	6.80		5.64	2.06
B	0.06			0.14
C	1.64		1.61	

This aggregate analysis gives a figure of 40% (ie 6.8/14.5) cannibalisation for the line extension.

Despite being the measure used by the major market research companies, this analysis has shortcomings. For example, the standard analysis does not account for changes in volume associated with those households who did not buy in both periods. To do this the table would need to be augmented with a "new buyers" column and a "non buyers" row. Or a running total could be kept of changes in sales volume due to increases and decreases in total category consumption. Gain-Loss Analysis becomes inaccurate at low share levels because of its requirement for matched samples, which is a particular problem with line extensions since they tend to be small. The algorithm also does not measure what would have happened to the parent had the line extension not been launched, ie it does not take account of trends in the parent brand share.

3.1.3 Deviations from SOE Model

The third measure we use in assessing the degree of cannibalisation is to predict what we would expect to happen when a new entrant is launched into a category, and then to see if the share movements caused by a line extension deviate from this. In particular, we can see whether the parent is affected disproportionately by the launch of the line extension. This measure will show the degree of *excessive* cannibalisation (see figure 4, page 39), not provide an estimate of total cannibalisation as the previous two measures attempt.

The SOE Model

The first stage in this method is to develop predictions of the share movements we would expect to see on the launch of any new product. To do this a simple model is developed, which suggests that any new entrant will take share from existing brands in proportion to their market share before its launch. We have called this a Share Order Effect (SOE) model. This concept of proportional gains (or losses) is consistent with many empirical duplication analyses, such as the Duplication of Purchase Law (Ehrenberg 1959), formalised in the Dirichlet model (Goodhardt, Ehrenberg & Chatfield 1984).

This SOE model is a constant-utility model based on Luce's Axiom of the Independence of Irrelevant Alternatives (IIA). In IIA models, probability of purchase is the dependent variable while individual preferences are assumed to be constant. Let us take the example of a consumer who has two brands (A and B) in her consideration set for detergent and buys A with a probability of 0.75 and B with a probability of 0.25. When a new brand C is introduced and is bought with a probability of 0.20 then it will cause changes to the probability of buying A and B in proportion to the probability of buying Brand C. So the share of both A and B would each fall by 20%, giving new probabilities of purchase of 0.60 for A, 0.20 for B and 0.20 for C.

Predictions Made Based on The SOE Model

An estimate of share of purchase can then be made assuming that a straight share order effect (SOE) model applies ie that all brands would lose share to the new entrant in direct proportion to their size before the launch. The calculation takes as given the share achieved in the chosen post launch period and recalculates all other brand shares in line with this. Continuing with the example above and with three brands in the market A, B and C, for simplicity let's also assume that the consumer described is typical of the market and her preferences exactly mirror market share. In this case her purchase probabilities will give us column 2 in Table 13 below. Column 2 is therefore the actual share of purchases before the launch of the line extension by Brand A.

Table 13: Example of Predictions Based on SOE Model

BRAND	ACTUAL SHARE PRE LAUNCH % (2)	PREDICTED SHARE POST LAUNCH % T (3)	ACTUAL SHARE POST LAUNCH % O (4)	DIFFERENCE O-T (5)
A	60	54	50	-4
LxA	0	10	10	0
TOTAL A	60	64	60	-4
B	20	18	20	2
C	20	18	20	2

In our analysis we have calculated share in terms of share of purchase occasions, in line with the Dirichlet model specification (Ehrenberg & Uncles 1995). Line extension A is now launched and is moderately successful, gaining 10% market share.

Using the SOE model, we would predict that this market share would derive from 10% of the shares of each of the incumbent brands (column 3). The base case therefore assumes no change in the overall structure of the market, consistent with Ehrenberg's (1988) comment that markets tend to be stationary for long periods. So brand A would lose 10% of 60% to retain a share of 54%, ie we would expect the

line extension to cannibalise 6 percentage points of the parent brand's share. Alternatively we could say that we would expect that 60% of the line extension's share would be cannibalised share (the ratio of the share loss by the parent to the total share achieved by the line extension ie 6/10 %). The remainder of the line extension's share we would expect to come from brand switching, with brands B and C each losing two percentage points, or alternatively contributing 20% each to LxA's volume. So in summary column 3 gives expected share movements, and therefore *expected* cannibalisation (column 2 - column 3).

Now we need to examine what actually happened (column 4). Although we only expected Brand A to lose six percentage points, brand A actually lost ten percentage points. This deviation from our expectation is shown in column 5 (column 4 - column 3). This is *excessive* cannibalisation in this case, since the figure is negative. So it would appear that all of the line extension's volume is from cannibalisation - 60% of which is *expected* and 40% of which is *excessive*. Brand B and C do not appear to have suffered at all from the launch of the new entrant.

Significance Tested by T tests on Matched Samples

We need to know whether the deviations from the model predictions are significant. To do this the model is tested, on a brand by brand (or line by line) basis, using a t-test for matched samples: the same households are measured in terms of their purchases before and after a launch and the mean of these differences is tested against the expected mean under this model. The absolute number of purchases is used in this calculation rather than the market share derived from these.

This test is carried out for each of these sets of predictions. Two levels of significance are used and are indicated when relevant (* $p<0.01$ ** $p<0.001$).

3.1.4 Duplication of Purchase Tables

A related measure of cannibalisation is provided by the use of duplication of purchase

(or perhaps more accurately cross-purchase) tables. These tables show which other brands a brand's customers also buy. In Dirichlet-type markets the other brands bought do not vary much from brand to brand. Ehrenberg & Uncles (1995) use the table below to illustrate this point.

Table 14: Duplication of Purchase in the US Coffee Market

Instant Coffee (USA, Annual)		% Who Also Bought							
		Max Hse	Sanka	Tast Chce	High Point	Folg-ers	Nes cafe	Brim	Maxim
Buyers of									
Maxwell House	%	-	32	29	32	38	26	13	13
Sanka	%	36	-	32	40	25	23	20	11
Tasters Choice	%	31	32	-	36	28	20	17	14
High Point	%	34	38	34	-	31	22	18	10
Folgers	%	51	30	35	40	-	25	15	11
Nescafe	%	48	39	34	40	34	-	15	8
Brim	%	33	45	39	44	27	20	-	16
Maxim	%	52	38	51	39	34	17	25	-
Average Duplication	%	41	36	36	39	31	22	17	12

Table 14 is a typical Duplication of Purchase table showing actual cross-purchasing between brands. The result is a matrix of brands showing what people also buy. For example, Table 14 shows that Maxwell House was bought by 36% of Sanka buyers, and by an average of 41% of buyers of each of the other brands. The columns show relatively little deviation from the average.

Ehrenberg & Uncles also use these figures to demonstrate the Duplication of Purchase Law which holds that the ratio of average duplication to average penetration will be a near-constant proportion.

Duplication of Purchase tables can also be used to compare actual cross-purchasing with theoretical norms derived from the Dirichlet model (Ehrenberg 1988 p353).

We know that, in almost all product fields, consumers will buy more than one brand. They will usually have a preferred (or favourite) brand and make secondary purchases of another or other brands (Ehrenberg & Uncles 1995). The proportion of individuals who buy a pair of brands can be computed by calculating the separate and combined penetrations of the two brands. Ehrenberg and Goodhardt (1970) have shown that in most product fields the purchasers of other brands are distributed in accordance with the penetrations of those other brands, ie following the IIA assumption.

However we might expect that, where two products share the same brand name ie line extension, the level of cross purchasing would be higher than that predicted by the Dirichlet. Ehrenberg (1976) found cross purchasing of two Macleans line variants to be over twice the level predicted by their respective penetrations.

Dirichlet Predictions

The theoretical norms given by the Dirichlet are calculated in the following manner. Let us take a simple market with only three brands named P, Q and R. Initially we want to estimate the proportion of individuals who buy P and Q.

The first stage is to form a composite brand (P + Q) by simply adding together the shares of the two constituent brands. This measure is then used to recalculate the Dirichlet matrix, giving a composite penetration.

The proportion of consumers who purchase both brands is given by

$$\hat{b}_{PQ} = \hat{b}_P + \hat{b}_Q - \hat{b}_{(P-Q)}$$

Conditional proportions can also be calculated to give, for example the percentage of buyers of brand Q who also buy brand P and vice versa.

$$\hat{b}_{P|Q} = \frac{\hat{b}_{P\,Q}}{\hat{b}_{Q}}$$

$$\hat{b}_{Q|P} = \frac{\hat{b}_{Q\,P}}{\hat{b}_{Q}}$$

Comparison of these theoretical levels against the actual level of cross purchasing gives an indication of cannibalisation. For example, if a line extension and parent brand had a higher level of cross purchasing than would be predicted by their penetrations, it would be highly suggestive of cannibalisation.

Cannibalisation barriers

Cross purchase tables can also be used to check for the existence of cannibalisation barriers, as suggested by Buday (1989). Let us look at the suggestion that a barrier exists between liquid and powdered detergent. If a cannibalisation barrier had developed between these two different formats we expect to see cross purchase between the powdered variants, and cross purchase between the liquid variants but little between the two types. We will test this in Chapter 9.

3.1.5 Buyer Analysis

Another measure of cross-purchase can be derived from buyer analysis. One of the major benefits of panel data is that it allows us to examine purchases on an individual basis rather than merely in aggregate. That means we can examine the purchasing behaviour of those consumers who bought the new entrant, and see if they are any different to category buyers in general.

The buyer analysis measure works in the following way.

For each new entrant, the share of purchase profile in the pre launch period for purchasers of the new entrant is compared with that of the total market. This comparison is used to test for the existence of a cannibalisation effect. If the buyers of the new entrant are shown to be disproportionate purchasers of the parent brand before the launch switching to the line extension after launch, then this would confirm cannibalisation if the parent had simultaneously suffered an unpredicted share loss. If the parent does not suffer despite high cross-purchasing, this develops our understanding of how line extensions work. The use of the same brand name may encourage purchase of a new line without substitution for the parent occurring.

3.2 Summary

This research study addresses the topical and relevant issue of cannibalisation. It seeks to develop our understanding of the effect by examining the various measures and methods which can be used to measure it on a consumer panel database.

Panel data offers a number of advantages over other types of data, primarily by allowing continuous tracking of individual household's actual purchase behaviour. The amount and accuracy of the data is higher than can normally be obtained from a single source.

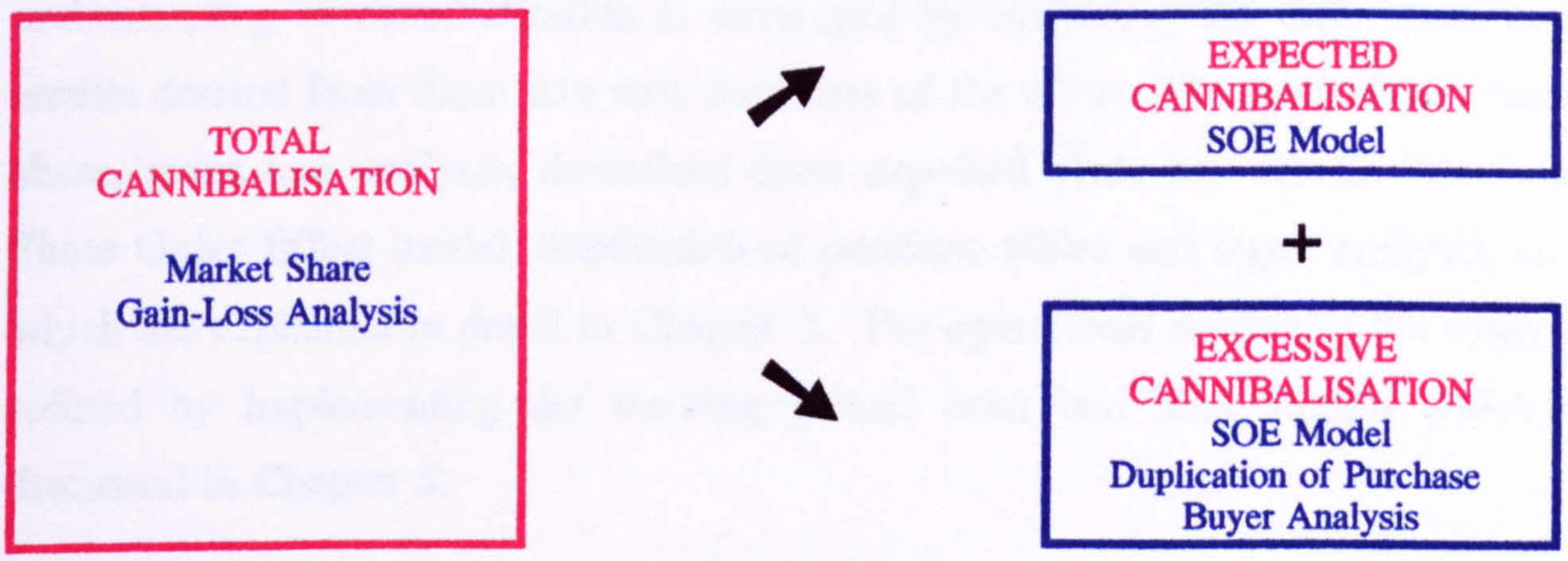
Five measures are explained in this chapter and they form the basis of the research study. They have been chosen to develop our breadth of understanding of cannibalisation since all five measure the effect in different ways. The differing perspectives should add to the richness of comprehension provided by the analysis.

Two are in common use amongst practitioners, and three are derived from academic theory. The two practitioner measures - market share and Gain-Loss Analysis focus on measuring total cannibalisation, rather than seeking to explain its derivation. The three academic-based measures - SOE model, duplication of purchase and buyer

analyses - allow for the measurement of excessive levels of cannibalisation. The standard SOE model implies the expected level of cannibalisation. As has already been noted, these measures were also chosen to maximise the benefit of using panel data, ie they gain from using data at the household level.

Figure 3.6 below summarises the measures and levels of cannibalisation which are at the heart of this research project.

Figure 3.6 Measures and Levels of Cannibalisation



The next chapter, Chapter 4, explains how these five measures fit into the study. It covers the objectives and methodology of this research. Part of this discussion covers the research procedure, an integral part of which is the pilot studies. One of the primary objectives of these preliminary studies is to refine the operationalisation details of the measures outlined here. These are discussed in detail in Chapter 5.

CHAPTER 4
OBJECTIVES & METHODOLOGY

This chapter details the objectives and methodology of this PhD thesis. The overall aim is to gain a greater understanding of the cannibalisation process in a variety of ways.

The study begins by analysing previous measures of cannibalisation, and the techniques used to calculate them. These have been found wanting. We need to study actual behaviour to derive a measure of cannibalisation in which we can be confident. The best data source to use for this is consumer panel data. Different measures have been developed for this research to correct the problems with existing measures. Our understanding of cannibalisation is developed by evaluating the differences in the results derived from these five new measures of the effect. The methods are market share, gains loss analysis, deviations from expected share movements based on a Share Order Effect model, duplication of purchase tables and buyer analysis, all of which are explained in detail in Chapter 3. The operational aspects of the study are refined by implementing the learning gained from two pilot studies which are discussed in Chapter 5.

The measures in the full study are taken from consumer panel data covering four different product categories in Germany and the UK. The study tests these alternative means of assessing the phenomenon using consumer panel data, covering 17 line extensions in fmcg product categories in the UK and Germany between 1985-90.

The results of the evaluation of past measures , and the use of panel data measures are used to suggest guidelines for an improved measure of cannibalisation.

As part of our attempt to understand how cannibalisation works, the study also tests for cannibalisation barriers, specifically in the UK detergent market.

4.1 Contribution of Study

As Chapters 1 and 2 have demonstrated, line extension is an extremely popular strategy in markets which are relatively sophisticated in terms of marketing development. The potential risk of cannibalisation is a reality associated with this type of new product. Other studies have used a variety of measures and methods to quantify this effect, but their shortcomings leave a gap in our knowledge. We need to quantify actual levels of cannibalisation and develop an understanding of the process by which these occur.

A marketing manager deciding on the viability of a potential line extension needs estimates of at least three critical figures.

1. The *volume* the extension is likely to achieve
2. The *source of that volume*. Since a line extension is unlikely to expand the category, the volume is likely to be achieved by *cannibalisation* or *draw*, or a combination of the two. Draw is obviously to be encouraged since that means that competitor brands will suffer, but cannibalisation is likely to occur to some degree.
3. The *incremental contribution*, which is derived from the two figures above plus a knowledge of the unit contributions of the new variant and those which it has cannibalised.

The figure which is likely to be the easiest to access is the last of these. Unit contribution can be calculated from internal records. The contributions of existing variants should be based on actual costs. The unit contribution of the new variant, particularly if it is filling-in or to a lesser extent imitative, should be calculated reasonably accurately. It may be based on pilot production runs, corporate or industry experience. As such, unit contributions are likely to be the most accurate of the three estimates.

The first of these figures, the estimate of volume, has seen much academic marketing activity in the field of new product development models. Although many of these

have been designed explicitly for new products (ie those with new brand names), modifications can be made to handle line extensions. Fader, Hardie & Walsh's (1994) model is designed specifically for line extensions and has yielded promising test results.

The area which is perhaps the most difficult to forecast, is the source of volume. This is not to say that estimating the volume of a new line extension is trivial, far from it, but at least any forecaster can benefit from a wealth of previous experience in this area. But the source of volume is more problematic. Where will the line extension's volume come from? Cannibalisation is unwelcome in most situations, draw is a far more attractive option. But although it is vital to be able to estimate the level of cannibalisation, there is little empirical work which allows us to understand this phenomenon and how to measure it. Previous research offers contrasting measures and results with no consensus emerging.

Without an estimate of the degree of cannibalisation, it is impossible to assess the attractiveness of a proposed line extension. This means it is very difficult for a manager to assess the potential of over two thirds of new product activity ie line extensions. But not only does the manager need an estimate pre launch, an understanding of the situation post launch is also valuable. Cannibalisation is not just about the launch period since its pattern is likely to change over time. It is possible that an established brand name encourages access to the new product in the early stages of its life cycle, but that once the market has returned to an equilibrium state the degree of cannibalisation will be reduced.

Consumer panel data provides important benefits to the study. It gives empirical validity to the findings, by recording actual continuous purchase data rather than ad hoc predicted purchases. It allows purchase behaviour to be tracked at the individual household level, unlike for example retail audit data which has the store as the lowest level of aggregation. The use of consumer panel data is unusual in this field as most of the previous research has relied on survey data. This survey data has caused challenges for researchers, either in frequency of reporting (Reddy, Holak & Bhat 1994) or sample sizes (Silk & Urban 1978, Green & Kreiger 1987). Consumer panels

offer a significant advantage by allowing for the analysis of actual consumer purchasing behaviour in large samples. Fader & Hardie (1996) are the exception to this since they use panel data, but at store level. However, as we have already noted, data gathered at the household level, while very commonly used in marketing practice, does have the potential to mask differences in consumption behaviour at the individual family member level. They therefore potentially hide in-home segmentations, usage-based segmentations, or individual family member loyalty to one brand.

However, for many products including most of those studied here, purchase is made by one person on behalf of the entire household, and therefore the data is appropriate.

In summary, the contribution of this study is to develop a deeper comprehension of the cannibalisation effect, allowing managers to evaluate better the performance of line extensions. This is particularly important since line extensions are such a common phenomenon. This understanding will stem from a critical analysis of the measures we can use to assess the effect, allowing a more detailed perception of the process.

The specific research objectives are detailed in Section 4.2 below.

4.2 Objectives

The research objectives of this thesis are as follows:

1. To evaluate current methods and measures of the cannibalisation effect.
(Chapter 2)

2. To contrast the results of five methods of measuring cannibalisation. These are market share, gains loss analysis, deviations from expected share movements based on a Share Order Effect model, duplication of purchase tables and buyer analysis.
(Chapters 6, 7 and 8)

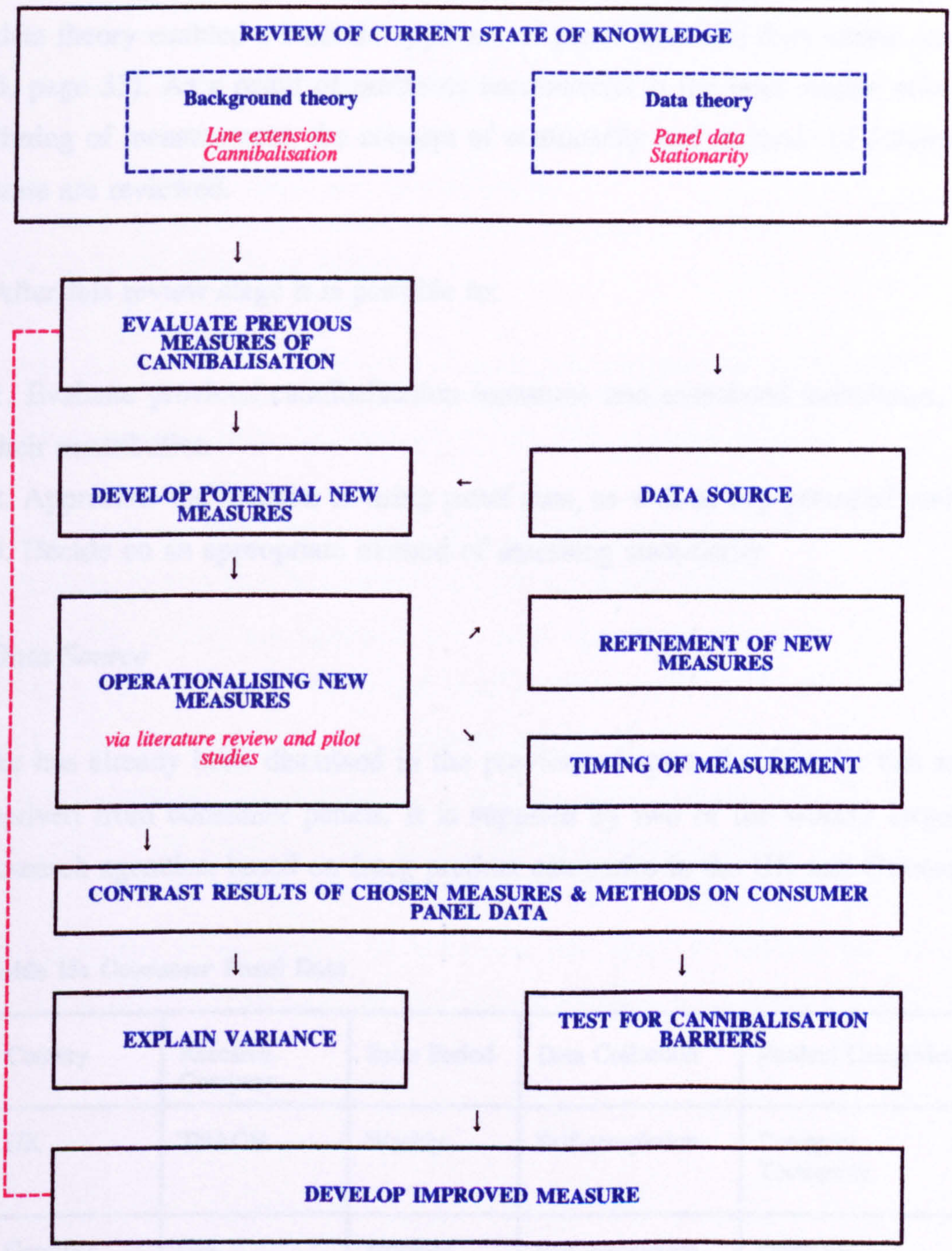
3. To develop an improved measure of cannibalisation.
(Chapter 8)

4. To test for the existence of cannibalisation barriers (Buday 1989).
(Chapter 9)

4.3 Methodology

A simplified version of the research procedure is summarised in Figure 6. For clarity, the diagram omits the numerous iterations which formed part of the research process. The critical stages in the process will now be discussed in more detail.

Figure 6: Research Procedure



Review of Current State of Knowledge

The current state of knowledge, in both background theory (line extensions and cannibalisation) and data theory (panel data and stationarity), is reviewed in Chapters 1,2, 3 and 5.

The review of past research in background theory allowed an evaluation of previous measures of cannibalisation used in other studies, and an understanding of the level

of knowledge of the process (Chapter 2 page 37). Evaluation of the research into the data theory enabled a realistic appraisal of panel data as a data source (see Chapter 3, page 53). As a result of problems encountered in the pilot studies relating to the timing of measurement, the concept of stationarity and methods of determining this state are reviewed.

After this review stage it is possible to:

1. Evaluate previous cannibalisation measures and associated techniques, assessing their contribution
2. Appreciate the benefits of using panel data, as well as any potential problems
3. Decide on an appropriate method of assessing stationarity

Data Source

As has already been discussed in the previous chapter, the data for this research is derived from consumer panels. It is supplied by two of the world's largest market research agencies, based on fmcg product categories in the UK and Germany.

Table 15: Consumer Panel Data

Country	Research Company	Sales Period	Data Collection	Product Categories	Time Period
UK	TNAGB	Weekly	Self-completion	Detergent Toothpaste	1985-90 1989-90
Germany	GfK	Monthly	Self-completion diary	Detergent Coffee	1989-90

As Table 15 demonstrates, the database covers two countries - the UK and Germany. The US was included in an initial sample but later excluded because of the excessive amount of promotional noise which confused the results. All the data are from consumer panels, although the frequency of collection varies depending on research company.

The research focuses on the market response to line extensions, particularly the impact of the new entrant on the parent brand. The line extensions to be analysed are chosen on the basis of the criteria shown in Table 16.

Table 16: Criteria for Selection of Line Extensions

Parent brand already in category
Frequently purchased category
High category penetration
Data includes two quarters before launch and two quarters after launch
Market needs to have returned to equilibrium in the period of the data
Extension must have purchases exceeding 100 purchase occasions

Using these criteria against the extant datasets, seventeen line extensions can be identified. Where two line extensions are launched simultaneously under the same parent, the results are aggregated to give one joint extension. This follows the precedent set in Reddy, Holak and Bhat's (1994) study and occurs in five out of the seventeen examples, giving an effective sample size of thirteen. The aggregation of two simultaneous line extensions is justified, given the scope of this study. We are interested in the impact of line extensions on the parent brand. If the scope were to be extended to cover, for example, the factors affecting cannibalisation this amalgamation would need to be re-visited. All chosen extensions are listed in Table 17 below and form the basis of the analysis detailed in Chapters 6 and 7.

Table 17: Line Extensions Analysed by Country and Product Category

Name	Product Category	Country
Ariel Liquid	Detergent	UK
Persil Liquid	Detergent	UK
Surf Liquid	Detergent	UK
Daz Liquid	Detergent	UK
Sunil Sulfatfrei	Detergent	Germany
Dixan 2kg	Detergent	Germany
Ariel 3kg & NFP	Detergent	Germany
Vizir Ultra 2kg & NFP	Detergent	Germany
Crest Gum Health Mild Mint	Toothpaste	UK
Sainsbury Freshmint & Mildmint	Toothpaste	UK
Colgate Gum Protector	Toothpaste	UK
Dallmayr Prodomo & C Frei	Coffee	Germany
Aldi der Feine	Coffee	Germany

Development of Potential New Measures

The choice of consumer panel data as a data source is a great influence on the choice of measures which can be used to measure the effect in this context.

The measures used in the full study are market share, gains loss analysis, deviations from expected share movements based on a Share Order Effect model, duplication of purchase tables and buyer analysis.

These five methods were chosen to represent a spectrum of the alternatives available to test for cannibalisation within a consumer panel data set. They represent a mix between practitioner and academic measures, covering different perspectives and levels of cannibalisation. The first two are the most commonly used by practitioners, the third allows us to test whether line extensions are a special case of new product and the fourth and fifth give a measure of cross-purchasing. These latter two give a different perspective whilst allowing us to test for the existence of cannibalisation

barriers.

Operationalising the New Measures

Two pilot studies were undertaken to determine the feasibility of the full study, and to resolve any operational problems. The more detailed results of these are discussed in the next chapter. The results of the preliminary studies confirm the practicality of the proposed research but suggest the need to refine some of the proposed measures. In particular, the need to re-evaluate the timing and duration of the measures is emphasised, as well as the requirement for appropriate tests of significance.

The table below summarises the five measures, indicating how they are operationalised in the full study. The learning gained from the pilot studies is included here.

Table 18: Operationalisation of the Five Cannibalisation Measures

Measure	Operationalised as	Software Used	Significance Test
Market Share	Share of purchase occasions pre and post launch on matched samples	SPSS	T test
SOE model	Deviations of market share post launch from expected share movements	SPSS	T test
GLA	Gains and losses derived from the algorithmn described in Chapter 3	SPSS	None
Duplication of Purchase	Level of cross-purchase between the line extension and the parent and other brands	Tailormade programme in Fortran	Chi-square
Buyer analysis	Comparison of share of purchase occasions by brand for the buyers of the line extension vs the total category	SPSS	T test

Note. Time Period: 2 quarters
Timing of Post Launch Period : Determined by stationarity tests on repeat purchasing rates

Comparison of Results of Cannibalisation Measures

Since the pilot studies demonstrated the feasibility and usefulness of the proposed

research, the full study used the five measures of cannibalisation on the four relevant datasets. The measures provided different results, with few examples where all were in agreement as to the degree of magnitude of cannibalisation.

Testing for Cannibalisation Barriers

The initial research on this was undertaken in Pilot Study I when the UK detergent market was examined. Further analysis was undertaken, the results of which can be found in Chapter 9.

Improved Measure of Cannibalisation

The research yields both contradictory and complementary findings from the different measures. The experience gained from understanding these variations forms a useful base from which to develop a more comprehensive measure of the cannibalisation effect.

4.4 Limitations of Study

It is perhaps useful at this stage to acknowledge some of the limitations of this study.

Its restriction to mature fmcg categories is realistic since both the availability of data and frequency of line extension activity make this a viable project. The assumption of stationarity is appropriate in these types of market but becomes more problematic when extended to growth markets. Examining only one type of product limits the generalisability of the findings. Similarly the sample size of 13, although appearing to offer variety, is small. The data are also restricted to two European countries - the UK and Germany.

The database of consumer panels, whilst offering many benefits, is not fully comprehensive, and no attempt has been made in this research to seek data beyond it. The use of this database has dictated the measures which we can use. The study

does not attempt to be predictive; we are concerned only with measuring the cannibalisation effect after the event.

4.5 Summary

The research aims to extend our understanding of one of the most important effects in modern marketing - that of cannibalisation. This aim is achieved predominantly by examining different measures of this effect tested on consumer panel data. Past measures of the effect are reviewed but rejected for a number of reasons, most pertinently because of their unsuitability for the consumer panel base which underpins this study. Five different measures are tested on four fmcg categories. These measures are refined by the use of pilot studies which are discussed in the next chapter.

The results of these and previous measures form the basis for a recommendation for an improved measure. The process of cannibalisation is further explored by examining the evidence for the existence of cannibalisation barriers.

CHAPTER 5
REFINING THE CANNIBALISATION MEASURES

The preceding two chapters have explained the objectives of this research and the measures which will be used to achieve them. This chapter covers the operationalisation of these measures which was developed by piloting various aspects of the full study. Two pilot studies were undertaken, and their structure and learning outcomes are discussed here.

The primary benefits of the pilot studies were to provide proof of the validity and feasibility of the five measures, and also to highlight some operational problems with their use. The important issues to arise were

1. The requirement to find an objective means of determining the post launch period.
2. The importance of the duration of the measure
3. The need to find appropriate tests of significance for the measures.

These are resolved by the use of stationarity tests to determine the post launch period, the use of the industry norm of two quarters as the duration of the measure, and the use of t tests on matched samples for market share and the SOE model, and a refinement of Chi-square for the duplication of purchase analysis.

Each pilot study is discussed in turn. Both use the same data based on four new product launches in the UK and German detergent markets. The learning outcomes from each are evaluated and the lessons for the full study are developed.

5.1 Pilot Study I

The first pilot study addressed three issues.

The first of these was whether the SOE model, described in the research objectives above (page 83, point 2) as one of the chosen five measures, was useful in the analysis of new product launches. The second was how to detect cannibalisation ie

what does it look like. And thirdly to see if it was possible to test Buday's (1989) notion of cannibalisation barriers.

The structure and findings of Pilot Study I are summarised below. A detailed account of the findings can be found in Appendix 1 (page 226), a transcript of a paper published in the *Journal of Marketing Management* (Lomax et al 1996).

A simple SOE model based on Luce's Axiom of the Independence of Irrelevant Alternatives (see page 71 for a detailed explanation) was tested on four different new product launches from the UK and German detergent markets. One of these was a flanker brand, the remainder line extensions. Of these, as we expected, only the product with both a new brand name and a new product format was consistent with the model. In the remaining three cases, all line extensions, the empirical data deviated from the model's predictions. The two UK line extensions appeared to be affected by product format; the German line extension, where the format change was more limited, cannibalised the parent. This pilot study suggested that line extensions are a special case of new product, since Wisk (the only product with a new brand name) behaved quite differently to the others which were all line extensions.

The SOE model was also used to test for a cannibalisation barrier between powdered and liquid detergents in the UK. The detailed results appear in Chapter 8, but in summary the evidence was suggestive but not conclusive. One of the problems is that Buday mentions usage occasion, which is impossible to detect with panel data.

The results of this first pilot study suggest that both the SOE model and buyer analysis are useful in providing insights into the cannibalisation process. The German example of Sunil Sulfatfrei provides a useful benchmark of cannibalisation, and it appears feasible to test for cannibalisation barriers with panel data, although the omission of data on usage occasion means that the findings cannot be fully complete.

This pilot study provided essential learning in the practicalities of dealing with data of this type. As Table 19 shows, a number of outcomes emerged from this study

which were not a formal part of the objectives.

Table 19 Contribution of Pilot Study I to the Research

OBJECTIVES	OUTCOMES	SOLUTIONS
Assess the validity/feasibility of the SOE model	Model is useful and practical	
Test buyer analysis	Provides insights	
Find evidence of cannibalisation	Found	
Check feasibility of testing for cannibalisation barriers	Testing is practical	
	Need for objective means of determining post launch period	Stationarity tests
	Need for tests of significance	t tests for market share and SOE model
	Duration of measure	Test 4 week periods in Pilot Study II

The need to find significance tests surfaced, so that results and their relative importance could be discussed with confidence. Discussions with Professor Gerald Goodhardt of City Business School led to the development of t tests based on matched samples as the standard measure.

Also very importantly, two issues relating to the timing of measurement came to the fore. The first of these was the duration of time over which the measure was taken, the second was when the measure was taken. In this first pilot study, the measures were taken for one quarter (13 weeks) in line with much of Ehrenberg's previous work on Dirichlet-type markets. However during the pilot study, and in particular during the interpretation of the results it became apparent that the use of quarters had a smoothing effect on some of the share changes which occurred after launch. As a result, Parfitt & Collins' (1968) use of a four week period for fmcg categories was adopted for the second pilot study.

The first pilot study uses a subjective method to determine when the post-launch

measure is taken. The data is "eyeballed", and a judgement taken on when the market had returned to equilibrium or stationarity. It became obvious that this method was open to accusations of abuse, and that a more objective means of determining the re-establishment of stationarity was required. The search for this objective means is detailed in the following section, and focuses on how to test for stationarity.

5.1.1 Stationarity and the Timing of Measures

The tendency for markets to be stationary for long periods has been noted by Ehrenberg (1988). Almost by definition, most markets are in their maturity stage at a given point in time. Hence, in these types of market, we would expect to see a stationarity around the mean on most measures, including repeat purchasing rate and penetration. In this type of horizontal time series, we would expect the measures to be about the same on average, regardless of when the observation is taken.

The concept of stationarity is particularly relevant to the research undertaken here, since we are concerned with defining the earliest period after launch when the market has returned to equilibrium. This could be defined as the first period after the launch when stationarity is re-established. Heavy advertising budgets may de-stabilise markets in the short term after launch.

This section defines stationarity and examines the measures which could be used to determine when this type of equilibrium has been re-established in the market. Three possibilities are reviewed - repeat purchasing rates, cumulative penetration and non parametric tests for randomness. The proposed solution is to use a combination of stationarity tests (runs test and Daniels test) on repeat purchasing rates.

Definition of Stationarity

A formal definition of stationarity (strictly speaking, stationarity *in the mean*) is given by Farnum & Stanton (1989 p48).

"A time series y_t; $t = 1, 2, \ldots$ is said to be stationary if the expected value of y_t is the same for any time t, ie $E(y_t) = \beta_0$ for $t = 1, 2, \ldots$"

As they comment (p50), the simplicity of the model belies its usefulness. Such a model is relevant in a large number of circumstances including those appropriate to this study. A stationary model is applicable in mature markets since the environment is relatively unchanging. Those behavioural forces which generate the series have stabilised. Even if there is a trend in the series, the relatively short time horizons used in this study would mean that the amount of change due to the trend is negligible.

A model for a stationary time series (or no-trend model) could be defined by the following function:

$$y_t = \beta_0 + \epsilon_t \qquad t = 1, 2, \ldots$$

where y_t = the actual level of the time series

β_0 = the unchanging average level of the series

ϵ_t = error term

The mean value of ϵ_t is assumed to be zero, and the error terms are assumed to be independent.

Determination of Post Launch Period

The period in which the post launch measure is taken is obviously critical to the validity of the model. If we are to assess the success or otherwise of an entrant, the choice of the period in which to take the measure is fundamental. Choosing the pre

launch period is relatively simple and uncontroversial; the period immediately before the launch of the new entrant is taken. By comparison, the marking of the post launch period is fraught with problems.

One solution would be to mirror the pre launch measure by taking the period immediately after the launch. This has the benefit of being simple to apply and has face validity. It is also the approach most commonly used in Gain-Loss Analysis. Yet its simplicity hides a major shortcoming. Take Wisk as an example (and we could hypothesise any new brand name).

Wisk was very slow to gain share in the UK detergent market. In Pilot Study I (Appendix 1), the post launch measure is taken a year after its launch when it had achieved a reasonable market share. A post launch measure taken in the period immediately after launch would have shown negligible share. So this "immediate" measure runs the danger of dramatically over-forecasting new entrant failures. It also does not allow us to take account of test markets where low initial share might simply be a function of limited roll-out rather than a shortcoming in product takeup. Another potential problem is the very small sample sizes of consumers actually buying the new product which may result from this approach.

So, a more sophisticated approach is demanded. The method used in the initial study was a subjective evaluation of when market equilibrium had been regained following the launch. Plots of share of purchase by brand were examined to allow a judgement on this. Post launch periods were chosen where the new entrant had achieved a reasonable size, and also critically before the launch of another product line. This has the benefit, and the danger, of flexibility. It is easy to tailor this approach to individual circumstances, but could lead to the accusation that only sympathetic data points have been chosen. So there is a need to develop a more rigorous heuristic which still allows for individual variation.

The following possibilities are considered:

1. Repeat purchasing rates
2. Penetration curves
3. Tests for stationarity

Let us examine each of these in turn.

Repeat Purchasing Rates

It would be reasonable to assume that the new entrant will have reached its equilibrium state when repeat purchasing has stabilised. Households will have settled into a routine which does, or does not, include the new product line in its portfolio. As Parfitt & Collins (1968) note, the repeat purchasing rate (RPR) is a measure of the success or failure of the new product's acceptance. The following table, and associated explanation of calculation of the RPR, is taken from their seminal 1968 paper.

Let us take a simple market with three brands - R, S and T. Brand T is a new brand and we are interested in calculating its RPR. Table 20 shows the purchasing behaviour of seven households over an 11 week period.

