PATTERNS OF BRAND AND STORE CHOICE

Timothy Jerome Lamb

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DECLARATION

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ABSTRACT

The subjects of brand choice and store choice have been widely studied, but these two aspects of consumer behaviour have tended to be treated in isolation from each other. This thesis therefore provides a detailed examination of the way in which brand choice and store choice patterns compare and interact. The results are based on AGB consumer panel data, and relate to three frequently-bought grocery products.

Despite the multiplicity of factors believed to influence brand and store choice, at the aggregate level many highly regular patterns (concerning for instance the rate of purchase at a store, or the extent to which a brand's buyers also buy another brand) are found in each context. These various patterns are shown to be predictable by the Dirichlet, a stochastic model of buying behaviour, using only market share as brand-specific or store-specific input.

Importantly, the Dirichlet is shown to apply not only to the "whole-market" contexts of brand choice and store choice (as is known from previous research), but to the "submarket" contexts of within-store brand choice and within-brand store choice. This indicates that, although the numerical values may differ, at a rather more fundamental level brand choice patterns are the same within different stores, and store choice patterns are the same for different brands. It also means that the practical utility of the Dirichlet - generating theoretical norms to help interpret the observed data - has been extended, providing retailers and manufacturers with a more detailed and flexible market analysis tool.

A wide range of new findings are reported regarding the relationship between brand and store loyalty. For instance, it is found (via a new methodology to take account of the crucial influence of market share) that the levels of brand loyalty and store loyalty are quite similar in degree, although the latter does tend to exceed the former - a result which holds important implications for consumers' reactions to a brand delisting or stock-out. It is also found on a number of measures that the overall level of within-store brand loyalty varies little from store to store, and that consumers exhibit marked brand loyalty across stores (i.e. they show no tendency to switch brands when switching stores). In all these cases, the value of structuring the (often complex) observed patterns via the Dirichlet is amply demonstrated.

ABBREVIATIONS

Choice Contexts

BC	=	Brand Choice.
SC	=	Store Choice.
BCwS	=	Brand Choice within a Store.
SCwB	=	Store Choice "within" a Brand.
aBaS	=	across-Brand/across-Store.

Products and Regions

Automatc	=	Automatic Washing Powder.
Inst Cof	=	Instant Coffee.
Rgn I	=	Region I.
Rgn II	=	Region II.
A.I	=	Automatic Washing Powder, Region I.
B.I	=	Tea Bags, Region I.
C.II	=	Instant Coffee, Region II.
etc.		

Brands and Stores

OB	=	O Brands	=	Other Brands.
OM	=	O Mltps	=	Other Multiples.
Ms	=	Misclns	=	Miscellaneous stores.

A1-I	=	Brand A1 in Region I.
A1-X	=	Brand A1 at Store X.
etc.		
B/S	=	Brand B at Store S.
OB/S	=	Other Brands at Store S.
B/OS	=	Brand B at Other Stores.
OB/OS	=	Other Brands at Other Stores.
any-B/any-S	=	any brand at any store.

Measures of Dirichlet Fit

MAD	=	Mean Absolute Difference (between observed and predicted figures).
MD	=	Mean (absolute) Deviation (from the mean).
MD(O)	=	Mean Deviation: Observed figures.
MD(D)	=	Mean Deviation: Dirichlet (i.e. predicted) figures.

O	=	Observed.
D	=	Dirichlet (i.e. predicted).

Measures of Buyer Behaviour

(Note that some definitions below assume the BC context, although the same measures are used in the SC, BCwS and SCwB contexts. For a fuller description of these measures, see Section 2.3.3.)

MS	=	Market share.
b	=	Penetration.
w	=	Average purchase frequency of the brand per brand buyer.
wp	=	Average purchase frequency of the product class per buyer of the brand.
w/wp	=	Share of requirement.
bs/b	=	The proportion of brand buyers who are sole buyers.
ws	=	Average purchase frequency of sole buyers.
8+	=	The proportion of brand buyers who buy the brand eight times or more.
dpl	=	Duplication (i.e. the proportion of a brand's buyers who also buy another stated brand).