Table 20: Illustration of Repeat Purchasing Rate Calculation using a Hypothetical Example

	Week	1	2	3	4	5	6	7	8	9	10	11
Buyer	1	T	T	R	T	R	R	R	R	T	R	R
	2	T		S		S		S		S		S
	3		T	T	T	T	T	T	T	T	T	T
	4		T		T		R		T		R	
	5			T		T		T		T		T
	6			T	T	R	T	R	R	S	R	R
	7			T	S		S		S		S	
Cum. buyers		2	4	7	<---------->		<---------->		<---------->		<---------->	
RPR					6/10	=60%	5/10	=50%	4/10	=40%	4/10	=40%

Source: Parfitt & Collins (1968 p132)

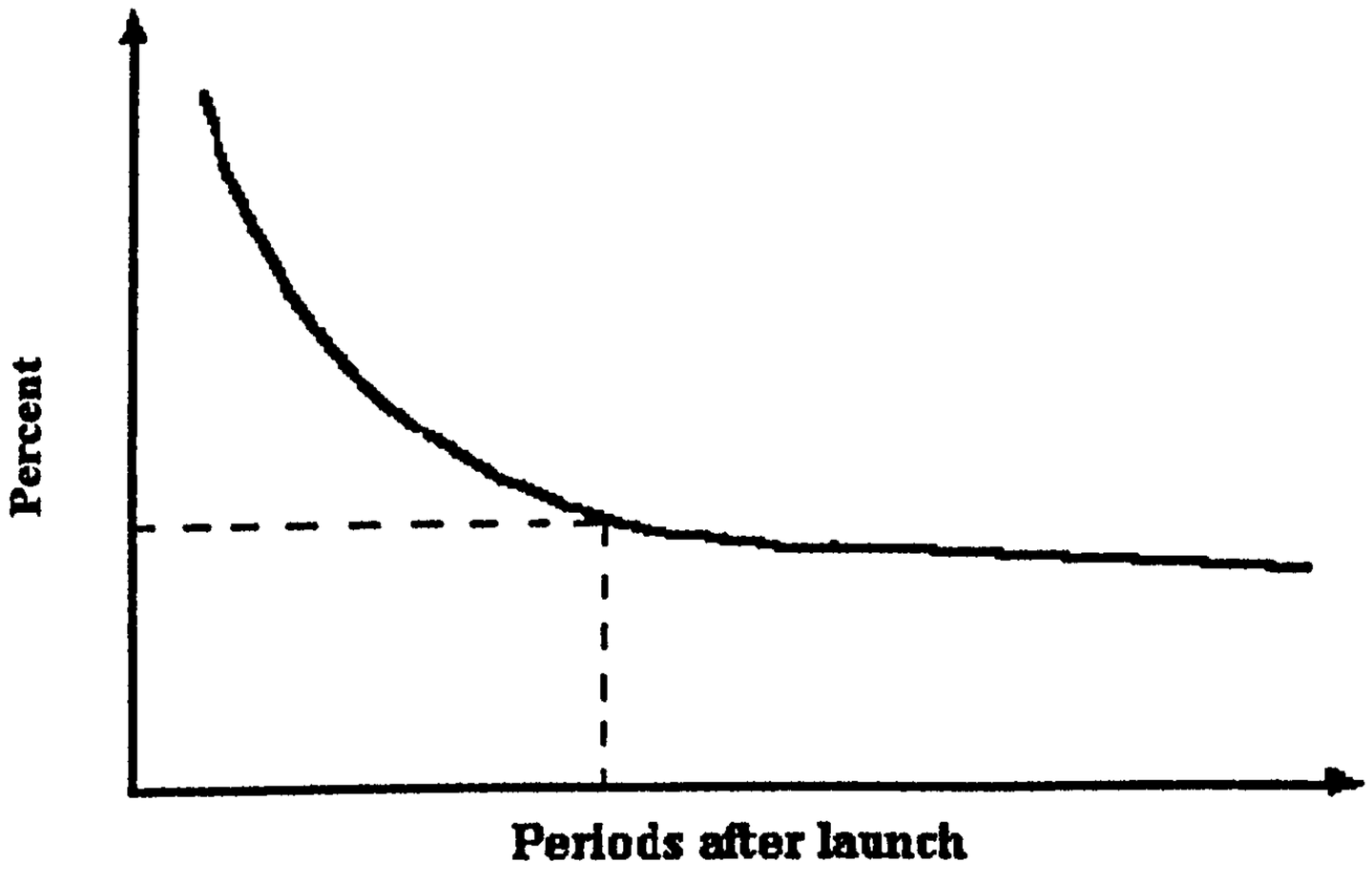
As each new Brand T buyer appears on the panel records, the household's purchasing behaviour is isolated as a continuous record over time. In effect each time a household trials Brand T it enters the sample. The initial trial of Brand T is effectively discarded since we are only interested in repeat purchase here. It is merely a necessary condition to allow the household into the sample.

The RPR is calculated from the period after the first purchase of Brand T, here in two week intervals. In our study we use two quarters as a time period. This interval is not an expression of calendar time because the calculation begins for each buyer from his date of entry into the market eg Buyer 2's first opportunity for repeat purchase is in weeks 2 and 3 whereas for Buyer 7 the first chance is in weeks 4 and 5. In the example shown here, these seven buyers made ten purchases between them in each of the two week periods. The final row of the table shows the RPR for each period.

A pattern of declining RPR as shown here is typical. The point where the RPR levels off is critical. A clear turning point on the RPR curve would give an objective point at which to take the post launch measure.

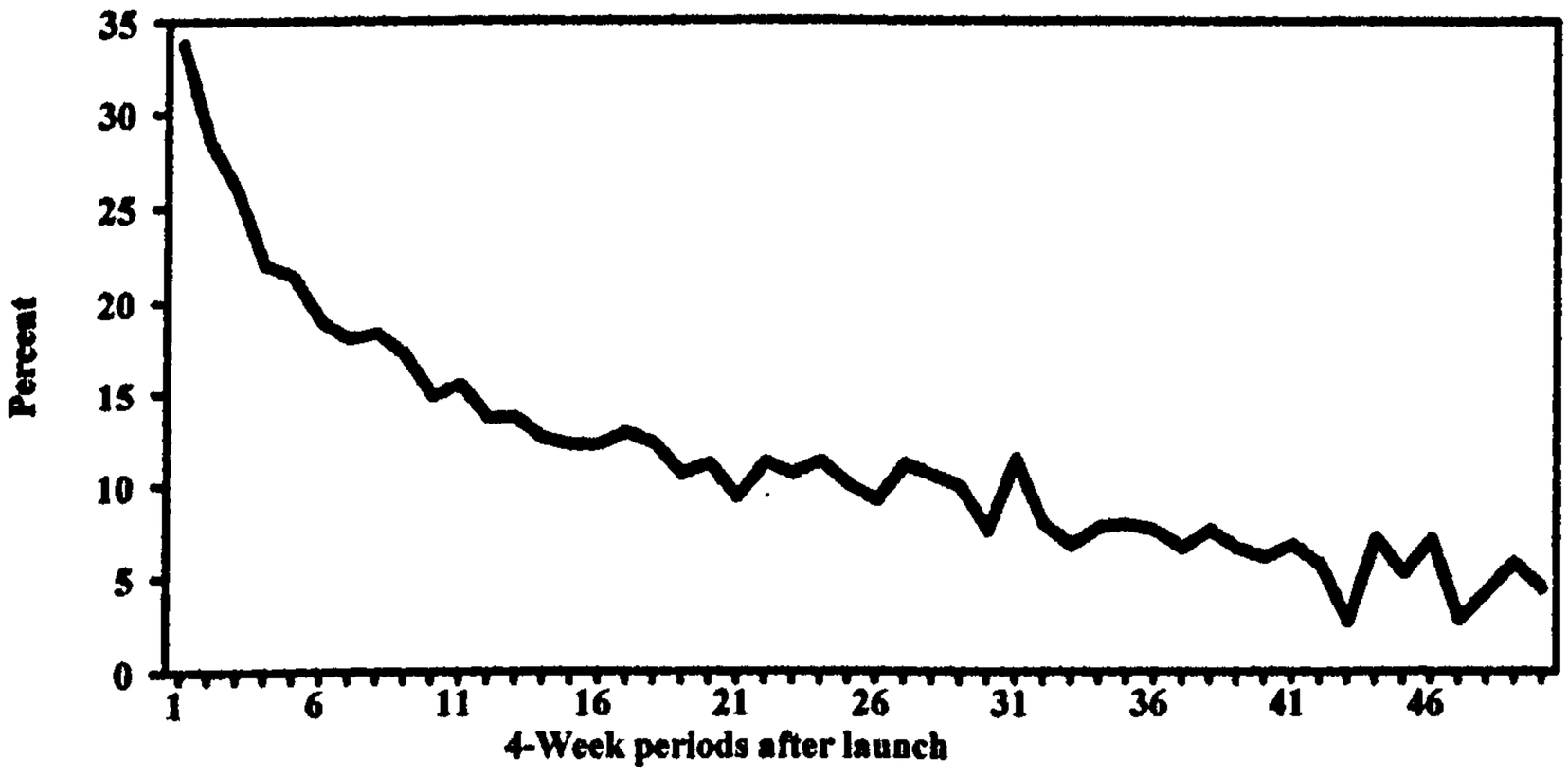
Figure 7 shows stylised repeat purchasing pattern with a clear post launch period in Period 18. In a perfect world, all new product introductions would display a similar clarity.

Figure 7: "Ideal" Repeat Purchasing Rate Pattern



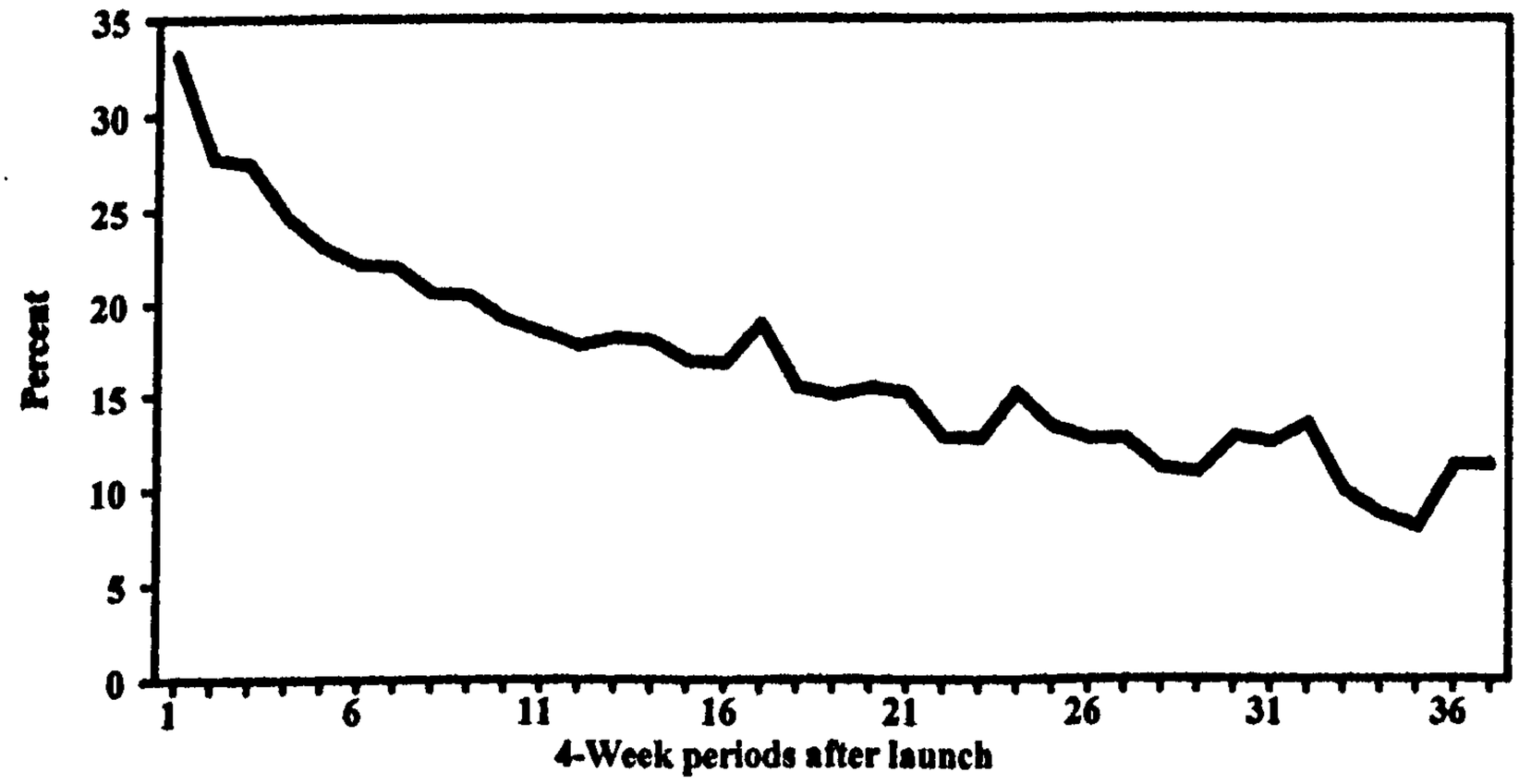
SPSS and Quattro Graphics were used to generate graphs of all the new product introductions in the UK and German detergent markets over the period of the database. Of the 31 curves drawn, only 2 approximated to the ideal. Wisk (Figure 8) and Ariel Liquid (Figure 9) show a similar pattern but lack a clear elbow, so there is still a high degree of subjectivity in the choice of post launch period.

Figure 8: Repeat Purchasing Pattern of Wisk in the UK Detergent Market



Source: TNAGB

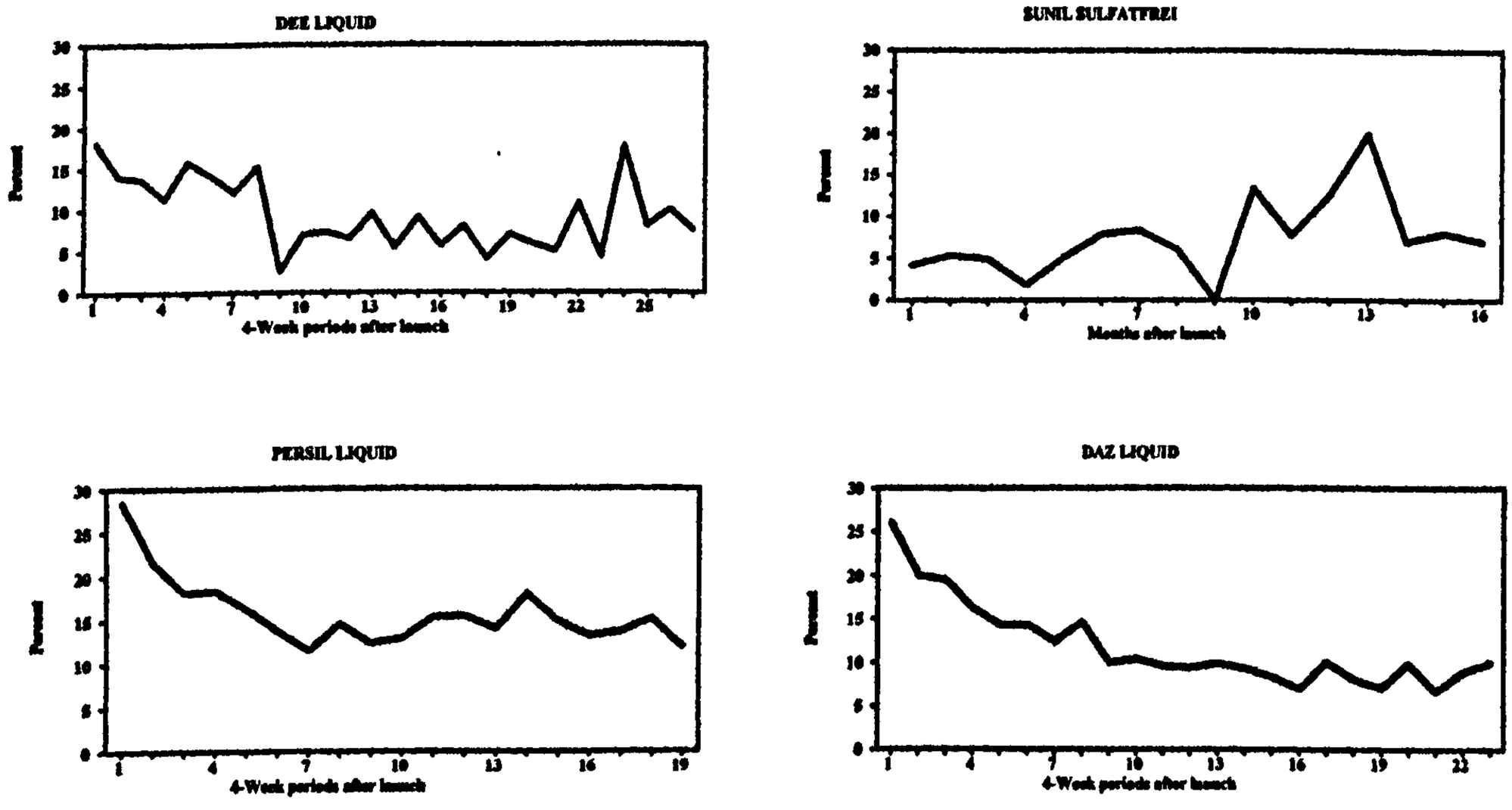
Figure 9: Repeat Purchasing Pattern of Ariel Liquid in the UK Detergent Market



Source: TNAGB

Others showed no discernible pattern as Figure 10 shows.

Figure 10: A Sample of Repeat Purchasing Patterns From the UK and German Detergent Markets



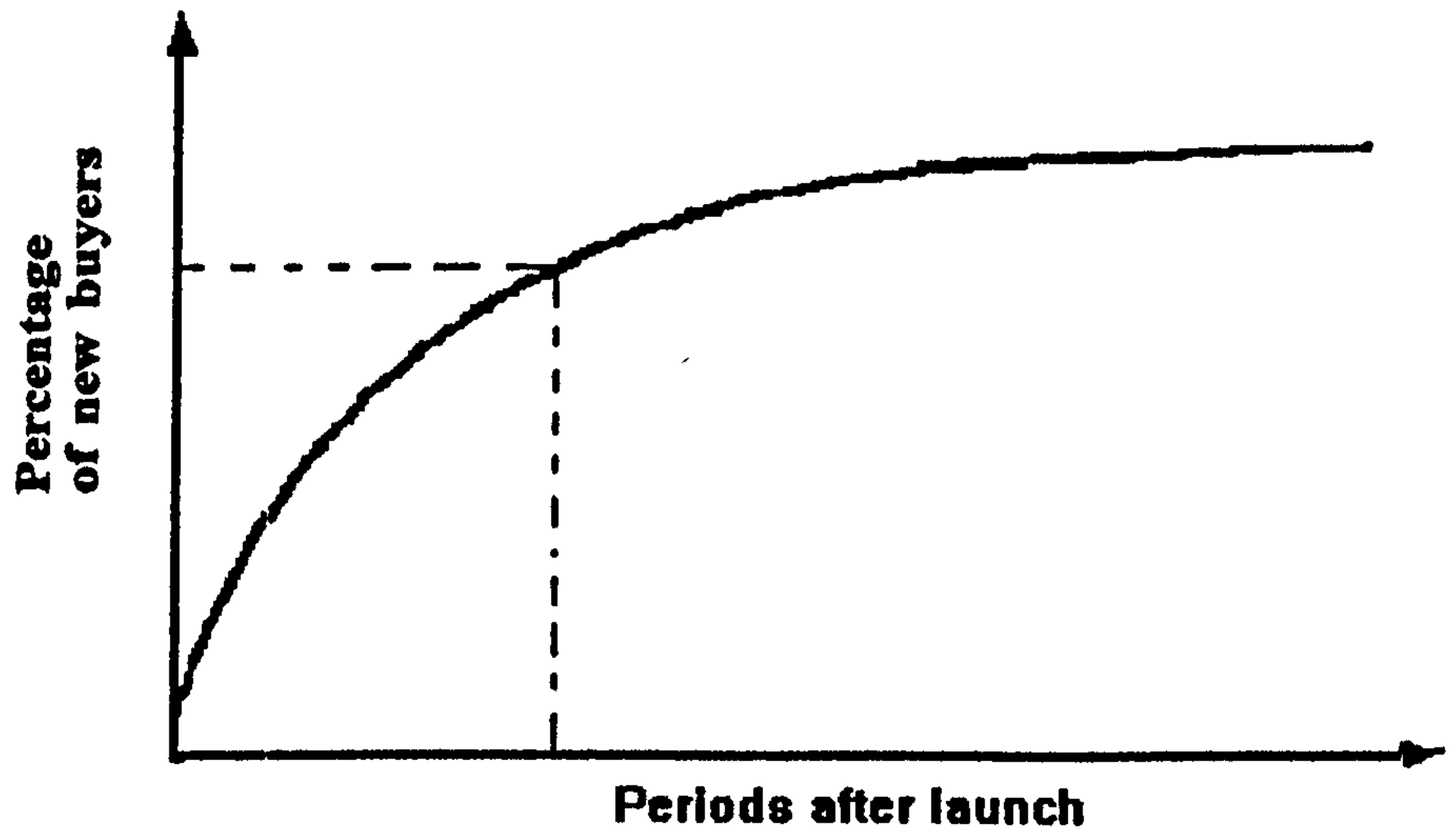
Source: GfK and TNAGB

One of the other problems with this approach is the systematic bias that it introduces for unsuccessful products. Almost by definition an unsuccessful product will have a very low (or no) repeat purchasing and this will distort the results.

Penetration Curves

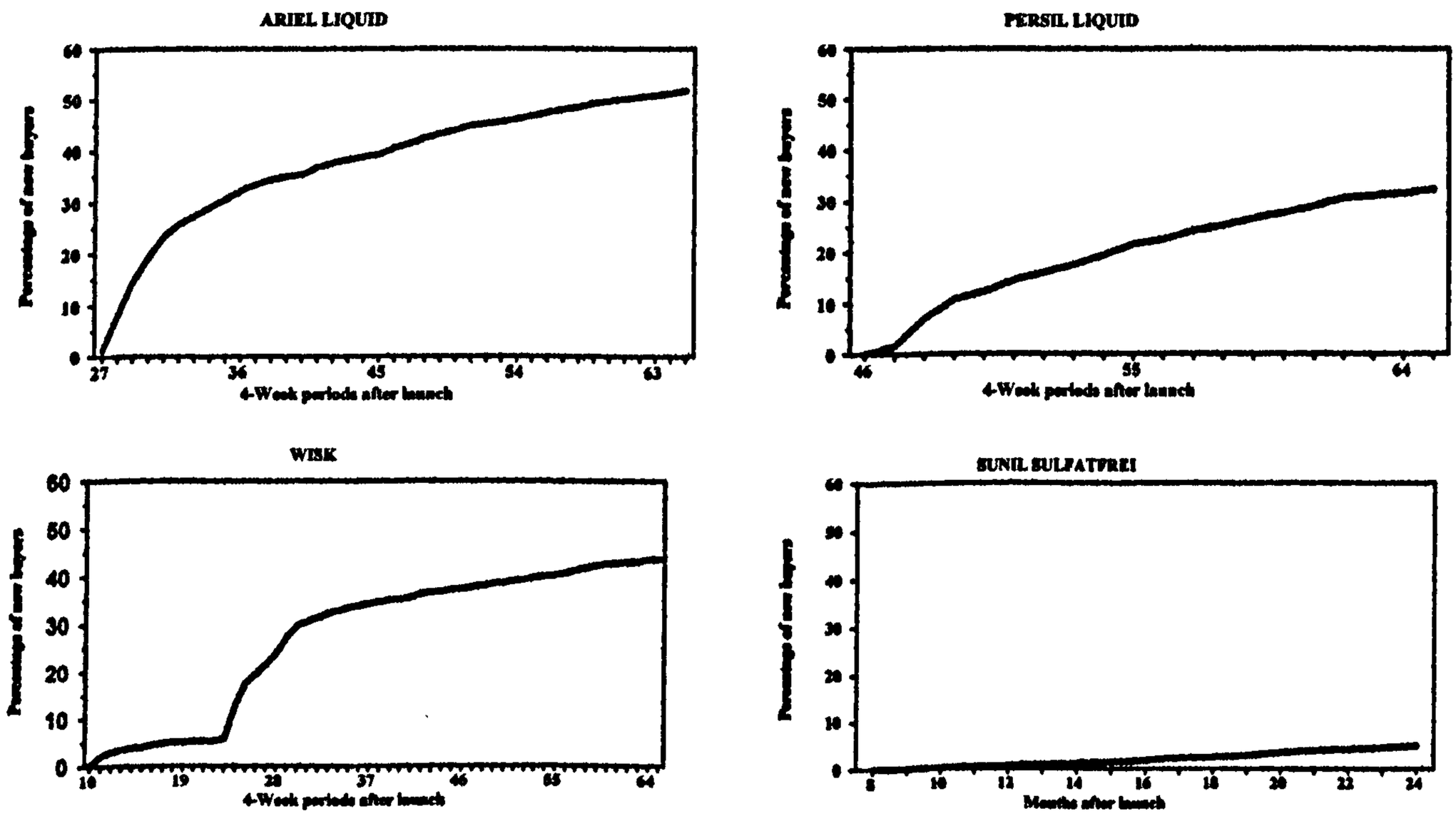
Cumulative penetration curves would be expected to show the inverse of repeat purchasing patterns. Again equilibrium would be reached at the elbow of the curve. A similar process was followed to the development of the repeat purchasing curves. Again 31 curves bearing relatively little resemblance to the ideal pattern (shown in Figure 11), emerged.

Figure 11: "Ideal" Cumulative Penetration Curve



The patterns were more consistent this time (see Figure 12) but again the absence of a clear elbow means that the judgement once again requires a high degree of subjectivity.

Figure 12: A Sample of Cumulative Penetration Curves from the UK and German Detergent Markets



Sources: GfK and TNAGB

Nonparametric Tests for Stationarity and Randomness

We can test for stationarity by using a variety of statistical tests, varying in their power.

The simplest of these is the "runs test" , which is readily accessible via the SPSS software package. It will be remembered that our interest is in defining the first period after launch in which the market could again be said to be stationary. To do this, the repeat purchasing rates of all the new entrants are graphed. As has already been noted a characteristic of a stationary market is to have stationarity around most measures, so share of volume or penetration could equally have been chosen. These graphs are then visually inspected to find a period which appears to be stationary. The runs test is then repeated over different time periods until stationarity is found. Daniels' test is then used to confirm the result. The first period of this run of stationarity is then adopted as the post launch period.

An explanation of these two nonparametric tests for stationarity follows. Firstly the simpler runs test.

Runs Test

One of the characteristics of a stationary time series is that any observation is equally likely to be above or the median of the series. This property is central to the runs test. The test consists of simple stages.

1. Calculate the median of the series.
2. Assign plus and minus signs to observations according to whether they are above or below the median.
3. List the pluses and minuses in chronological order.
4. Count the number of "runs" or blocks of pluses and minuses (Branle 1965). This is the test statistic R.
5. Test the hypothesis of stationarity using R.

A random no-trend series should produce a random string of pluses and minuses, giving neither too few nor too many runs. Too few runs suggests a series with trend, or one with large positive autocorrelation. Too many runs suggest negative autocorrelation as the series fluctuates rapidly above and below the mean. A random series should produce a moderate number of runs, with a smaller number of pluses and minuses than in a trending or positively autocorrelated series.

A more detailed explanation of this test, along with a worked hypothetical example, can be found in Technical Appendix 1a (see page 222).

This test was repeated with different time series for each new entrant. When stationarity was identified, the first period of that time series was taken as the post launch period. This choice was tested by Daniels' test, which validated the runs test in each case. An outline description of Daniels' test follows.

Daniels' Test

A more powerful, although less quick and easy, test of stationarity can be constructed by using Spearman's coefficient (ρ = rho). This test is known as Daniels' test for trend (Daniels 1950). A similar one exists using Kendall's correlation coefficient (τ = tau) called the Trend test (Gilchrist 1976 p185). However Farnum & Stanton (1989 p72) state that these two tests *"nearly always give the same results"* and also that *"they are nearly equal in statistical power as well."* They suggest that while there is little to recommend one over the other, there may be slight preferences. The Trend test may be preferable where sample sizes are small, since Kendall's coefficient tends to normality faster than Spearman's. But Daniels' test has the advantage of using the more familiar and larger Spearman's, which is more commonly found in software packages. For these reasons Daniels' test has been chosen for this study.

Daniels' test has not been used as the initial test for stationarity. It is more complex to calculate than the runs test and not available on the SPSS software. As such it would have proved cumbersome to use in the type of iterative processing that was

used for the runs test. However it is more powerful and has been used to validate the choice of post launch period.

As with the runs test, a more detailed explanation of this test, along with a worked hypothetical example, can be found in the Technical Appendix, this time Technical Appendix 1b (see page 224).

Daniels' test is used in this study to allow us to feel more confident in the simpler runs test. In each case of a new entrant, the results of both tests are consistent in suggesting that the series has become stationary.

So, in summary, the first pilot study extended our knowledge of dealing with large datasets of this type. It confirmed the usefulness of the SOE model and Buyer Analysis. But it also suggested problems in the timing and duration of measurement. The timing issue was resolved by using the stationarity tests suggested above. The duration was tested again in Study II.

5.2 Pilot Study II

The second pilot study assessed the feasibility of using three different measures of cannibalisation - the SOE (Share Order Effect) model, GLA (Gains Loss Analysis) and duplication of purchase tables - on consumer panel data. It was designed to see how the methods differed in their detection of cannibalisation. It also tested a shorter duration for the measures - that of 4 weeks. The results showed cannibalisation of the parent by all three line extensions, and suggested the need to use multiple measures when evaluating the degree of cannibalisation. The study also demonstrated the need to sample over time since the extent of cannibalisation was shown to be dynamic.

Similarly to Pilot Study I, the more detailed findings can be found in the appendix (Appendix 2, page 251, The Measurement of Cannibalisation). This appendix is a transcript of a paper published in *Market Intelligence and Planning*, (Lomax et al 1996).

In summary, all the line extensions produced greater or lesser evidence of cannibalisation with the degree of magnitude determined by the measure, the timing of the measure and the length of the measurement period. One of the main benefits of this pilot was to suggest that the four weekly periods used were too short, causing too many fluctuations in the results. This unfortunate characteristic was aggravated by the small sample sizes resulting from matching households on line extension purchase. The short period length also made the timing of the post launch measure even more critical. The alternative time periods considered for the full study are discussed in the next section. The final decision was to move to two quarterly periods in the full study which smoothed these fluctuations and made the timing less critical.

Pilot Study II also emphasised the need to develop tests of significance for the measures. The SOE model's significance was tested by t tests, developed as part of Pilot Study I. GLA does not have a test of significance. Following advice from Professor Gerald Goodhardt at City Business School, a significance test for the duplication of purchase tables was devised for the full study. This test is a Chi-square based on a 2x2 contingency table for each cell of the table. The pilot study showed the difficulties associated with calculating the duplication of purchase tables. New software was developed for the final study with the aid of an ESRC grant.

Table 21: Contribution of Pilot Study II to the Research

OBJECTIVES	OUTCOMES	SOLUTIONS
Assess feasibility of using SOE, GLA and duplication tables on the panel data	All feasible but duplication of purchase software found to be cumbersome and lacking a significance test. GLA suffered from small sample sizes, aggravated by the short measurement period	New software developed for the duplication of purchase analysis funded by an ESRC grant
Assess benefit of using alternative measures of the same effect	All give a different perspective and are therefore complementary	
Evaluate use of 4 week time period for measurement	Too short, particularly for GLA	Alternative time periods considered, and industry standard of two quarters (26 weeks) implemented for full study
	Need for significance test for duplication analysis	Development of Chi-square test as part of new software

The duration of the measurement period, although amended between pilot studies, still continued to cause problems in pilot study II. A variety of alternatives were considered for the full study and these are discussed in the next section.

5.2.1 Length of Measurement Period

The timing of the measures is critical to their validity, but so too is their duration. Four different time periods were examined:

quarterly (13 weeks)

monthly

factoring of the inter-purchase interval

two quarterly (26 weeks)

Quarterly

Quarters were used in Pilot Study I, based on much of Ehrenberg's work. In this study, the post-launch period was chosen subjectively by "eyeballing" the data. As the project progressed, more objective means of choosing both the post launch period and

its duration were sought. This resulted in the use of the tests described in the previous section, and the use of 4 weekly data as suggested by Parfitt & Collins (1968) for the second pilot study.

Monthly

Pilot Study II showed that whilst the use of the non parametric tests worked well in determining a period of equilibrium, the use of four weekly time periods was less successful. Basically four weeks is too short a period; the dataset, although large by most standards, is not large enough. This problem is aggravated by the need to have matched samples, ie households who bought in both periods. Gains Loss Analysis suffered particularly, being unable to handle line extensions with small shares such as Sunil Sulfatfrei in the German detergent market.

Factoring the Inter-Purchase Interval

Since products vary in the frequency with which they are purchased, a measure was proposed which took account of this variation. This measure, of multiplying the average inter-purchase interval by perhaps two or three times, has intuitive validity. But unfortunately there are operational problems in using it with panel data. It would require weighting each SKU in the dataset, by not only pack weight but other criteria such as degree of concentration eg for detergents and washing up liquid. Categories such as coffee are particularly problematic, covering such diverse subcategories as instant, filter and expresso, where an average inter-purchase interval for the category is not really relevant given the variation in subcategories. A rough estimate of purchasing rate can be gained by using purchase occasion, which for most product categories in our datasets, was approximately once a quarter.

Two Quarterly

The resolution of the above problem is to use two quarterly periods. This duration benefits from appearing to be relevant in the light of the approximate inter-purchase

interval above (ie allowing most households the opportunity to purchase the category twice over this time period), and from being the convention in the analyses carried out for practitioners by research agencies.

5.3 Summary

This chapter explains how the measures of cannibalisation are refined as part of the pilot testing process. The two preliminary studies, Pilot Studies I and II, confirmed the feasibility of the proposed full study, and the measures to be used in it. These studies emphasised the amount of work involved in preparing and analysing data sets of this type. They also allowed for the removal of bugs in the programmes at an early stage.

Pilot testing of this nature allows for the detail of operationalisation to be finalised. Relevant tests of significance were developed for the measures. Two important operational details of timing were also resolved. The first is **when** to take the measures and the second is for **how long.**

The timing of the measure is determined by the use of the two statistical tests for stationarity (the runs test and Daniels test, described above). These tests are performed on repeat purchasing rate data, to allow for variation in repeat purchase cycles within product categories. The first period after launch when stationarity has been identified is referred to in subsequent chapters as the **stabilised post-launch period.** However waiting for stationarity to be re-established does create concerns as the "signal-to-noise" ratio will worsen as the time horizon increases. It may therefore be harder to identify the line extension effect from other activities in the market. As a result, the **immediate post-launch period** is also used and variations between the results of the two are analysed. Frequently the two periods coincide.

The duration of the measures is two quarters (26 weeks) in line with practitioner convention. This time period offers the benefit of larger purchaser samples, and

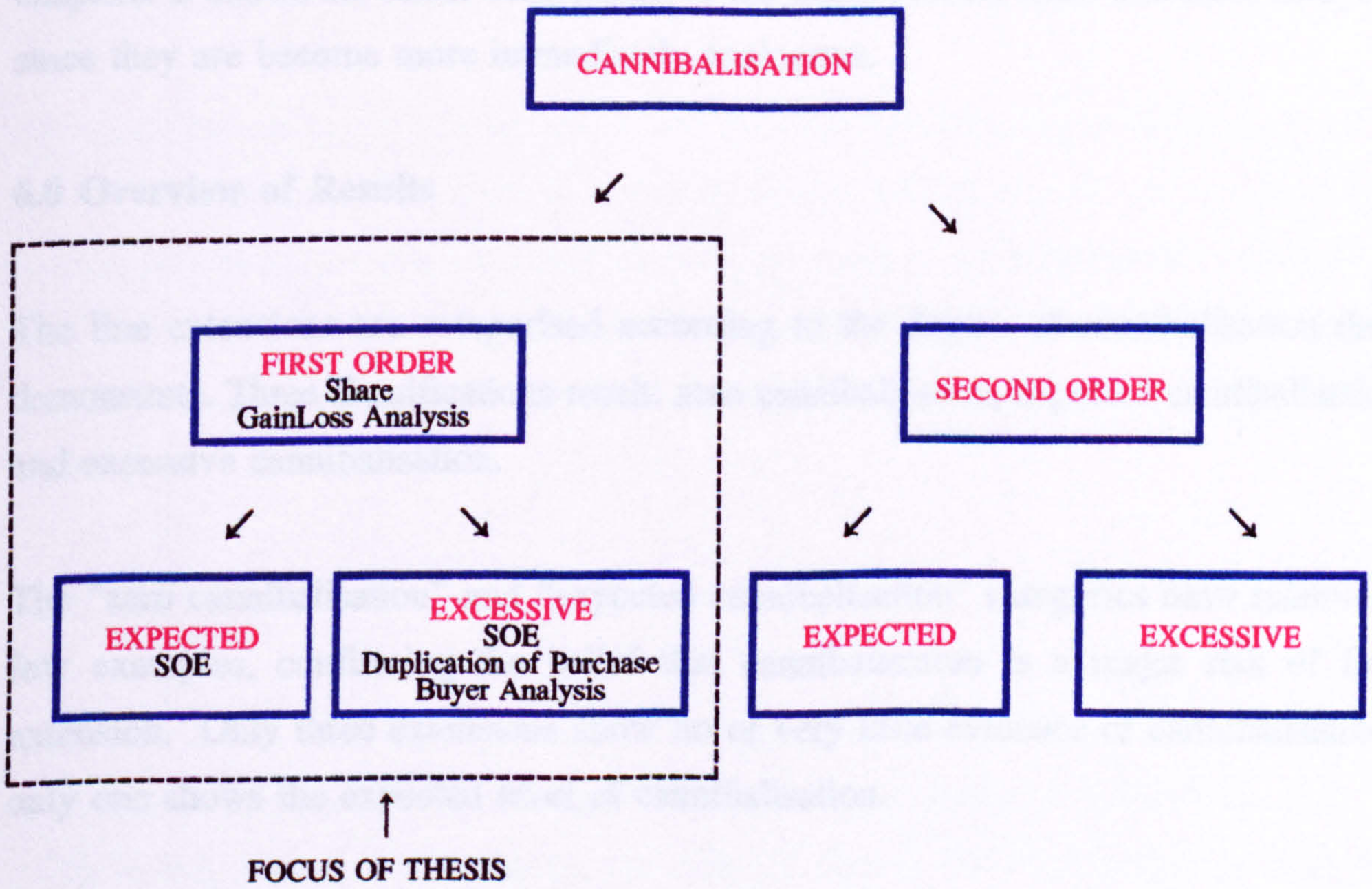
hence a lower tendency to random fluctuations. It also means that the immediate launch period and the stabilised launch period are more likely to coincide.

CHAPTER 6
FIRST ORDER CANNIBALISATION:
ZERO AND EXPECTED LEVELS

In Chapter 2 (figure 4, page 39), cannibalisation is decomposed into several levels. The next two chapters examine the evidence for first order cannibalisation ie share loss by the parent brand at the total, expected and excessive levels. This chapter concentrates on those line extensions showing relatively low levels of cannibalisation - between zero and the expected level. The next chapter examines the remaining group, those extensions which excessively cannibalise the parent.

In both chapters the same measures are used ie those discussed in Chapter 3. Of these, market share and gain loss analysis are appropriate to assess total cannibalisation. Comparisons with expected share movements (SOE model) allow us to distinguish between the expected level of cannibalisation and the excessive. The duplication of purchase tables and buyer analysis also indicate excessive cannibalisation by showing if the level of cross-purchasing is disproportionate. Figure 13 below illustrates the levels of cannibalisation and relevant measures.

Figure 13: Cannibalisation: Levels and Measures



Each of the thirteen line extension examples is analysed on each of the measures. The extensions have been assigned groups according to the degree of cannibalisation which they display.

The degree of cannibalisation is measured from as a characteristic of the line extension's view, rather than of the parent brand. This is the approach taken by Hardie (1994). We can calculate how much of the line extension's volume is derived from cannibalisation by using the following equation:

$$CV_{LX} = \frac{MS_C}{MS_{LX}}$$

where CV_{LX} is the percentage of line extension volume due to cannibalisation

MS_C is the total cannibalised share and

MS_{LX} is the line extension's share.

This orientation is used in the summary analyses presented in this and the following chapters. It allows for easier comparison of the market share, GLA and SOE analyses since they are become more immediately analogous.

6.0 Overview of Results

The line extensions are categorised according to the degree of cannibalisation they demonstrate. Three classifications result: zero cannibalisation, expected cannibalisation and excessive cannibalisation.

The "zero cannibalisation" and "expected cannibalisation" categories have relatively few examples, confirming the belief that cannibalisation is a major risk of line extension. Only three extensions show no or very little evidence of cannibalisation, only one shows the expected level of cannibalisation.

"Excessive cannibalisation" is by far the most common category with most (nine out of the thirteen) line extensions taking more share from the parent than would be predicted by the size of the parent brand alone. Although share analysis and deviations from the SOE model suggest that up to 100% of the line extension's share is derived from the parent, Gain Loss Analysis (GLA) suggests only a maximum of around 50% is likely to be purchases switched from the parent.

The post-launch time period used for most of these analyses is the period immediately following the launch. In almost all cases, the market was found to have achieved stationarity by this time, tested by a combination of the runs and Daniels' test. Where equilibrium had not been re-established, two time periods are shown - the immediate post-launch period and the first period where stationarity had been achieved. This applies in two cases, Aldi der Feine and Sunil Sulfatfrei.

The results form a continuum from zero to total cannibalisation. This chapter focuses on the lower end of the spectrum, starting with zero levels.

6.1 Zero Cannibalisation

As would be anticipated, incidences where no cannibalisation has occurred as a result of the launch of a line extension are relatively infrequent. Of the thirteen line extensions, only one (Surf Liquid) showed no signs of cannibalisation whatsoever. Two others - Daz Liquid and Crest Gum Health Mild Mint - show little sign of cannibalisation with only Gains Loss Analysis suggesting that the parent brand suffered.

6.1.1 Surf Liquid

Surf Liquid was launched onto the UK detergent market in 1987, following a flurry of liquid variant launches by the major brands on the market. It achieved a share of 1.7% within a year of its launch. As table 22 shows, far from suffering from the

launch of a new line, the parent brand itself gained share over the same period. The total brand is significantly larger after the launch of the line extension than before.

Table 22: Market Share Movements after the Launch of Surf Liquid

BRAND	MARKET SHARE		
	Pre Launch	Post Launch	Diff
Surf (ex line ext)	5.5	6.7	1.2
Surf Liquid	0	1.7	1.7
TOTAL	5.5	8.4	2.9 **

← A negative figure here would suggest cannibalisation

**p<0.001

NB Pre launch period 8 Post launch period 10 Data source: TNAGB

Market share gives a broad view of market dynamics but perhaps more detail of brand switching is provided by GLA. The gains loss methodology gives a matrix of brands gaining share against brands losing share. An abbreviated version of this is shown in Table 23 below, illustrating the sources of Surf Liquid's share gain. For clarity only the main contributors of volume are shown, ie only those losing more than 10% of the new entrant's volume.

Table 23: Launch of Surf Liquid Analysed by Gains Loss Analysis

	BRANDS LOSING (%row)				
BRAND GAINING	Persil	Ariel	Daz	Wisk	Others
Surf Liquid	**25**	**23**	**23**	11	11

Note. Pre launch : Period 8 Post Launch : Period 10 Data source: TNAGB

The main contributors to Surf Liquid's share are Persil, Ariel and Daz each contributing around a quarter of volume each. The parent brand contributes nothing to the line extension volume, a very encouraging result for the brand's owners. Surf's resilience to share loss appears to be due at least in part to a market effect. Buyers were, at this time, moving towards liquid variants of detergents. A more detailed GLA shows the liquid variants of the major brands suffering as Surf Liquid gains share -

Ariel Liquid contributing 19%, Daz Liquid 13% and Wisk and Persil Liquid 11% each.

Duplication of purchase analysis produces a matrix of a different sort - that of buyers of the different brands who also buy any or some of the other brands available. These composite penetrations can be compared with the theoretical norms produced by the Duplication of Purchase Law, to show any unusual variations from the pattern predicted. To simplify the communication of these results we have called the predicted penetration 100 and indexed the observed data against this. Figures over 100 show a level of cross-purchasing higher than that predicted by the model, and suggest excessive cannibalisation.

Although the duplication of purchase analysis (Table 24) shows a slightly higher than expected level of cross purchasing between parent and line, this bias is not significant. This value of 117 is the only duplication index of line-parent which does not reach significance, and is the lowest value in the study. Buyers of Ariel, Wisk and Daz are significantly more likely to also buy Surf Liquid, a finding which is consistent with GLA. However GLA marks out Persil as the main contributor to Surf Liquid's volume whereas the duplication analysis shows a level of cross purchasing below, although not significantly below, that which we would expect.

Table 24: Duplication of Purchase for Surf Liquid buyers

Buyers of these brands who also bought Surf Liquid	Post Launch Period	
Surf	117	
Ariel	153	**
Persil	88	
Wisk	276	**
Daz	176	**

Note. Post launch : Period 10
* p<0.01 **p<0.001

Data source: TNAGB

The fourth approach (SOE) confirms the picture provided by the previous three tables. Table 25 uses the variations in share movements predicted from brand size. As we can see, not only does Surf (the parent brand), not lose the expected amount of share to Surf Liquid, it actually gains. So there is no evidence of cannibalisation at either the expected or excessive level, confirming the results of Table 22 as we would expect.

Table 25: UK Detergent Share of Purchase Expected and Actual Post Surf Liquid Launch - All buyers

BRAND	EXPECTED SHARE POST LAUNCH (T)	ACTUAL SHARE POST LAUNCH (O)	DIFF (O-T)
SURF (ex line extension)	5.4	6.7	1.3
Surf Liquid	1.7	1.7	0
TOTAL SURF	7.1	8.4	1.3
Base: Buyers		1457	
: Purchases		11521	

← A negative figure here would show excessive cannibalisation

Note. Pre launch : Period 8 Post Launch : Period 10 Data source: TNAGB
* p<0.01 **p<0.001

Our fifth measure of cannibalisation is buyer analysis. One of the benefits of panel data is that it allows us to isolate groups of buyers. We can look at just that group of consumers who chose to purchase Surf Liquid. By looking at the brands which Surf Liquid buyers bought before the launch of the new line, and comparing these to the total market we can look for differences between the two groups. If these buyers were particularly heavy purchasers of Surf before the launch, it would suggest potential cannibalisation. Table 26 suggests that this is indeed the case; buyers of Surf Liquid were more likely to be buyers of the Surf parent (or to buy more of it) before the launch of the liquid variant. They bought nearly 30% more Surf (as a proportion of their purchases) than the market as a whole (7.1% vs 5.5%). Although this is a distinct increase, it is not statistically significant and is one of the smallest biases towards the parent in the sample analysed in this study.

Table 26: Comparison of Share of Purchase for Surf Liquid Buyers vs Total Market

BRAND	SURF LIQUID BUYERS PURCHASE PROFILE %	TOTAL MARKET PURCHASE PROFILE %	DIFF	
More likely to have bought				
ARIEL	28.1	23.1	5	*
DAZ	17.3	11.9	5	*
SURF	7.1	5.5	2	
WISK	6.8	4.8	2	
Less likely to have bought				
PERSIL	19.5	27.5	-8	*
STORE	5.7	9.0	-3	
OTHERS	15.3	18.2	-3	
Base: Purchases : Buyers	1115 121	11158 1457		

Note. * $p<0.01$

Rounding means that some of the figures in the DIFF column may appear incorrect.

Pre launch: Period 8 Data source: TNAGB

To summarise. Surf Liquid shows no evidence of cannibalisation on any of the measures used (Table 27). From this point of view it provides a useful benchmark of 0% cannibalisation. Although Surf Liquid purchasers are heavier purchasers of Surf than UK detergent buyers in general, they are not significantly so and there is no evidence that they substituted their purchases of Surf powder for Surf Liquid.

The parent brand's resistance to share loss is possibly be due to a market effect, ie a movement away from powdered detergents into liquids. Surf Powder may already have lost share to previous liquids, and therefore further share erosion to a liquid format is likely to be negligible. The relatively small share achieved by Surf Liquid also suggests that it was a (too) late entrant. Further indications of a market effect can be gleaned from Table 26 where it can be noted that Persil has a poor showing among Surf Liquid buyers. This could be due to its lack of a liquid variant, Ariel with a powdered and liquid format fared much better. Wisk, a liquid only detergent, also features heavily in the Surf Liquid buyers' portfolio.

Table 27: Cannibalisation Evidence: Surf Liquid

MEASURES	DEGREE OF CANNIBALISATION		
	TOTAL	EXPECTED	EXCESSIVE
Share	✗		
Gain Loss Analysis	✗		
Duplication of Purchase			✗
Buyer Analysis			✗
SOE Model		✗	✗

6.1.2 Daz Liquid

Daz Liquid is another line extension which does not appear to cannibalise the parent. As Table 28 shows, the parent brand once again benefits from the launch of the new line, not only to the extent of gaining 100% of the incremental volume accruing from the extension but also growing itself.

Table 28: Market Share Movements after the Launch of Daz Liquid

BRAND	MARKET SHARE		
	Pre Launch	Post Launch	Diff
Daz (ex line ext)	7.4	7.9	0.5
Daz Liquid	0.0	4.0	4.0
TOTAL	7.4	11.9	4.5 **

**p<0.001

NB Pre launch period 6 Post launch period 8 Data source: TNAGB

The line extension has a very credible share of 4%, a year after launch, contributing 54% of the total brand growth of 61% over the period (from 7.4 % to 11.9%). GLA (Table 6.1.2.2) shows the main contributors to the line extension's volume to be Ariel and Others (a composite of all remaining brands minus the top five and store brands).

Table 29: Launch of Daz Liquid Analysed by Gains Loss Analysis

	BRANDS LOSING (%row)				
BRAND GAINING	Ariel	Wisk	Store	Daz	Others
Daz Liquid	31	13	13	10	21

Note. Pre launch : Period 6 Post Launch : Period 8 Data source: TNAGB

Wisk and Store detergents (an aggregate of all retailer brands) also add an important proportion at 13% each. The parent brand (Daz) is shown as giving 10% of the line extension's volume. As with Surf Liquid, there does appear to be a movement towards liquids, although not as marked. This is probably because the launch of Daz Liquid pre-dates that of Surf Liquid, and there were fewer liquid variants on the market at the time. Even so over 40% of the line extension's volume came from liquids, predominantly Ariel Liquid (23%) and Wisk (13%).

Duplication of purchase analysis shows that buyers of Daz are significantly more likely to also buy Daz Liquid. The same is true for buyers of Ariel and Wisk. This offers some consistency with GLA which identified Ariel, Wisk and Daz as the main branded contributors to volume. Persil buyers are shown by duplication analysis to be significantly less likely to buy Daz Liquid than we would expect, perhaps because they prefer the powdered format.

Table 30: Duplication of Purchase for Daz Liquid Buyers

Buyers of these brands who also bought	Post Launch Period	
Daz	172	**
Wisk	170	**
Ariel	135	**
Store	135	*
Persil	67	**

Note. Post launch : Period 8
* p<0.01 **p<0.001

Data source: TNAGB

Since there is no evidence of cannibalisation at the total level (Table 28), there is no reason to test for either expected or total cannibalisation via the SOE model. It would be an unproductive analysis to test the split between levels of cannibalisation when share (the basis of the SOE analysis) shows that cannibalisation does not appear to exist in this case.

However it is productive to examine that cohort of consumers who purchase Daz Liquid to see if their purchase behaviour is different from the UK detergent market as a whole. Table 31 makes that comparison.

Table 31: Comparison of Share of Purchase for Daz Liquid Buyers vs Total Market

BRAND	DAZ LIQUID BUYERS PURCHASE PROFILE %	TOTAL MARKET PURCHASE PROFILE %	DIFF	
More likely to have bought				
ARIEL	31.1	25.6	6	**
WISK	10.3	6.4	4	**
DAZ	9.6	7.4	2	*
Less likely to have bought				
PERSIL	15.3	24.9	-10	**
SURF	5.1	5.8	-1	
STORE	9.0	9.1	0	
OTHERS	19.7	20.9	-1	
Base: Purchases :Buyers	3266 363	11293 1470		

Note. * p<0.01 ** p<0.001
Rounding means that some of the figures in the DIFF column may appear incorrect.
Pre launch: Period 6 Data source: TNAGB

The table above shows that, as with Surf, the buyers of the line extension purchased more of the parent brand in the pre-launch period than was true of the market as a whole. This bias is a very similar proportion to Surf, although here the difference is significant. Once again the cohort of liquid buyers were 30% heavier purchasers of the powdered variant than the average UK detergent buyer (9.6% vs 7.4%) The similarities to Surf continue if we look at the other significant variations from the market as a whole. Once again, Persil suffers from a lack of a liquid format, and once again Ariel and Wisk are favoured.

As the summary table below (table 32) shows, there is very limited evidence to suggest any cannibalisation. GLA suggests that the parent brand lost volume, and then only as a relatively minor contributor. Although duplication of purchase shows a significantly high level of cross purchase there is no associated share loss to confirm cannibalisation. As with Surf, although purchasers of the line extension bought more of the parent, there is no evidence of substitute purchasing, creating a cannibalisation effect.

Table 32: Cannibalisation Evidence: Daz Liquid

MEASURES	DEGREE OF CANNIBALISATION		
	TOTAL	EXPECTED	EXCESSIVE
Share	✗		
Gain Loss Analysis	10%		
Duplication of Purchase			✓ **
Buyer Analysis			✓ *
SOE Model		✗	✗

* p< 0.01 ** p < 0.001

6.1.3 Crest Gum Health Mild Mint

The launch of Crest Gum Health Mild Mint in the UK toothpaste market produces entirely incremental volume for the Crest brand. Once again, the parent brand enjoys contemporaneous growth, although not at a significant level. The line extension only provides 0.6% market share, although this is not unusual in such a fragmented market.

Table 33: Market Share Movements after the Launch of Crest Gum Health Mild Mint

BRAND	MARKET SHARE		
	Pre Launch	Post Launch	Diff
Crest (ex line ext)	10.2	11.2	1.0
Crest Gum Health Mild Mint	0.0	0.6	0.6
TOTAL	10.2	11.8	1.6

*p<0.01 **p<0.001

Note. Pre launch : Period 2 Post Launch : Period 4 Data source: TNAGB

The growth of the parent brand (Table 33) suggests no cannibalisation and that, as with the previous two examples, all the line extension's volume derives from brand switching.

However GLA (Table 34) provides a contrasting view. It pinpoints Crest as the **major** contributor (20%) to the line extension's share. Even Colgate, the market leader with nearly a quarter of the volume, trails Crest with a loss of 18%. Similarly Macleans with a No. 2 market position only gives 12%.

Table 34 : Launch of Crest Gum Health Mild Mint Analysed by Gains Loss Analysis

	BRANDS LOSING (%row)			
BRAND GAINING	Crest	Colgate	Macleans	Aquafresh
Crest Gum Health Mild Mint	**20**	**18**	**12**	**10**

Note. Pre launch : Period 2 Post Launch : Period 4 **Data source: TNAGB**

Duplication of purchase analysis shows a disproportionately high level of cross purchasing between line and parent. Significantly high levels are also found with Sensodyne and Sainsburys toothpastes.

Table 35: Duplication of Purchase for Crest Gum Health Mild Mint Buyers

Buyers of these brands who also bought Crest Gum Health Mild Mint	Post Launch Period	
Crest	250	**
Sainsbury	327	**
Sensodyne	228	*
Colgate	91	
Macleans	93	

Note. Post launch : Period 4 **Data source: TNAGB**
* p<0.01 **p<0.001

As with Daz Liquid, since there is no evidence of cannibalisation at the total level (Table 33), there is no reason to test for either expected or total cannibalisation via the SOE model.

Crest Gum Health buyers show disproportionate purchasing of the parent brand. This is also true of buyers of Surf and Daz Liquid. But as Table 36 shows the difference is far more marked here. Crest Gum Health buyers made over twice as many parent purchases proportionately than the total market. Crest accounted for 23.4% of their purchases before the launch of Gum Health, but only 10.2% of the purchases of toothpaste buyers in general. However, as with Daz Liquid there is only limited evidence (provided by GLA) that this leads to substitute purchasing.

As with the duplication analysis, Sainsbury and Sensodyne appear as significant in the Crest Gum Health buyers portfolio. But the results of these two analyses are less consistent when we look at Colgate. In the duplication analysis the level of cross purchasing was lower than we would expect whereas in this buyer analysis Colgate forms a significantly higher proportion of the buyers' portfolio.

Table 36: Comparison of Share of Purchase for Crest Gum Health Mild Mint Buyers vs Total Market

BRAND	CREST GUM HLTH MLD MNT BUYERS PURCHASE PROFILE %	TOTAL MARKET PURCHASE PROFILE %	DIFF
More likely to have bought			
CREST	23.4	10.2	13 **
SENSODYNE	8.7	5.1	4 *
SAINSBURY	7.2	3.2	4 *
SUPERDRUG	6.6	3.4	3
Less likely to have bought			
COLGATE	14.5	23.4	-9 **
MACLEANS	12.1	16.0	-4 *
AQUAFRESH	7.8	9.8	-2
OTHERS	11.8	16.0	-4
Base: Purchases	346	10546	
: Buyers	83	2755	

Note. *p>0.01 ** p<0.001
Rounding means that some of the figures in the DIFF column may appear incorrect.
Pre launch: Period 2 Data source: TNAGB

The summary table below (Table 37) shows GLA, duplication of purchase and buyer analysis all suggesting cannibalisation. GLA shows the parent brand losing volume to the line extension, and as the most significant contributor. Duplication of purchase and buyer analysis both show significantly higher levels of cross purchase than we would expect.

Table 37: Cannibalisation Evidence: Crest Gum Health Mild Mint

MEASURES	DEGREE OF CANNIBALISATION		
	TOTAL	EXPECTED	EXCESSIVE
Share	✗		
Gain Loss Analysis	20%		
Duplication of Purchase			✓ **
Buyer Analysis			✓ **
SOE Model		✗	✗

** p <0.001

6.1.4 Summary

Only Surf Liquid shows unequivocal evidence of zero cannibalisation. Daz Liquid and Crest Gum Health offer less unambiguous examples. Although the balance of evidence in both these cases suggests that the line extensions did not cannibalise their respective parent brands, GLA, the duplication of purchase analysis and buyer analysis are all suggestive of some loss on the part of the parent. In the absence of any share loss by the parent, it is hard to prove cannibalisation. Indeed both the parent brands grew. It is possible that the share analysis is missing cannibalisation by not taking account of what might have happened if the line extension had not been launched. We will return to this issue in Chapter 8.

6.2 Expected Cannibalisation

The category of expected cannibalisation contains only one example from the sample of thirteen extensions. Expected cannibalisation is the level of cannibalisation expected, given the size of the parent brand pre-launch. If the IIA Axiom was valid in the context of line extension, we would expect this to be the largest group. Since this category is the smallest of the three, our concerns about the validity of the IIA assumption and line extensions appear justified. The sole example of expected cannibalisation is Ariel Liquid from the UK detergent market.

6.2.1 Ariel Liquid

Ariel Liquid is the only example of expected cannibalisation. It was launched in the UK in 1986 as a line extension of the parent powder brand. It rapidly gained share, achieving nearly 11% market share in the two quarter period after launch.

Table 38: Market Share Movements after the Launch of Ariel Liquid

BRAND	MARKET SHARE		
	Pre Launch	Post Launch	Diff
Ariel (ex line ext)	16.3	15.0	-1.3
Ariel Liquid	0	10.6	10.6
TOTAL	16.3	25.6	9.3 **

← Suggests some cannibalisation

*p<0.01 **p<0.001

Note. Pre launch : Period 4 Post Launch : Period 6 Data source: TNAGB

The small share loss by the parent brand suggests a limited amount of cannibalisation, though much less than the sales of the line extension. This prima facie analysis suggests that 12%(1.3 /10.6) of the line extension's share has been cannibalised, the remainder deriving from brand switching. GLA suggests that twice as much of Ariel Liquid's share (24%) is at the expense of the parent. Table 39 below illustrates the sources of Ariel Liquid's share gain, with Ariel and Persil between them donating half of Ariel Liquid's volume. We might expect Ariel Powder to lose since the products share a common name, ie a first order cannibalisation effect. Persil also contributed

a significant amount to Ariel Liquid's success, which could be explained on the grounds of size since Persil was the market leader at this time. This size effect may have been aggravated by the fact that the Persil brand was only composed of powdered variants at the time.

Table 39: Launch of Ariel Liquid Analysed by Gains Loss Analysis

	BRANDS LOSING (% row)	
BRAND GAINING	Ariel	Persil
Ariel Liquid	24	23

Note. Pre launch : Period 4 Post Launch : Period 6 Data source: TNAGB

Duplication analysis offers partial support for the results of GLA (Table 40). The parent brand, Ariel shows a significantly high level of cross purchasing with the line extension. Wisk buyers are similarly more likely to also buy Ariel Liquid, suggesting a portfolio of liquid brands. But there is no evidence for more cross-purchasing on the part of Persil buyers than we would expect.

Table 40: Duplication of Purchase for Ariel Liquid buyers

Buyers of these brands who also bought Ariel Liquid	Post Launch Period	
Ariel	131	**
Wisk	169	**
Persil	107	
Daz	115	

Note. Post launch : Period 6 Data source: TNAGB

* p<0.01 **p<0.001

However when we use the fourth method, the SOE model, we find a different picture. Ariel actually suffers less than the share loss we would predict from its size, having a share 0.4% above the theoretical share after launch. So although some

cannibalisation has occurred it is only at the expected level (in fact slightly below it), and none at the excessive level.

Table 41: UK Detergent Share of Purchase Expected and Actual Post Ariel Liquid Launch - All buyers

BRAND	EXPECTED SHARE POST LAUNCH (T)	ACTUAL SHARE POST LAUNCH (O)	DIFF (O-T)
ARIEL (ex line extension)	14.6	15.0	0.4
Ariel Liquid	10.6	10.6	0.0
TOTAL ARIEL	25.2	25.6	0.4
Base: Buyers : Purchases		1451 11272	

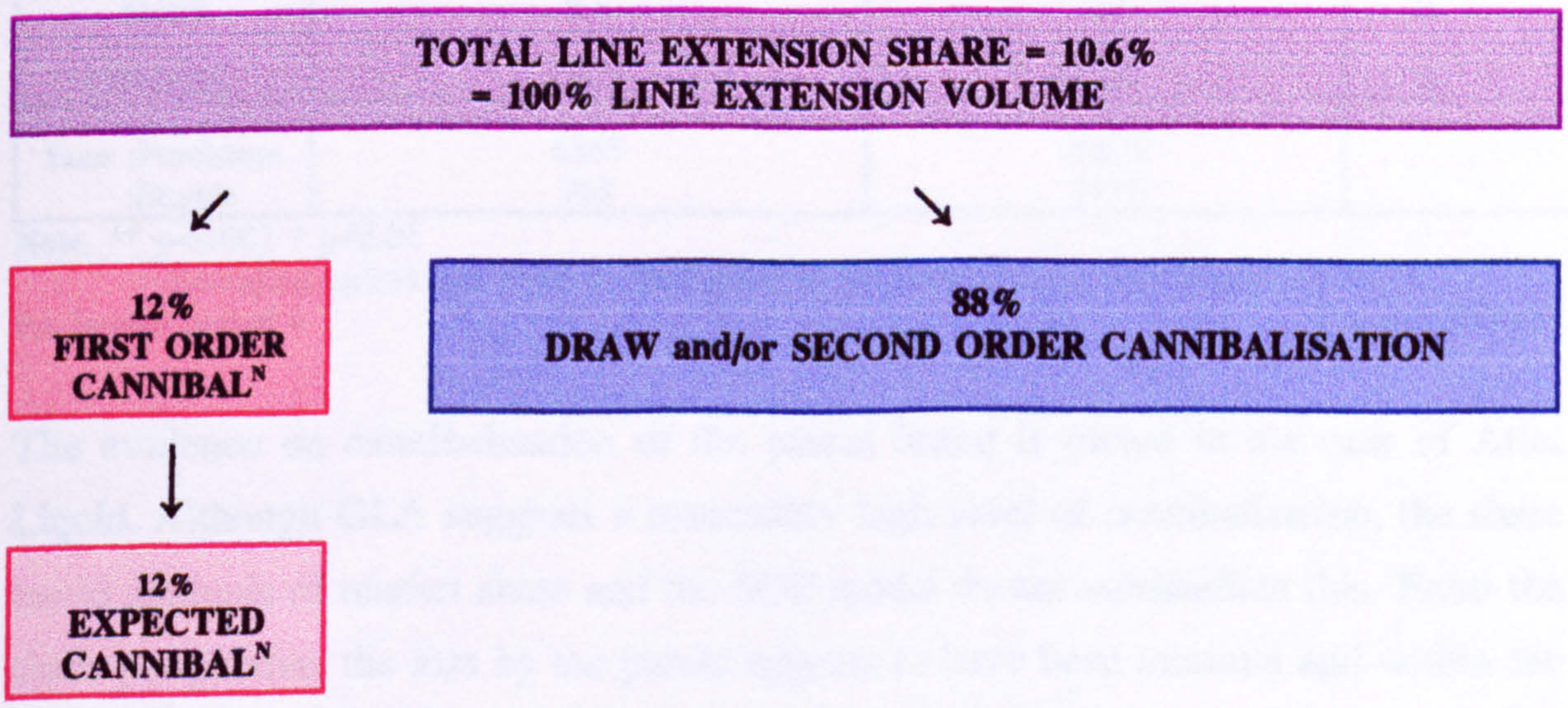
← suggests that cannibalisation is not excessive

Base: Purchases Made by All Detergent Buyers
Data source: TNAGB

Note. Pre launch : Period 4 Post Launch : Period 6
* p<0.01 **p<0.001

The results of the market share and SOE analyses are summarised in the figure below. These analyses show the line extension's volume to come predominantly from draw and/or second order cannibalisation (88%). Only 12% of the volume is derived from first order cannibalisation, which is all at the expected level. The level of cannibalisation is actually below the expected 16% level.

Figure 14: Source of Line Extension Share: Ariel Liquid



Source: Market share & SOE analyses

Given the relatively low level of cannibalisation we would expect Ariel Liquid buyers to be only slightly heavier purchasers than the total market. This is the case - only 18% heavier purchasers (19.2% vs 16.3%), the lowest figure so far. As Table 42 demonstrates, there are two other significant differences between Ariel Liquid purchasers and the total market. Wisk takes a higher proportion of their purchases than is true for the market as a whole: Persil takes a lower proportion than would be expected if Ariel Liquid buyers were typical of all detergent buyers. This suggests a predisposition towards liquids, rather than a brand effect.

Table 42: Comparison of Share of Purchase for Ariel Liquid Buyers vs Total Market

BRAND	ARIEL LIQUID BUYERS PURCHASE PROFILE %	TOTAL MARKET PURCHASE PROFILE %	DIFF	
More likely to have bought				
WISK	7.8	5.5	2	**
ARIEL	**19.2**	**16.3**	**3**	*
DAZ	9.0	8.6	0	
Less likely to have bought				
PERSIL	27.9	30.3	-2	
STORE	6.5	8.1	-2	
SURF	9.6	9.7	0	
OTHERS	20.0	21.6	-2	
Base :Purchases :Buyers	6165 768	10678 1451		

Note. ** $p<0.001$ * $p<0.01$
Rounding means that some of the figures in the DIFF column may appear incorrect.
Pre launch period 4 Source: TNAGB

The evidence on cannibalisation of the parent brand is mixed in the case of Ariel Liquid. Although GLA suggests a reasonably high level of cannibalisation, the share based methods of market share and the SOE model do not substantiate this. From the share perspective, the loss by the parent appears to have been minimal and within the boundaries of expected cannibalisation given the size of the parent and the success of the line extension. Both buyer analysis and the duplication tables show a high level

of cross-purchase between parent and line, but there is only limited evidence, provided by GLA to suggest that this translated into substitution.

Table 43: Cannibalisation Evidence: Ariel Liquid

MEASURES	DEGREE OF CANNIBALISATION		
	TOTAL	EXPECTED	EXCESSIVE
Share	✓ 12%		
Gain Loss Analysis	24%		
Duplication of Purchase			✓ **
Buyer Analysis			✓ *
SOE Model		✓ 12%	✗

*p <0.01 **p<0.001

6.2.2 Discussion

The fact that twelve out of thirteen examples do not fit the model provided by the IIA axiom provides convincing evidence that this assumption is suspect in the case of line extensions. This failure shows that line extensions are a special case of new products and do not behave in the same way as other types of new products. Since one of the reasons for line extending is the assumption that the shared brand name will create earlier acceptance for the new product, this finding is not surprising.

6.3 Summary of Results

This chapter reviewed those line extensions which demonstrated either zero cannibalisation or cannibalisation at the expected level. Both groups are small, compared with those extensions exhibiting excessive cannibalisation. This summary examines first the market share dynamics of the two sets (Table 44) and secondly, the cannibalisation evidence on the measures tested (Table 45).

Table 44: Summary Market Share Movements for Zero and Expected Cannibalisation Extensions

Extension	Parent Brand Share Movement (2)	Extension Share (3)	Total Brand Share Movement (4)
Zero Cannibalisation			
Surf Liquid	+ 1.2	1.7	+ 2.9
Daz Liquid	+ 0.5	4.0	+ 4.5
Crest Gum Health	+ 1.0	0.6	+ 1.6
Expected Cannibalisation			
Ariel Liquid	-1.3	10.6	+ 9.3
Mean	0.4	4.2	4.6

The zero cannibalisation examples are characterised by growth in the parent brand over the period of the launch. It would be possible to experience no cannibalisation if the parent was static, but none of our examples demonstrate this. In the case of the sole example of expected cannibalisation, Ariel Liquid, the parent brand declines marginally.

The size of the line extension does not appear to affect the level of cannibalisation - Crest Gum Health is the smallest extension in our sample and does not cannibalise, yet Daz Liquid, also with zero cannibalisation, is one of the largest. Ariel Liquid is the most successful line extension analysed, in terms of share achieved, and shows only the expected level of cannibalisation.

Since one of the major objectives of this study is to evaluate the measures used for cannibalisation, let us examine the evidence for the four extensions discussed so far (Table 45).

Table 45: Summary Cannibalisation Evidence for Zero and Expected Cannibalisation Extensions

Extension	% total cannibalisation (market share)[1] (5)	% total cannibalisation (GLA) (6)	% excessive cannibalisation (SOE)[2] (7)	Significant cross purchase (DoP) (8)	More likely to be purchasers of parent (9)
Zero Cannibal[n]					
Surf Liquid	0	0	0	117	Yes
Daz Liquid	0	10	0	172 *	Yes *
Crest Gum Health	0	20	0	250 *	Yes **
Expected Cannibal[n]					
Ariel Liquid	12	24	0	131 *	Yes *
Mean	3	14	0	168	

[1] Calculated by dividing the parent brand share loss by the extension's share (ie col 5 = col 2 / col 3 in Table 6.3.1)
[2] Calculated by taking the difference between the observed and theoretical parent brand share (see previous chapter), and divided by the extension share. Alternatively it can be calculated by subtracting the parent's share pre-launch from the total cannibalisation figure in col 5.

Surf Liquid is our clearest example of zero cannibalisation. It does not cannibalise the parent brand on the market share, GLA, SOE and duplication (DoP) measures. Indicators of cannibalisation are given by the duplication and the pre launch buyer analyses. But these give directional rather than significant results. The buyer analysis shows the purchasers of Surf Liquid to have a higher proportion of their purchases attributable to the parent brand than the average UK detergent buyer. However this propensity to purchase Surf is not significant and since it does not translate into any market share decline, it does not appear to have led to substitute purchasing. Possibly these buyers incorporated Surf Liquid into their portfolio along with Surf Powder, substituting the liquid for another brand.

Both Daz Liquid and Crest Gum Health appear not to cannibalise on the share measures. But contradictory evidence is offered by the GLA and duplication of purchase analysis. These examples are less straightforward than the Surf liquid scenario. We will return to the variance in these measures in Chapter 8.

Ariel Liquid produces reasonably consistent results. It does cannibalise the parent according to all the measures. The SOE measure shows this cannibalisation to be at

the expected level rather than the excessive. However the degree of cannibalisation does vary according to the measure used, providing another issue to be discussed in Chapter 8.

The next chapter builds on these results by examining the remaining line extensions, all of which fall within the category of excessive cannibalisation.

CHAPTER 7
FIRST ORDER CANNIBALISATION: EXCESSIVE LEVELS

Chapter 6 concentrated on those line extensions demonstrating either zero or relatively low levels of cannibalisation. This chapter examines those extensions which cannibalise the parent to an excessive extent.

This is by far the largest category with most (nine of the thirteen) line extensions causing a share loss to the parent brand above that which would be expected from the respective sizes of parent and line. The degree of excessive cannibalisation varies quite widely from moderate levels in the case of the Vizir line extensions to the maximum amount in the case of Aldi der Feine. The variation in the extent of excessive cannibalisation is, broadly speaking, dependent on the size of the parent. If, for example, the parent brand is large, even a high level of cannibalisation may be largely expected. If, alternatively, the parent brand is small the cannibalisation may prove to be excessive to a greater extent.

The nine line extensions discussed in this chapter are:

Vizir 2kg & Vizir NFP
Persil Liquid
Colgate Gum Protection
Dixan 2kg
Sunil Sulfatfrei
Ariel 3kg & Ariel NFP
Dallmayr Prodomo & C Frei
Sainsbury Freshmint & Mildmint
Aldi der Feine

These line extensions are presented in ascending order level of total cannibalisation (based on market share).

7.1 Vizir 2kg & Vizir NFP

Since the launches of Vizir 2kg and Vizir NFP were simultaneous on the German detergent market, they are analysed as an aggregate. This follows the precedent set by Reddy, Holak & Bhat (1995).

The twin launch appears to be successful with the two variants jointly capturing 3.0% of the market, nearly three times the size of the parent. The parent brand lost a small amount over this time period declining from 1.3% to 1.1%.

However the total brand obviously grew significantly, rising to over 4% of the market with the two entrants contributing nearly three quarters of the volume.

Table 46: Market Share Movements after the Launch of Vizir 2kg & NFP

BRAND	MARKET SHARE		Diff	
	Pre Launch	Post Launch		
Vizir (ex line ext)	1.3	1.1	-0.2	**
Vizir 2kg & NFP	0.0	3.0	3.0	
TOTAL	1.3	4.1	2.8	**

*p<0.01 **p<0.001
NB Pre launch period 2 Post launch period 4 Data source: GfK

Although the market share analysis suggests some cannibalisation, GLA shows Ariel and Sunil to be the main contributors rather than the parent (Table 47). Vizir (not shown as it falls below the threshold set of 10%) loses only 6% of the line extensions' volume.

Table 47: Launch of Vizir 2kg & NFP Analysed by Gains Loss Analysis

	BRANDS LOSING (%row)			
BRAND GAINING	Ariel	Sunil	Tandil	Persil
Vizir 2kg & NFP	23	13	10	10

Note. Pre launch : Period 2 Post Launch : Period 4 Data source: GfK

Purchasers of the new Vizir lines display unexpected purchase patterns (Table 48). Duplication of purchase analysis shows that buyers of Vizir, Omo , Ariel and Sunil are all significantly more likely to also buy Vizir 2kg and Vizir NFP than we would predict. The level of cross purchase between the line and the line extensions is particularly high (775 indexed on 100).

Table 48: Duplication of Purchase for Vizir 2kg & NFP Buyers

Buyers of these brands who also bought Vizir 2kg & NFP	Post Launch Period	
Vizir	775	**
Omo	234	**
Dixan	197	
Ariel	167	**
Sunil	163	**

Note. Post launch : Period 4 Data source: GfK
* p<0.01 **p<0.001

Given the relatively small shares of the extensions, and especially the parent, the SOE model (with rounding) predicts that the parent brand will remain at much the same

level. The actual reduction in parent brand share of 0.2% (Table 49) demonstrates a small but excessive level of cannibalisation.

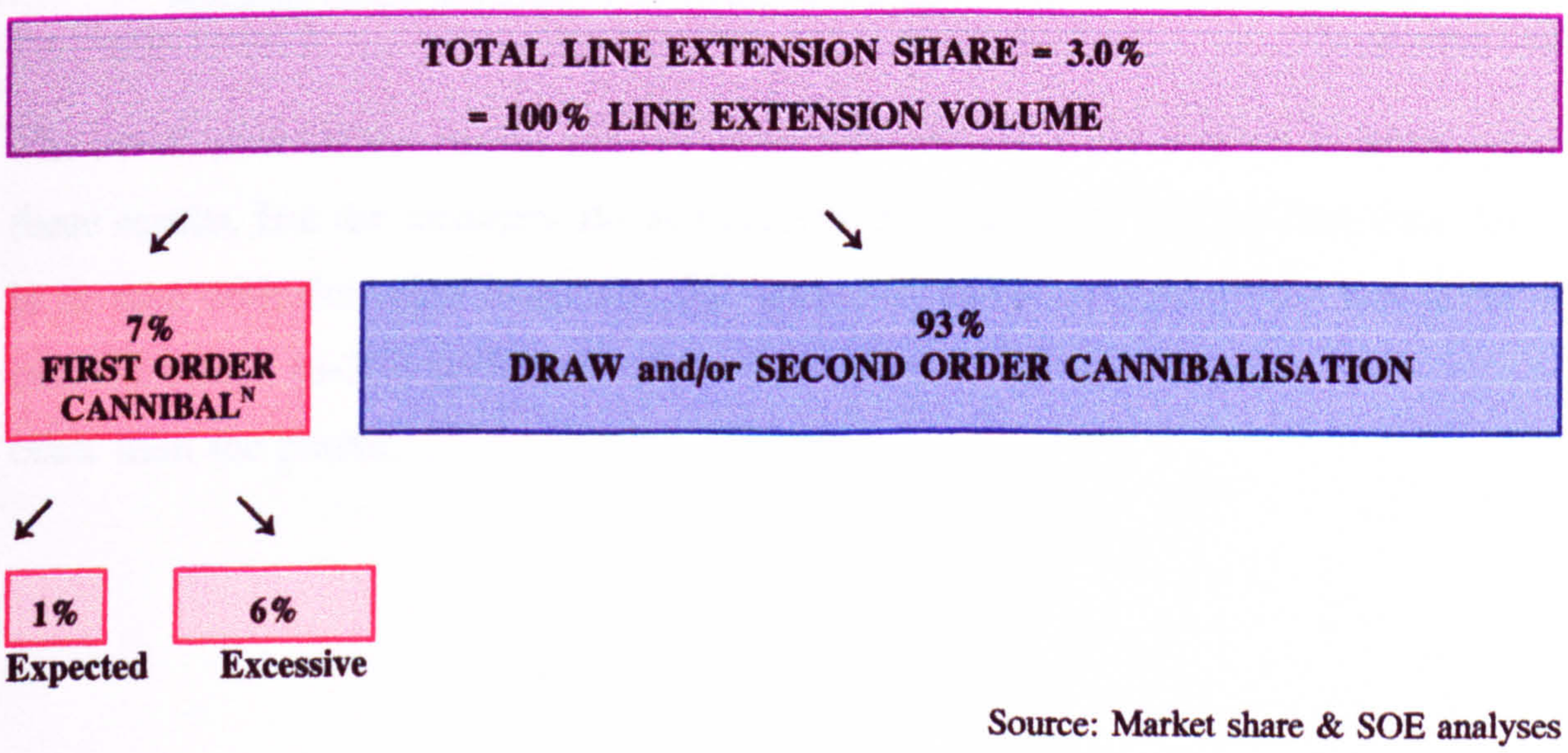
Table 49: German Detergent Share of Purchase Expected and Actual Post Vizir 2kg & NFP Launch - All Buyers

BRAND	EXPECTED SHARE POST LAUNCH (T)	ACTUAL SHARE POST LAUNCH (O)	DIFFERENCE (O-T)
Vizir (ex line extension)	1.3	1.1	-0.2
Vizir 2kg & NFP	3.0	3.0	0.0
TOTAL	4.3	4.1	-0.2
Base: Buyers		2113	
: Purchases		6601	

Note. Pre launch : Period 2 Post Launch : Period 4 Data source: GfK
* p<0.01 **p<0.001

The market share and SOE analyses give a total cannibalisation figure of 7%, with most of this at the excessive level (6%).

Figure 15: Source of Line Extension Share: Vizir 2kg & NFP



Source: Market share & SOE analyses

A comparison of the share of purchase of the Vizir line extensions' buyers vs the total market shows a marked bias (Table 50). Buyers of the line extensions have a nearly six times higher proportion of their purchases accounted for by the Vizir parent brand than the market as a whole (7.3% vs 1.3%).

Table 50: Comparison of Share of Purchase for Vizir 2kg & NFP Buyers vs Total Market

BRAND	VIZIR 2KG & NFP BUYERS PURCHASE PROFILE %	TOTAL MARKET PURCHASE PROFILE %	DIFF	
More likely to have bought				
ARIEL	22.1	15.5	7	**
VIZIR	7.3	1.3	6	
SUNIL	12.6	10.0	3	
OMO	7.3	5.0	2	
WEISSER	6.2	5.5	1	
OTHERS	26.5	26.4	0	
Less likely to have bought				
TANDIL	7.4	17.5	-10	**
PERSIL	10.6	18.8	-8	**
Base :Purchases :Buyers	660 144	7125 2113		

Note. ** p<0.001
Rounding means that some of the figures in the DIFF column may appear incorrect.
Pre launch: Period 2 Data source: GfK

The small sizes of the parent and the extensions dictate some caution in interpreting these results. But the measures do seem relatively consistent. For the first time, GLA is in step with the other measures. All measures agree on a relatively low level of cannibalisation (6-7%) with most of the line extension's volume coming from sources other than the parent.

Table 51: Cannibalisation Evidence: Vizir 2kg & NFP

MEASURES	DEGREE OF CANNIBALISATION TOTAL	EXPECTED	EXCESSIVE
Share	✓ 7%		
Gain Loss Analysis	6%		
Duplication of Purchase			✓ **
Buyer Analysis			✓ *
SOE Model		✓ 1%	✓ 6%

* p<0.01 ** p<0.001

7.2 Persil Liquid

Persil Liquid was Lever Brothers' somewhat belated response to the success of Ariel Liquid in the UK detergent market. It seems likely that they were hoping to maintain Wisk as their liquid brand and Persil as their powder brand, removing the risk of any first order cannibalisation. However Persil declined in share from 33% (in Q3 1985 just prior to the launch of Wisk) to 24% (in Q1 1988 just before the launch of Persil Liquid). This deterioration in share was almost certainly due to the success of liquid products. When this decline became untenable Persil Liquid was launched.

Persil Liquid was moderately successful, although less so than Ariel Liquid, gaining a share of 4.8% against Ariel's 10.6%. The total brand benefits from the launch gaining 2.5 % over the period, although the parent suffers losing share of 2.3 % (Table 52). This implies that nearly half the liquid's (48%) volume is cannibalised from the parent.

Table 52: Market Share Movements after the Launch of Persil Liquid

BRAND	MARKET SHARE		Diff	
	Pre Launch	Post Launch		
Persil (ex line ext)	24.9	22.6	-2.3	**
Persil Liquid	0	4.8	4.8	
TOTAL	24.9	27.4	2.5	*

*p<0.01 **p<0.001
NB Pre launch period 6 Post launch period 8 Data source: TNAGB

GLA confirms that the parent suffered disproportionate loss, with Persil powdered variants adding over a third (36%) to the volume gained by the liquid. Ariel is a major contributor adding almost 30% of the volume. As with Surf and Daz Liquids, more detailed analysis shows that liquids suffer from the launch of a new liquid eg Ariel Liquid donated 20% to the new entrant.