BLwS	=	**B**rand **L**oyalty **w**ithin a **S**tore.
BLaS	=	**B**rand **L**oyalty **a**cross **S**tores.
SLwB	=	**S**tore **L**oyalty "**w**ithin" a **B**rand.
SLaB	=	**S**tore **L**oyalty **a**cross **B**rands.

PART I

INTRODUCTION

Chapter 1

INTRODUCTION

Contents:

1.1. OVERVIEW.

Over the last three decades substantive efforts have been devoted to the study of brand choice behaviour. Recently, attention has also focused on the issue of store choice. However, these two aspects of consumer behaviour have tended to be treated in isolation from each other. This study therefore aims to improve understanding of how brand choice and store choice patterns compare and interact.

The importance of relating these two aspects of consumer behaviour has been heightened by recent developments in the grocery retailing environment. The abolition of resale price maintenance, the expansion and ascendancy of the large retail corporations, the accompanying growth in "private label" share, and the fragmentation of manufacturers' brands have combined to produce that oft-cited "shift in the balance of power" between manufacturer and retailer. Once able to dictate terms to a weak and fragmented retail trade, manufacturers now face a situation where a small number of aggressive supermarket chains dominate the distribution of groceries. It seems appropriate therefore to incorporate the "store factor" into the study of brand choice, and indeed to explore how brand buying relates to choosing between these large and highly competitive store chains.

In dealing with such issues, this study is descriptive, not explanatory, in approach. Concern centres on overt, aggregate choice behaviour (e.g. how many people buy this brand at this store? how often do they do so? and to what extent do they buy other brands or shop at other stores?), the aim being to establish regularities in behaviour, and the extent to which these accord with existing theory.

In this basic orientation, the study conforms to an ongoing series of analyses involving application of the "NBD" and "Dirichlet" models of buying behaviour. Indeed, conformity extends to the data type used (panel data), the analysis unit chosen, and the measures of behaviour employed. The results - concerning the products automatic washing powder, tea bags and instant coffee in two regions of the UK - can therefore be meaningfully related to existing knowledge in the area.

To clarify the intended contribution of the study, a brief review of this current body of knowledge would be appropriate.

1.2. EXISTING KNOWLEDGE.

A single act of purchasing represents a complex behavioural phenomenon. It embodies a multitude of decisions made - either explicity or implicitly - by the consumer: whether to buy the product, where to shop, which brand to buy, which pack-size, flavour, variety, and so on. On a deterministic perspective, it expresses both internal influences such as needs, attitudes and the experience of previous usage, and external influences such as advertising, availability, and social pressure. Furthermore, all consumers are unique, differing in personality, consumption rates, brand preferences, role (i.e. buyer, decision-maker or user?), and so on. Finally, all these considerations are compounded by differences between product fields, concerning distribution, brand differentiation, storage life, number of end-uses, and many other factors.

Yet despite such complexity, brand buying behaviour at the aggregate level - for frequently-bought products in "stationary" markets - has been found to exhibit a series of marked regularities. These include the following.

* The rate of buying a brand differs little from brand to brand, although this rate does tend to fall slightly with decreasing market share.

* The frequency distribution of purchases follows a positively-skewed downward-sloping curve, implying a large proportion of occasional buyers and relatively few heavy buyers.

* The extent to which a brand's buyers also purchase any other given brand varies with this latter brand's penetration (i.e. the proportion of the population who buy the brand at least once over the analysis period).

Crucially, these "law-like" regularities are not just empirical observations, but have been encapsulated by two main theoretical formulations. The first is the well-known NBD model (Ehrenberg, 1959; Chatfield, Ehrenberg and Goodhardt, 1966), which describes the buying pattern for an individual brand: the level of repeat-buying (e.g. the proportion of this month's buyers who buy it again next month), the growth in the number of buyers and the rate of purchase over time (e.g. if 20% of the population buy the brand in one month, how many will buy it in a year?), and the frequency distribution of purchases (i.e. the proportion of the brand's buyers who purchase it once, twice, etc. over the period).

The second formulation is the more general Dirichlet model (Goodhardt, Ehrenberg and Chatfield, 1984) which, importantly, **integrates** the predicted buying pattern for different brands. In this capacity, the Dirichlet represents a comprehensive model of buying behaviour, able to predict any aspect of aggregated brand choice patterns: how many people buy a brand, how often they do so, the proportion also buying other brands, the product-class purchasing rates of the buyers of specific brands, and so on.

The empirical support for the two models is substantial. Each has described the patterns of brand choice in many product fields and under a wide variety of market conditions (see e.g. Ehrenberg and Goodhardt, 1979, Table 5.3). Their main utility lies in the provision of theoretical norms on certain key measures of buyer behaviour. These "benchmarks" have proved very useful in identifying atypical patterns of behaviour, and in gauging the effects of promotional activity and other market dynamics.

In recent years, a major development in this line of research has taken place: the direct transfer of brand choice theory to the context of store choice. Specifically, the NBD has been shown to successfully describe the patronage pattern of store chains (Jephcott, 1972; Kau, 1981), store types (Wrigley, 1980), and individual outlets (Wrigley and Dunn, 1984a). The more general Dirichlet model has similarly been found applicable to chains (Kau, 1981; Kau and Ehrenberg, 1984; Uncles and Ehrenberg, 1988) and to individual outlets (Wrigley and Dunn, 1984b). These analyses cover a broad range of product fields, providing a good basis for generalization.

1.3. GAPS IN KNOWLEDGE.

Within this field of research, three main "gaps in knowledge" can be identified.

First, while it has been established that "store choice is like brand choice" in so far as the same models hold in each case, the question remains as to how the two contexts compare in terms of the numerical values involved. Put another way, is the level of store loyalty similar to the level of brand loyalty? Jephcott's (1972) results parenthetically indicated some correspondence here, but - the fit of the NBD being of primary concern - these did not take account of the market share factor on which brand and store loyalty are known largely to depend.

Second, investigation of brand choice **within individual stores**, and of store choice **for individual brands**, is at an early stage. Results so far are nevertheless encouraging. Kau's (1981) analysis supported the appropriateness to each context of the NBD model and the well-known "Duplication of Purchase Law" (described in Chapter 6). And Wrigley and Dunn (1984c) similarly found this "Law" to hold for brand choice within individual outlets. However, no direct application of the Dirichlet (which effectively subsumes both these formulations) has yet been made to either choice context. This gap was noted by Kau (1981, p. 197) in his recommendations for future research:

> "The application of the Dirichlet model should in future be further extended to the study of choice of store in more product fields as well as in the choice of brands within a store."

And Wrigley and Dunn (1984c, p. 1235) comment:

> "If this within-stores Dirichlet is calibrated for particular individual stores, it may be of great practical use in a two-stage approach to the analysis of store and brand choice."

On a more theoretical level Goodhardt et al. (1984, p. 639) question whether two parameters of the Dirichlet model might be store-specific characteristics.

Third, the study of the **interaction** of brand and store choice is also at a preliminary stage. Again, both Kau (1981) and Wrigley and Dunn (1984c) report valuable results on the issue, but without examining the predictive ability of the Dirichlet in this area. More generally, brand-store interaction - as indicated in the next section - represents a complex, multi-faceted subject, and several of its aspects have yet to be explored. The possibility of a **hierarchical** relationship between brand and store choice is one such issue (Goodhardt et al., 1984, p. 639).