Table 53: Launch of Persil Liquid Analysed by Gains Loss Analysis

	BRANDS LOSING (%row)		
BRAND GAINING	Persil Powder	Ariel	Wisk
Persil Liquid	36	29	11

Note. Pre launch : Period 6 Post Launch : Period 8 Data source: TNAGB

The duplication analysis also suggests that the parent brand suffered from the introduction of the liquid. Although the level of cross purchase between parent and line is significantly higher than that anticipated, the index of 119 is the second lowest parent-line cross purchase level recorded in this study. The lowest value is given by Surf Liquid (marginally lower at 117); Surf Liquid, it will be remembered, is the only unequivocal clear case of zero cannibalisation.

Table 54: Duplication of Purchase for Persil Liquid Buyers

Buyers of these brands who also bought Persil Liquid	Post Launch Period	
Persil	120	*
Sainsbury	196	
Wisk	178	**
Ariel	120	*
Surf	85	
Daz	71	

Note. Post launch : Period 8
* p<0.01 **p<0.001

Data source: TNAGB

We would expect Persil's share to decline to 23.7% in the post launch, in fact it dropped to 22.8% (Table 55). This shows excessive cannibalisation, even though the total brand did benefit from the liquid variant's introduction. This contrasts with the outcome of our previous study (Lomax et al 1996) which showed no excessive cannibalisation of the parent. This discrepancy can be explained by variations in the timing of the measure and its duration. In the Pilot Study I reported in the *Journal of Marketing Management*, the measurement period used was a quarter ie half that used in this study, and the measurement was taken when sales indicated that market equilibrium had been restored ie a subjective judgement. This study has built on the pilot by extending the measurement period in line with market practice, and using an objective means of determining stationarity, ie non-parametric testing.

Even so, this variance in results is of interest and is an area to which we will return in Chapter 8.

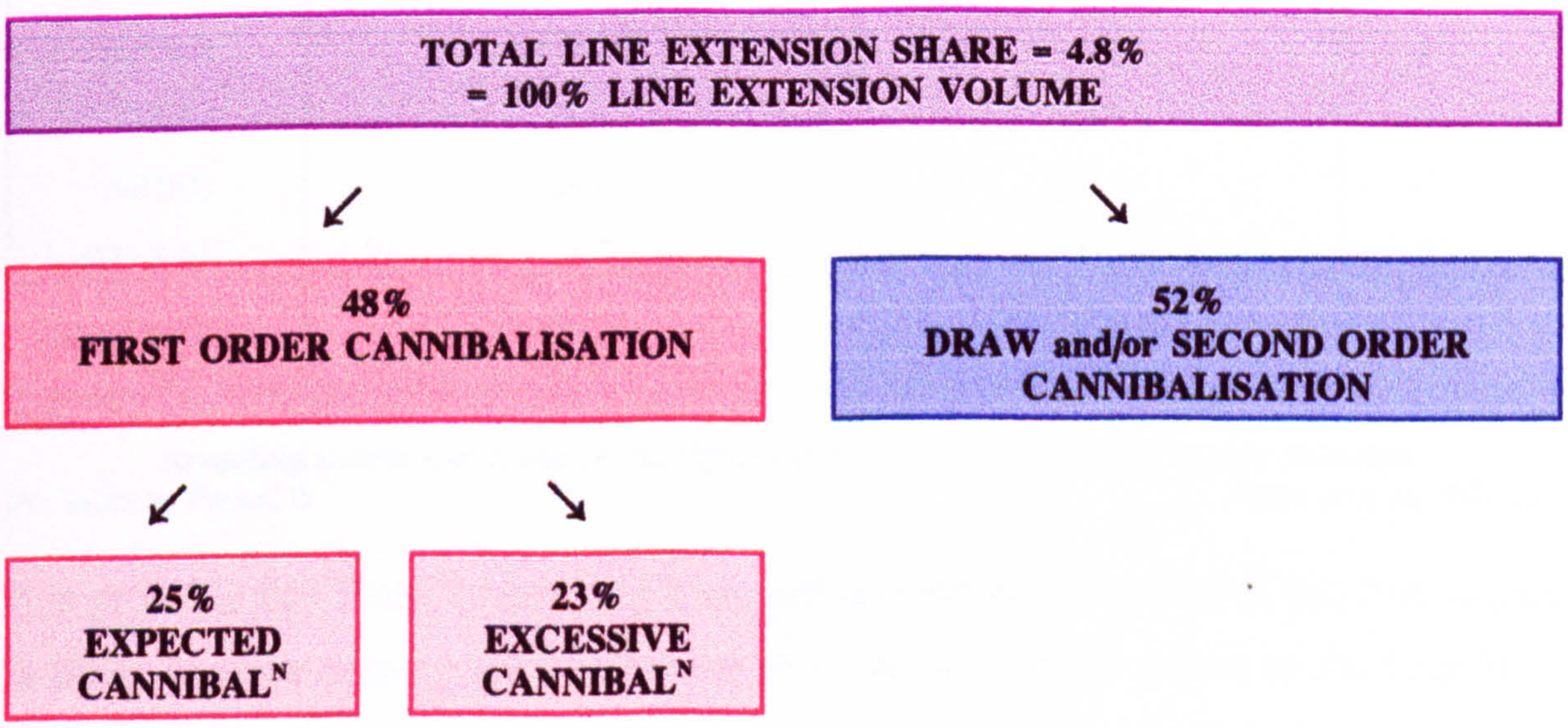
Table 55: UK Detergent Share of Purchase Expected and Actual Post Launch Persil Liquid - All Buyers

BRAND	EXPECTED SHARE POST LAUNCH (T)	ACTUAL SHARE POST LAUNCH (O)	DIFFERENCE (O-T)
Persil (ex line extension)	23.7	22.6	-1.1
Persil Liquid	4.8	4.8	0
TOTAL	28.5	27.4	-1.1
Base: Buyers		1470	
: Purchases		11198	

Note. Pre launch : Period 6 Post Launch : Period 8 Data source: TNAGB
* p<0.01 **p<0.001

The market share and SOE analyses show a symmetrical design to Persil Liquid's derivation of share. The share is sourced approximately 50:50 between cannibalisation (48%) and draw (52%). The cannibalisation itself is also balanced with roughly equal proportions at the expected and excessive levels.

Figure 16: Source of Line Extension Share: Persil Liquid



Source: Market share & SOE analyses

Persil Liquid buyers are more likely to have bought Persil powder before the launch of the new line, although this predisposition is less pronounced than in most other examples (Table 56). Liquid buyers have just over 25% more of their purchases of the parent brand compared to all detergent buyers (31.3% vs 24.8%). Persil powdered

variants accounted for nearly a third of the purchases of those consumers who went on to buy the liquid product, the highest proportion of purchases recorded for a single brand in this market within this study. The relatively low preference for the parent is likely to be a function of the high market share of the parent making higher proportionate bias unlikely. If Persil Liquid buyers had twice the weight of Persil in their portfolio compared to the total market, then half their purchases would be Persil which seems unlikely in our experience of the market.

Table 56: Comparison of Share of Purchase for Persil Liquid Buyers vs Total Market

BRAND	PERSIL LIQUID BUYERS PURCHASE PROFILE %	TOTAL MARKET PURCHASE PROFILE %	DIFF	
More likely to have bought				
PERSIL	**31.3**	**24.9**	**6**	**
WISK	9.2	6.4	3	*
Less likely to have bought				
SURF	4.1	5.8	-2	
STORE	7.2	9.1	-2	
DAZ	5.3	7.4	-2	
ARIEL	24.8	25.6	-1	
OTHERS	18.2	20.9	-3	
Base: Purchases : Buyers	4082 481	11293 1470		

Note. *p>0.01 ** p<0.001
Rounding means that some of the figures in the DIFF column may appear incorrect.
Pre launch: Period 6 Data source: TNAGB

It is probable that Persil Liquid was launched defensively. The role of this line variant is likely to have been to prevent further share erosion of the parent to the benefit of liquid versions on the market. Hence cannibalisation was probably viewed as a necessary evil to prevent further decline.

As with the Vizir extensions, although to a lesser degree, the measures are broadly consistent with GLA understating the cannibalisation shown by share analysis. All

measures agree on a significant amount of cannibalisation, varying from 36% (GLA) to 48% (share).

Table 57: Cannibalisation Evidence: Persil Liquid

MEASURES	DEGREE OF CANNIBALISATION		
	TOTAL	EXPECTED	EXCESSIVE
Share	✓ 48%		
Gain Loss Analysis	36%		
Duplication of Purchase			✓ *
Buyer Analysis			✓ **
SOE Model		✓ 25%	✓ 23%

* p <0.01 ** p<0.001

7.3 Colgate Gum Protection

Colgate Gum Protection was launched as a line extension of the Colgate toothpaste brand, and achieved a share of 1.2%. However its share growth coincided with a significant decline in parent brand, suggesting that over 80% of the new line's volume was at the expense of the parent.

Table 58: Market Share Movements after the Launch of Colgate Gum Protection

BRAND	MARKET SHARE		
	Pre Launch	Post Launch	Diff
Colgate (ex line ext)	24.8	23.8	-1.0 **
Colgate Gum Protection	0.0	1.2	1.2
TOTAL	24.8	25.0	0.2

*p<0.01 **p<0.001
NB Pre launch period 1 Post launch period 3 Data source: TNAGB

Colgate is shown as the most significant loser in GLA (28%), followed by Macleans (20%) and Aquafresh (11%), both of whom are significant brands in the market place.

Table 59: Launch of Colgate Gum Protection Analysed by Gains Loss Analysis

	BRANDS LOSING (%row)		
BRAND GAINING	Colgate	Macleans	Aquafresh
Colgate Gum Protection	28	20	11

Note. Pre launch : Period 1 Post Launch : Period 3 **Data source: TNAGB**

Both market share and GLA agree that the line extension has cannibalised the parent, although share suggests a far higher level of first order cannibalisation.

Duplication analysis shows a significantly higher than expected level of cross purchase between parent and line (Table 60).

Table 60: Duplication of Purchase for Colgate Gum Protection Buyers

Buyers of these brands who also bought Colgate Gum Protection	Post Launch Period	
Colgate	160	**
Superdrug	200	
Mentadent	191	*
Ultrabrite	167	
Aquafresh	155	
Sensodyne	44	

Note. Post launch : Period 3 **Data source: TNAGB**
* p<0.01 **p<0.001

However the index provided by Colgate, although significant, is not the highest. Mentadent buyers are even more disproportionately likely to buy Colgate Gum Protection than buyers of the parent brand (191). Superdrug, Ultrabrite and Aquafresh buyers also show higher than expected levels of cross-purchase although these are not significant at the 1% level. Sensodyne buyers are much less likely than predicted (44) to also buy Colgate Gum Protection suggesting possible nicheing on the part of the Sensodyne brand.

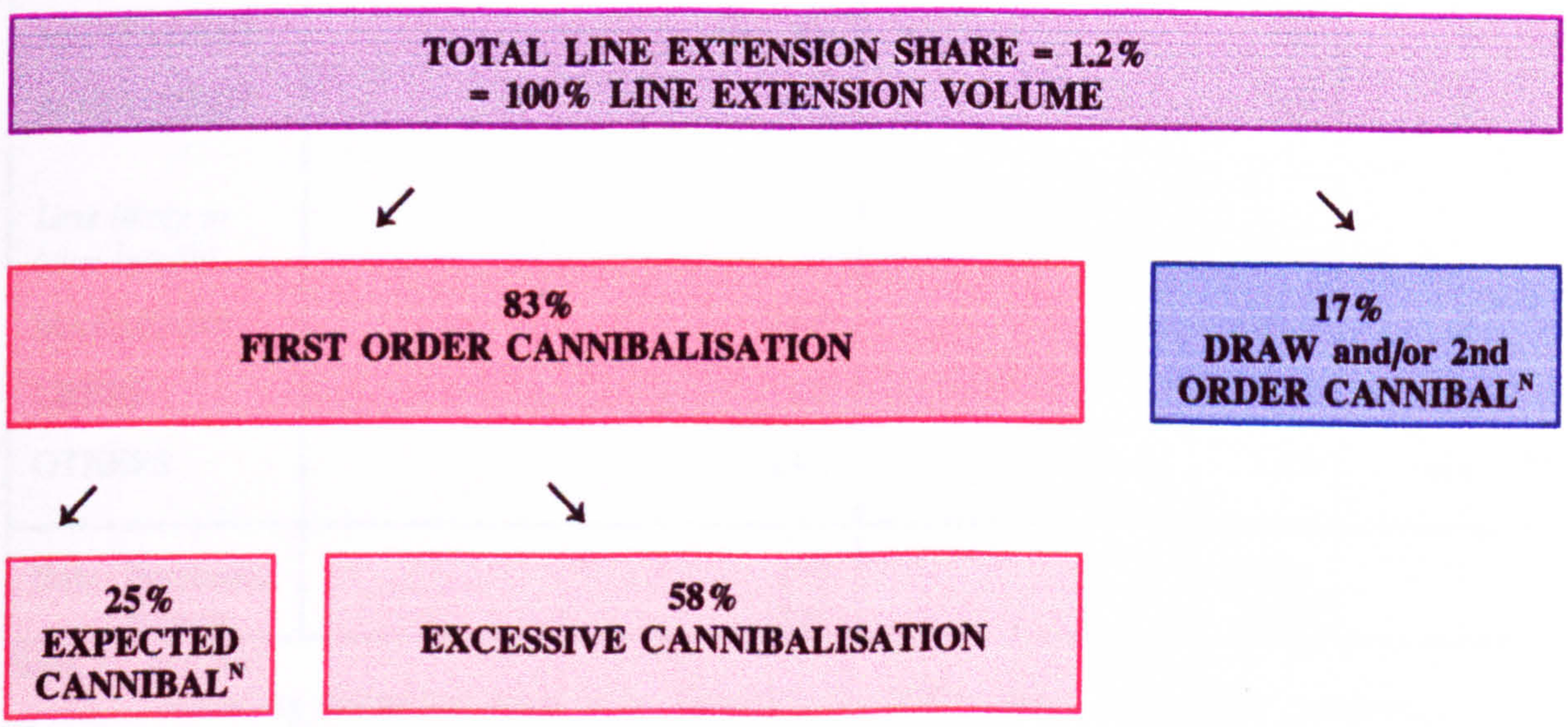
Table 61: UK Toothpaste Share of Purchase Expected and Actual Post Launch Colgate Gum Protection - All Buyers

BRAND	EXPECTED SHARE POST LAUNCH (T)	ACTUAL SHARE POST LAUNCH (O)	DIFFERENCE (O-T)
Colgate (ex line extension)	24.6	23.8	-0.8
Colgate Gum Protection	1.2	1.2	0.0
TOTAL	25.8	25.0	-0.8
Base: Buyers		2709	
: Purchases		10290	

Note. Pre launch : Period 1 Post Launch : Period 3 Data source: TNAGB
* p<0.01 **p<0.001

As Table 61 shows, the parent brand loses more share than we would expect, giving us another example of excessive cannibalisation. Line extension volume whilst being 80% total cannibalisation is also two thirds at the excessive level suggesting a strong brand name effect (Table 58).

Figure 17: Source of Line Extension Share: Colgate Gum Protection



Source: Market share & SOE analyses

Figure 17 summarises the sources of line extension share. Colgate Gum Protection's share is mostly at the expense of the parent brand (83%). This is the highest level of

first order cannibalisation we have seen so far, and is typical of the line extensions to come. Only a small proportion of the line extension's volume (17%) is derived from brands other than the parent. The Colgate parent is large so 25% cannibalisation would be expected but a significant proportion is at the excessive level.

Colgate Gum Protection buyers are heavier purchasers of the market leader, which is the parent brand Colgate (Table 62). They make 50% more purchases of Colgate as a proportion of total purchases than the typical toothpaste buyer. It is interesting to note that the previous example of Persil Liquid had a parent of similar size. In that case however the line extension purchasers showed a preference in the order of 25% whereas here the bias is twice as large.

Table 62: Comparison of Share of Purchase for Colgate Gum Protection Buyers vs Total Market

BRAND	COLGATE GUM PROTECTION BUYERS PURCHASE PROFILE %	TOTAL MARKET PURCHASE PROFILE %	DIFF
More likely to have bought			
COLGATE	36.4	24.8	12 **
MENTADENT	7.6	5.0	3
AQUAFRESH	9.7	9.4	0
Less likely to have bought			
MACLEANS	14.6	16.1	-2
CREST	8.5	10.9	-2
OTHERS	23.2	33.8	-11 **
Base: Purchases	879	10923	
: Buyers	157	2709	

Note. ** p<0.001
Rounding means that some of the figures in the DIFF column may appear incorrect.
Pre launch: Period 1 Data source: TNAGB

To summarise, all measures agree that Colgate Gum Protection cannibalises the parent, although the degree of cannibalisation is more in debate. At 28%, GLA suggests a reasonably low level of cannibalisation consistent with Colgate's status as

a market leader. Duplication analysis suggests a moderate level of cannibalisation, with other brands also contributing. Share analysis (and therefore also SOE) suggest a far higher percentage (83%) is derived from the parent.

Table 63 Cannibalisation Evidence: Colgate Gum Protection

MEASURES	DEGREE OF CANNIBALISATION		
	TOTAL	EXPECTED	EXCESSIVE
Share	✓ 83%		
Gain Loss Analysis	28%		
Duplication of Purchase			✓ **
Buyer Analysis			✓ **
SOE Model		✓ 25%	✓ 58%

** p <0.001

7.4 Dixan 2kg

A 2kg version of Dixan detergent was launched onto the German market in 1988. The market share figures (Table 7.4.1) suggest that it was successful but almost entirely at the expense of the parent brand. A superficial analysis of share of volume suggests that 87% of the line's volume came from the parent.

Table 64: Market Share Movements after the Launch of Dixan 2kg

BRAND	MARKET SHARE		
	Pre Launch	Post Launch	Diff
Dixan (ex line ext)	1.2	0.2	-1.0 **
Dixan 2kg	0.0	1.2	1.2
TOTAL	1.2	1.4	0.2

*p<0.01 **p<0.001

NB Pre launch period 2 Post launch period 4 Data source: GfK

But GLA suggests that although the Dixan parent was a loser (11%), other brands were far more affected by the launch of the new entrant. In particular, Persil and Ariel between them contribute nearly half the volume.

Table 65: Launch of Dixan 2kg Analysed by Gains Loss Analysis

	BRANDS LOSING (%row)		
BRAND GAINING	Persil	Ariel	Dixan
Dixan 2kg	24	24	11

Note. Pre launch 2 : Period Post Launch : Period 4 Data source: GfK

Duplication of purchase analysis implies a far greater contribution by the parent brand. Buyers of Dixan are over nine times as likely to purchase Dixan 2kg than we would expect given their respective penetrations (Table 66). This is the only significant deviation (at the 1% level) from the predictions of the model. Other brands (Vizir, Omo, Ariel and Sunil) show disproportionately high levels of cross purchase but not to a significant level. Tandil shows a surprisingly low level of cross purchase (40) but again not to a significant extent.

Table 66: Duplication of Purchase for Dixan 2kg buyers

Buyers of these brands who also bought Dixan 2kg	Post Launch Period	
Dixan	913	**
Vizir	298	
Omo	168	
Ariel	161	
Sunil	143	
Tandil	40	

Note. Post launch : Period 4 Data source: GfK
* p<0.01 **p<0.001

Since both the parent and the new line are small at 1.2%, the theoretical parent share after launch is consistent with the pre-launch figure (with rounding). This means that almost all the cannibalisation is excessive.

Table 67: German Detergent Share of Purchase Expected and Actual Post Dixan 2kg Launch - All buyers

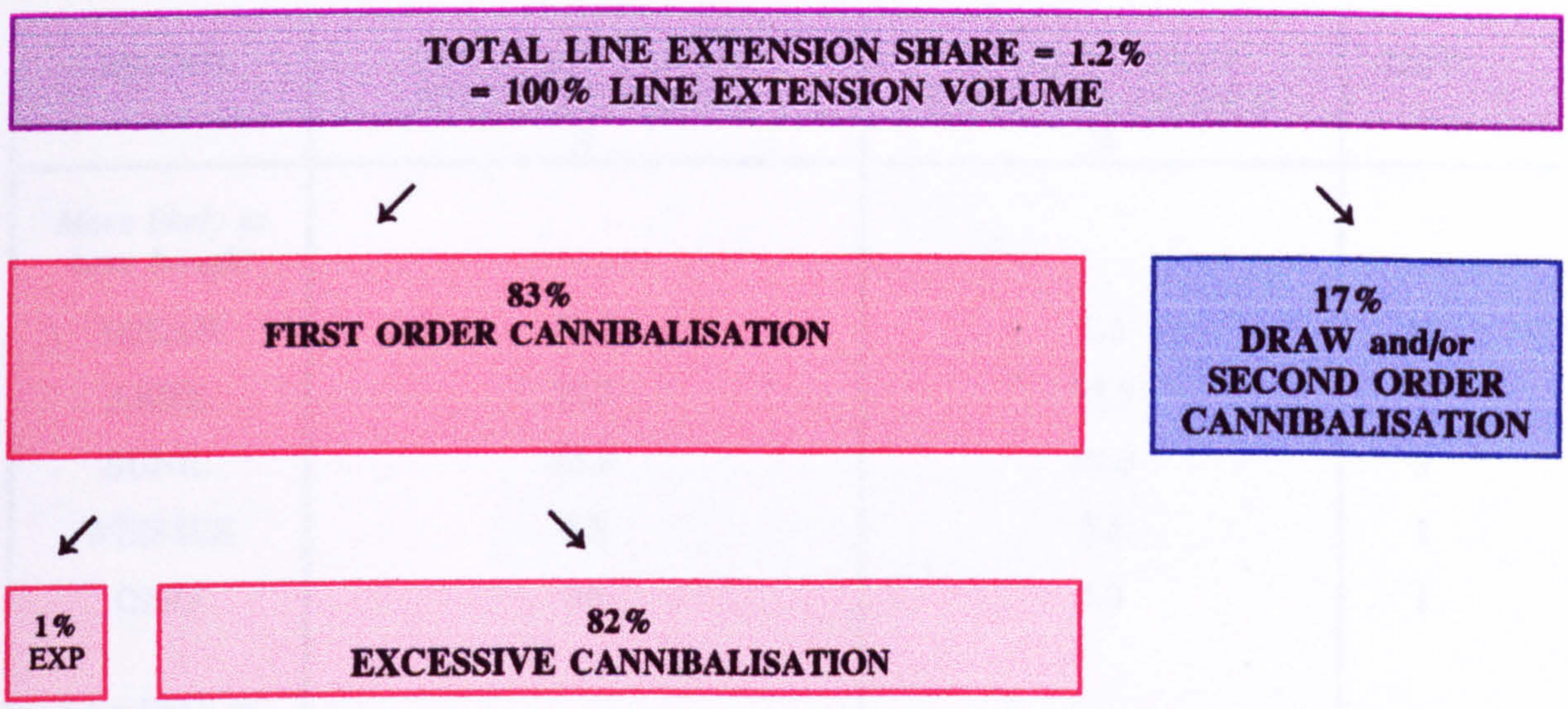
BRAND	EXPECTED SHARE POST LAUNCH (T)	ACTUAL SHARE POST LAUNCH (O)	DIFFERENCE (O-T)
Dixan (ex line extension)	1.2	0.2	-1 **
Dixan 2kg	1.2	1.2	0
TOTAL	2.4	1.4	-1
Base: Buyers		6601	
: Purchases		2113	

Base: Purchases Made by All Detergent Buyers
Data source: GfK

Note. Pre launch : Period Post Launch : Period
* p<0.01 **p<0.001

The market share and SOE analyses show Dixan 2kg, cannibalising its parent to the same extent as the previous example of Colgate Gum Protection. But the relative sizes of the parent brands (Dixan 1.2% and Colgate 24.8%) mean that Dixan 2kg's cannibalisation is far more than expected (82% excessive) rather then the 58% excessive cannibalisation experienced by Colgate.

Figure 18: Source of Line Extension Share: Dixan 2kg



Source: Market share & SOE analyses

This excessive degree of cannibalisation is somewhat explained by examining what buyers of Dixan 2kg bought before the line was available (Table 68). The cohort purchased Dixan nearly **ten** times more heavily than the total German detergent market. This compares with Colgate where the buyers of Colgate Gum Protection bought only 50% more proportionally of the parent. This effect is in part due to the size of the parent. It would have been impossible for Colgate to have ten times the share of the buyers' portfolio, given its initial share of 24.8%. Another factor is probably the nature of the line extension. A 2kg format is a large pack and therefore only likely appeal to those confident of the product's efficacy ie previous purchasers of the parent.

Table 68: Comparison of Share of Purchase for Dixan 2kg Buyers vs Total Market

BRAND	DIXAN 2KG BUYERS PURCHASE PROFILE %	TOTAL MARKET PURCHASE PROFILE %	DIFF	
More likely to have bought				
DIXAN	11.5	1.2	10	**
ARIEL	22.7	15.5	7	
SUNIL	13.0	10.0	3	
WEISSER	6.3	5.5	1	
OMO	5.6	5.0	1	
Less likely to have bought				
TANDIL	4.1	17.5	-13	**
PERSIL	17.5	18.8	-1	
OTHERS	19.3	26.5	-7	
Base :Purchases	269	7125		
:Buyers	56	2113		

Note. ** $p<0.001$

Rounding means that some of the figures in the DIFF column may appear incorrect.

Source: GfK

Once again GLA appears to be out of step with the other measures. It suggests only a small loss by the parent (11%) while other measures suggest that it is excessive. Duplication analysis shows a particularly marked level of cross purchase (index of 913), as does the buyer analysis.

Table 69: Cannibalisation Evidence: Dixan 2kg

MEASURES	DEGREE OF CANNIBALISATION		
	TOTAL	EXPECTED	EXCESSIVE
Share	✓ 83%		
Gain Loss Analysis	11%		
Duplication of Purchase			✓ **
Buyer Analysis			✓ **
SOE Model		✓ 1%	✓ 82%

** p <0.001

7.5 Sunil Sulfatfrei

Sunil Sulfatfrei was launched as a sulphate free variant (more concentrated version) of the German detergent, Sunil. It is one of two line extensions (the other is Aldi der Feine) where the market does not return to stability in the immediate post launch period. Analyses from two post launch periods are included in this section, the immediate post launch period (period 3) and the stabilised post launch period (period 4). The classification of this line as one which caused excessive cannibalisation is based on the analysis of the stabilised period. The immediate launch period would suggest that cannibalisation is only at the expected level.

By the stabilised post launch period, the parent brand declined after launch (2.1%) but this loss was compensated for by the line extension's volume gain of 2.5%.

Table 70: Market Share Movements after the Launch of Sunil Sulfatfrei - Stabilised Post Launch Period

BRAND	MARKET SHARE		
	Pre Launch	Post Launch	Diff
Sunil (ex line ext)	10.1	8.0	-2.1 **
Sunil Sulfatfrei	0.0	2.5	2.5
TOTAL	10.1	10.5	0.4

*p<0.01 **p<0.001
NB Pre launch period 1 Post launch period 4 Data source: GfK

In the immediate post launch period (Table 71), the parent brand declined only slightly after launch (0.1%) and the line extension's had only achieved a volume gain of 1.1%.

Table 71: Market Share Movements after the Launch of Sunil Sulfatfrei - Immediate Post Launch Period

BRAND	MARKET SHARE		
	Pre Launch	Post Launch	Diff
Sunil (ex line ext)	10.5	10.4	-0.1
Sunil Sulfatfrei	0.0	1.1	1.1
TOTAL	10.5	11.5	1.0

← suggests some but minimal cannibalisation

NB Pre launch period 1 Post launch period 3 Data source: GfK

Although the market share analyses (Tables 70 and 71) show that the total brand benefitted from the line extension, GLA shows the parent brand to be the main contributor of volume to the new line. Table 72 shows that over a quarter (26%) of the line extension's volume came from the parent brand in the immediate post launch period, rising to 29% in the stabilised period. Persil was also a significant contributor in both periods.

Table 72: Launch of Sunil Sulfatfrei Analysed by Gains Loss Analysis

Immediate Post Launch Period 3

BRANDS LOSING (%row)			
BRAND GAINING	Sunil	Persil	Tandil
Sunil Sulfatfrei	**26**	**13**	**12**

Stabilised Post Launch Period 4

BRANDS LOSING (%row)			
BRAND GAINING	Sunil	Persil	Tandil
Sunil Sulfatfrei	**29**	**18**	**8**

Note. Pre launch : Period 1 Data source: GfK

Duplication of purchase analysis is consistent with this finding, showing buyers of Sunil to be buyers of Sunil Sulfatfrei at a level significantly more likely than we would expect. This tendency, (shown in Table 73), to purchase both the parent and the line extension declines over time, from an index of 324 in the immediate post

launch period to an index of 262 in the stabilised period. Both levels of cross-purchase are significantly higher than the Dirichlet would predict.

This finding implies that either the parent brand or the line extension slips out of the buyers' portfolios over this period. Since we know that the parent brand share declines and the line extension's increases (comparing Tables 70 and 71) between the immediate and the stabilised post launch periods, the former would appear to be the more likely.

Table 73: Duplication of Purchase for Sunil Sulfatfrei

Buyers of these brands who also bought Sunil Sulfatfrei	Immediate Post Launch Period		Stabilised Post Launch Period	
Sunil	324	**	262	**
Omo	149		226	**
Dixan	143	*	136	
Weisser	112		135	

Note. Immediate Post launch : Period 3 Stabilised Post Launch Period 4 Data source: GfK

* p<0.01 **p<0.001

Comparison with the SOE model (Table 74) suggests that excessive cannibalisation has occurred in the stabilised post launch period. The parent brand performs significantly worse than we would expect.

Table 74: German Detergent Share of Purchase Expected and Actual Post Sunil Sulfatfrei Launch - All Buyers in Stabilised Post Launch Period

BRAND	EXPECTED SHARE POST LAUNCH (T)	ACTUAL SHARE POST LAUNCH (O)	DIFFERENCE (O-T)
Sunil (ex line extension)	9.8	8.0	-1.8 *
Sunil Sulfatfrei	2.5	2.5	0
TOTAL	12.3	10.5	-1.8
Base: Purchases : Buyers		6568 2097	

Note. Pre launch : Period 1 Post Launch : Period 4 Data source: GfK
* $p<0.01$

The earlier measure gives a different picture. In the immediate post launch period, Sunil Sulfatfrei provides one of the few examples where the SOE model offers a good fit (Table 75). Sunil performs in line with the model, losing the share we would expect given the size of the parent brand. Here share loss is at the expected level rather than excessive.

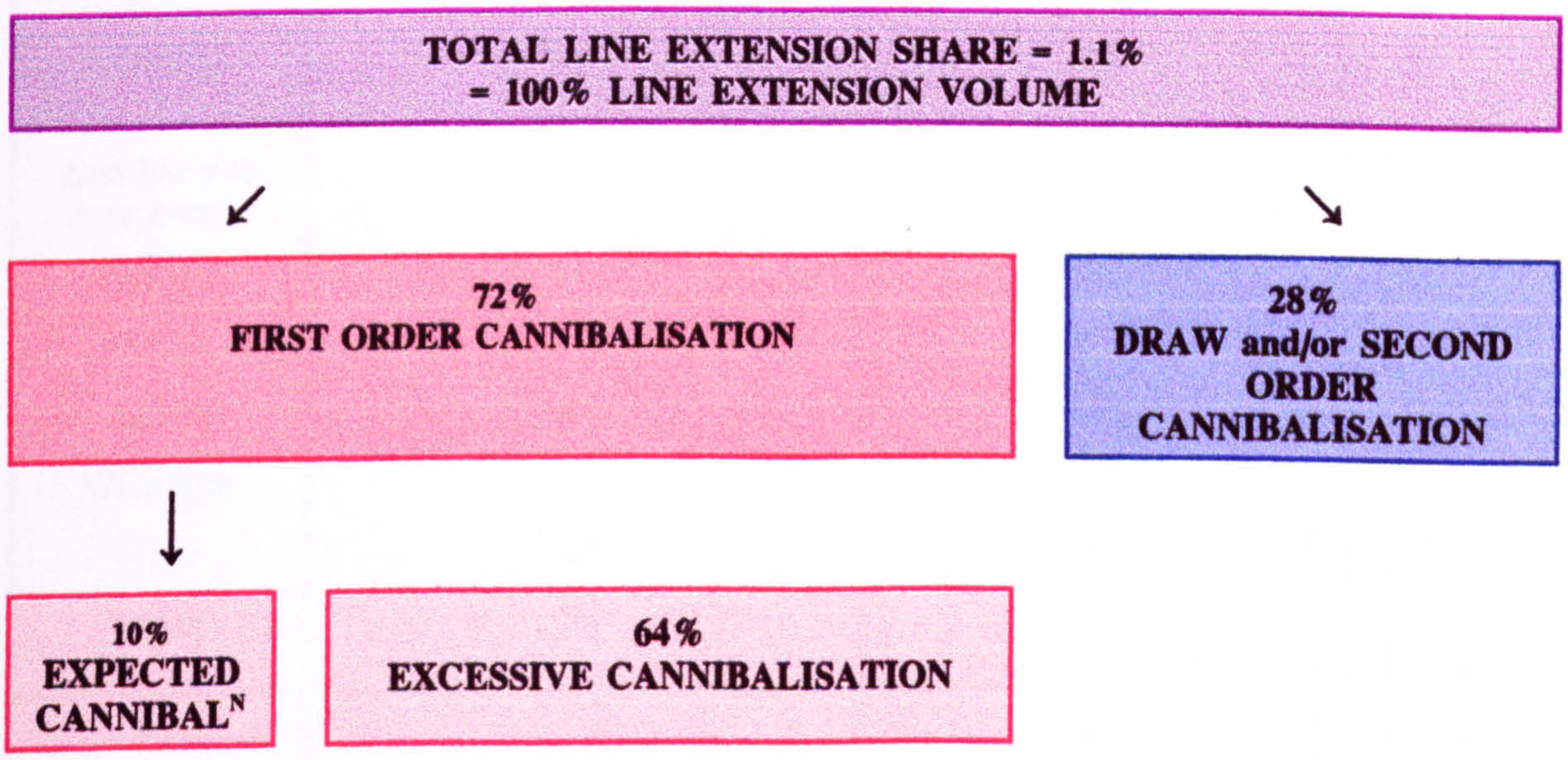
Table 75: German Detergent Share of Purchase Expected and Actual Post Sunil Sulfatfrei Launch - All Buyers in Immediate Post Launch Period

BRAND	EXPECTED SHARE POST LAUNCH (T)	ACTUAL SHARE POST LAUNCH (O)	DIFFERENCE (O-T)
Sunil (ex line extension)	10.4	10.4	0
Sunil Sulfatfrei	1.1	1.1	0
TOTAL	11.5	11.5	0
Base :Purchases :Buyers		6991 2149	

Note. Pre launch : Period 1 Post Launch : Period 3 Data source: GfK

Figure 19 summarises the analyses of market share and the SOE model in the stabilised post launch period. The level of first order cannibalisation is given by the ratio of the share loss by the parent to the line extension's share, in this case 1.8 divided by 2.5. This equates to 72%, a small amount of which is expected since we would anticipate 10.1% cannibalisation given Sunil's share pre launch.

Figure 19: Source of Line Extension Share: Sunil Sulfatfrei



Source: Market share and SOE analyses

If we look at those buyers who bought Sunil Sulfatfrei we find that, consistent with the other examples analysed, the parent brand accounted for a higher percentage of their purchases than we would expect. Similarly to Crest Gum Health, Sunil Sulfatfrei buyers made over twice as many purchases proportionately of the parent brand than would be expected. Nearly a quarter (23.6%) of their purchases are the parent brand in the pre launch period compared to a proportion of 10.1% in the German detergent market overall. This deviation from the market profile is the only significant difference between Sunil Sulfatfrei purchasers and detergent buyers in general.

Table 76: Comparison of Share of Purchase Sunil Sulfatfrei Buyers vs Total Market

BRAND	SUNIL SULFATFREI BUYERS PURCHASE PROFILE %	TOTAL MARKET PURCHASE PROFILE %	DIFF	
More likely to have bought				
SUNIL	23.6	10.1	14	**
OMO	7.2	4.5	3	**
OTHERS	24.6	24.4	0	
Less likely to have bought				
TANDIL	11.2	17.7	-7	
PERSIL	16.2	19.5	-3	
ARIEL	8.2	12.1	-4	
WEISSER	4.7	5.3	-1	
UNA	3.4	4.8	-1	
VIZIR	0.9	1.6	-1	
Base: Purchases : Buyers	847 174	7444 2097		

Note. ** p<0.001

Rounding means that some of the figures in the DIFF column may appear incorrect.

Pre launch: Period 1 Data source: GfK

In summary Sunil Sulfatfrei shows an excessive level of cannibalisation based on the SOE analysis. GLA, as with the previous examples of excessive cannibalisation, shows a lower degree of cannibalisation; here 26% vs the 84% indicated by share alone.

Table 77: Cannibalisation Evidence: Sunil Sulfatfrei

MEASURES	DEGREE OF CANNIBALISATION		
	TOTAL	EXPECTED	EXCESSIVE
Share	✓ 84%		
Gain Loss Analysis	29%		
Duplication of Purchase			✓ **
Buyer Analysis			✓ **
SOE Model		✓ 10%	✓ 74%

** p < 0.001

7.6 Ariel 3kg & NFP

As with previous examples the simultaneous launch of these two lines onto the German detergent market will be treated as an aggregate line. In contrast to the two Vizir entrants, the Ariel lines enjoy limited success. Between them, they only achieve 1.7% volume, concurrent with a 1.5% decline on the part of the parent.

Table 78: Market Share Movements after the Launch of Ariel 3kg & NFP

BRAND	MARKET SHARE			
	Pre Launch	Post Launch	Diff	
Ariel (ex line ext)	15.4	13.9	-1.5	**
Ariel 3kg & NFP	0.0	1.7	1.7	
TOTAL	15.4	15.6	0.2	**

*p<0.01 **p<0.001
NB Pre launch period 2 Post launch period 4 Data source: GfK

The simultaneous share loss by the parent and share gain by the extension suggest cannibalisation. GLA confirms this with the parent brand being the highest solus contributor to line extension volume at 25%.

Table 79: Launch of Ariel 3kg & NFP Analysed by Gains Loss Analysis

	BRANDS LOSING (%row)		
BRAND GAINING	Ariel	Persil	Others
Ariel 3kg & NFP	25	19	27

Note. Pre launch : Period 2 Post Launch : Period 4 Data source: GfK

Duplication of purchase analysis also implies that the parent brand is the main loser. Ariel is the only brand whose buyers show a significantly high level of cross purchase with the line extension.

Table 80: Duplication of Purchase for Ariel 3kg & NFP Buyers

Buyers of these brands who also bought Ariel 3kg & NFP	Post Launch Period	
Ariel	203	**
Vizir	240	
Persil	139	
Dixan	50	

Note. Post launch : Period 4 Data source: GfK
* p<0.01 **p<0.001

Comparison of the theoretical share after launch with the actual (Table 81) shows the parent brand losing 1.3% more share than expected, suggesting excessive cannibalisation.

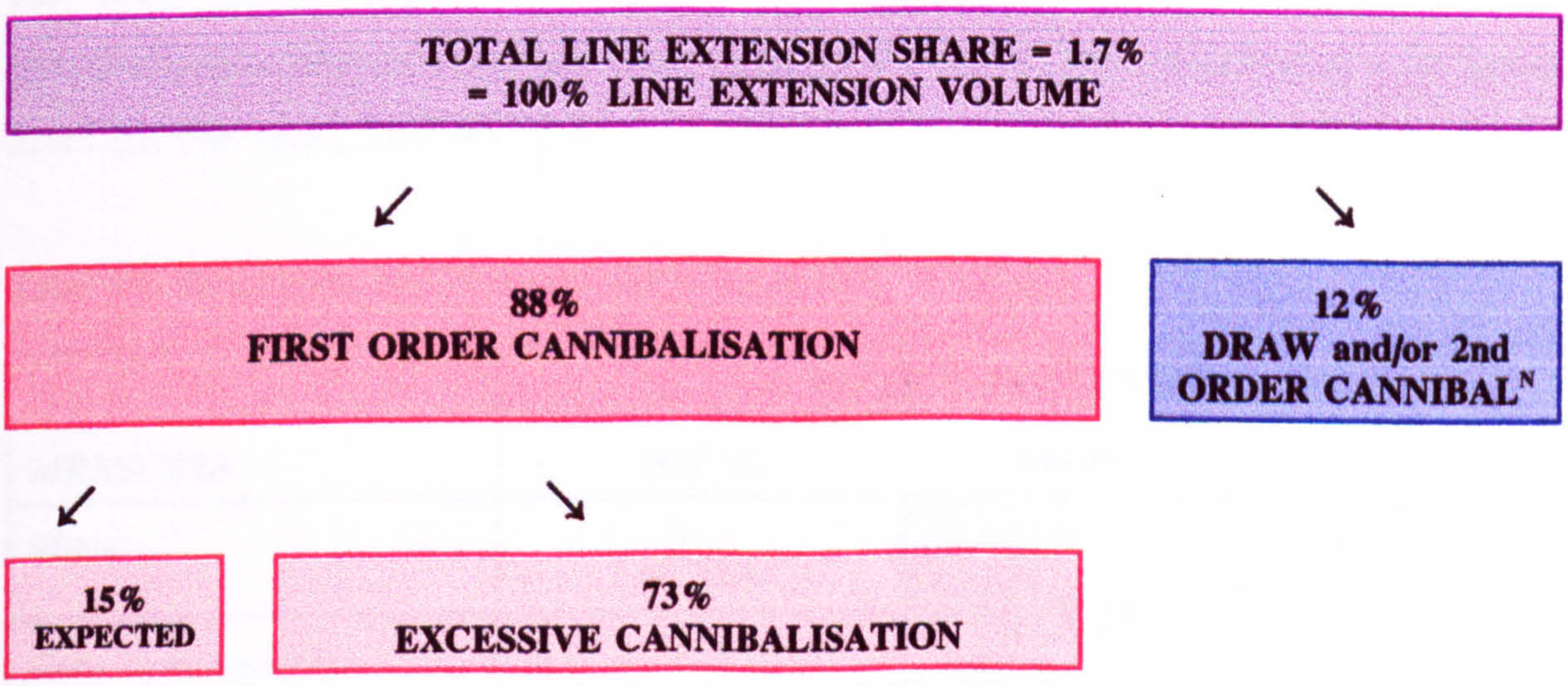
Table 81: German Detergent Share of Purchase Expected and Actual Post Ariel 3kg & NFP Launch - All Buyers

BRAND	EXPECTED SHARE POST LAUNCH (T)	ACTUAL SHARE POST LAUNCH (O)	DIFF (O-T)
Ariel (ex line extension)	15.2	13.9	-1.3 *
Ariel 3kg & NFP	1.7	1.7	0
TOTAL	16.9	15.6	-1.3
Base: Buyers		2113	
: Purchases		6601	

* $p<0.01$
Note. Pre launch : Period 2 Post Launch : Period 4 Data source: GfK

The combined analyses of share and SOE suggest a high degree of first order cannibalisation (88%), most of which is excessive since the parent lost more share than would be expected over the launch period.

Figure 20: Source of Line Extension Share: Ariel 3kg & NFP



Source: Market share & SOE analyses

As with all the line extension examples, buyers of the line extension bought a higher proportion of the parent than the total market. In this case, Ariel line extension buyers bought nearly twice as much Ariel (Table 82), in terms of share, as the average detergent buyer.

Table 82: Comparison of Share of Purchase for Ariel 3kg & NFP Buyers vs Total Market

BRAND	ARIEL 3KG & NFP BUYERS PURCHASE PROFILE %	TOTAL MARKET PURCHASE PROFILE %	DIFF	
More likely to have bought				
ARIEL	**30.2**	**15.4**	**15**	**
OTHERS	30.9	27.7	3	
Less likely to have bought				
TANDIL	7.2	17.5	-10	**
SUNIL	5.3	10.0	-5	
PERSIL	17.8	18.8	-1	
WEISSER	4.9	5.5	-1	
OMO	3.7	5.0	-1	
Base :Purchases	487 121	7125 2113		

Note. ** p<0.001

Rounding means that some of the figures in the DIFF column may appear incorrect.

Pre launch: Period 2 Data source: GfK

As with Dixan 2kg and Colgate Gum Protection, all measures agree that cannibalisation has occurred but GLA suggests this effect has happened at a far lower level (in this case, 25% vs 88%).

Table 83: Cannibalisation Evidence: Ariel 3kg & NFP

MEASURES	DEGREE OF CANNIBALISATION TOTAL	EXPECTED	EXCESSIVE
Share	✓ 88%		
Gain Loss Analysis	25%		
Duplication of Purchase			✓ **
Buyer Analysis			✓ **
SOE Model		✓ 15%	✓ 73%

** p<0.001

7.7 Dallmayr Prodomo & C Frei

Dallmayr Prodomo and Dallmayr Caffeine Frei were simultaneous launches of line extensions under the Dallmayr parent brand onto the German coffee market. Their launch had a dramatic effect on the composition of the total brand. The parent share of 3.7% declined dramatically to 0.2% whilst the line extensions gained share of 3.7%.

Table 84: Market Share Movements after the Launch of Dallmayr Prodomo & C Frei

BRAND	MARKET SHARE		
	Pre Launch	Post Launch	Diff
Dallmayr (ex line ext)	3.7	0.2	-3.5 **
Dallmayr Prodomo & C Frei	0.0	3.7	3.7
TOTAL	3.7	3.9	0.2

*p<0.01 **p<0.001
NB Pre launch period 2 Post launch period 4 Data source: GfK

This shift in volume from the parent to the line extensions is mirrored by the GLA. Here 44% of the line extensions' volume is contributed by the parent. This is the second highest value shown by GLA in this study, it is outstripped only by the Sainsbury toothpastes described next. Separately they contribute 44% and 38%.

Table 85: Launch of Dallmayr Prodomo & C Frei Analysed by Gains Loss Analysis

	BRANDS LOSING (%row)		
BRAND GAINING	Dallmayr	Jacobs	Tchibo
Dallmayr Prodomo & C Frei	44	15	10

Note. Pre launch : Period 2 Post Launch : Period 4 Data source: GfK

Duplication of purchase analysis shows several significant deviations from the level of cross purchase we would anticipate (Table 86). Buyers of Dallmayr show the highest degree of duplication with the line extension (369). But it is not the only brand to show a significantly high level of cross purchase; Idee, Hag, Onko, Melitta

and Jac also fall into this category. By contrast, Aldi buyers are significantly less likely to buy the Dallmayr extensions than we would anticipate.

Table 86: Duplication of Purchase for Dallmayr Prodomo & C Frei Buyers

Buyers of these brands who also bought Dallmayr Prodomo & C Frei	Post Launch Period	
Dallmayr	369	**
Idee	177	**
Hag	168	**
Onko	137	**
Melitta	136	*
Jacobs	125	**
Aldi	79	**

Note. Post launch : Period 4
* p<0.01 **p<0.001

Data source: GfK

As we might expect given the share performance, the parent brand performance is far worse than we would have predicted from the SOE model. The parent's rapid decline, contemporaneous with the exensions' share gain suggest replacement, either at retailer or manufacturer level.

Table 87: German Coffee Share of Purchase Expected and Actual Post Dallmayr Prodomo & C Frei Launch - All Buyers

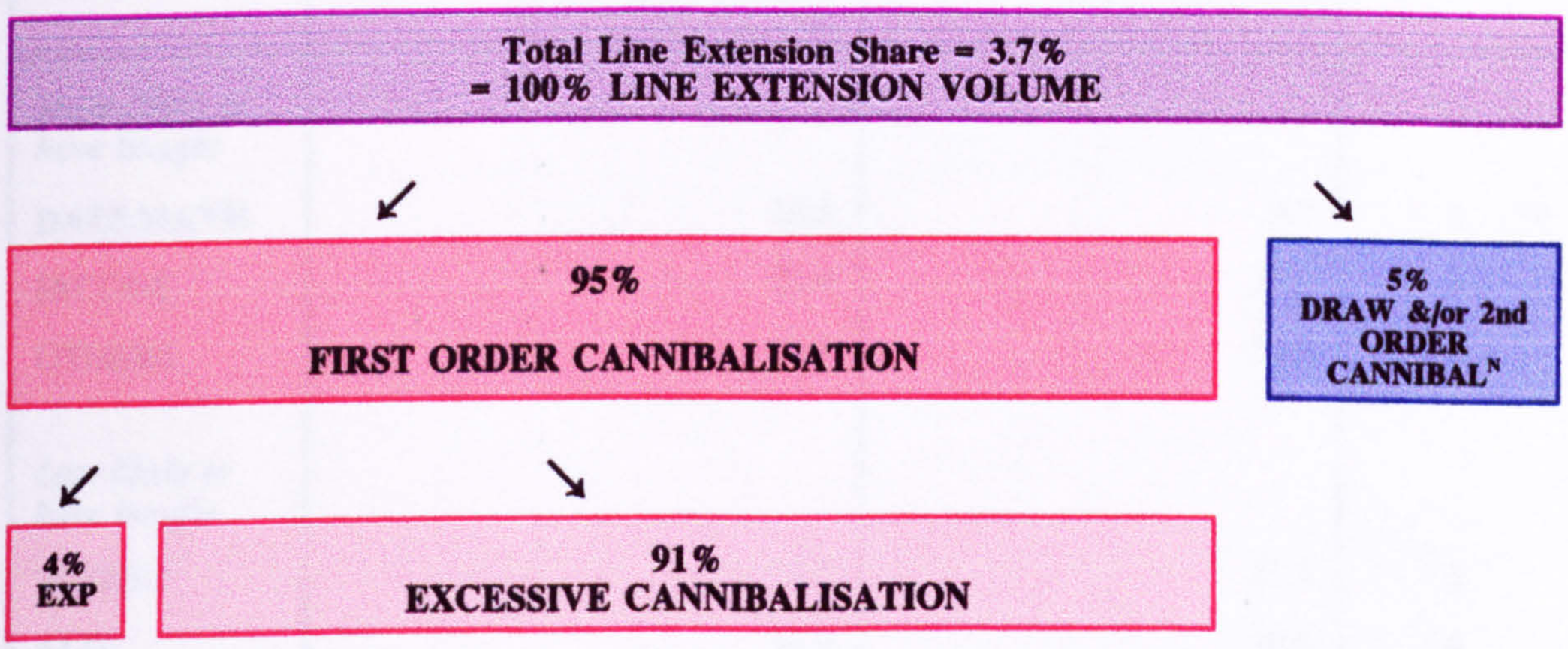
BRAND	EXPECTED SHARE POST LAUNCH (T)	ACTUAL SHARE POST LAUNCH (O)	DIFFERENCE (O-T)	
Dallmayr (ex line extension)	3.6	0.2	-3.4	**
Dallmayr Prodomo & C Frei	3.7	3.7	0.0	
TOTAL	7.3	3.9	-3.4	
Base: Buyers : Purchases		2339 25822		

Note. Pre launch : Period 2 Post Launch : Period 4
**p<0.001

Data source: GfK

Given the very high levels of cannibalisation indicated by share analysis, the parent brand seems to have enjoyed only a very marginal benefit from its two new lines. Even accepting that volume is not the only reason for line extending, these two lines do not appear to have proved advantageous to the brand. The small size of the parent means that most of the cannibalisation is excessive.

Figure 21: Source of Line Extension Share: Dallmayr Prodomo & C Frei



Source: Market share & SOE analyses

This high degree of cannibalisation agrees with the evidence from studying the purchase profile of the buyers of the line extensions (Table 88). These households tended to be consumers of Dallmayr coffee before the launch of the two new lines.

Dallmayr accounts for 10.5% of their purchases compared with 3.7% of the market as a whole, ie three times more than the average German coffee buyer.

Table 88: Comparison of Share of Purchase for Dallmayr Prodomo & C Frei Buyers vs Total Market

BRAND	DALLMAYR PRODOMO & C FREI BUYERS PURCHASE PROFILE %	TOTAL MARKET PURCHASE PROFILE %	DIFF
More likely to have bought			
DALLMAYR	**10.5**	**3.7**	**7 ****
JACOBS	22.4	18.9	4
OTHERS	25.5	23.8	2
Less likely to have bought			
TCHIBO	16.7	21.5	-5
ALDI	13.9	18.2	-4
EDUSCHO	11.0	13.9	-3
Base: Purchases	8077	25118	
: Buyers	687	2339	

Note. ** p<0.001
Rounding means that some of the figures in the DIFF column may appear incorrect.
Pre launch: Period 2 Data source: GfK

Although GLA seems to underestimate the gravity of the situation again, the value of 44% is one of the highest recorded for this measure in this study. This implies that GLA gives values on a different scale of magnitude to the share measure. All measures confirm cannibalisation.

Table 89: Cannibalisation Evidence: Dallmayr Prodomo & C Frei

MEASURES	DEGREE OF CANNIBALISATION		
	TOTAL	EXPECTED	EXCESSIVE
Share	✓ 95%		
Gain Loss Analysis	44%		
Duplication of Purchase			✓ **
Buyer Analysis			✓ **
SOE Model		✓ 4%	✓ 91%

** $p < 0.001$

7.8 Sainsbury Freshmint and Mildmint Toothpastes

Sainsbury launched Freshmint and Mildmint toothpastes simultaneously under their retailer brand in the UK. Their effect on the parent seems to have been dramatic (Table 90) and, like Dallmayr, their share seems to be almost exclusively due to cannibalisation. Over 95% of their joint market share seems to be stolen from the parent. Such a dramatic sales loss over a relatively short period implies that the two lines were replacement lines, and that Sainsbury's parent brand had variants de-listed as the new lines were stocked. As a retailer, Sainsbury controls distribution so that simultaneous listing/de-listing would be relatively easy to achieve.

The total brand benefits slightly from the introduction of the two lines (up 0.1%) over the year. But this share increase may not have been reflected in increased profitability, depending on the margin differences between the new variants and those de-listed.

Table 90: Market Share Movements after the Launch of Sainsbury Freshmint and Mildmint Toothpastes

BRAND	MARKET SHARE		
	Pre Launch	Post Launch	Diff
Sainsbury (ex line ext)	3.2	1.1	-2.1 **
Freshmint & Mildmint	0	2.2	2.2
TOTAL	3.2	3.3	0.1

*p<0.01 **p<0.001
NB Pre launch period 2 Post launch period 4 Data source: TNAGB

GLA confirms that the parent brand is the main contributor to volume, although not to the same extent as the share analysis implies. Sainsbury parent brand contributed 48% to the Freshmint variant, and 44% to the Mildmint variant. To the pair combined, the parent gives 46%, the highest value that GLA attributes to cannibalisation in this study. No other single brand contributes more than 10% to the line extensions.

Table 91: Launch of Sainsbury Freshmint and Mildmint Toothpastes Analysed by Gains Loss Analysis

BRANDS LOSING (%row)	
BRAND GAINING	Sainsbury
Freshmint & mildmint	46

Note. Pre launch: Period 2 Post Launch: Period 4 Data source: TNAGB

Duplication of purchase analysis (Table 92) gives the highest index of the study to the degree of cross purchase between the Sainsburys' parent and line extensions. Buyers of Sainsbury toothpaste are nearly ten times as likely to purchase the new line extensions. Interestingly, buyers of Tesco toothpaste are also significantly more likely to buy the new line extensions. This suggests that some buyers tend to have a retailer brand portfolio, a view which is given support by the level of cross purchasing also shown by Superdrug toothpaste buyers. Additional evidence is provided by the low levels of cross purchasing with the major manufacturer brands on the market.

Table 92: Duplication of Purchase for Sainsbury Freshmint and Mildmint Toothpaste Buyers

Buyers of these brands who also bought Sainsbury Freshmint & Mildmint	Post Launch Period	
Sainsbury	986	**
Tesco	530	**
Superdrug	201	
Macleans	98	
Crest	72	
Colgate	64	
Mentadent	61	

Note. Post launch : Period 4
* p<0.01 **p<0.001

Data source: TNAGB

As the share analysis suggested, the degree of cannibalisation is excessive (Table 93). We would expect the share of the parent to reduce to 3.1% but it actually declines to 1.1%.

Table 93: UK Toothpaste Share of Purchase Expected and Actual Post Launch Sainsbury Freshmint and Mildmint Toothpastes - All Buyers

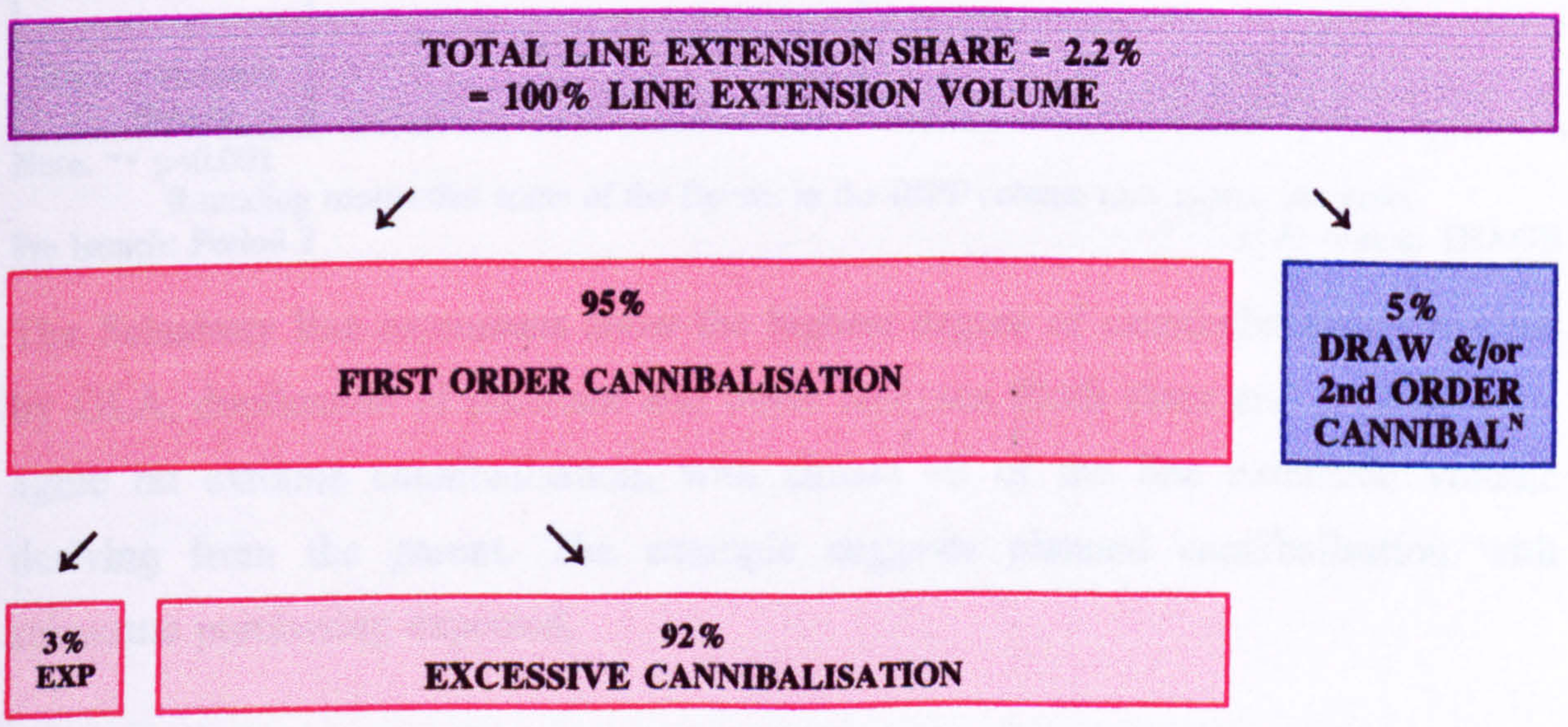
BRAND	EXPECTED SHARE POST LAUNCH (T)	ACTUAL SHARE POST LAUNCH (O)	DIFF (O-T)
Sainsbury			
(ex line extension)	3.1	1.1	-2.0 **
Freshmint & Mildmint	2.3	2.3	0.0
TOTAL	5.4	3.4	-2.0
Base: Buyers		2755	
: Purchases		10028	

Base: Purchases Made by All Detergent Buyers
Data source: TNAGB

Note. Pre launch : Period 2 Post Launch : Period 4
**p<0.001

The summary picture from share and SOE analysis for the Sainsbury's line extensions is very similar to the previous example of Dallmayr Prodomo and C Frei. High levels of first order cannibalisation are experienced by both (95%). Another similarity is the low level of parental brand share, giving high levels of excessive cannibalisation (92% in the case of Sainsbury, 91% for Dallmayr).

Figure 22: Source of Line Extension Share: Sainsbury Freshmint & Mildmint toothpastes



Source: Market share & SOE analyses

A high degree of cannibalisation is confirmed by examining the purchases of Freshmint and Mildmint buyers before the launch of these variants. The households who bought the new lines were much more likely to have been Sainsbury's toothpaste

before the launch. Sainsbury toothpaste accounts for 37.6% of their purchases, compared with only 3.2% of the UK toothpaste buyers (Table 94). This nearly twelve fold difference is the highest predisposition towards the parent brand in this study. The level of cannibalisation suggests substitute purchasing.

Table 94: Comparison of Share of Purchase for Sainsbury Freshmint & Mildmint Toothpaste Buyers vs Total Market

BRAND	SAINS FRSHMNT & MLDMNT BUYERS PURCHASE PROFILE %	TOTAL MARKET PURCHASE PROFILE %	DIFF
More likely to have bought			
SAINSBURY	37.6	3.2	34 **
OTHERS	40.5	37.4	3
Less likely to have bought			
COLGATE	7.3	23.4	-16 **
MACLEANS	6.0	16.0	-10 **
CREST	4.4	10.2	-6
AQUAFRESH	4.2	9.8	-6
Base: Purchases	383	10546	
: Buyers	72	2755	

Note. ** $p<0.001$

Rounding means that some of the figures in the DIFF column may appear incorrect.

Pre launch: Period 2 Data source: TNAGB

The Sainsbury line extensions show the highest degree of cannibalisation measured by GLA, duplication of purchase and buyer analyses. Both share and SOE analysis agree on extreme cannibalisation, with almost all of the line extension volume deriving from the parent. The example suggests planned cannibalisation with substitute purchasing expected.

Table 95: Cannibalisation Evidence: Sainsbury Freshmint & Mildmint

MEASURES	DEGREE OF CANNIBALISATION		
	TOTAL	EXPECTED	EXCESSIVE
Share	✓ 95%		
Gain Loss Analysis	47%		
Duplication of Purchase			✓ **
Buyer Analysis			✓ **
SOE Model		✓ 3%	✓ 92%

** p < 0.001

7.9 Aldi der Feine

Aldi der Feine was launched onto the German coffee market as a line variant of the Aldi retailer brand. As with Sunil Sulfatfrei, the market did not return to stability in the immediate post launch period so where appropriate the results of analysis from both the immediate post launch period (period 4) and the stabilised post launch period (period 5) are reviewed.

Its launch achieved a share of nearly 1% but coincided with a 2.5% share loss by the parent, suggesting excessive cannibalisation. The market share remained stable between periods 4 and 5 so Table 7.9.1 reflects the situation in both periods.

Table 96: Market Share Movements after the Launch of Aldi der Feine

BRAND	MARKET SHARE		
	Pre Launch	Post Launch	Diff
Aldi (ex line ext)	18.1	15.6	-2.5 **
Aldi der Feine	0.0	0.9	0.9
TOTAL	18.1	16.5	-1.6 **

*p<0.01 **p<0.001
NB Pre launch period 2 Post launch period 4 Data source: GfK

GLA (Table 97) confirms the disproportionate volume loss by the parent, showing 36% of Aldi der Feine's volume deriving from other Aldi coffee variants in the immediate post launch period. The only other brand contributing a significant amount over this time is Jacobs at 14%. The stabilised period shows a very similar picture with the main contributor to the line extension's volume still being the parent (33%). Jacobs appears to suffer more, rising to 18%, as does Tchibo (19%).

Table 97: Launch of Aldi der Feine Analysed by Gains Loss Analysis

Immediate Post Launch Period 4

BRANDS LOSING (%row)		
BRAND GAINING	Aldi	Jacobs
Aldi der Feine	36	14

Stabilised Post Launch Period 5

BRANDS LOSING (%row)			
BRAND GAINING	Aldi	Tchibo	Jacobs
Aldi der Feine	33	19	18

Note. Pre launch : Period 2

Data source: GfK

Duplication of purchase analysis (Table 98) shows two significant deviations from the patterns of cross purchasing we would expect. Buyers of Aldi are significantly more likely to also buy Aldi der Feine. However this level of cross purchasing (189 in the immediate post launch period, 203 in the stabilised post launch period), ie about twice the level we would expect, contrasts with our previous example, also a retailer brand. Sainsburys' buyers were ten times more likely to also buy the Sainsbury line extensions than the model would forecast.

This increase in the level of cross-purchasing between the parent brand and line extension, between the two post launch periods, contrasts with our finding with Sunil Sulfatfrei. It will be remembered that Sunil Sulfatfrei was the only other example of a line extension where stability had not been re-established in the immediate post launch period. There, (Table 73), the level of cross-purchasing declined. This was also the case with Ariel Liquid, Persil Liquid and Sunil Sulfatfrei in Pilot Study II (see Appendix II) where the duration of measurement was 4 weeks. Since this increase is only minor it may be due to sampling error. Certainly a decline in cross-purchasing would seem more intuitive.

Table 98: Duplication of Purchase for Aldi der Feine Buyers

Buyers of these brands who also bought Aldi der Feine	Immediate Post Launch Period	Stabilised Post Launch Period
Aldi	189 **	203 **
Onko	137	166
Dallmayr	148	154
Idee	123	131
Tchibo	103	114

Note. Immediate Post Launch : Period 4 Stabilised Post Launch: Period 5 Data source: GfK
* p<0.01 **p<0.001

Given the pre-launch share of 18.1%, and the line extension's minor success of 0.9% of volume, we would expect the parent brand to decline to 18.0% of the market. In fact the parent brand's share in the immediate post-launch period is 15.6%, showing excessive cannibalisation and suggesting an ongoing erosion of the retailer brand's position. The position is very similar in the stabilised post launch period, except the share decline is more marked as the parent brand captures only 15.6% of the market.

Table 99: German Coffee Share of Purchase Expected and Actual Post Launch Aldi der Feine - All Buyers

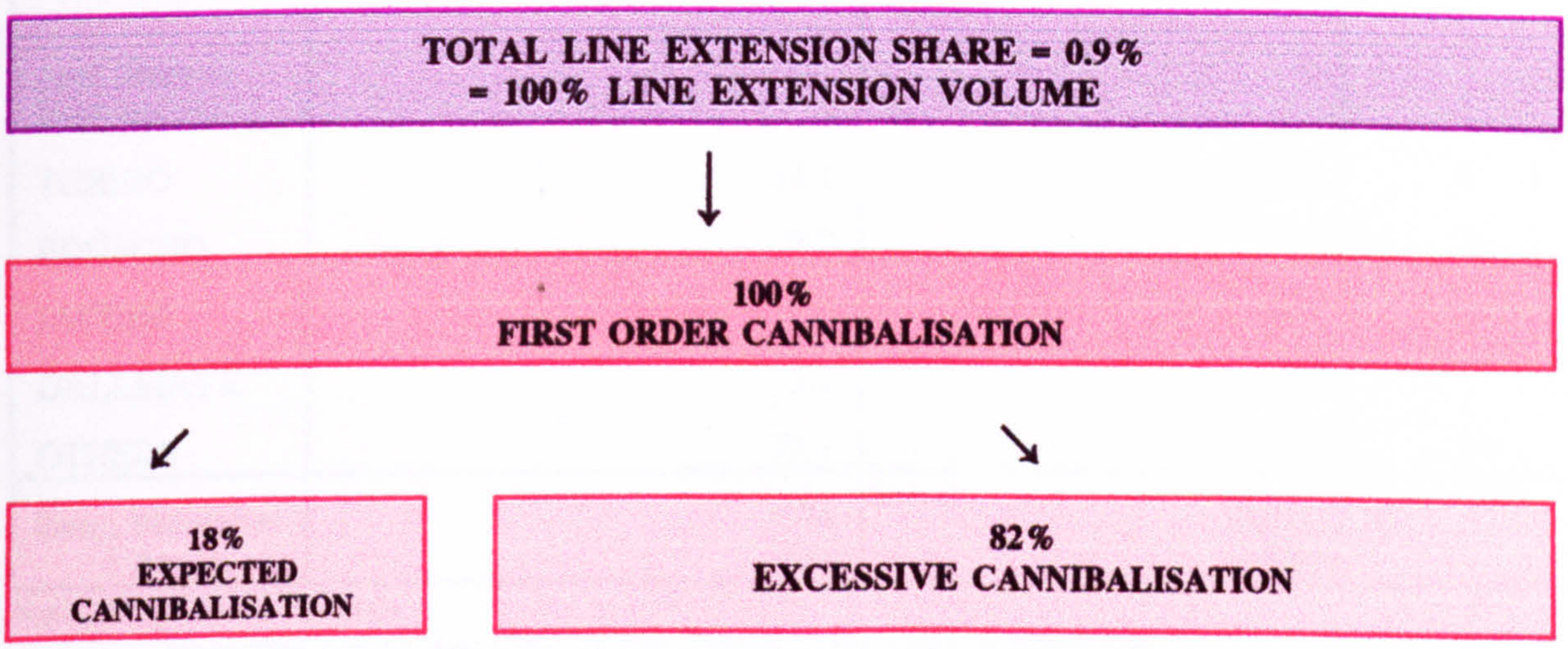
BRAND	EXPECTED SHARE POST LAUNCH (T)	ACTUAL SHARE POST LAUNCH (O)	DIFFERENCE (O-T)
Aldi (ex line extension)	18.0	15.6	-2.4
Aldi der Feine	0.9	0.9	0.0
TOTAL	18.9	16.5	-2.4
Base: Buyers		2329	
: Purchases		25265	

Note. Pre launch : Period 2 Post Launch : Period 5 Data source: GfK
* p<0.01 **p<0.001

Aldi der Feine provides us with the only example of 100% cannibalisation within the set analysed, assuming we base our definition on share analysis. This line extension is the only instance analysed where the parent brand declined more than the line

extension contributed. The level of excessive cannibalisation is not as high as in some previous examples, notably Dallmayr and Sainsbury, since the parent brand is relatively large. Cannibalisation can be decomposed into 18% expected and 82% excessive, as Figure 23 illustrates.

Figure 23: Source of Line Extension Share: Aldi der Feine



Source: Market share & SOE analyses

Unsurprisingly Aldi der Feine buyers are disproportionate purchasers of the parent brand. Aldi coffee accounts for 33.9% of their purchases against 18.1% of coffee buyers in general. Although this is a near doubling of preference for Aldi against the total population, this bias is lower than many other examples.

Table 100: Comparison of Share of Purchase for Aldi der Feine Buyers vs Total Market

BRAND	ALDI DER FEINE BUYERS PURCHASE PROFILE %	TOTAL MARKET PURCHASE PROFILE %	DIFF
More likely to have bought			
ALDI	**33.9**	**18.1**	**16 ****
Less likely to have bought			
TCHIBO	14.1	21.5	-7 *
EDUSCHO	9.7	13.8	-4
JACOBS	16.6	18.9	-2
DALLMAYR	3.6	3.7	0
OTHERS	22.1	24.0	-2
Base: Purchases	2674	25068	
: Buyers	231	2329	

Note. ** p<0.001 *p<0.01

Rounding means that some of the figures in the DIFF column may appear incorrect.

Pre launch: Period 2 Data source: GfK

Aldi der Feine stands at the extreme of cannibalisation, at the ultimate value of 100% based on share. GLA suggests over a third cannibalisation, although other extensions have scored higher on this measure.

Table 101: Cannibalisation Evidence: Aldi der Feine

MEASURES	DEGREE OF CANNIBALISATION TOTAL	EXPECTED	EXCESSIVE
Share	✓ 100%		
Gain Loss Analysis	33%		
Duplication of Purchase			✓ **
Buyer Analysis			✓ **
SOE Model		✓ 18%	✓ 82%

** p < 0.001

7.10 Summary

This chapter deals exclusively with those line extensions which show excessive degrees of cannibalisation. As such, we would expect the analysis of these line extensions to reveal that the total brand benefits less from their launch than those analysed in Chapter 6. This is broadly speaking true. As Table 102 shows, in all but one case, the total brand gained share after the launch of the line extension(s) but these gains tend to be moderate.

Table 102: Summary Market Share Movements for Excessive Cannibalisation Extensions

Extension	Parent Brand Share Movement (2)	Extension Share (3)	Total Brand Share Movement (4)
Excessive Cannibalisation			
Vizir 2kg & NFP	- 0.2	3.0	+ 2.8
Persil Liquid	- 2.3	4.8	+ 2.5
Colgate Gum Protection	- 1.0	1.2	+ 0.2
Dixan 2kg	- 1.0	1.2	+ 0.2
Sunil Sulfatfrei	- 2.1	2.5	+ 0.4
Ariel 3kg & NFP	- 1.5	1.7	+ 0.2
Dallmayr Prodomo & C Frei	- 3.5	3.7	+ 0.2
Sainsbury Freshmint & Mildmint	- 2.1	2.2	+ 0.1
Aldi der Feine	- 2.5	0.9	- 1.6
Mean	-1.8	2.4	0.6

The range in total brand share movement from a loss of 0.8% to a gain of 2.8% emphasises the incremental nature of most line extensions, and reinforces the concept of market stationarity.

All parent brands lost share, as we would expect in examples of excessive cannibalisation. These losses range from 0.2% in the case of the Vizir extensions to 2.3% for Persil Liquid. However this highest loss of 2.3% for the Persil parent is

concurrent with the highest share in this category of 4.8% for the line extension. The lowest share achieved by a line extension which demonstrates excessive cannibalisation is 1.0% for Aldi der Feine. But this figure needs to be treated with caution since it overestimates the success of line extensions. The nature of the sample design excluded very small line extensions.

If we examine the cannibalisation evidence for these extensions, we can see that the measures are consistent in the sense they all agree on cannibalisation. Every measure on every extension demonstrates the existence of a cannibalisation effect (Table 103). Market share, GLA and SOE all show a level of cannibalisation. Duplication of purchase analysis (col 8) shows every line extension has a significantly higher level (at $p<0.01$) of cross purchase with its parent than we might expect. Buyer analysis (Col 9) shows that, in all cases, line extensions buyers are more likely to be purchasers of the parent than category buyers in general.

Table 103: Summary Cannibalisation Evidence for Excessive Cannibalisation Extensions

Extension	% total cannibalisation (market share)[1] (5)	% total cannibalisation (GLA) (6)	% excessive cannibalisation (SOE)[2] (7)	Significant level of cross purchase (Duplication) (8)	More likely to be purchasers of parent (9)
Excessive Cannibalisation					
Vizir 2kg & NFP	7	6	6	775 **	Yes
Persil Liquid	48	36	23	120 *	Yes **
Colgate Gum Protection	83	28	58	160 **	Yes **
Dixan 2kg	83	11	82	913 **	Yes **
Sunil Sulfatfrei	84	29	74	262 **	Yes **
Ariel 3kg & NFP	88	25	73	203 **	Yes **
Dallmayr Prodomo & C Frei	95	44	91	369 **	Yes **
Sainsbury Fresh & Mildmint	95	46	92	986 **	Yes **
Aldi der Feine	100	33	82	203 **	Yes **
Mean	76	29	65	443	

[1] Calculated by dividing the parent brand share loss by the extension's share (ie col 5 = col 2 / col 3 in table 7.10.1)
[2] Calculated by taking the difference between the observed and theoretical parent brand share (see previous chapter), and divided by the extension share. Alternatively it can be calculated by subtracting the parent's share pre-launch from the total cannibalisation figure in col 5.

But there is less consistency when we delve deeper and try to assess the degree of magnitude of the cannibalisation effect.

Market share, our most simplistic measure, gives a range of cannibalisation from 7% to 100%. GLA gives a more restricted range from 6% to 46%. The range is perhaps less of an issue, than the absence of correlation between the market share estimates and GLA estimates, of essentially the same effect. For example, contrast the results of Colgate Gum Protection and Dixan 2kg, both of which have estimates of cannibalisation of 83% (based on market share). But GLA suggests that the parent contributes 28% in the case of Colgate, and less than half that in the case of Dixan (11%).

Another feature of this category is the two extensions where the immediate post launch period is not characterised by stability. Sunil Sulfatfrei and Aldi der Feine are both analysed on two post launch periods - the one immediately following launch and the one where stability has been reached. There is little variation in the two sets of results for the Aldi line but Sunil Sulfatfrei shows an excessive level of cannibalisation in the stabilised period but only an expected level in the preceding period. This temporal variance will be discussed in the next chapter.

CHAPTER 8
DISCUSSION OF CANNIBALISATION FINDINGS

This chapter summarises and examines the findings described in Chapters 6 and 7, and seeks to explain the reasons for the variance. After the summary of results, we examine each measure in turn. We define precisely what each measures, showing the range of values found for each. Since the different methods provide contrasting results, potential explanations are explored. Some of these are intrinsic to the measure whilst others relate to environmental circumstance. Understanding why the different measures produce varying results is fundamental to our understanding of the cannibalisation effect. Only when the weaknesses of the measures tested are understood can an improved measure be developed.

8.1 Summary of Results

In total seventeen line extensions were analysed in Chapters 6 and 7, although aggregation of four pairs of extensions resulted in a sample of thirteen. If we look at the impact of these launches on both the parent brand and the health of the total brand (ie parent + extension) we can see that extensions have varying degrees of success.

Share Movements of Parent, Extension and Total Brand

The table below summarises the market share movements of parent brand, line extension and total brand. Parent brands lost a small amount of share on the launch of a line extension, on average less than one percentage point. Line extensions tended to be small volume, achieving an average of only 2.8% share in the post launch period. This may be partly related to the choice of product categories which were mature and therefore tended to be fragmented. It also may be a function of the nature of line extensions, as Hardie (1994) noted line extensions tend to be imitative or filling-in rather than innovative. As such, it would be expected that their impact on existing brands would be marginal. The total brand, generally, benefited from the launch of line extension(s), gaining 1.8% on average in market share, between the pre launch and the post launch periods.

Table 104: Descriptive Statistics of Line Extension Impact

Measure	Mean	Range
Parent Brand Share Movement	- 0.9	- 3.5 to 1.2
Extension Share	2.8	0.6 to 10.6
Total Brand Share Movement	1.8	- 0.8 to 9.3

At one extreme both parent and extension do well, Surf and Daz Liquids are examples of this. In both these cases the parent continues to grow alongside the extension's share gain, allowing the brand to benefit from both sources. Cannibalisation is negligible, an ideal situation following a new product launch. There could be several possible explanations for this happy outcome. The parent brand could be in growth, possibly because of distribution gains or promotional activity (possibly including the line extension). The line extension might be sufficiently different to the existing variants to be viewed as only a partial substitute, or cannibalisation barriers may exist. One factor likely to affect these two specific extensions is a market effect. There is some evidence that the UK detergent market was, at the time of these launches, moving towards liquid formats. This would have protected the powdered variants of the parent brands.

Crest Gum Health is also relatively successful for both the parent and the total brand. Although the parent brand remained static rather than growing, there is little evidence of cannibalisation at the first order level. Although the line extension only achieved a small share by most standards (0.6%), it must be remembered that this is a very fragmented market. The toothpaste market is also very competitive and the reasons for launching a line extension such as Gum Health may be defensive. The need to offer a full range to major retail accounts may take precedence over volume considerations. The risks in allowing a competitor to gain a listing by offering a unique variant are too great for many manufacturers. Such a foothold could prove very costly.

However these three line extensions (Surf Liquid, Daz Liquid and Crest Gum Health) appear to be unusual. Most parent brands lost share after the launch of an extension, varying from 0.2% by Vizir to 3.5% by Dallmayr. The average share loss by those

parent brands which lost share was 1.5%, compared with an average share gain by the extensions of these brands of 3.1%. Perhaps a more realistic comparison would exclude Ariel Liquid as an outlier since its achievement of 10.6% share is unusual. Its exclusion would not alter the average share loss by the parent but reduces the average line extension share (of those with parents who lost share) to 2.2%. This suggests that for many brands, line extension is only a moderately successful strategy. The small amount of share increase accruing to the total brand may or may not be worthwhile. Factors such as relative contributions, defensive motives and increased costs of stockholding etc need to be considered.

The sole line extension showing only the expected levels of cannibalisation, Ariel Liquid, coincided with a decline by the parent brand. But this parental share loss is more than compensated by the share gains made by the new line extension. For Ariel Liquid, the success of the line extension strategy is far less ambiguous than those described above. The share loss by the parent would appear to be an acceptable price to pay for the benefit to the total brand.

The table below examines the relationship between four market share sizes - those of the line extension, the parent brand pre-launch, the parent brand post-launch and the total brand combining both the line extension and the parent brand after launch.

Table 105: Correlation Matrix of Market Shares (Pearson's Correlation Coefficient)

	Line Extension Share	Parent Share Pre Launch	Parent Share Post Launch	Total Brand Share
Line Extension Share	-			
Parent Share Pre Launch	0.17	-		
Parent Share Post Launch	0.24	**0.98** **	-	
Total Brand Share	0.43	**0.95** **	**0.96** **	-

* p<0.01 **p<0.001

Reddy et al's (1994) study showed one of the success determinants for line extensions in the US cigarette industry to be the strength of the parent brand. If we also take the

market share of the parent to be an indicator of its strength, then our study finds no relationship. Line extension share does not have a significant association with the size of the parent brand before launch (r=0.17, p=0.58). The association with the total brand share after launch is higher, but that is to be expected since line extension share is then a component of the total brand. The other significant correlations are equally expected - we would expect the two parent brand figures to show a relationship, and for them to be associated with the total brand share.

First Order Cannibalisation

Overall, levels of cannibalisation were shown be high within this study, although in only one instance (Aldi der Feine) was the maximum of 100% replacement achieved. This total substitution is probably the result of the withdrawal of other parent variants.

Table 106 summarises the first order cannibalisation results from the preceding two chapters. The next section, which refers to this table, reviews each of the measures, clarifying their definition and examining their contribution to the debate.