1.4. OBJECTIVES OF THIS STUDY.

In brief, this study aims to generalize existing knowledge of brand and store choice patterns (via replicative analysis), and begin to fill the gaps in knowledge just mentioned. More specifically, four main objectives can be defined.

1. **To illustrate the regularities, and assess the fit of the Dirichlet model, in the brand choice and store choice contexts.**

   This is the most replicative area of analysis, in that the patterns and the applicability of the model are well-established at this level of aggregation. However, the analysis differs from previous studies in two main ways: (i) it represents the first application of the Dirichlet to the automatic washing powder and tea bag markets; and (ii) greater emphasis is given to **measuring** the degree of fit achieved by the Dirichlet.

2. **To establish the degree of similarity between the brand choice and store choice patterns (i.e. via direct comparison).**

   Two issues are involved: (i) is the level of loyalty similar in each case? and (ii) does the Dirichlet describe one context better than the other?

3. **To identify the regularities, and assess the predictive validity of the Dirichlet model, in the contexts of:**

   (i) brand choice within individual stores;
   (ii) store choice for individual brands.

   The present study represents the first direct application of the Dirichlet to these two choice contexts.

4. **To examine the interaction of brand choice and store choice.**

   Several issues, considered to fall within this subject-area, are studied:

(i) Are brand choice and store choice interdependent? (E.g. do brand preferences vary from store to store?)

(ii) Does the level of within-store brand loyalty vary from store to store?

(iii) Does the level of within-brand store loyalty vary from brand to brand?

(iv) Do consumers tend to switch brands when switching stores, or do they remain loyal to a brand across stores?

(v) Are consumers more likely to buy other brands at the same store or the same brand at other stores?

The data used for such analyses are extensive, concerning in total 72 distinct markets or submarkets, each of which contains five brands or stores. Thus a good basis for generalization is provided.

1.5. RESEARCH ORIENTATION.

Seven basic research orientations have already been mentioned or implied, but these are worth emphasizing in order to clearly delimit the scope of this study.

1.5.1. Aggregated Behaviour.

Analysis is concerned not with the choice behaviour of individual consumers (which typically exhibits irregularity to the point of resembling a random process), but with the collective behaviour of many individuals (which is more prone to regularity and susceptible to prediction). The degree of aggregation varies, however. At its highest level, all consumers (i.e. all regional panel members) are considered; at its lowest level, the buyers of a particular brand at a particular store represent the focus of analysis.

1.5.2. Description, not Explanation.

Attention centres on identifying and describing regularities in choice behaviour, many of which have been widely observed elsewhere. Beyond a few notes in Chapter 14, no attempt is made to explain **why** these patterns are what they are, or indeed to account for the market share on which they seemingly depend.

Such emphasis on description might be criticized for failing to identify the **causes** underlying buyer behaviour, the knowledge of which would help direct marketing efforts aimed at **changing** behaviour (e.g. increasing sales). Certainly most research into consumer behaviour has been more explanatory in approach, seeking to account for brand choice in terms of cognitive processing, consumer characteristics and external influences (promotions, social influences, etc.). However, the practical knowledge gained is limited. Many studies have tended to treat "brand choice" as a singular event, isolated from both past and subsequent choice, and in consequence hold little relevance to the **patterns** of behaviour that are now known to exist. Others **have** sought to explain choice behaviour over time, or more specifically brand loyalty, citing such notions as "risk reduction", "learning", "cognitive dissonance", and a wealth of consumer characteristics. But in view of the multitude of potential factors described earlier (Section 1.2), and the diversity of these studies in terms of products analysed and measures employed, it will be of no surprise that few generalizeable results have emerged.

The descriptive approach adopted here can be justified on three counts. First, the description of behaviour should logically precede its explanation. Generalizing and extending existing descriptive theory will establish precisely what needs to be explained. Second, a descriptive theory of buyer behaviour is valuable in providing a basis on which to identify **irregularities** in behaviour, and hence in directing efforts at explanation to where they are most needed. Third, describing the realities of consumer behaviour helps delimit the potential influence of marketing activity: it suggests what in practice can be achieved, and what can not. For instance, without descriptive analysis it would not be known that a marketing plan intended to markedly increase sales through purchasing rates alone (rather than through the number of buyers) would be aiming at an altogether unusual pattern of behaviour.