Table 106: Descriptive Statistics of First Order Cannibalisation Results

Measure	Mean	Range
% Total Cannibalisation (market share)	53	0 to 100
(ex extensions with zero cannibalisation)	70	7 to 100
% Total Cannibalisation (GLA)	24	0 to 46
(ex extensions with zero cannibalisation)	26	6 to 46
% Excessive Cannibalisation (SOE)	45	0 to 92
(ex extensions with no excessive cannibalisation)	65	6 to 92
Level of cross purchase (duplication)	359	117 to 986
Parental propensity (buyer analysis)	244	18 to 1075

Market Share

This is the simplest of all the measures used here. We have taken the share gain made by the extension (ie total extension volume) as a percentage of the share loss made by the parent. This gives a measure of the proportion of the extension's volume which appears to be derived from the parent. It does provide a very simplistic view since it examines the market at an aggregate level. Another shortcoming is that, in common with all the other measures, it does not take into account what might have happened to the parent had the line extension not been launched. For example, the parent might be in long term decline, and facing de-listing by the major retailers in which case its share would have decreased anyway regardless of the line extension's appearance.

The results of our study (Table 106) show levels of cannibalisation covering the theoretical boundaries of 0 to 100%. Generally where cannibalisation was excessive, the market share analysis provided higher estimates of the degree of cannibalisation than the other measure of total cannibalisation, GLA. However at low levels the reverse was true. Where cannibalisation was either zero or at expected levels, GLA provided higher values, suggesting some compression in the range in GLA.

Market share analysis suggests that around half (53%) of the average line extension's volume is derived from its parent. If we ignore those line extensions which did not appear to steal share from the parent, this percentage rises. Of those extensions which did cannibalise, the average proportion deriving from the parent was over two thirds (70%).

The market share measure we have used does not take account of volume shifts in the market, unlike for example GLA. This assumption is reasonable for most extensions, apart from those which might be viewed as innovative, since few extensions can expect to have much impact on market size.

Gains Loss Analysis

GLA produces a broadly similar measure to the market share figures described above with a few notable differences. Similarly to market share, GLA looks at the source of line extension volume and its magnitude. The output of GLA shows where the line extension's volume has come from. Since our interest here is solely with first order cannibalisation, we can focus on the percentage of line extension volume lost by the parent. The main differences between this and the market share measure are related to the method of calculation. For both, we use matched households as our sample. But with market share, we manipulate the data only at the aggregate level; with GLA we calculate at the household level and then aggregate. The GLA algorithm also takes account of changes in volume, unlike the other analyses. But it does have the limitation of having no test of significance associated with it which makes it difficult to assess the importance of values. In this thesis only those values over 10% have been considered, but this is a subjective heuristic.

The similarity between the market share and GLA measures leads to a reasonably close correlation of results, although the range of GLA values is more restricted, in this case between 0 and 46%. This difference in degree of magnitude of cannibalisation estimated between the two methods can be seen most clearly at a line extension level. The greatest variation is found in the case of Aldi der Feine where share suggests that all the extension's volume is at the expense of the parent, and GLA suggests that only a third (33%) of volume is stolen.

It is likely that both the share measure and GLA over-estimate cannibalisation where the parent is in decline, since neither takes account of this contingency in their calculation. Any decrease in parental share would tend to be attributed to the line extension.

SOE Model

The SOE model allows us to see how the market dynamics following a new product launch differ from those share movements we might expect. Since only one of the thirteen examples fits the SOE model, the implication is that line extensions differ from the typical new product. The IIA axiom underpinning the model, is as we suspected, invalidated by the specific context of a line extension.

The SOE model gives us a measure of the level of cannibalisation we would expect from the IIA axiom, and hence allows us to see if the level of cannibalisation is excessive. It gives a broad range of values for cannibalisation at the excessive level ranging from 0 to 92%. These values are the percentage of line extension volume derived from the parent above that expected. Four of the thirteen extensions do not cannibalise at this excessive level. If these are ignored, the average level of excessive cannibalisation approaches two thirds of volume (65%). Since the SOE model is closely related to share, the values of these two measures correlate quite closely. It also follows that the SOE values match with those from GLA, although the order of magnitude differs.

Duplication of Purchase

This measure uses a similar principle to SOE above, but measures instead the deviations from expected duplications given the respective penetrations. We are looking for the degree to which cross-purchasing is excessive, ie are households who buy the extension more likely to purchase the parent as well, as we would expect? The duplication tables show us what else consumers of the line extension bought, ie they provide a measure of cross-purchase. Our interest is in whether consumers of the line extension also buy the parent.

Table 107 summarises the duplication of purchase findings from all extensions. An index of 100 would indicate a level of cross purchase in line with the Dirichlet predictions, ie consistent with the penetrations of the two products. An index in excess

of this figure shows an excessive level of cross-purchasing. As can be seen, all line extensions showed a higher level of cross purchase with the parent brand than we would expect from their respective penetrations. With the exception of Surf Liquid all these deviations were significant.

Table 107: Summary of Duplication of Purchase Findings

Extension	Duplication Index
Sainsbury Freshmint & Mildmint	986 **
Dixan 2kg	913 **
Vizir 2kg & NFP	775 **
Dallmayr Prodomo & C Frei	369 **
Sunil Sulfatfrei	262 **
Crest Gum Health	250 **
Aldi der Feine	203 **
Ariel 3kg & NFP	203 **
Daz Liquid	172 **
Colgate Gum Protection	160 **
Ariel Liquid	131 **
Persil Liquid	120 *
Surf Liquid	117
Mean	359

* p<0.01 ** p<0.001

As Table 107 shows the range of cross purchasing is considerable with Surf Liquid at one extreme at 117, and Sainsbury Freshmint and Mildmint at the other with 986. The mean figure of 358 suggests that the average buyer of a line extension is two and a half times more likely to also buy the parent than we would expect from penetration. There are two possible implications of this. The first is that the disproportionate level of cross-purchasing is an indicator of cannibalisation. The second possibility is that although buyers tend to purchase both the parent and the line, the purchasing is not a substitution of the parent by the line. Instead the extension replaces another brand in the buyers' portfolio. These two potential explanations can be checked by examining the fortunes of the parent brand over the

relevant period. Significant share loss by the parent would suggest the former explanation.

Buyer Analysis

This analysis allows us to show if buyers of the line extension are more likely to have bought the parent before the launch than the market as a whole. It is related to duplication of purchase in the sense that it provides another measure of the degree of overlap between parent and new line. Neither of these measures prove cannibalisation, but they would be expected to give an indicator of when cannibalisation is more likely.

However, there are two important differences between the duplication and buyer analyses. The first of these is the timing of the period used for each analysis. Duplication analysis, in this study, has used the **post launch period** examining the level of cross purchasing between line and parent after the launch. The buyer analysis is carried out in the **pre launch period**, examining what buyers of the line extension bought before the new line. Duplication analysis therefore helps to understand what buyers of the line extension do after the launch, buyer analysis expands our understanding of how these households behaved before. The second important distinction is the benchmark against which the purchases are judged. Duplication analysis compares actual purchasing behaviour with the theoretical norms of the Dirichlet; in buyer analysis the comparison is made with the purchasing behaviour of the total category.

All the line extensions in this study were bought by consumers with a greater propensity to purchase the parent than the average category purchaser. This information adds to our understanding of how the cannibalisation effect works. If buyers of a line extension are more likely to buy the parent but the parent's share does not suffer, this gives a vindication of the line extension strategy. In this situation, the familiar brand name would appear to have encouraged purchase without substitution occurring.

Table 108 shows the line extensions in descending order of their level of propensity for their buyers to purchase the parent brand. This parental propensity figure (col 2) shows the degree to which buyers of the line were more likely to be buyers of the parent brand before the launch of the new line, compared with the category buyers in general. It is calculated by dividing the percentage share of the parent in the line extension buyers' portfolio by the percentage share of the parent in the category as a whole, both measures being taken in the pre launch period. For example if we analyse the purchasing patterns of Crest Gum Health buyers before the launch of that particular line, we find that 23.4% of their purchases were accounted for by the Crest parent brand. This compares with 10.2% of the market as a whole. We know therefore that buyers of the line extension were significantly more likely to be buyers of the parent before the new line's launch. A quantification of that propensity is given by dividing the buyers' parental share (col 3) by the total market's parental share (col 4), ie the ratio of 23.4 to 10.2. This gives a parental propensity figure of 129, showing that buyers of Crest Gum Health were over twice as likely as the market to buy the parent brand.

Table 108: Summary Buyer Analysis Results

Line Extension	Parental Propensity[1] % (2)	Buyers' Parental Share % (3)	Market Parental Share % (4)	Difference[2] % (5)		Level of Cannibalisation
Sainsbury Freshmint & Mildmint	1075	37.6	3.2	34.4	**	Excessive
Dixan 2kg	858	11.5	1.2	10.3	**	Excessive
Vizir 2kg & NFP	462	7.3	1.3	6.0		Excessive
Dallmayr Prodomo & C Frei	184	10.5	3.7	6.8	**	Excessive
Crest Gum Health	129	23.4	10.2	13.2	**	Zero
Sunil Sulfatfrei	134	23.6	10.1	13.5	**	Expected
Aldi der Feine	87	33.9	18.1	15.8	**	Excessive
Ariel 3kg & NFP	96	30.2	15.4	14.8	**	Excessive
Colgate Gum Protection	47	36.4	24.8	11.6	**	Excessive
Daz Liquid	30	9.6	7.4	2.2	*	Zero
Surf Liquid	29	7.1	5.5	1.6		Zero
Persil Liquid	26	31.3	24.9	6.4	**	Excessive
Ariel Liquid	18	19.2	16.3	2.9	*	Expected
Mean	244	21.7	10.9	10.7		

[1] The ratio of buyers' parental share to the total market parental share (ie col 3 / col 4)
[2] The difference between buyers' parental share and the market parental share (ie col 3- col 4)

The values range from an unequivocal 1075% in the case of the two Sainsbury toothpastes to a modest 18% in the case of Ariel Liquid. This range covers a nearly twelve times increase in the case in the case of the new Sainsburys' toothpastes (ie buyers of the line were twelve times more likely to buy the parent than the total category), to buyers of Ariel Liquid who were only 18% more likely to have bought Ariel than detergent buyers in general.

There are two interesting points to note. The first is that in all cases (except Surf Liquid), buyers of the line extension showed a significantly higher propensity to purchase the parent brand than category purchasers as a whole. Also it might intuitively be expected that those extensions which cannibalise the parent to a greater extent would also have buyers who were more likely to have purchased the parent before the launch. But although the four extensions which demonstrate the highest

propensity also show excessive levels of cannibalisation, Crest Gum Health and Sunil Sulfatfrei at zero and expected cannibalisation do not fit this pattern.

Similarly although Daz Liquid, Surf Liquid and Ariel Liquid show lower levels of bias as we might expect, Persil Liquid with its excessive cannibalisation shows relatively low bias as well. GLA also shows no clear relationship with the buyer analysis results.

This suggests that, although buyers of line extensions will be more likely to buy the parent brand, this in itself does not give a clear indicator of cannibalisation. Even the magnitude of the bias does not guide us in predicting the level of cannibalisation.

8.2 Advantages and Disadvantages of the Measures

The table below summarises the advantages and disadvantages of the five measures tested against the panel data. No one measure emerges as the "best" measure, the costs and benefits of each need to be weighed before a decision is taken. In most cases, it seems that the best approach would be to use multiple measures since each of these gives a different perspective on the share dynamics between line extension and parent.

Table 109: Summary of Advantages and Disadvantages of Measures

Measure	Advantages	Disadvantages
Share	Simple to use	Does not forecast what might have happened if line extension hadn't been launched Does not take account of market volume shifts Over estimates if parent in decline
GLA	Industry standard measure	Does not forecast what might have happened if line extension hadn't been launched Over sensitive to household level variations, particularly on small samples Distorted by households which buy the same brand in two periods No test of significance Over estimates if parent in decline
SOE	Allows separation of expected and excessive levels Allows comparison with other new product types	Does not forecast what might have happened if line extension hadn't been launched Does not take account of market volume shifts Over estimates if parent in decline
Duplication of Purchase	Sound theoretical base	Does not forecast what might have happened if line extension hadn't been launched Gives indicator of potential cannibalisation not direct measure Sample sizes can become small
Buyer Analysis	Intuitively valid	Does not forecast what might have happened if line extension hadn't been launched Gives indicator of potential cannibalisation not direct measure Sample sizes can become small

8.3 Summary of Cannibalisation Measures

The next table summarises the results of each cannibalisation measure by line extension. The results are presented in order of the degree of cannibalisation on the basis of the market share figure.

As can be seen, no immediate correlation between the different types of measure is apparent although the market share based measures (of market share, GLA and SOE) seem to have some relationship. These figures formed the basis of the correlation matrix discussed in the next section.

Table 110: Summary Cannibalisation Evidence for All Extensions

Extension	% total cannibalisation (market share)[1] (2)	% total cannibalisation (GLA) (3)	% excessive cannibalisation (SOE)[2] (4)	Level of cross purchase (Duplication) (5)		Parental Propensity (6)	
Zero Cannibalisation							
Surf Liquid	0	0	0	117		29	
Daz Liquid	0	10	0	172	**	30	*
Crest Gum Health	0	20	0	250	**	129	**
Expected Cannibalisation							
Ariel Liquid	12	24	0	131	**	18	*
Excessive Cannibalisation							
Vizir 2kg & NFP	7	6	6	775	**	462	
Persil Liquid	48	36	23	120	*	26	**
Colgate Gum Protection	83	28	58	160	**	47	**
Dixan 2kg	83	11	82	913	**	858	**
Sunil Sulfatfrei	84	29	74	262	**	134	**
Ariel 3kg & NFP	88	25	73	203	**	96	**
Dallmayr Prodomo & C Frei	95	44	91	369	**	184	**
Sainsbury Freshmint & Mildmint	95	46	92	986	**	1075	**
Aldi der Feine	100	33	82	203	**	87	**
Mean	53	24	45	359		244	

[1] Calculated by dividing the parent brand share loss by the extension's share
[2] Calculated by taking the difference between the observed and theoretical parent brand share (see previous chapter), and divided by the extension share. Alternatively it can be calculated by subtracting the parent's share pre-launch from the total cannibalisation figure in col 2.

8.4 Correlation of Measures

It will be apparent from the results described in Chapters 6 and 7 and the summary table above, that results of the five measures were not consistent. The correlation matrices below quantify the degree of variation and consistency. Both Spearman's and Pearson's Coefficients have been calculated. Both agree on those measures which are significantly correlated, but the order and magnitude of the other correlations vary slightly.

Table 111: Correlation Matrix of Cannibalisation Measures (Spearman's Coefficient of Rank Correlation)

Measures	Market Share	GLA	SOE	Duplication Analysis	Buyer Analysis
Market Share	-				
GLA	**0.80 ****	-			
SOE	**0.92 ****	**0.73 ***	-		
Duplication Analysis	0.43	0.23	0.65	-	
Buyer Analysis	0.42	0.19	0.67	**0.97 ****	-

* p<0.01 ** p<0.001

Table 112: Correlation Matrix of Cannibalisation Measures (Pearson's Correlation Coefficient)

Measures	Market Share	GLA	SOE	Duplication Analysis	Buyer Analysis
Market Share	-				
GLA	**0.70 ****	-			
SOE	**0.98 ****	**0.64 ***	-		
Duplication Analysis	0.26	0.05	0.39	-	
Buyer Analysis	0.33	0.14	0.45	**0.97 ****	-

* p<0.01 ** p<0.001

As the two tables above show, there is a distinct partitioning between the two types of measures. The measures based on market share, ie market share, the SOE model and GLA all correlate very closely. As we would expect, given their identical

database, market share and the SOE model correlate particularly closely (0.92 on Spearman's and 0.98 on Pearson's). GLA shows a significant correlation with both these measures (0.8 and 0.7 with market share, and 0.73 and 0.64 with the SOE model on Spearman's and Pearson's Coefficients respectively).

The other association is shown by the two measures which are based on cross-purchase. The duplication of purchase and buyer analyses show an extremely high correlation of 0.97 on both coefficients. This suggests that buyers of the line extensions were purchasers of the parent before the launch of the line and after. This finding is consistent with Fazio's (1986) framework, suggesting that the greater accessibility of the parental brand name generated by the direct experience of purchase, has then led to the purchase of the line extension. It is important to note that this behaviour did not always translate into cannibalisation, so the purchase of the line extension was not always substitution for purchases of the parent.

Although these two cross-purchase measures do not correlate significantly with the market share and GLA figures, there is a closer relationship with the SOE measure. Although this correlation does not reach $p=0.01$ significance, the figures of 0.65 ($p=0.016$) and 0.67 ($p=0.012$) on Spearman's suggest an association. Since the SOE measure, duplication of purchase and buyer analysis were all set up to measure excessive cannibalisation, this result is encouraging. It would appear that high levels of cross-purchase before, and to a slightly lesser extent, after the launch of a line extension are a marker for excessive cannibalisation.

8.5 Correlation of the Measures with Share

The data which we have allow us to test the relationship between market share and the level of cannibalisation. Does the size of the line extension, the parent brand or both combined (the total brand) affect the level of cannibalisation experienced? We might expect that larger parent brands might lose more, if the IIA axiom were true. We might also expect that larger line extensions would take more from their parents than their less successful counterparts.

Table 113: Correlation Matrix of Cannibalisation Measures Against Share (Spearman's Coefficient of Rank Correlation)

	Market Share	GLA	SOE	Duplication Analysis		Buyer Analysis	
Line Extension Share	0.16	0.07	0.20	0.21		0.33	
Parent Brand Share Pre Launch	0.06	0.34	0.25	**0.70**	*	**0.73**	*
Parent Brand Share Post Launch	0.00	0.22	0.30	0.67		**0.69**	*
Total Brand Share Post Launch	0.12	0.14	0.44	**0.77**	*	**0.84**	**

* p<0.01 ** p<0.001

Table 114: Correlation Matrix of Cannibalisation Measures Against Market Share (Pearson's Correlation Coefficient)

	Market Share	GLA	SOE	Duplication Analysis		Buyer Analysis
Line Extension Share	0.33	0.09	0.39	0.25		0.24
Parent Brand Share Pre Launch	0.15	0.32	0.06	0.68		0.60
Parent Brand Share Post Launch	0.01	0.19	0.20	**0.72**	*	0.64
Total Brand Share Post Launch	0.09	0.20	0.29	**0.72**	*	0.66

* p<0.01 ** p<0.001

In fact, this is not the case. There is very little association between the size of the line extension, parent or total brand and any of the cannibalisation figures based on market share, ie the market share, GLA and SOE measures.

The size of the parent brand and total brand do correlate with the two measures of cross purchase, ie the duplication and buyer analyses. This might be explained by two factors. Firstly, the larger brands may have a smaller standard error associated with

estimates from the sample, making correlations higher. The second is that it is likely that we are seeing a Double Jeopardy Effect (Ehrenberg, Goodhardt & Barwise 1990). The more popular brands are bought by more households who buy them more often. This higher penetration and purchase frequency would mean that households which buy the larger parent brands are more likely to have higher levels of cross-purchase with a line extension, than would be true for those with smaller parents.

The size of the line extension seems to have relatively little effect on the level of cannibalisation. Its association with the measures of cannibalisation, particularly those based on market share, is very low.

These low correlations suggest that line extensions with larger parents benefit. It would appear that households who buy the line extension are more likely to have bought the parent before the launch of the line extension and to continue doing so after the launch. The role of the parent seems to be in encouraging accessibility without substitution. Having a larger parent does not increase the risk of cannibalisation, nor does being a larger line extension.

The idea that accessibility is important derives from Fazio's (1986) view of cognitive processes which was discussed in Chapter 1 (see page 29). The study cited there, by Fazio & Zanna (1981), suggests that attitudes learned through direct experience, such as trial, are more accessible or stronger than those stemming from indirect sources. This increased strength leads to a stronger link between attitude and behaviour, a link which is strengthened by repetition (Powell & Fazio 1984) such as might be gained by repeated purchase. We would expect therefore that households who purchase the parent brand frequently to have a strong and positive attitude towards that brand. That attitude will be accessed when the consumer is confronted with the line extension.

Fazio argues that what people do is constrained by what they can bring to mind: if you can't think it, you can't do it. The greater the strength of the attitude towards the parent, the greater the automaticity in purchasing the line extension.

8.6 Factors Affecting the Level of Cannibalisation

The previous section demonstrates that the size of the parent brand and the line extension are not useful as predictors of the degree of cannibalisation. But what are the factors which can predict the level of share loss? Although it is beyond the scope of this study to make a detailed evaluation, we can draw some tentative conclusions.

It is reasonable to assume that the more similar products are, the more likely they are to be substitutes. This similarity is related to the concept of fit between parent brand and extension, the investigation of which has taxed many researchers, beginning with Aaker & Keller (1990). One dimension of similarity of fit is brand name, which is the bond between all extension products and their respective parents. But other factors are also likely to have an effect, such as pack size, product format, price, positioning etc.

The results of our study give limited evidence on product format (see Chapter 9 for this analysis). The liquid detergents launched in the UK were all new product formats, competing alongside their powdered counterparts. In general, the powdered parent brands suffered little cannibalisation in the face of the launch of these new forms. Surf and Daz showed zero cannibalisation, Ariel only the expected amount and Persil only a small degree of excessive cannibalisation. This change in format could be viewed as innovative, and as such represents a relatively strong concept for line extensions. The fact that line extension appears to be an effective strategy in this situation contrasts with Sheinin & Schmitt's (1994) view that stronger concepts favour a new brand name. Our research does not show whether developing a new brand would have been more successful than leveraging an existing one in all cases. But the case of Wisk and Persil Liquid supports the case for line extension.

Pilot Study I (see Appendix I) evaluated the differing fortunes of these two products. This comparison is particularly interesting since, according to Bunten & Simmons (1993), they are actually the same product. Wisk had a very slow build of share and then declined rapidly. Persil Liquid built share very quickly, almost matching Wisk

in its first quarter of launch and then passing it in the second quarter of sales. The use of the existing brand name appeared to give faster awareness to the product, as well as possibly allowing speedier distribution gains.

On the basis of the UK detergent industry, it would appear that product format has a role to play in determining the degree of cannibalisation. A significant change would appear to protect the parent from share loss. This suggests a cannibalisation barrier, preventing substitution.

8.7 Developing an Improved Measure of Cannibalisation

Any measure which is developed needs to be closely linked to the definition of cannibalisation. If we accept Ambler's (1996 p74) definition of cannibalisation as,

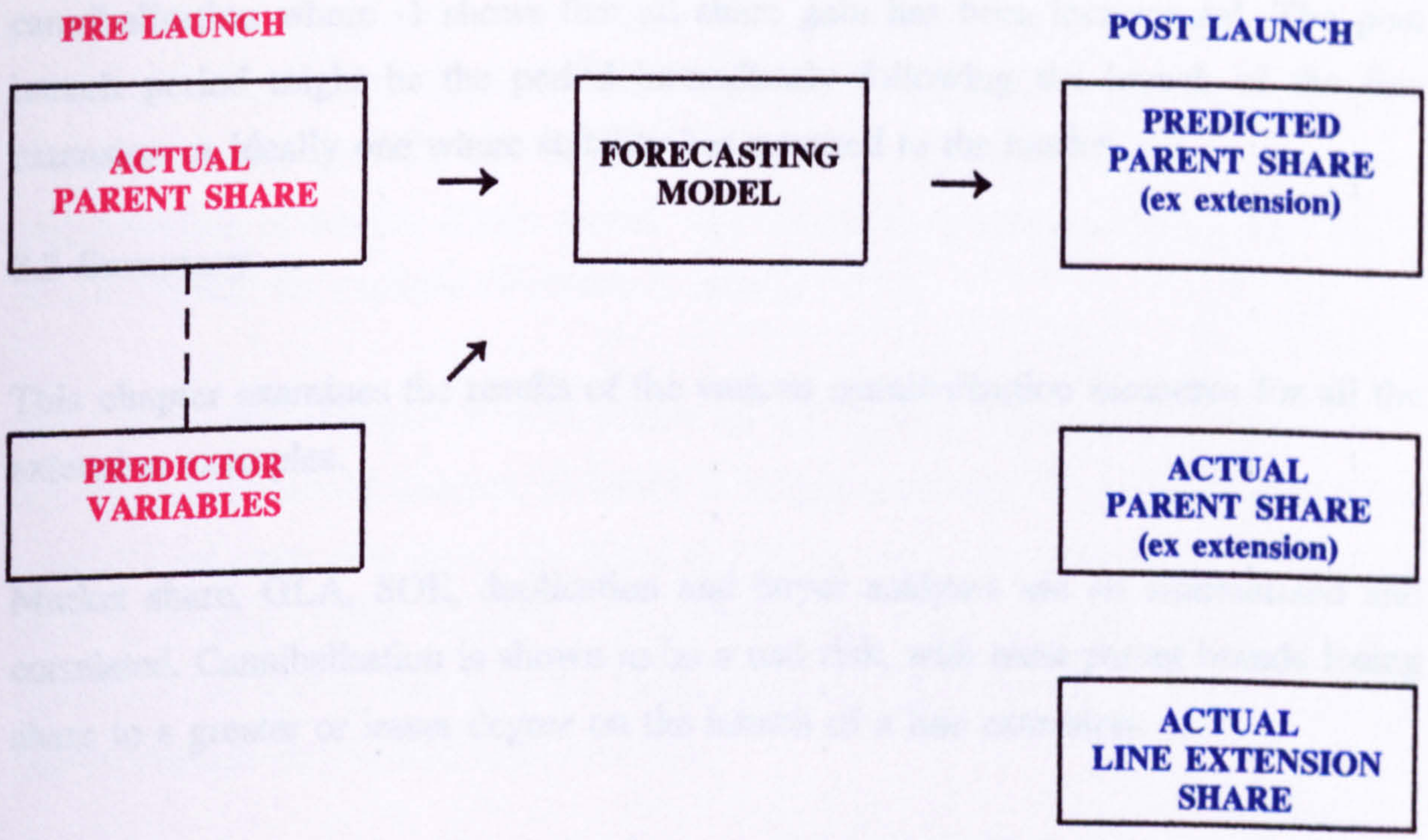
"The market share of the existing brand if the extension had not been launched less what it turned out to be"

and combine it with Hardie's (1994) view that the degree of cannibalisation needs to be viewed as a characteristic of the line extension, then the following composite definition emerges.

First order cannibalisation is the proportion of the line extension volume attributable to share loss by the parent beyond that anticipated by the parental share forecast.

If this new definition is used, then any improved measure of cannibalisation will need to include the new line's volume, the parent brand's volume pre and post launch and a forecast of the parent brand share (assuming no line extension had been launched) as inputs (see figure 24).

Figure 24: Inputs Required for Improved Measure



None of the measures reviewed in this study fit this specification, although some could theoretically be modified. The market share measure, for example, could incorporate a forecast of parental market share. It is likely that data beyond that supplied by the consumer panel would be required to make an accurate forecast, since other relevant predictive variables (eg advertising expenditure, distribution) would have an impact on the parental brand share. Given the relatively short timescales, perhaps exponential smoothing would be appropriate.

Once the post launch measures of parent share (predicted and actual) and line extension share are generated, a measure of first order cannibalisation can be derived from the following equation,

$$C_1 = \frac{\hat{MS}_P^{t+1} - MS_P^{t+1}}{MS_{Lx}^{t+1}}$$

where C_1 is the first order cannibalisation coefficient
MS is market share
t+1 is the post launch period
P is the parent brand
Lx is the line extension, and ^ is the predicted value

This function will give values between -1 and +1. A value of +1 indicates 100% cannibalisation where -1 shows that all share gain has been incremental. The post launch period might be the period immediately following the launch of the line extension or ideally one where stability has returned to the market.

8.8 Summary

This chapter examines the results of the various cannibalisation measures for all the extension examples.

Market share, GLA, SOE, duplication and buyer analyses are all summarised and correlated. Cannibalisation is shown to be a real risk, with most parent brands losing share to a greater or lesser degree on the launch of a line extension.

Households who bought line extensions, are both more likely to have bought the parent brand before the launch of the new line and to continue buying it afterwards, although not necessarily as a substitute purchase. The role of an existing brand name may be one of strengthening the accessibility of attitude towards the name. Neither the size of the line extension nor that of the parent seems to have an effect on the level of cannibalisation. However larger parent brands seem to encourage higher levels of cross-purchasing, perhaps as part of a Double Jeopardy effect.

It is concluded that no one measure provides the "right" answer. Cannibalisation emerges as a complex phenomenon, varying over time and context. Each of the measures used adds a different dimension to our understanding.

All measures suffer from the shortcoming that they do not take into account what would have happened if the line extension had not been launched. The significance of this omission varies according to which definition of cannibalisation is used. Any improved measure of cannibalisation needs to be linked to a relevant definition. If a derivation of Ambler's (1996) definition is taken as is suggested, then a forecast of the market share of the existing brand had the extension not been launched, is essential. The inclusion of a forecast of parental share does suggest the need for data

beyond the panel since other variables (eg promotional expenditure, distribution) are likely to have an impact. Accurate forecasts of predicted share will be elusive until we fully understand the dynamics and interplay of both promotional and distribution effects. Despite decades of academic research devoted to these effects, our understanding of them is at best partial with several conflicting models of the effects of advertising, for example (Vakratis & Ambler 1995).

The next chapter (Chapter 9) concentrates on one specific objective of this study - to test for cannibalisation barriers. Evidence is sought from the UK detergent market for a barrier between powdered and liquid detergent, since this example is specifically cited by Buday (1989). Chapter 10 concludes this study, covering all the research objectives and giving directions for future research. The contribution of this study to our knowledge in this area is summarised.

CHAPTER 9
CANNIBALISATION BARRIERS

The concept of cannibalisation barriers was advanced by Buday (1989). Should cannibalisation barriers be found to exist, their presence would provide useful guidance to a manager deciding in which direction to extend his brand. Since the company's interests are best served by minimising any cannibalisation effect, a manager would logically choose to extend a brand into subcategories protected by these barriers. So if, for example, a barrier was found to exist between powdered and liquid detergent as Buday suggests, the sensible course of action with a powder brand would be to extend into liquid detergent, and vice versa.

But although these barriers would undoubtedly prove to be of strategic and tactical use, there is no academic literature which provides any proof of their existence. In the absence of previous academic research, this chapter examines the available databases for empirical evidence of the presence of cannibalisation barriers. Duplication of purchase tables are well suited to this task since they can be adapted to examine the level of cross purchasing between subcategories. We know, from the Dirichlet predictions, the level of cross purchasing that we would expect given the relative penetrations of these subcategories, and any disproportionately low levels would be indicative of a barrier of some description. Additional information is also supplied by analyses conducted during the pilot study, examining the cohorts of consumers who bought successive liquid variants in the UK detergent market.

9.1 Review of Cannibalisation Barriers

The idea of cannibalisation barriers was first discussed in Chapter 2 (see page 42), as a means of minimising the degree of cannibalisation. Buday defines them as

perceptual or physical boundaries found around many consumer segments that restrict the shifting of sales volumes. Although he defines two types of barrier, only the first of these, described below, is relevant to line extensions.

Boundaries separating user groups between which crossover is rare eg product form such as dry vs canned catfood, powdered versus liquid detergent. Here, he asserts form loyalty, at least within usage occasion, is very high.

His second category of boundaries between usage occasions. eg product categories, is relevant to category extensions rather than extensions within the same category which is our interest here.

Although duplication tables are useful to test his assertion, it is important to bear in mind one limitation. Because of the nature of panel data we are restricted to commenting on a household's total purchase behaviour, ie we cannot look at usage occasions. So if, for example, a household uses powdered detergent for machine washing and a liquid detergent for hand washing, we would only know that they use both. Hence their level of cross purchasing might well fall within the bounds of the Dirichlet predictions.

However Buday does suggest that these boundaries are found around **many** consumer segments so we would still expect to see some evidence for their existence.

9.2 UK Detergent Market

The UK detergent market is an interesting arena in which to test Buday's theoretical boundaries. Detergents are one of the product categories specifically mentioned in his 1989 paper as demonstrating cannibalisation barriers between product forms, namely powder and detergent. Our data allows us to test for barriers across these subcategories in the year following the main liquid launches, coincidentally also 1989. Arguably this period would be the one most likely to demonstrate form loyalty since liquids are reasonably established (Wisk was launched in 1985). Later data (in the mid

1990s) starts to show a movement back to powders (source: Lever Bros) as housewives become disenchanted with liquids and the associated difficulties in accurate dosage.

Figure 25 shows the pattern of launches in the UK detergent market between 1985-88. Our cohort analysis focuses on buyers of Ariel Liquid and Persil Liquid. The duplication of purchase analysis includes all buyers of detergent in the 52 weeks of 1989, ie after the launches of Wisk, Ariel and Persil Liquids, the major players in the liquid format.

Figure 25: Timing of UK Liquid Detergent Launches 1985-1988.

		PRODUCT LAUNCHED	MEASURE TAKEN
1985	Q1		
	Q2		
	Q3		
	Q4	Wisk	
1986	Q1		
	Q2		
	Q3		
	Q4		*Pre Launch Ariel Liquid*
1987	Q1	Ariel Liquid	
	Q2		
	Q3		
	Q4		
1988	Q1		
	Q2		*Pre Launch Persil Liquid*
	Q3	Persil Liquid	
	Q4		

If we look first at Table 115, we can see the picture across subcategories. The table shows the cross purchase rates observed in the UK detergent market, from data gathered over the 52 weeks of 1989.

Table 115: Cross Purchase Between Liquid and Powdered Detergent in the UK Market 1989

	<——Powdered Variants %——>						<——Liquid Variants %——>					
	Buyers of:											
Who also buy:	**Persil**	**Ariel**	**Bold**	**Daz**	**O/L**	**Other**	**Persil**	**Ariel**	**Wisk**	**Daz**	**O/L**	**Other**
Any powder	48	36	29	29	25	50	23	27	14	15	12	37
Any liquid detergent	42	29	24	22	21	44	40	46	26	28	21	57

As we saw in Chapter 6, the duplication analysis gives us a matrix showing what buyers of one brand also bought. Here we have analysed powdered and liquid variants separately. So we can see, for example, that 48% of buyers of Persil Powder also buy other powdered brands while 42% of them buy liquid variants. Similarly 23% of buyers of Persil Liquid also buy powdered products and 40% buy other liquid products.

If there were a cannibalisation barrier, we would expect that buyers of powdered products would be less likely to buy liquid products than other powdered variants. This is the case in Table 115 where if we look at buyers of powdered detergents only (the left hand side of the table) we can see that the percentages who buy other powders (the first row of numbers) is always higher than the percentage who also buy liquids (the second row). However this could just be a penetration effect, perhaps powder products are simply bigger. But more support is given to the idea of a barrier by looking at buyers of liquid detergents (the right hand side of the table). Here we see the opposite effect. Buyers of liquid variants, regardless of the brand are always more likely to also buy other liquids than powders.

Another approach to detecting barriers between subcategories is to look at those buyers who bought the new liquid variants and see if they differ in their purchasing patterns from the population of detergent buyers as a whole. In particular we are interested in whether they were more likely to buy other detergent brands before the launch. Tables 116 and 117 look at the cohorts of buyers who purchased Ariel Liquid

and Persil Liquid respectively. This data is taken from the pilot study and hence the measurement period is quarters, rather than two quarters as in the full study.

Table 116: Comparison of Share of Purchase for Ariel Liquid Buyers vs Total Market- Pre launch Q4 1986

BRAND	ARIEL LIQUID BUYERS PURCHASE PROFILE %	TOTAL MARKET PURCHASE PROFILE %	DIFF.
More likely to have bought			
WISK	14	10	4 **
ARIEL	18	16	2
Less likely to have bought			
PERSIL	26	29	-3 **
BOLD	11	13	-2
OWN LABEL	6	8	-2
DAZ	9	9	0
OTHERS	17	17	-1
Base	3099	5296	

Note. ** p<0.001

As Table 116 demonstrates, there are two significant differences between Ariel Liquid purchasers and the total market. Wisk takes a higher proportion of their purchases than is true for the market as a whole: Persil takes a lower proportion than would be expected if Ariel Liquid buyers were typical of all detergent buyers. This suggests a predisposition towards liquids, and a possible cannibalisation barrier developing between the subcategories.

A comparison of the purchase profiles of Persil Liquid buyers against the total market (Table 117) shows that Persil Liquid buyers bought significantly more of the other brands of liquid detergent before the launch. They are more likely to have bought Ariel Liquid, Wisk and Other Liquids and significantly less likely to have bought the powdered variants.

This table also suggests cannibalisation as Persil Powder accounted for a significantly higher proportion of the purchases of those buyers who went on to purchase Persil Liquid than was true for the market as a whole. But this merely seems to have encouraged access to the brand since other analysis shows that Persil Powder share only declined in line with its predicted loss.

Table 117: Comparison of Share of Purchase for Persil Liquid Buyers vs Total Market- Pre launch Q2 1988

BRAND & SUBCATEGORY	PERSIL LIQUID BUYERS PURCHASE PROFILE %	TOTAL MARKET PURCHASE PROFILE %	DIFF.
More likely to have bought			
Persil Powder	31	24	7 **
Ariel Liquid	12	9	3 **
Other Liquid	8	5	3 **
Wisk	8	6	2 *
Less likely to have bought			
Ariel Powder	8	13	-5 **
O/L Powder	4	7	-3 **
Daz Powder	6	9	-3 *
Other Powder	14	17	-3 *
Bold Powder	8	10	-2
Base	2195	5815	

Note. Pre launch: Q2 1988
** p<0.001 * p<0.01
Rounding means that some of the figures in the DIFF. column may appear incorrect.

In the launches of both Ariel and Persil Liquids, the powdered variants suffered most. This might suggest the presence of a cannibalisation barrier, between liquids and powders.

Buday also suggested that crossover between user groups is rare in these circumstances but these results give only limited support to this view - if Buday were

correct then one would expect to find some evidence that consumers remain within the liquid category. To take the UK market as an example it might be expected that consumers would first buy Wisk and then Ariel Liquid and then maybe Persil Liquid. Tables 116 and 117 do show that Ariel and Persil Liquid buyers were significantly more likely to have bought liquid detergents before these launches than the market as a whole. But not to such a great extent that crossover, between powder and liquid, could be described as rare. However Buday does limit his assertion on form loyalty to **within usage occasion** and the constraints of the panel data do not allow us to assess this.

Instead of cannibalisation barriers, the results could be explained as an advertising effect of the new product. In this context the launch of Ariel Liquid (UK) could have supported the Ariel powdered variants, producing a sales effect which outweighed that of cannibalisation. Though speculative, this thinking is also consistent with the resistance to loss shown by Wisk since the arrival of the new Ariel variant supported the liquid format. Advertising effects are difficult to disentangle. But support for existing brands in liquid format would become weaker, as more and more liquids enter the market. When Persil Liquid (UK) entered the market, it did so partly at the expense of other liquids.

Evidence for cannibalisation barriers, within the UK detergent market between the subcategories of powder and liquid, is limited. The results are not inconsistent with Buday's thinking but neither are they strong enough to provide conclusive proof. It is also possible that other types of barrier might exist, eg not those between product format but between different price levels.

CHAPTER 10
CONCLUSIONS AND DIRECTIONS FOR FUTURE RESEARCH

The results of this study have been analysed and discussed in previous chapters. This chapter shows how the research objectives set have been achieved, and reviews the implications of these findings for both academics and practitioners. Directions for future research are outlined. In particular, suggestions are made for an improved measure of cannibalisation since existing measures suffer from significant omissions.

10.1 Summary of Results by Research Objective

This research study aims to achieve four objectives (see page 83).

These are:

1. To evaluate current methods and measures of the cannibalisation effect.

2. To contrast the results of five methods of measuring cannibalisation.

3. To develop an improved measure of cannibalisation.

4. To test for the existence of cannibalisation barriers.

These four objectives have been achieved by an evaluation of previous research, and analysis of consumer panel data.

This section summarises the findings of this study in relation to each of the objectives described above.

To evaluate current methods and measures of the cannibalisation effect.

Previous research on cannibalisation has used conjoint analysis, preference modelling, ecological nicheing and regression analysis. These are discussed in depth in Chapter 2, but in summary the conclusions of this evaluation are:

1. The choice of definition of cannibalisation is critical to the validity of the measure chosen. Since there is no one widely accepted definition, this is not a trivial decision.

2. Consistent with the variation in definition, there is no one generally accepted measure of the cannibalisation effect. Various authors have used/developed different measures with varying degrees of success and have used different techniques.

3. There is a tendency to adapt existing techniques (conjoint, regression, preference modelling) to measure the effect rather than to develop new methods. The exception to this is the use of ecological nicheing by Mason & Milne (1994) which takes an innovative approach to measuring the phenomenon.

4. Whilst each of the four methods examined in Chapter 2 has elements which are of interest, none offers a definitive approach. All have problems/limitations associated with their use.

Conjoint analysis is weakened by its assumption of rationality and high involvement, which is unlikely to be true of most habitual purchases.

An associated problem is of respondent fatigue, as the number and level of attributes increases. A particular problem in relation to this study is that it is unsuitable for use with consumer panel data.

Preference modelling, as incorporated into the ASSESSOR model, is constrained by its dependence on the IIA axiom for validity. As this study has shown, this assumption is suspect for line extensions. This restricts its application to other types

of new product. The Fader and Hardie (1996) application, of preference modelling, is limited to predicting new SKUs which are bounded by existing attributes.

Ecological nicheing is only able to predict potential cannibalisation. Its reliance on the use of demographics to predict purchasing may be suspect, care needs to be taken in the choice of predictive variables since demographics may not be appropriate.

Regression analysis works at the aggregate level and does not benefit from the richness of panel data. Its effectiveness is dependent on the inclusion of the right predictive variables.

To contrast the results of five methods of measuring cannibalisation

This study has concentrated on five measures which have not been used in previous academic research. These five are all computed on the same dataset sample of thirteen line extensions to allow for direct comparability

The five methods tested here are a market share measure, Gain Loss Analysis, deviations from expected share movements based on a Share Order Effect (SOE) model, duplication of purchase analysis and buyer analysis. The first three focus on market share, the latter two measure cross-purchase.

The results of computing these five measures show cannibalisation to be a real risk of a line extension strategy. Only one brand demonstrated no evidence of share loss by the parent. With the exception of Surf, all other brands showed some evidence of cannibalisation on one or all measures. Generally the total brand benefits from the launch of a line extension; although the parent brand may suffer share loss the line extension volume more than compensates. This alone does not necessarily vindicate the use of a line extension strategy, other factors such as relative contribution play a part.

All the measures added to our understanding of the effect, but all have limitations of scope. Our study emphasises the critical nature of timing in measuring cannibalisation. A change to either the duration or timing of the post launch measure can significantly affect the magnitude of the cannibalisation measured. Levels of cross-purchase shown by the duplication and buyer analyses are higher than we might predict, but only suggest the potential for cannibalisation rather than its presence. Substitution of the parent by the line extension does not always follow cross-purchase.

The three market share measures correlate quite closely, as do the two cross-purchase measures.

To develop an improved measure of cannibalisation

Any measure which is developed needs to be closely linked to the definition of cannibalisation. The following is proposed as a pragmatic definition which allows for a useful quantification of the effect.

First order cannibalisation is the proportion of the line extension volume attributable to share loss by the parent beyond that anticipated by the parental share forecast.

If this new definition is used, then any improved measure of cannibalisation will need to include the new line's volume, the parent brand's volume pre and post launch and a forecast of the parent brand share (assuming no line extension had been launched) as inputs.

None of the measures reviewed in this study fit this specification, although some could theoretically be modified. The market share measure, for example, could incorporate a forecast of parental market share. It is likely that data beyond that supplied by the consumer panel would be required to make an accurate forecast, since other relevant dependent variables (eg advertising expenditure, distribution) would have an impact on the parental brand share.

To test for the existence of cannibalisation barriers.

Buday's (1989) concept of cannibalisation barriers, which separate user groups between which crossover is rare, is tested on the UK detergent market.

Detergent is a particularly appropriate market on which to test Buday's theory since he specifically mentions a barrier between powdered and liquid detergents. But the evidence to support his assertion is limited. The results of the analyses described in Chapter 9 are not inconsistent with his theory, but neither are these findings strong enough to provide substantive support. The results suggest more restricted crossover between the product forms than we would expect, but not to the extent that it could be described as rare as Buday suggests. In addition, explanations other than the existence of cannibalisation barriers are possible. Advertising effects and market trends may offer alternative solutions.

10.2 Implications of Research Findings

This study has developed our understanding of an important market effect - that of cannibalisation. This section summarises the contribution to knowledge which this research has made. A number of issues emerge.

1. Cannibalisation is real.

Our sample of line extensions confirms the view that cannibalisation is a real risk of an extension strategy.

Potential line extensions need to be evaluated in terms of the incremental contribution they supply, not just in volume terms. A line extension is attractive when its marginal contribution benefits the total brand ie when

$$\pi_P^{t+1} + \pi_{Lx}^{t+1} > \hat{\pi}_P^{t+1}$$

where π is contribution (unit contribution x volume)

t+1 is the post launch period

P is the parent brand (ex extension)

Lx is the line extension and

^ is the predicted value of the parent brand, assuming the line extension is not launched

Hence share shifts, as a result of a line extension launch only give partial understanding. Even 100% cannibalisation can be profitable if the unit contribution of the line extension is greater than that of the existing lines under the parental umbrella.

Even if the cannibalisation by a line extension leads to reduced overall profitability of the brand, line extending may still be the appropriate strategy. The extension may fulfil a defensive purpose, either by matching or pre-empting competitive threats.

2. Buyers of the line extension tend to have bought the parent brand significantly more often before the launch than other category buyers.

This often, although not always, translates into cannibalisation.

Since buyers of the line extension will often have bought the parent before launch, practitioners can use this to their advantage. This finding is not surprising and emphasises the importance of customer retention as a strategy. The challenge is to ensure that line extension is an addition to the portfolio rather than a substitution for

existing lines of the parent brand. Clear distinctions need to be made between the positioning of the line extension vs the existing lines, perhaps by usage occasion.

3. Cross purchase is significantly higher between the line extension and the other lines of the parent brand.

This implies that the pre purchase behaviour noted in point 2 above carries through into the post launch period. Both these findings vindicate the use of a line extension strategy, to some extent. The extension of an existing brand name does seem to have an effect in encouraging purchase of the new line extension. This study adds to the evidence that an existing brand encourages access to the new line. However, from a practitioner viewpoint, the same comments apply as above - the line extension needs to be sufficiently distanced from the parent to discourage substitute purchasing.

4. The IIA axiom is not valid in the context of line extensions.

The evidence from the SOE analysis shows that the IIA axiom does not apply where an existing brand name is used. This means that models such as ASSESSOR, which have this as an underlying assumption, are of limited value in this context. The contribution of the SOE model in this study has been to demonstrate to which cannibalisation is excessive, frequently exceeding the level we would expect from the IIA Axiom.

5. The timing and duration of the period of measurement is critical.

Results vary depending on when the measure is taken, and for how long. This is demonstrated by the differences in the findings between the pilot studies and the full study, and between the immediate and the stabilised post launch periods. Sunil Sulfatfrei, for example, demonstrated only the expected level of cannibalisation in the immediate post launch period, but cannibalised the parent brand to an excessive amount by the stabilised post launch period. Persil Liquid showed the expected level of cannibalisation in Pilot Studies I and II, but the increased duration of the measure

in the full study showed excessive cannibalisation. Similarly, duplication analysis indices vary over time, with most households showing a declining tendency to purchase both parent and line extension over time. Sunil Sulfatfrei (full study and Pilot Study II), Persil Liquid and Ariel Liquid (both Pilot Study II) all display this effect.

The dynamic nature of cannibalisation suggests the need to sample over time and to be thoughtful about the duration of the measure. It is difficult to be prescriptive about when to measure and for how long. But timing based on stationarity and frequency of purchase has intuitive appeal.

6. The practitioner industry standard measure of GLA has significant limitations.

This finding suggests that market research agencies, that base cannibalisation estimates on GLA of consumer panels, should refine/replace this analysis.

Its major weaknesses are:

instability when faced with small sample sizes (which are typical of line extensions)

no significance testing

over estimation of cannibalisation when the parent is in decline

over-sensitivity to household level variations

7. Line extensions tend to be small volume

This reflects their tendency to be imitative or filling-in (Hardie 1994) rather than innovative. It may also be due to the nature of the markets which form the sample in this study. Since they are mature, they will tend to be fragmented.

8. Line extensions tend to contribute volume rather than just cannibalise.

Most line extensions contribute more volume than they steal from their parent brand. This feature alone, however, does not vindicate the use of a line extension strategy. The extent to which they contribute incremental volume to the total brand needs to be viewed in the context of the differences in contribution between new and existing lines. Alternatively the line extension may have fulfilled a defensive role beyond that of economics. However, managers should be wary of the temptation of putting strategic logic before financial logic. Proliferation carries its own risks, as Quelch & Kenny (1995) point out. Their assertions suggest that less may well be more, as weaker line logic leads to confused, less loyal consumers and increased costs. The result may be a lack of trade credibility and increased competitor opportunity.

10.3 Limitations of the Study

Although this study adds greatly to our understanding of an important effect, it is not without its limitations. Some of these were discussed in Chapter 4 but this initial list is augmented here. In particular the limitations of panel data are discussed.

The scope of the research is bounded by the line extensions analysed in terms of sample size, market type and geography. Its restriction to mature fmcg categories is realistic since both the availability of data and frequency of line extension activity make this a viable project. The assumption of stationarity is appropriate in these types of market but becomes more problematic when extended to growth markets. Examining only one type of product limits the generalisability of the findings. Similarly the sample size of 13, although appearing to offer variety, is small. The data are also restricted to two European countries - the UK and Germany.

The database of consumer panels, whilst offering many benefits, is not fully comprehensive, and no attempt has been made in this research to seek data beyond it. As any other data source, consumer panel database is not perfect although valuable. As has already been noted, the panel data report household rather than

individual consumer behaviour. This distinction becomes important in product categories which are characterised by individual rather than shared household consumption. It is less of an issue therefore with categories such as detergent, where individuals within a household are likely to share the same product, compared with more "personal" categories such as say, breakfast spreads where individual preferences may be clouded by household purchasing. By their nature, consumer panels report only **what** households purchased not **why**. Whilst understanding actual behaviour is critical, this does mean that the motivation needs to be inferred.

A particular problem in researching line extensions is that their small market shares are generated by relatively few households buying them. Consumer panel datasets are large in comparison to many data sources but even they suffer from small sample sizes when examining only those households which bought the new line. Several line extensions were discarded from the initial sample because of the sample sizes became too small to be workable. The study is therefore restricted to only those line extensions which were relatively successful.

The study does not attempt to be predictive; we are concerned only with measuring the cannibalisation effect after the event.

Although this study adds to our knowledge of the phenomenon of cannibalisation, there remains much work to be done before we can say that we fully understand the effect. This study has contributed a greater understanding of existing measures, with an appreciation of the likely results of these. Conclusions have been drawn as to the requirements of an improved measure, and it is here and in other areas that further research could usefully contribute.

10.4 Directions for Future Research

We need to validate the improved measure outlined in Chapter 8 by testing its usefulness against other measures. Detail of its operationalisation needs to be finalised. Specific areas to be tested include the investigation of alternative forecasting

methods, the use of a measurement period based on frequency of purchase and of timing based on stationarity. Our experience in this study suggests that a consumer panel database is valuable in work of this type, but that the time taken in setting up and processing datasets of this size should not be underestimated.

The relationship between the measures investigated here could usefully be explored. In particular the possibility of a structural relationship between the five measures could be examined. The field of mathematics is likely to prove useful here, with Structural Equation Modelling (SEM) offering a potential technique to understand further the inter-relationships between the measures used. SEM is likely to be particularly appropriate since it allows for the examination of a series of dependence relationships simultaneously, potentially generating the answers to a series of inter-related questions.eg How does pack size affect the degree of cannibalisation? How does flavour/fragance? How does brand name affect purchasing behaviour? How does the size of the brand affect cross-purchasing? How does the level of cross-purchasing affect the level of cannibalisation? The first stage here would be to develop a path diagram representing all the potential causal relationships.

Another important research question which needs to be addressed is : What are the predictors of the direction and extent of the cannibalisation effect? Why do some extensions cannibalise and not others? This study provides limited evidence on product format but other factors such as pack size, price and availability are all likely to have an effect. Our research also suggests that the size of the parent brand and of the line extension itself are not significant in predicting the level of cannibalisation.

It would also be useful to compare line extensions with other types of new product. How do they differ in the way that they take share from incumbent products? Our study has shown that line extensions are a special case and that the use of an existing brand name does affect the new product. But more studies are needed to give a more detailed understanding of the differences.

This study has focused on first order cannibalisation - the share loss by the parent brand. This is often the concern of the brand manager. But at a more senior level, the

manager is tasked with maximising a portfolio of products. Here second order cannibalisation, loss of share by other brands owned by the same company, becomes an issue. The impact on other brands in the corporate portfolio needs to be examined.

Cannibalisation is an important effect, which has received little academic attention to date. Its ubiquity in today's marketplace suggests further research will prove productive and benefit academics and practitioners alike. The study presented here goes some way to provide the building blocks for that effort.

APPENDICES

TECHNICAL APPENDIX 1a

RUNS TEST

Let us examine a fictitious example of a consumer good to illustrate more clearly the mechanics of using the runs test. Table T1a contains two years of monthly sales of SoaperDuper, an established detergent brand.

Table T1a Repeat Purchasing Rate of SoaperDuper Detergent 1990-1

Period	Repeat Purchasing Rate	Sign	Period	Repeat Purchasing Rate	Sign
1	14.1	-	13	22.0	+
2	15.2	-	14	18.8	+
3	13.4	-	15	19.1	+
4	17.3	-	16	20.0	+
5	18.0	+	17	17.2	-
6	17.8	+	18	16.5	-
7	16.1	-	19	17.7	+
8	15.7	-	20	18.3	+
9	16.3	-	21	15.5	-
10	17.1	-	22	17.5	+
11	18.2	+	23	16.3	-
12	19.0	+	24	18.2	+

The number of pluses and minuses depends on whether the series has an odd or even number of observations. The median is regarded as an observation, but if n is odd it is ignored. Let us call m the number of pluses, and also the number of minuses. In a series with an odd number of observations we would expect m to be (n-1)/2; in an even series we would expect m to be n/2.

The median is calculated by arranging the observations in ascending numerical order. Since n=24, the median, $\tilde{y}$, is the midpoint between the 12th and 13th observations. The median is calculated by halving the sum of these two observations, in this case of 17.4.

Each of the observations is assigned a sign according to whether it is above or below the median. These signs are shown in columns 3 and 6 in Table 19 above. The number of runs is then determined, in the case of the SoaperDuper example there are 10 runs.

The runs test, in common with other nonparametric tests for stationarity, uses hypothesis testing to discover whether the data are supportive of stationarity. The format of the hypothesis test is:

H_0: The series is a no-trend model with independent errors ie

$$y_t = \beta_0 + \epsilon_t \text{ where } \beta_0 \text{ is constant and } \epsilon_t \text{ is independent}$$

H_A: The series has trend or autocorrelated errors ie

$$y_t = \beta_0 + \epsilon_t \text{ where } \beta_0 \text{ is not constant and } \epsilon_t \text{ is not independent}$$

The test statistic used is R, the number of runs above and below the median value. If the sequence were random we would expect R to have the following mean and standard deviation:

$$\mu_R = m+1$$

$$\sigma_R = \sqrt{\frac{m(m-1)}{2m-1}}$$

The critical values of R vary according to the sample size. For small samples ($m \leq 20$), it is necessary to use tables prepared by Swed & Eisenhart (1943). But with values of m above 20, R may be treated as a normal random variable with the descriptive statistics specified above.

Since m=12 in the SoaperDuper example, the Swed & Eisenhart tables should be used. However, the calculations below illustrate how the test would be run on the large-sample decision rule.

Decision Rule: Reject H_0 if $|z| > z_{.05} = 1.645$

$$\mu_R = m+1 = 12 + 1 = 13$$

$$\sigma_R = \sqrt{\frac{m(m-1)}{2m-1}} = \sqrt{\frac{12(12-1)}{2*12-1}} = 2.396$$

$$R = 10$$

$$z = \frac{r-\mu_R}{\sigma_R} = \frac{10-13}{2.395} = 1.252$$

Since $|1.252| = 1.252 < 1.645$ we can accept H_0 that the series is stationary/random. Of course, this does not prove stationarity but is supportive of it.

TECHNICAL APPENDIX 1b

DANIELS' TEST

To demonstrate how this test works in practice we will once again use the SoaperDuper data introduced in Table T1a in the previous Technical Appendix. The first stage is to calculate Spearman's rho for the n pairs of t and y_t. These are tested for significance, using critical values derived from a normal approximation for larger samples, and again from special tables for smaller sample sizes (see appendix DD in Farnum & Stanton). Table T1b demonstrates the calculation of Spearman's rho for the SoaperDuper data. Since the sample is again small (n<30), a normal approximation is not really appropriate. However we will treat the sample as larger to demonstrate the decision rule relevant to larger samples.

The calculation of the test statistic, r_s is shown below.

$$r_s = 1 - \frac{6\Sigma d_t^2}{n(n^2-1)} = 1 - \frac{6*1401}{24*24^2-1} = 0.391$$

Once again the null hypothesis of stationarity is tested ($\propto$= 5%).

Decision Rule: Reject H_0 if $|z| \rangle z_{.025} = 1.96$

$$\sigma_{r_s} = \frac{1}{\sqrt{n-1}} \mu_{r_s} = \frac{01}{\sqrt{23}} = 0.209$$

$$z = \frac{r_s - \mu_{r_s}}{\sigma_{r_s}} = \frac{0.391 - 0}{0.209} = 1.871$$

Since |1.871| = 1.871 $\langle$ 1.96 we can accept H_0 that the series is stationary/random with 95% confidence.

Table 1b Calculation of Spearman's rho for Daniels' Test for SoaperDuper Data

Time t	Share of Purchase y_t	Rank of y_t $R(y_t)$	d_t = t-$R(y_t)$	d_t^2
1	14.1	2	-1	1
2	15.2	3	-1	1
3	13.4	1	2	4
4	17.3	12	-8	64
5	18.0	16	-11	121
6	17.8	15	-9	81
7	16.1	6	1	1
8	15.7	5	3	9
9	16.3	7	2	4
10	17.1	10	0	0
11	18.2	17	-6	36
12	19.0	21	-9	81
13	22.0	24	-11	121
14	18.8	20	-6	36
15	19.1	22	-7	49
16	20.0	23	-7	49
17	17.2	11	6	36
18	16.5	16	2	4
19	17.7	14	5	25
20	18.3	19	1	1
21	15.5	4	17	289
22	17.5	13	9	81
23	16.3	7	16	256
24	18.2	17	7	49
$\sum d_t^2$				1401

APPENDIX 1

PILOT STUDY I

New Entrants in a Mature Market: An Empirical Study of the Detergent Market

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Abstract

An analysis of the UK and German detergent markets provides useful evidence for the development of a model to predict the share changes that occur when a new product enters the market. A simple share order effect (SOE) model based on Luce's Axiom of the Independence of Irrelevant Alternatives (IIA) is tested on four different new product launches. Of these only the product with both a new brand name and a new product format is consistent with the model. In the remaining three cases, all line extensions, the empirical data deviate from the model's predictions. The two UK line extensions appear to be affected by product format; the German line extension cannibalises the parent. From these studies it is suggested that radical line extensions do not cannibalise whereas line extensions that have a close fit with the parent are more likely to take sales from the core brand.

Introduction

One major question facing a marketer with a new product to launch is what to call it. The prevalence of brand extension, and more specifically line extension, as a branding strategy during the 80s and 90s is well documented. Many marketing managers choose to harness the power of an existing brand rather than create a new one. Estimates vary but authors (Aaker 1991, Lawrence 1993, Miller 1993) agree that more than two-thirds of all new product launches are line extensions.

The use of terms in this field tends to be undisciplined, with a number of authors having quite different meanings for the same terms. For the purposes of this paper Tauber's

(1981) evaluation of "new opportunities from the company's viewpoint", will be used. He categorises these opportunities according to the product category entered and brand name used. With supply pressures and demand stagnation, Tauber sees four major opportunities for the firm as the matrix in Figure 1 illustrates.

Figure 1 : New Product Opportunities From The Company's Viewpoint

		PRODUCT CATEGORY	
		New	Existing
BRAND NAME	New	NEW PRODUCT	FLANKER BRAND
	Existing	FRANCHISE EXTENSION	LINE EXTENSION

Source : Tauber (1981)

Brand extension will therefore be used as a generic term to cover both franchise and line extensions; franchise extensions involve the stretching of a brand into a new category and line extensions comprise those new lines that extend the brand but only within the same product class. An example of franchise extension would be Virgin moving from a record company to an airline, a line extension would be Lemon Fairy Liquid. Both are brand extensions.

However it is important to note that although the examples given fall very neatly into the chosen classification, not all brand extensions are so clear cut. Is Birds Eye Fish-in-Sauce so different to Birds Eye Fish Fingers ? Or can Marks & Spencer moving into financial services really be called a franchise extension since, although it was certainly a new-to-the-company category, there was no real change in consumer base?

This absence of clear delineation can create potential problems for research within this area. In this paper, we report on three new products that are unambiguously line extensions and one which is a flanker brand.

Brand extension remains a popular strategy despite several studies noting risks associated with this practice. These are summarised in Figure 2 below, the most relevant risk for this research is that of cannibalisation - the disproportionate loss of sales by the parent as a result of share gain by the extension. This may be acceptable to the company if the company has a long-term aim to replace the parent with the extension, or if the extension is more profitable, or if brand sales increase overall. But otherwise it is unwelcome and introduces added costs for little or no incremental revenue.

Figure 2 : Risks associated with a brand extension strategy

	Risks	Authors
Risks for the extension	Inappropriate associations	Aaker & Keller (1990) Park, Milberg & Lawson (1991)
	Consumer confusion	Ries & Trout (1986) McWilliam (1993)
	Inadequate / inappropriate support	Kapferer (1992) Barwise (1993)
	No significant point of difference	Kapferer (1992) Murphy (1992)
Risks for the parent brand	Negative effects on image	Ries & Trout (1986) Kapferer (1992) Keller & Aaker (1992)
	Dilution of brand image	Ries & Trout (1986) Smith & Park (1992) Kapferer (1992) Keller & Aaker (1992) John & Loken (1992)
	Image spillover effects	Sullivan (1990)
	Cannibalisation	Buday (1989) Fader, Hardie & Walsh (1994) Reddy, Holak & Bhat (1994)
Risks for the company	Opportunity cost	Ries & Trout (1986)
	Restrictive vision	Kapferer (1992)
	Stifling product innovation	Bennett & Cooper (1981)

Cannibalisation

Although the anticipated degree of cannibalisation is obviously very important in determining the brand strategy, as yet there is little empirical work that attempts to quantify it. Some work has been done in the field of modelling where models such as ASSESSOR (Silk & Urban 1978) and the preference models developed by Fader, Hardie & Walsh (1994) have included cannibalisation as a variable. In the field of consumer durables, the focus has been on diffusion models (eg Bass 1969, Peterson & Mahajan

1978, Mahajan, Sharma & Buzzell 1993, Norton & Bass 1987) as an aid to predicting the extent of substitution (cannibalisation).

One of the few studies to provide a quantification of the cannibalisation process was undertaken by Reddy, Holak and Bhat (1994). Their study of the US cigarette industry covered 75 line extensions of 34 regular filter brands between 1950 and 1984. They found that line extensions cannibalised the parent brand to varying degrees with some categories such as menthol and 100s actually fuelling market growth. Later extensions into lights, light 100s and Ultra categories showed a greater degree of cannibalisation, although the percentages concerned were small (between 1.4% and 4.7% of brand purchases as an average per category). This study is unusual in that it uses longitudinal data, but is limited by the annual reporting of the data and its restriction to one atypical industry.

Reducing The Risks of Cannibalisation

Buday (1989 p29) suggests that

"Excessive cannibalisation is one of the common arguments against brand-extending....Common branding implies a similarity: similarity invites replacement."

The problem of the extension merely becoming a replacement purchase for the parent is only likely to occur where the products are substitutes, as was noted by Sullivan (1990). This is often assumed to be the case with line extensions - Bunten and Simmons (1993) cite the example of Alka Seltzer Plus whose sales volume was derived largely at the expense of the core brand. This effect can also be seen operating in the reverse direction. Birds Eye Walls' rationalisation of their Viennetta range, from two red berry flavours with Strawberry and Raspberry to one only, had a negligible impact on sales. Previous purchases of Raspberry were replaced with Strawberry.

Franchise extensions run a much smaller risk; the different product category, and often different usage occasion can reduce the risk to zero. Hence the launch of Aquafresh Flex toothbrushes did not cannibalise the parent Aquafresh toothpaste brand. The less similar the new product to the parent, the lower the risk of a disproportionate loss of sales by the parent.

Cannibalisation Barriers

Buday (1989) suggests the wise marketer can extend his brand with minimal risk of excessive cannibalisation by being aware of the "cannibalisation barriers " existing in the market. These are perceptual or physical boundaries that, he asserts, are found around many consumer segments and restrict the shifting of sales.

He categorises two types of barrier:

1. Boundaries separating user groups, between which crossover is rare, eg product form such as dry versus canned catfood and, relevant to this study, powdered versus liquid detergent. He asserts that form loyalty, at least within usage occasion is very high. So a consumer might use a powdered detergent for hand washing, and a liquid detergent in the washing machine.

2. Boundaries between usage occasions, typically separating product categories. The example of Ivory soap, detergent and dishwashing liquid is cited. When the brand was extended again to shampoo, the potential for cannibalisation was virtually zero since the extension had a completely different usage occasion.

Although his proposition of cannibalisation barriers is not counter-intuitive, there is little published research evidence underpinning his assertion. Certainly if these barriers exist, they would provide a valuable guideline to any marketing manager concerned about the extent of potential cannibalisation. Boundaries separating user groups would reduce

cannibalisation for line extensions, and boundaries between usage occasions would virtually eliminate it for franchise extensions. In the Findings section, we show the results of our analysis of the UK detergent market that allows us to test whether such a barrier exists between user groups of powdered and liquid detergent.

Share Order Effect Model

Our findings also test the usefulness of a Share Order Effect model. The SOE model is a constant-utility model based on Luce's Axiom of the Independence of Irrelevant Alternatives (IIA)(Luce 1959). In IIA models probability of purchase is the dependent variable, while individual preferences are assumed to be constant.

However the IIA assumption is not intuitive when considering line extensions. In this situation some products could be considered more similar than others. Fader, Hardie and Walsh (1994) use the IIA assumption to develop their preference models predicting consumer choice among SKUs (Stock Keeping Units). In this paper we are interested in evaluating line extensions using the SOE model and testing under what conditions the IIA assumption does not hold.

The concept of proportional gains (or losses) is also consistent with many empirical duplication analyses, such as the Duplication of Purchase Law (Ehrenberg 1959) formalised in the Dirichlet model (Goodhardt, Ehrenberg & Chatfield 1984).

Objectives

The objectives of the study are three fold

1. To discover if the SOE model is appropriate for line extensions as well as new brands.
2. To detect situations where cannibalisation has occurred
3. To discover if there are cannibalisation barriers

Methodology

Consumer panel data covering the UK (1985-1990) and German (1989-1990) detergent markets are examined. The US market was included in an initial sample but was later rejected after preliminary analysis suggested the amount of sales variation from aggressive promotional activity within this market made it unsuitable for this study.

For each market, data are initially analysed at the level of the individual consumer. The unit of analysis is the single purchase or sale which is then aggregated across the buyers of each brand. The basic brand performance measure is "Share of Purchase": the percentage of purchase occasions accounted for by each brand in a quarter (13 weeks).

The market profile (in terms of the brands' shares of purchase) is examined pre and post launch. The pre launch measure is taken in the quarter immediately prior to the launch of the new entrant, and a post measure is then taken in the quarter after which sales indicate that market equilibrium has been restored.

An estimate of share of purchase is made assuming that a straight share order effect (SOE) model applies ie that all brands lose share to the new entrant in direct proportion to their size before the launch. The calculation takes as given the share achieved by the new entrant in the chosen post launch period and recalculates all other brand shares in line with this.

Let us take the example of a very simple detergent market with only three brands A, B, and C. Before the launch of new Brand D, Brand A's share of purchase is 20%, Brand B's is 30% and Brand C's is 50%. Brand D is moderately successful and achieves 10% of the market. The SOE model, underpinned by the IIA assumption, would predict that all the existing brands will lose share to brand D in proportion to their share before the launch. So we would expect the post launch position to be Brand D 10%, Brand A 18% (20*[(100-10)/100], Brand B 27% (30*[(100-10)/100] and Brand C 45% (50*[100-10/100]).

These predictions are made for both the total market (all buyers of detergent over the relevant periods) and for a subset of the total, namely all purchasers who bought the new entrant at least once. The model is tested, on a brand by brand basis, using a t-test for matched samples: the same households were measured in terms of their purchases before and after a launch and the mean of these differences was tested against the expected mean under this model. The absolute number of purchases is used in this calculation rather than the market share derived from these.

For each new entrant, the share of purchase profile in the pre launch period for purchasers of the new entrant is compared with that of the total market. This is used to test for the existence of a cannibalisation effect. If the buyers of the new entrant are shown to be disproportionate purchasers of the parent brand then this could confirm cannibalisation, especially if the parent also suffers an unpredicted share loss.

Findings

(I) The UK Detergent Market - Launch of Wisk, Ariel Liquid & Persil Liquid

The detergent market in the UK had seen relatively little innovation before 1985, most of the brands were relatively mature with well-established product lines. But in the final quarter of 1985 Lever Brothers launched Wisk, a flanker brand with a new liquid formulation. This was the first in a series of liquid detergent launches that are summarised in Figure 2.

Figure 2. Timing of UK Liquid Detergent Launches 1985-1989.

		Product Launched	Measure Taken
1985	Q1		
	Q2		
	Q3		Pre Launch Wisk
	Q4	Wisk	
1986	Q1		
	Q2		
	Q3		
	Q4		Post Launch Wisk Pre Launch Ariel Liquid
1987	Q1	Ariel Liquid	
	Q2		Post Launch Ariel Liquid
	Q3		
	Q4		
1988	Q1		
	Q2		Pre Launch Persil Liquid
	Q3	Persil Liquid	
	Q4		
1989	Q1		
	Q2		PostLaunch Persil Liquid
	Q3		

For each of these new entrants the market is examined pre and post launch. The pre launch measures are taken in Q3 1985 for Wisk, Q4 1986 for Ariel Liquid and Q2 1988 for Persil Liquid. Post measures are taken in Q4 1986 for Wisk, Q2 1987 for Ariel Liquid and Q2 1989 for Persil Liquid. In each case the post launch measures are taken in the first quarter after launch in which shares showed a return to an equilibrium state. An estimate of share of purchase is then made, assuming that a straight share order effect (SOE) model applies. The purchase behaviour of consumers, before and after the launch, is examined both on a total market basis and in terms of only that cohort of buyers who

purchase the new entrant at least once. The results of these analyses are presented in Tables 1 - 7.

Wisk

Table 1 demonstrates the impact of the launch of Wisk on the UK detergent market, along with predictions of share, based on a SOE effect model.

Table 1 UK Detergent Share of Purchase Pre and Post Wisk Launch - All Buyers

BRAND	ACTUAL Share of Purchase PRE LAUNCH %	PREDICTED Share of Purchase POST LAUNCH %	ACTUAL Share of Purchase POST LAUNCH %	DIFF
PERSIL	33	30	29	-1
ARIEL	19	17	16	-1
BOLD	13	12	13	1
OWN LABEL	9	8	8	0
DAZ	8	7	9	2 *
OTHERS	19	17	17	-0
WISK	-	10	10	0
Base	4943	5114	5114	

Base : Purchases made by all Detergent Buyers
Source: AGB

Note. Pre Launch: Q3 1985 Post Launch : Q4 1986
* $p<0.01$
Rounding means that some of the figures in the DIFF column may appear incorrect.

It will be remembered that Wisk is a new brand and an innovative new product since it is the first liquid detergent onto the UK market. In common with many innovations it has a slow start, building to a share of nearly 10% after one year.

Bunten & Simmons (1993 p24) suggest that consumers were hesitant about switching to the different product format which Wisk offered. As they put it,

" a different product format, without any brand heritage, was only for the brave"

Wisk also did not benefit from the immediate brand awareness as a line extension would in a similar situation.

As Wisk is a new brand the IIA assumption is expected to hold and as Table 1 shows, all brands, except Daz, lose share in line with their pre launch positions.

If one now examines only those consumers who buy Wisk, the pattern is very similar. A SOE model gives relatively robust predictions with only minor variations, as Table 2 illustrates. None of these differences is significant at $p<0.01$ level. For Wisk buyers the new entrant accounts for 20% of their purchases in Q4 1986 over a year after the launch, twice the level of the total market.

Table 2 Share of Purchase Pre and Post Wisk Launch - Wisk Buyers Only

BRAND	ACTUAL Share of Purchase PRE LAUNCH %	PREDICTED Share of Purchase POST LAUNCH %	ACTUAL Share of Purchase POST LAUNCH %	DIFF
PERSIL	33	27	24	-2
ARIEL	17	14	13	-1
BOLD	13	11	12	1
OWN LABEL	9	7	8	0
DAZ	9	7	9	2
OTHERS	19	16	17	1
WISK	-	19	19	
Base	2468	2607	2607	

Base: Purchases Made by Buyers of Wisk

Note : Pre Launch: Q3 1985 Post Launch : Q4 1986 Source: AGB

Rounding means that some of the figures in the DIFF column may appear incorrect.

A comparison of the pre launch purchase profiles of these two groups - all detergent buyers (Table 1) vs Wisk buyers (Table 2) shows negligible differences between the

groups (Table 3). So the Wisk brand appears to have been trialed by consumers regardless of the brands they previously bought.

Table 3 Comparison of Share of Purchase for Wisk Buyers vs Total Market - Pre launch Q3 1985

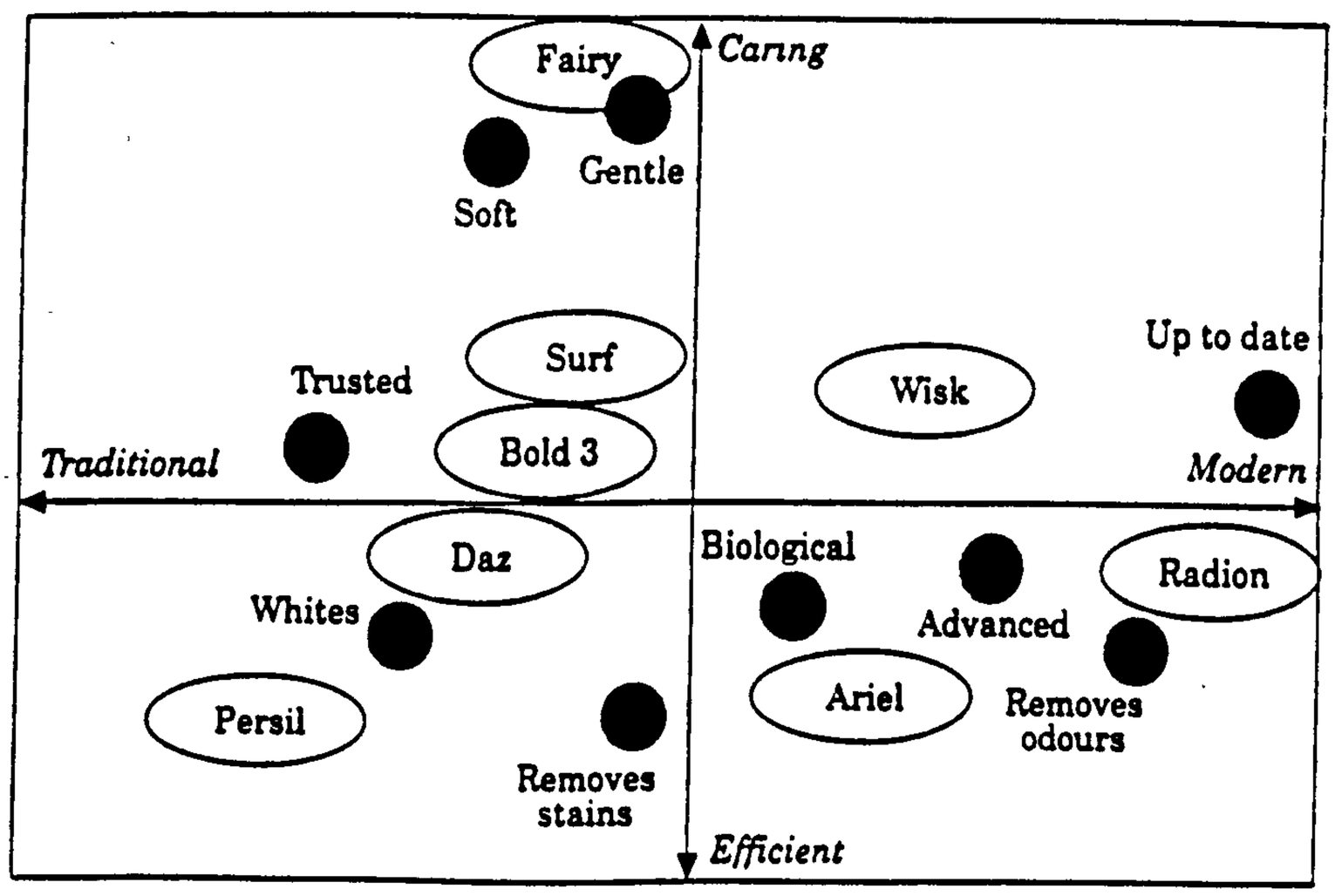
BRAND	WISK BUYERS PURCHASE PROFILE %	TOTAL MARKET PURCHASE PROFILE %	DIFF
PERSIL	33	33	-0
ARIEL	17	19	-1
BOLD	13	13	-0
OWN LABEL	9	9	1
DAZ	9	8	1
OTHERS	19	19	0
Base	2468	4943	

Source: AGB

Note: Rounding means that some of the figures in the DIFF column may appear incorrect.

This result is particularly interesting since Lever Bros had positioned Wisk as distinctly different to their major brand Persil presumably in an attempt to minimise cannibalisation. As the brand map below demonstrates, Persil's image is of tradition and efficiency with special ownership of the "Whites" category whereas Wisk is seen as more modern and caring. Lever Bros were hoping to lose proportionately less from Persil but that hope was not realised.

Figure 3. Detergent Brand Image Map



Source: Millward Brown
in Gosling (1991 p220)

Ariel Liquid

Procter & Gamble responded to Levers' launch of Wisk with the launch of Ariel Liquid in the first quarter of 1987. Their branding strategy was quite different to that of Levers - Ariel Liquid is a line extension of the parent brand within the detergent market. As such it might be hypothesised that

- Ariel Liquid would gain share more rapidly than Wisk for two reasons. Firstly it would be seen as less innovative as a liquid detergent had already been

launched on the market. Secondly it would benefit from an existing brand name (Claycamp & Liddy 1969, Aaker & Keller 1990, Doyle 1989).

- Ariel Powder would suffer a disproportionate loss of share due to cannibalisation by the extension.

- Wisk would lose share disproportionately since it was more similar to the new entrant because of its liquid form.

The data support the first hypothesis as Ariel Liquid took only one quarter to climb to the share levels that it took Wisk a year to achieve.

But as Table 4 shows the second cannibalisation hypothesis is not supported. Ariel, as a brand, benefits greatly from the introduction of the liquid variant, and the Ariel powdered variants suffer no more than would be expected for any brand of comparable size. Cannibalisation does not seem to have occurred to any significant extent in this case. Table 5 corroborates this. Those buyers who went on to purchase Ariel Liquid had only a slightly higher percentage of their purchases accounted for by Ariel Powder than all buyers of detergent (18% vs 16%).

Table 4. UK Detergent Share of Purchase Pre and Post Ariel Liquid Launch - All buyers

BRAND	ACTUAL Share of Purchase PRE LAUNCH %	PREDICTED Share of Purchase POST LAUNCH %	ACTUAL Share of Purchase POST LAUNCH %	DIFF
ARIEL	16	25	26	0
Ariel Powder	16	14	14	0
Ariel Liquid	-	12	12	0
PERSIL	29	26	24	-2 *
BOLD	13	11	10	-1
OWN LABEL	8	7	7	0
DAZ	9	8	9	2 *
WISK	10	9	8	-1
OTHERS	17	15	17	1 *
Base	5296	5801	5801	

Base: Purchases Made by All Detergent Buyers
Source: AGB

Note. Pre launch : Q4 1986 Post Launch : Q2 1987
* $p<0.01$
Rounding means that some of the figures in the DIFF column may appear incorrect.

The third hypothesis is also not supported. Wisk only loses share in line with its market position (Table 4). The only brand to suffer disproportionately to any significant extent is Persil, which did not have a liquid variant at this time. However as Table 5 demonstrates, there are two significant differences between Ariel Liquid purchasers and the total market. Wisk takes a higher proportion of their purchases than is true for the market as a whole: Persil takes a lower proportion than would be expected if Ariel Liquid buyers were typical of all detergent buyers. This suggests a predisposition towards liquids.

Table 5. Comparison of Share of Purchase for Ariel Liquid Buyers vs Total Market - Pre launch Q4 1986

BRAND	ARIEL LIQUID BUYERS PURCHASE PROFILE %	TOTAL MARKET PURCHASE PROFILE %	DIFF
PERSIL	26	29	-3 **
ARIEL	18	16	2
BOLD	11	13	-2
OWN LABEL	6	8	-2
DAZ	9	9	0
WISK	14	10	4 **
OTHERS	17	17	-1
Base	3099	5296	

Note. ** p<0.001
Rounding means that some of the figures in the DIFF column may appear incorrect.

Persil Liquid

Lever Bros responded to the success of Ariel Liquid somewhat belatedly, in Q3 1988. It seems likely that they were hoping to maintain Wisk as their liquid brand and Persil as their powder brand. Possibly the dominance of Ries & Trout's (1986) view on line extensions played a part and the fear of consumer confusion/cannibalisation was too great to risk line extension. Eventually it would appear that Persil's deterioration in share from 33% (in Q3 1985 just prior to the launch of Wisk) to 24% (in Q1 1988 just before the launch of Persil Liquid) became impossible to accept. This share loss was almost certainly due to the success of liquid products.