1.5.3. Stationary Markets.

Another basic orientation of the present research is that it relates to the "stationary" or "equlibrium" market condition - a situation where neither product class nor brands or stores within it show any marked variation or trend in sales over the period. The approach may seem restrictive on the view that marketing is concerned primarily with imposing **change**, but it can be justified in a number of respects.

First, an understanding of the static situation can give clues as to how change may be achieved. The clearest example is that brand share differences relate more to the **number** of brand buyers involved than to the purchasing rates of these buyers. Second, stationary models such as the Dirichlet can be (and are) used as "base-lines" to help gauge the nature of any change achieved (e.g. whether a sales increase derives from new buyers or from previous customers buying more frequently). And third, in the medium term, the stationary condition emerges as the general case: "any examination of actual data for frequently-bought consumer goods will show that large trends or big variations in sales are the exception" (Ehrenberg, 1988, p. 13).

A corollary of this orientation is that market shares are in this study taken as given: attention focuses on the patterns of choice associated with brands (or stores) of different market shares, not on how these shares were achieved, or why one brand (or store) should enjoy a larger share than another.

1.5.4. Focus on Brands and Stores, not Consumers.

The main concern is not with the buyer behaviour of consumers themselves (e.g. how many brands do consumers typically buy?; how brand-loyal are consumers?), but with the buyer behaviour associated with each brand and store (e.g. how often is the brand bought?; does it receive more loyalty than other brands?), the point being to measure the performance of **brands** and **stores** in the marketplace. This distinction is akin to that between the passive and active in grammar: the issue is not how consumers buy brands, but how brands are bought by consumers.

1.5.5. Generalizable Patterns, not Markets in Themselves.

The main thrust of this thesis is to identify generalizable behavioural patterns, rather than to describe "the tea bag market", or any other market in itself. Thus, if a behavioural irregularity is associated with any specific brand, this is deemed of interest only in so far as it represents a deviation from theory. The organization of the thesis accords with this approach: analysis proceeds on a measure-by-measure basis, rather than taking each product field in turn.

1.5.6. Store = Chain.

As the panel data used do not differentiate between separate branches of any given chain, the study of "store" choice in this thesis is strictly concerned with choice between grocery **chains** or so-called **multiples**. For reasons given in Section 2.2.3, it seems likely that the main findings of this study would still hold if individual outlets were considered.

1.5.7. No Emphasis on Private Labels.

Private labels (or retailers' "own brands") represent a tangible expression of a brand-store relationship, and as such are very relevant to the question of interaction between brand and store choice. However, private labels do not constitute the focus of this study. First, the need for anonymity precludes the identification of any private label that might be involved. Second, since this study covers much uncharted territory, it seems appropriate to establish the pattern for brands in general before singling out private labels for special scrutiny. And third, a focused investigation, contemporaneous with this study, of the buying patterns associated with private labels has been conducted by Ellis (1989).

1.6. DEVELOPMENTS IN GROCERY RETAILING.

This section expands on the points made earlier regarding recent changes in the grocery retailing environment, and notes the new demands for research generated by these developments.

Essays on contemporary grocery retailing usually begin by citing a "shift in the balance of power" between manufacturer and retailer (in the latter's favour). Before examining the factors involved, it would be appropriate to set such change in historical perspective.