Our findings suggest that Persil Liquid does not cannibalise Persil Powder. The powdered variants of the brand lose slightly less share than would be predicted by the

SOE model (Table 6). The brand in total benefited, although not to the same extent as Ariel with its earlier similar line extension.

Table 6. UK Detergent Share of Purchase Pre and Post Persil Liquid Launch - All buyers

BRAND	ACTUAL Share of Purchase PRE LAUNCH %	PREDICTED Share of Purchase POST LAUNCH %	ACTUAL Share of Purchase POST LAUNCH %	DIFF
PERSIL	24	29	29	0
Persil Powder	24	22	23	0
Persil Liquid	-	6	6	0
ARIEL	22	20	19	-1
Ariel Powder	13	12	11	-2 *
Ariel Liquid	9	8	9	1
BOLD	10	9	10	1
OWN LABEL	9	8	8	-1
O/L Powder	7	6	5	-1 *
O/L Liquid	2	2	3	1
DAZ	9	8	6	-2 *
WISK	6	5	5	0
OTHERS	22	20	23	2
Other Powder	17	16	15	-2 *
Other Liquid	5	4	8	4 **
Base	5815	5951	5951	

Base: Purchases Made by All Detergent Buyers

Note. Pre launch : Q2 1988 Post Launch : Q2 1989 Source: AGB

** p<0.001 * p<0.01

Rounding means that some of the figures in the DIFF column may appear incorrect.

As with Ariel Liquid, the powders are the losers with Ariel Powder, Daz, Own Label Powder and Other Powder losing significantly more share than would be expected.

A comparison of the purchase profiles of Persil Liquid buyers against the total market (Table 7) might suggest some evidence that Lever Bros' postulated concern over potential cannibalisation was justified. Persil Powder accounted for a significantly higher proportion of the purchases of those buyers who went on to purchase Persil Liquid than was true for the market as a whole. But this merely seems to have encouraged access to the brand since as the preceding Table 6, demonstrates Persil Powder share only declined in line with its predicted loss. Persil Liquid buyers also bought significantly more of the other brands of liquid detergent before the launch. They are more likely to have bought Ariel Liquid, Wisk and Other Liquids and significantly less likely to have bought the powdered variants.

Table 7. Comparison of Share of Purchase for Persil Liquid Buyers vs Total Market - Pre launch Q2 1988

BRAND	PERSIL LIQUID BUYERS PURCHASE PROFILE %	TOTAL MARKET PURCHASE PROFILE %	DIFF	
PERSIL	31	24	7	**
ARIEL	20	22	-2	
Ariel Powder	8	13	-5	**
Ariel Liquid	12	9	3	**
BOLD	8	10	-2	
OWN LABEL	6	9	-3	
O/L Powder	4	7	-3	**
O/L Liquid	3	2	0	
DAZ	6	9	-3	*
WISK	8	6	2	*
OTHERS	22	22	-0	
Other Powder	14	17	-3	*
Other Liquid	8	5	3	**
Base	2195	5815		

Note. Pre launch: Q2 1988
** p<0.001 * p<0.01
Rounding means that some of the figures in the DIFF column may appear incorrect.

(ii) The German Detergent Market - Launch of Sunil Sulfatfrei

Sunil Sulfatfrei was launched in the third quarter (Q3) of 1989 as a more concentrated version of the parent brand, Sunil. Examination of the market profile pre (Q2 1989) and post launch (Q4 1990) suggests that Sunil as a brand did not benefit at all from the introduction of Sunil Sulfatfrei. A comparison of the "actuals" columns in Table 8 shows that the total brand (inclusive of the line extension) only increased share from 9.5% of purchases in Q2 1989 to 9.9% of purchases in Q4 1990. The line extension gained 2.6% share over this period, suggesting cannibalisation.

Table 8. Share of Purchase Pre and Post Sunil Sulfatfrei Launch - All buyers

BRAND	ACTUAL Share of Purchase PRE LAUNCH %	PREDICTED Share of Purchase POST LAUNCH %	ACTUAL Share of Purchase POST LAUNCH %	DIFF	
SUNIL	9.5	11.8	9.9	-1.9	
Sunil (Others)	9.5	9.3	7.3	-2.0	*
Sunil Sulfatfrei	-	2.6	2.6		
PERSIL	19.2	18.7	19.2	0.5	
TANDIL	18.0	17.5	15.9	-1.6	
ARIEL	12.5	12.2	15.6	3.4	**
WEISSER	4.9	4.8	5.3	0.5	
OMO	5.2	5.1	2.9	-2.2	**
UNA	4.2	4.1	3.8	-0.3	
ALMAT	2.1	2.0	2.3	0.3	
OTHERS	24.3	23.7	25.2	1.6	
Base	3244	2900	2900		

Base: Purchases Made by All Detergent Buyers
Source: GfK

Note. Pre Launch: Q2 1989 Post Launch: Q4 1990
** p<0.001 * p<0.01
Rounding means that some of the figures in the DIFF column may appear incorrect.

The SOE model does not offer a good fit, partly because Sunil Sulfatfrei seems to cannibalise the parent and hence the IIA assumption is suspect. However, since the small percentage share gained by Sunil Sulfatfrei has only a marginal effect on the

market equilibrium, it is possible that the share loss by the Sunil (Others) variants could be attributable to factors other than cannibalisation.

However analysis of that cohort of consumers who purchase Sunil Sulfatfrei gives a much clearer picture. With those consumers who purchase the line extension it appears to have been quite successful, capturing over a fifth of their purchases (20.8%) by Q4 1990, 15 months after the launch. But if we track back to look at the purchasing patterns of these buyers before the launch, we can see that previously they were heavy buyers of the parent brand. Their purchases of Sunil Sulfatfrei are therefore largely at the expense of Sunil (Others) - a cannibalisation effect. The parent brand suffers disproportionately from the introduction of this line extension, accounting for 23.6% of these buyers' detergent purchases before the launch and only 16.2% (excluding Sunil Sulfatfrei) post launch.

Table 9. Comparison of Share of Purchase for Sunil Sulfatfrei Buyers vs Total Market

BRAND	SUNIL SULFATFREI BUYERS PURCHASE PROFILE %	TOTAL MARKET PURCHASE PROFILE %	DIFF	
SUNIL	23.6	9.5	14.1	**
PERSIL	14.5	19.2	-4.7	*
TANDIL	10.5	18.0	-7.5	**
ARIEL	11.3	12.5	-1.2	
WEISSER	4.8	4.9	-0.1	
OMO	7.5	5.2	2.3	*
UNA	1.3	4.2	-2.9	*
ALMAT	0.8	2.1	-1.3	
OTHERS	25.7	24.3	1.4	
Base	373	3244		

Note. ** $p<0.001$ * $p<0.01$

A comparison of the share of purchase profiles of Sunil Sulfatfrei purchasers against all buyers of detergent shows some interesting differences and provides confirmation of the cannibalisation effect. If the shares of purchase are examined before the launch

of Sunil Sulfatfrei we can see, from Table 9, that those purchasers who go on to buy Sunil Sulfatfrei purchase Sunil far more frequently than the total market. Sunil accounts for 23.6% of their purchases compared to 9.5% for the total market. Persil Liquid in the UK, Table 7, showed a similar although less marked effect. However in the case of Persil Liquid the parent brand did not lose share disproportionately; the parent brand Sunil did. So for Sunil Sulfatfrei buyers the purchase of Sunil Sulfatfrei appears to have been a straight replacement for the purchase of one of the other Sunil detergents.

This identification of clear evidence of cannibalisation provides a benchmark against which to gauge the performance of other new entrants within other markets.

DISCUSSION

This study examines the impact of four new entrants in terms of the dynamics of share shifts which occur after launch. This preliminary investigation of the UK and German detergent markets shows that the model produces valid predictions of brand share following the launch of Wisk, but is less accurate at predicting the shares following the launches of Ariel Liquid and Persil Liquid. In the case of Sunil Sulfatfrei the SOE model is not at all appropriate. These results are consistent with the notion that the IIA assumption is not appropriate for line extensions.

In the case of line extensions, it would normally be expected that a degree of cannibalisation ie disproportionate substitution would occur, since the extension could be seen as a replacement purchase for the parent. However there is no evidence of cannibalisation with either of these UK extensions. It could be hypothesised that the parent brands did not lose share disproportionately since the extensions were seen as being radically different to their parents. The liquid detergent format distanced the extension from the parent in spite of the shared brand name.

In the launches of both Ariel and Persil Liquids, the powdered variants suffered most. This might suggest the presence of a cannibalisation barrier as described by Buday

(1989). His suggestion - that form loyalty is high, at least within usage occasion - is relevant here. Buday also suggested that crossover between user groups is rare in these circumstances.

Our results give limited support to this view - if Buday were correct then one would expect to find some evidence that consumers remain within the liquid category. To take the UK market as an example it might be expected that consumers would first buy Wisk and then Ariel Liquid and then maybe Persil Liquid. Tables 5 and 7 do show that Ariel and Persil Liquid buyers were significantly more likely to have bought liquid detergents before these launches than the market as a whole. But not to such a great extent that crossover, from powder to liquid, could be described as rare. However Buday does limit his assertion on form loyalty to **within usage occasion** and the constraints of the panel data do not allow us to assess this.

Instead of cannibalisation barriers, our results could be explained as an advertising effect of the new product. In this context the launch of Ariel Liquid (UK) could have supported the Ariel powdered variants, producing a sales effect which outweighed that of cannibalisation. Though speculative, this thinking is also consistent with the resistance to loss shown by Wisk since the arrival of the new Ariel variant supported the liquid format Advertising effects work in opposition to our other hypotheses and are difficult to disentangle. But we would expect that support for existing brands in liquid format to become weaker as more and more liquids enter the market. When Persil Liquid (UK) entered the market it did so partly at the expense of other liquids.

The launch of Sunil Sulfatfrei onto the German detergent market provides a contrast. The SOE model does not produce accurate predictions of the direction and magnitude of share changes. But here the parent brand Sunil is cannibalised by the extension; for many consumers, the extension provides a substitute purchase. The degree of similarity of fit between Sunil and its Sulfatfrei variant appears to be far greater than that between the UK products of Ariel and Ariel Liquid, and Persil and Persil Liquid.

Extensions do cannibalise the parent if the two products are seen as substitutes. This needs to be viewed as a continuum with greater similarity leading to a greater level of substitutability. Some account needs to be taken of the degree of similarity of fit between the parent and offspring. This fit might be operationalised on a number of dimensions, of which brand name is only one, and probably not the most important. From our small sample it would appear that, although brand name is a dimension in determining the similarity of fit between product lines, it is not necessarily a dominant one. Although Buday's cannibalisation barriers are not shown to exist to the extent where crossover is rare between user groups, perhaps there is a form loyalty within usage occasion which overrides brand loyalty.

It is valuable to note the dramatically differing fortunes of Wisk and Persil Liquid in the UK since, according to Bunten & Simmons (1993), they are actually the same product. Wisk had a very slow build of share which then declined rapidly. Persil Liquid built share very quickly almost matching Wisk in its first quarter of launch and then passing it in its second quarter of sales. This suggests that line extension is a more effective strategy provided the extension is sufficiently different from the parent.

Directions For Future Research

These preliminary findings are perhaps best viewed as an extended case study since there are too few examples to make any meaningful statements about new entrants and markets in general. There is a need to build on the results of this research with more studies. It may be that a more sophisticated SOE model needs to be developed which will take account of the similarity of fit between the new entrant and the incumbents. The UK experience with Ariel and Persil suggests that brand name is not a particularly significant dimension in determining fit, although this is perhaps due to the radical nature of the extension. Other dimensions could be pack format, pack size, price, fragrance etc. This model then needs to be tested in other markets and countries to determine the range of its application.

APPENDIX 2

PILOT STUDY II

The Measurement of Cannibalisation

Wendy Lomax, Kathy Hammond, Maria Clemente & Robert East

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The prevalence of line extensions, as manufacturers struggle to maximise the leverage of their brand equity, is undoubtable and well- documented (Aaker 1990, Tauber 1981, Ries & Trout 1986). Brand owners use existing brand names to reduce barriers to entry for the new line with the implicit assumption that additional profit will be earned as a result. But haunting the parent brand is the spectre of cannibalisation. What if the line extension is successful but only at the expense of the parent? Additional costs will be incurred perhaps without the benefit of incremental revenue.

Cannibalisation is a very real threat for the vast majority of new product launches. But there has been little empirical work which quantifies this threat, or which examines the measures which can be used to define it. In this study we use panel data to examine three alternative measures of cannibalisation - gains loss analysis, duplication of purchase tables and a method based on deviations from the expected share movements. Each of these measures is tested on three line extensions in the UK and German detergent markets.

DEFINITION OF CANNIBALISATION

There is no one generally accepted definition of cannibalisation. Kerin, Harvey & Rothe (1978) use Heskett's (1976) definition

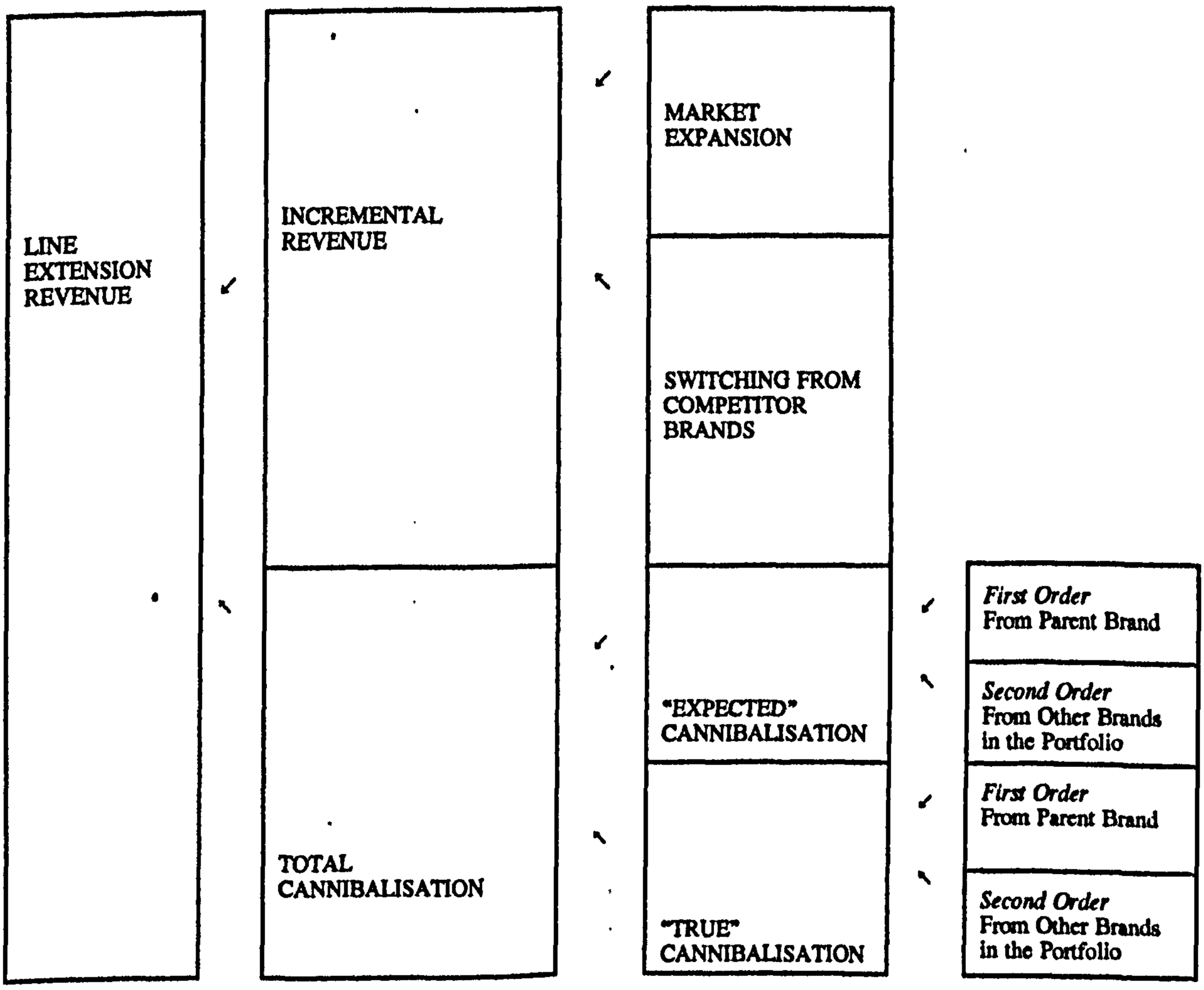
"the process by which a new product gains sales by diverting them from an existing product."

Mason and Milne (1994) use Copulsky's (1976) definition and are less concerned with process than with magnitude. They define cannibalisation as

" the extent to which one product's customers are at the expense of other products offered by the same firm."

But it is difficult for any manager to determine this - managers tend to take a more aggregate approach and look at sales volumes and shares, not at individual's buying patterns. It also over simplifies the construct which can be viewed on a number of levels.

Figure 1 LEVELS OF ABSTRACTION OF CANNIBALISATION



As figure 1 illustrates any line extension can potentially gain revenue from a number of sources. Ideally the sales would be derived from the incremental revenues described in the top half of the figure which may be as a result of market expansion or switching from competitor brands, or a combination of the two. But more often the new product's sales will take from the existing portfolio to a greater or lesser extent.

Indeed it is important to appreciate that for most products some cannibalisation at the total level is almost inevitable. The work of Ehrenberg and others would suggest that any new product entering a market will take share from all the existing players in proportion to their size. This figure we term "expected" cannibalisation and we would expect this to be higher for larger brands, and lower for small ones. So to expect no cannibalisation at all is perhaps idealistic and will only be achieved by a few. A prudent manager might expect some share loss by the parent brand, and indeed all other brands in the portfolio as inevitable. His efforts should be directed towards preventing "true " cannibalisation ie disproportionate share loss by either the parent brand or others within the company's portfolio. .

MEASURES OF CANNIBALISATION

There appears to be no standard measure of cannibalisation. Reddy, Holak & Bhat (1994) define it as a percentage of total category sales. A working measure might be that percentage of the new product's sales which derives from the sales of an existing product within the company's portfolio. A tighter definition might examine only the sales loss experienced by the parent. Both allow for a range of 0% to 100%. We would expect the figure to be higher the more similar the line extension is to the parent/other brands in the portfolio. That similarity might be in terms of price, brand name, usage occasion or other attributes such as flavour or pack format.

Buday (1989 p29) suggests that

"Excessive cannibalisation is one of the common arguments against brand-extending....Common branding implies a similarity: similarity invites replacement."

The problem of the extension merely becoming a replacement purchase for the parent is only likely to occur where the products are substitutes, as was noted by Sullivan (1990). This is often assumed to be the case with line extensions - Bunten and Simmons (1993) cite the example of Alka Seltzer Plus whose sales volume was derived largely at the expense of the core brand. This effect can also be seen operating in the reverse direction. Birds Eye Walls' rationalisation of their Arctic Roll range, from two red berry flavours with Strawberry and Raspberry to one only, had

a negligible impact on sales. Previous purchases of Raspberry were replaced with Strawberry.

Franchise extensions run a much smaller risk; the different product category, and often different usage occasion can reduce the risk to zero. Hence the launch of Aquafresh Flex toothbrushes did not cannibalise the parent Aquafresh toothpaste brand. The less similar the new product to the parent, the lower the risk of a disproportionate loss of sales by the parent.

IDENTIFICATION OF CANNIBALISATION

Finding evidence of cannibalisation is by no means clear cut. Any process needs to take account of the dynamics of the market. We examine three potential methods - gains loss analysis, deviations from expected share movements and duplication of purchase tables. Each of these is tested on panel data covering consumer purchases of detergent in the UK (1986-89) and Germany (1989-90). In particular we examined the launches of three line extensions - Ariel Liquid (UK 1986), Persil Liquid (UK 1988) and Sunil Sulfatfrei (Germany 1989). The periods used are 4 weekly for the UK data and monthly for the German data, following the convention in fmcg markets (Parfitt & Collins 1968). A brief summary of each of the three methods is given below and then each of the launches is analysed illustrating the different perspectives each of these methods gives on the cannibalisation effect.
Firstly let us look at gains loss analysis.

Gains Loss Analysis

This method reallocates gains and losses in volume over two periods (normally those immediately before and after the launch of a new product).The analysis is done on a household basis and volumes are adjusted to take account of any change in volume between the pre and post launch periods (Rohloff 1963). The results from the individual households are then aggregated to give a brand switching report for the panel as a whole.

The convention of using the period immediately after launch raises some concerns. This period is likely to be atypical since the market's equilibrium has been disturbed. Distribution may be gained only slowly. Buying behaviour is likely to be more primitive with the more obvious cues of brand name and price assuming disproportionate importance (Rao & Sieben 1992). Later periods are likely to show the impact of the more sophisticated buying behaviour which is typical with this type of product (Monroe 1990).

Duplication of Purchase Tables

Duplication of purchase (or perhaps more accurately cross-purchase) tables can be used empirically to give actual cross purchasing and compared with theoretical norms derived from the Dirichlet model (Ehrenberg 1988 p353). We know that in almost all fmcg product fields consumers will buy more than one brand. They will usually have a preferred (or favourite) brand and will make secondary purchases of another or other brands. The proportion of individuals who buy a pair of brands can be computed by calculating the separate and combined penetrations of the two brands. Ehrenberg and Goodhardt (1970) have shown that, in most product fields, the purchasers of other brands are distributed in accordance with the penetrations of those other brands ie following the IIA assumption (Luce 1959)

However we would expect that where two products share the same brand name ie line extension, the level of cross purchasing would be higher than that predicted by the Dirichlet. Ehrenberg (1976) found the cross purchasing of the two Macleans line variants to be twice the level predicted by their respective penetrations.

We analysed the cross purchasing of the consumer panels in two different time periods. Initially we looked at the total market in the period immediately after launch, as we did with the gains loss method, but over an extended period of 13 weeks to allow for adequate levels of cross purchasing. Then we expanded the analysis by looking at a later post launch period when the market had returned to stability (which was determined by a combination of the runs test and Daniels' test).

Deviations from Expected Share Movements

As Figure 1 shows we would expect some share loss from the parent brand, and other brands in the portfolio. The magnitude of this "expected cannibalisation" would be in direct proportion to the share held by the incumbent brands prior to the new product launch. As we have already noted this concept of proportional gains (or losses) is consistent with many empirical duplication analyses, such as the Duplication of Purchase Law (Ehrenberg 1959) formalised in the Dirichlet model (Goodhardt, Ehrenberg & Chatfield 1984).

For each market, data are initially analysed at the level of the individual consumer. The unit of analysis is the single purchase or sale which is then aggregated across the buyers of each brand. The basic brand performance measure is "Share of Purchase": the percentage of purchase occasions accounted for by each brand in a period.

The market profile (in terms of the brands' shares of purchase) is examined pre and post launch. The pre launch measure is taken in the period immediately prior to the launch of the new entrant, and a post measure is then taken in the period after which sales patterns indicate a return to stationarity in the market (calculated by a combination of a Runs test and Daniels' test).

An estimate of share of purchase is made assuming that a straight share order effect (SOE) model applies ie that all brands lose share to the new entrant in direct proportion to their size before the launch. The calculation takes as given the share achieved by the new entrant in the chosen post launch period and recalculates all other brand shares in line with this.

Let us take the example of a very simple detergent market with only three brands A, B, and C. Before the launch of new Brand D, Brand A's share of purchase is 20%, Brand B's is 30% and Brand C's is 50%. Brand D is moderately successful and achieves 10% of the market. The SOE model, underpinned by the IIA assumption, would predict that all the existing brands will lose share to brand D in proportion to their share before the launch. So we would expect the post launch position to be

Brand D 10%, Brand A 18% (20*[(100-10)/100], Brand B 27% (30*[(100-10)/100] and Brand C 45% (50*[100-10/100]).

These predictions are made for both the total market (all buyers of detergent over the relevant periods) and for a subset of the total, namely all purchasers who bought the new entrant at least once. The model is tested, on a brand by brand basis, using a t-test for matched samples: the same households were measured in terms of their purchases before and after a launch and the mean of these differences was tested against the expected mean under this model. The absolute number of purchases is used in this calculation rather than the market share derived from these.

For each new entrant, the share of purchase profile in the pre launch period for purchasers of the new entrant is compared with that of the total market. This is used to test for the existence of a cannibalisation effect. If the buyers of the new entrant are shown to be disproportionate purchasers of the parent brand then this could confirm cannibalisation, especially if the parent also suffers an unpredicted share loss.

We will now see how these methods differ in their detection of cannibalisation.

1. Ariel Liquid

Ariel Liquid was launched in the UK in 1986 as a line extension of the parent powder brand. It rapidly gained share. The gains loss methodology gives a matrix of brands gaining share against brands losing share. An abbreviated version of this is shown in Table I below, illustrating the sources of Ariel Liquid's share gain.

Table I: Launch of Ariel Liquid Analysed by Gains Loss Analysis

	BRANDS LOSING (% row)						
BRAND GAINING	Ariel Powder	Persil	Wisk	Bold	Daz	Store	Others
Ariel Liquid	32	16	25	8	3	4	13

Note. Pre launch : Period 26 Post Launch : Period 28 Source: AGB

Gains loss analysis suggests that the two main losers were the parent brand and Wisk. Nearly a third (32 %) of Ariel Liquid's volume came from the parent brand with a quarter (25%) coming from Wisk. One might expect Wisk to lose since it was the only other liquid detergent on the market, and Ariel Powder to lose since the products shared a name. Persil Powder also contributed a significant amount to Ariel Liquid's success, which could be explained on the grounds of size.

Duplication of purchase analysis produces a matrix of a different sort - that of buyers of the different brands who also buy any or some of the other brands available. These composite penetrations can be compared with the theoretical norms produced by the Dirichlet, to show any unusual variations from the pattern predicted. To simplify the communication of these results we have called the predicted penetration 100 and indexed the observed data against this. Figures over 100 show a level of cross purchasing higher than that predicted by the model, and suggest cannibalisation.

Table II: Duplication of Purchase for Ariel Liquid buyers

Buyers of these brands who also bought Ariel Liquid	Immediate Post Launch Period	Stabilised Post Launch Period
Ariel Powder	**157**	**130**
Persil Powder	78	60
Wisk	**195**	**180**
Bold	96	79
Daz	90	107
Store Liquid	**197**	**210**

Note. Immediate post launch : Period 28 Stabilised post launch : Period 38 **Source: AGB**

The duplication of purchase method confirms the gains loss results in the sense that both show that Wisk and Ariel Powder suffer most. However Persil Powder seems to be more resistant in the latter analysis. Store Liquid appears to part of the portfolio of many of the

Ariel Liquid buyers, which alongside the high figures reported for Wisk, might be indicative of a partitioning in the market between liquid and powdered buyers. Buyers of Ariel Liquid become less likely to become purchasers of Ariel Powder (157 to 130) over time which suggests either a reduction in the brand effect as the line extension becomes established, or that the liquid variant has become a substitute purchase for the parent. A similar effect occurs with Wisk. Store liquids by contrast become more important, probably as they become more widespread in the 40 weeks which separate the two measures.

However when we use the third method we find a different picture. This approach uses the variation in share movements from those we might have predicted had size been the only variable of significance. As Table III demonstrates, Ariel as a brand gained considerably from the launch of the liquid variant (increasing its total share from nearly 14% of the market before the launch to over 24% after the market had returned to equilibrium). The powdered variants showed none of the attrition of share which might have been expected. In line with the other methods Wisk is shown to be a loser when the liquid competitor arrives, with a share decline which is significant at the 0.1% level.

Table III: UK Detergent Share of Purchase Pre and Post Ariel Liquid Launch - All buyers

BRAND	ACTUAL Share of Purchase PRE LAUNCH %	PREDICTED Share of Purchase POST LAUNCH %	ACTUAL Share of Purchase POST LAUNCH %	DIFF
ARIEL	14	21	24	3 **
Ariel Powder	14	12	15	3
Ariel Liquid	-	9	9	0
PERSIL	29	26	26	1
BOLD	13	12	9	-3
STORE	8	7	10	3 *
DAZ	9	8	7	-1
WISK	12	11	6	-5 **
OTHERS	17	15	19	4
Base	1202	1333	1333	

Base: Purchases Made by All Detergent Buyers
Source: AGB

Note. Pre launch : Period 26 Post Launch : Period 38
* p<0.01 **p>0.001
Rounding means that some of the figures in the DIFF column may appear incorrect.

One of the benefits of panel data is that it allows us to isolate groups of buyers. So we can look at just that group of consumers who chose to purchase Ariel Liquid. As Table IV demonstrates, there are two significant differences between Ariel Liquid purchasers and the total market. Wisk takes a higher proportion of their purchases than is true for the market as a whole: Persil takes a lower proportion than would be expected if Ariel Liquid buyers were typical of all detergent buyers. This suggests a predisposition towards liquids, rather than a brand effect.

Table IV: Comparison of Share of Purchase for Ariel Liquid Buyers vs Total Market

BRAND	ARIEL LIQUID BUYERS PURCHASE PROFILE %	TOTAL MARKET PURCHASE PROFILE %	DIFF
PERSIL	26	29	-3 **
ARIEL	15	14	1
BOLD	11	13	-2
STORE	6	8	-1
DAZ	10	9	1
WISK	16	12	5 **
OTHERS	17	17	0
Base	724	1202	

Note. ** p<0.001

Rounding means that some of the figures in the DIFF column may appear incorrect.

Source: AGB

2. Persil Liquid

Persil Liquid was launched onto the UK detergent market in 1988, a belated response to the success of Ariel Liquid. Similarly to Ariel Liquid, Persil Liquid was differentiated from the parent brand by product format but carried the same brand name in the same product category.

The gains loss analysis (Table V) shows a similar market response to Ariel Liquid's launch.

Table V: Launch of Persil Liquid Analysed by Gains Loss Analysis

	BRANDS LOSING (% row)									
BRAND GAINING	Persil Powder	Ariel Powder	Ariel Liquid	Wisk	Bold	Daz	Store Pwdr	Store Lqd	Other Pwdr	Other Lqd
Persil Liquid	31	3	14	8	6	5	1	4	10	18

Note. Pre launch : Period 45 Post Launch : Period 48

Source: AGB

The parent brand appears to contribute nearly a third of the volume (31%) to the line extension: the other liquid variants also suffer. Ariel Liquid is a significant contributor of volume (14%), as is Wisk to a lesser extent (8%). As far as Lever Brothers are concerned the loss by Ariel is to be welcomed since Ariel is a Procter & Gamble brand whereas the loss by Wisk, one of their own stable, is more concerning.

The duplication of purchase analysis (Table VI) confirms that households purchasing Persil Liquid were also more likely to be purchasers of Persil Powder, Ariel Liquid, Wisk and Store Liquids. Once again, the two main motivators to purchase appear to be the brand name and the liquid format. By the time Persil Liquid is launched, there are many more liquid competitors to face.

Table VI: Duplication of Purchase for Persil Liquid buyers

Buyers of these brands who also bought Persil Liquid	Immediate Post Launch Period	Stabilised Post Launch Period
Persil Powder	165	121
Ariel Powder	70	80
Ariel Liquid	182	184
Wisk	191	179
Bold	71	55
Daz	77	48
Store Liquid	151	146

Note. Immediate post launch: Period 48 Stabilised post launch : Period 50 Source: AGB

As with Ariel Liquid the level of cross purchasing between the parent and the line extension reduces significantly over time (from an index of 160 to 121). In this case the market returns to stability relatively quickly, and only 8 weeks separate the measures. But interestingly the cross purchasing between the liquids (with the exception of Store

Liquids) remains high. Households who buy Persil Liquid are nearly twice as likely to buy Ariel Liquid, and Wisk.

Analysis of share movements (Table VII) shows that the Share Order Effect model holds up relatively well in this case. None of the share movements deviate from those proportionate movements we would expect (except the aggregate category of Others). Persil Powder holds up well, losing only the share that would be expected in view of its size. The brand as a whole benefits from the introduction of the line extension increasing its share from 23% of the market before the launch to 27% after.

Table VII: UK Detergent Share of Purchase Pre and Post Persil Liquid Launch - All buyers

BRAND	ACTUAL Share of Purchase PRE LAUNCH %	PREDICTED Share of Purchase POST LAUNCH %	ACTUAL Share of Purchase POST LAUNCH %	DIFF
PERSIL	23	27	27	1
Persil Powder	23	22	22	1
Persil Liquid	-	5	5	0
ARIEL	21	20	25	5
Ariel Powder	13	12	13	2
Ariel Liquid	8	8	11	3
BOLD	10	9	7	-2
STORE	9	9	8	-1
Store Powder	7	7	6	0
Store Liquid	2	2	2	-1
DAZ	8	8	9	1
WISK	5	5	5	0
OTHERS	24	23	19	-4 **
Other Powder	18	17	15	-2 *
Other Liquid	6	6	5	-1
Base	1441	1403	1403	

Base: Purchases Made by All Detergent Buyers

Source: AGB

Note. Pre launch : Period 45 Post Launch : Period 50

** p<0.001 * p<0.01

Rounding means that some of the figures in the DIFF column may appear incorrect.

However despite this relatively stable picture illustrated in Table VII, the purchasers of Persil Liquid are significantly different to the market as a whole. They are significantly more likely to be purchasers of Persil Powder, Ariel Liquid, Wisk and Other Liquids (Table VIII).

Table VIII: Comparison of Share of Purchase for Persil Liquid Buyers vs Total Market - Pre launch

BRAND	PERSIL LIQUID BUYERS PURCHASE PROFILE %	TOTAL MARKET PURCHASE PROFILE %	DIFF
PERSIL	30	23	7 **
ARIEL	20	21	-2
Ariel Powder	8	13	-5 **
Ariel Liquid	12	8	3 **
BOLD	9	10	-1
STORE	5	9	-4
Store Powder	3	7	-4 **
Store Liquid	3	2	0
DAZ	6	8	-3 *
WISK	7	5	2 *
OTHERS	24	24	0
Other Powder	14	18	-4 *
Other Liquid	10	6	4 **
Base	566	1441	

Note. Pre launch: Period 45
** $p<0.001$ * $p<0.01$
Rounding means that some of the figures in the DIFF column may appear incorrect.

They are also significantly less likely to be purchasers of powdered products, particularly Ariel Powder, Store Powder and Other Powders. This profile confirms the gains loss and cross purchase analyses, with a clear indication that those households who purchased Persil Liquid were heavier purchasers of Persil Powder and liquid detergents than the average but lighter purchasers of powdered brands in general.

3. Sunil Sulfatfrei

Sunil Sulfatfrei was launched onto the German detergent market in 1989 as a concentrated version of the parent brand Sunil. It was relatively unsuccessful, capturing only 2.3% of the market once the market had stabilised. The very small market share proved a problem for the gains loss analysis. The output suggested that no brands (at the one decimal place level), including the parent had contributed any

volume. The duplication of purchase analysis proved more fruitful (Table IX) suggesting that households who purchase this line extension are six times more likely to be purchasers of the parent brand in the period immediately after the launch. They are more than twice as likely to be purchasers of both line extension and parent after the market has stabilised. This suggests cannibalisation. These households are also more likely to be purchasers of Ariel, Omo and Weiss.

Table IX: Duplication of Purchase for Sunil Sulfatfrei buyers

Buyers of these brands who also bought Sunil Sulfatfrei	Immediate Post Launch Period	Stabilised Post Launch Period
Sunil	600	238
Ariel	225	162
Tandil	75	38
Weiss	150	176
Omo	175	333
Una	0	105
Almat	0	81

Note. Immediate post launch: Period 9 Stabilised post launch : Period 17 Source: GfK

Analysis of share movements also adds weight to the probability of cannibalisation. The parent brand loses share between the pre launch and post launch periods. This share loss is significant, although only at the 5% level. The only brand to lose share significantly at the 1% level is Omo, which is again consistent with the cross purchasing pattern shown in the third column of Table IX.

Table X: Share of Purchase Pre and Post Sunil Sulfatfrei Launch - All buyers

BRAND	ACTUAL Share of Purchase PRE LAUNCH %	PREDICTED Share of Purchase POST LAUNCH %	ACTUAL Share of Purchase POST LAUNCH %	DIFF
SUNIL	10.4	12.5	11.2	-1.3
Sunil (Others)	10.4	10.2	8.9	-1.3
Sunil Sulfatfrei	-	2.3	2.3	0.0
PERSIL	18.1	17.7	19.8	2.1
TANDIL	17.7	17.3	18	0.7
ARIEL	15.2	14.9	13.8	-1.1
WEISSER	7.7	7.5	7.4	-0.1
OMO	5.1	5	3.2	-1.8 *
UNA	3.4	3.3	3.4	0.1
ALMAT	2.5	2.4	1.8	-0.6
OTHERS	24.3	19.5	21.4	1.9
Base	651	651	651	

Base: Purchases Made by All Detergent Buyers
Note. Pre Launch: Period 7 Post Launch: Period 17 Source: GfK
** p<0.001 * p<0.01
Rounding means that some of the figures in the DIFF column may appear incorrect.

More evidence to support Sunil Sulfatfrei's cannibalisation of the parent comes from Table XI. Buyers of Sunil Sulfatfrei are significantly more likely to be purchasers of the parent brand, and significantly less likely to be buyers of Persil or Tandil. So, although the small market share achieved by Sunil Sulfatfrei appears to cause problems for all the methods, particularly gains loss, there is supporting evidence for the cannibalisation effect emerging from the other methodologies.

Table XI: Comparison of Share of Purchase for Sunil Sulfatfrei Buyers vs Total Market

BRAND	SUNIL SULFATFREI BUYERS PURCHASE PROFILE %	TOTAL MARKET PURCHASE PROFILE %	DIFF	
SUNIL	21.2	10.4	10.8	**
PERSIL	8.1	18.1	-10.0	**
TANDIL	7.1	17.7	-10.6	**
ARIEL	14.1	15.2	-1.1	
WEISSER	13.1	7.7	5.5	*
OMO	4.0	5.1	-1.1	
UNA	4.0	3.4	-0.7	
ALMAT	1.0	2.5	-1.4	
OTHERS	27.3	20.0	7.3	**
Base	99	651		

Note. ** p<0.001 * p<0.01

Summary

The three line extensions discussed here all showed some evidence of cannibalisation. Ariel Liquid did not cannibalise the parent brand at the aggregate level of market share, indeed the brand as a whole benefitted from its launch. This is surely the major target of any marketing manager. However both the gains loss and duplication of purchase analyses suggested cannibalisation: gains loss showed a third of the parent's volume as deriving from the parent powders (Table I) and the duplication of purchase table (Table II) that buyers of Ariel Liquid were more likely to be buying Ariel Powder although this bias reduced over time. Comparison with the purchasing patterns of buyers of Ariel Liquid with those of the total market (Table IV) showed that they were significantly more likely to be purchasers of the Ariel brand before the launch of the liquid than was the market as a whole.

The launch of Persil Liquid similarly benefitted the parent brand although there was slight erosion of the share of the powdered variants by the time the market had stabilised

(Table VII). Again both gains loss and duplication of purchase analyses show a cannibalisation effect: once again gains loss suggested that around a third of the line extension's volume came from the parent (Table V) and the duplication of purchase table (Table VI) shows that households are more likely to buy both the line extension and the parent than we would have expected given their respective penetrations. However this bias again diminishes over time. Persil liquid buyers were also significantly more likely than the market as a whole to buy Persil Powder before the launch of the liquid variant.

Sunil Sulfatfrei provided problems for all the methods because of its small sample size. Gains loss analysis was unable to show the source of the line extension's volume. The duplication of purchase table (Table IX), share changes (Table X) and purchase profile (Table XI) all suggest cannibalisation.

Discussion

This study examines the differing perspectives offered by three alternative techniques available to evaluate cannibalisation effects. Testing of these techniques on three line extensions underlines the prevalence of cannibalisation since all three line extensions show some evidence of cannibalisation, although the effect is not necessarily evident at the aggregate level of market share. Ariel and Persil seemed to benefit from the introduction of their respective liquid variants, although Sunil suffered share loss when its Sulfatfrei variant was launched.

However, duplication of purchase tables show disproportionate cross purchasing between all parent brands and their line extensions (up to six times the level predicted in the case of the period immediately after the launch of Sunil Sulfatfrei). This effect diminishes over time but is still disproportionate even when the market has returned to stability. This unpredicted high level of cross purchasing is confirmed by an examination of the purchase profiles of purchasers of new entrants. Purchasers of Persil Liquid and

Sunil Sulfatfrei are significantly more likely to have been purchasers of the parent brand before launch, than are purchasers of detergent in total. Ariel liquid buyers were only slightly more likely to have been purchasers of Ariel.

Gains loss analysis shows the parent brands contributing around a third of the line extensions' volume in the case of Ariel and Persil Liquids, but is insufficiently sensitive to handle the low market share of Sunil Sulfatfrei.

These variations in results suggest that marketing managers should use multiple methods wherever possible, and need to sample over time since the "snap shot" approach may not give a true picture. All the angles need to be considered to develop a fuller understanding, particularly with small brands.

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