In the mid-nineteenth century, it was the **wholesalers** who dominated the distributive trades. "Manufacturers would be expected to produce wholesaler-patented designs to order and the wholesalers dictated terms to retailers who wished to stock these 'brands'" (Watkins, 1986, p. 125). However, the power of manufacturers grew as rising productivity and standardization demanded wider markets than catered for by any single intermediary. Further, growing urbanization (implying geographical separation of producer and consumer) led to a need for products of recognizable quality, and by the end of the century manufacturers had responded with the first brands and, importantly, supportive advertising. This direct link with the consumer has been nurtured and widened throughout this century (as evidenced by the plethora of "household name" brands), and manufacturers have exploited the power of their consumer franchise in dictating terms to what, until quite recently, has been a weak and fragmented retail trade.

The present-day strength of the retailers in their dealings with manufacturers derives from five main developments over the last three decades.

First, the abolition of resale price maintenance in 1964 (via the Resale Prices Act) effectively transferred a major aspect of strategic and tactical prerogative from the manufacturer to the retailer. It also enabled the supermarket multiples, which had appeared in the late 1950s, to pass on to the consumer the benefits of their relative operational efficiency.

Second, catalysed by this last development and through major investment programmes, the larger grocery chains have expanded to a point where they now enjoy a hegemonic position in grocery retailing, as expressed by the market share figures in Table 1.1. Of these "major chains", Sainsbury, Tesco, The Gateway (formerly Dee) Corporation, Asda and the Argyll Group account for almost half of current UK grocery sales (Wrigley, 1987); and in the

London area, Sainsbury and Tesco alone are reported to represent over half of packaged grocery sales (Randall, 1985).

TABLE 1.1

Market Shares (%) of Grocery Retailer Subsectors, 1980-86.

	1980	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**
Major chains *	57	59	62	64	67	69	71
Cooperatives	21	20	18	19	17	16	15
Other Grocers	22	21	20	17	16	15	14

Notes:
* Grocery retailers with turnover greater than £9m in 1982.
- Source: Retail Business Quarterly Trade Reviews, "Food Shops", No. 4, December 1987, p. 7.

Third, this domination of the large multiples has been compounded by a concentration in **ownership**, which reduces the number of "buying points" (see e.g. Oliver, 1980, p. 261; Watkins, 1986, p. 131). Recent examples include Argyll's purchase of Safeway (which is itself now subsuming Presto), and Tesco's buying of Hillards (a Yorkshire-based supermarket chain).

Fourth, closely tied to the expansion of the large supermarket chains is the growth of private labels (occurring primarily over the last twenty years). These "retailer brands" now account for one quarter of the packaged grocery market, and in two large chains - Sainsbury and Waitrose - represent about half of packaged grocery sales (Simmons and Meredith, 1984, p. 9).

Fifth, in addition to the rise of private labels, the number of manufacturers' brands has proliferated - even in established product fields. An extreme example concerns breakfast cereals, where the number of brands rose from 30 in 1975 to 94 in 1985 (Buck and Yates, 1987).

In sum, these developments involve a simultaneous **concentration** on the retail side and **fragmentation** with regard to brands. The implications to the pattern of interdependence between retailer and manufacturer are not difficult to see.

Retail concentration makes crucial the trading practices of the large multiples to the success of an individual brand. A decision not to "list" a new brand by a major multiple could destroy its prospects, especially as smaller retailers are impressed by the reactions of the large chains to new products. Randall (1985, p. 75) cites the view of one food manufacturer that if Sainsbury and Tesco refuse to stock a new product, then it is simply not worth launching. For established brands the threat of delisting is equally potent, a recent casualty being Kellogg's Sultana Bran, delisted nationally by Sainsbury (Caulkin, 1987, p. 30).

At the same time brand fragmentation, exacerbated by the proliferation of private labels, has raised pressure on shelf-space. Simmons and Meredith (1984, p. 18) report that most retailers are willing to restrict brand range to the brand leader, a private label (where possible), and probably a second manufacturer brand.

In such circumstances, it indeed seems reasonable to assume that the relative bargaining strengths of manufacturer and retailer - regarding such matters as merchandising and supply terms - has altered in the latter's favour. However, this oft-cited "shift in the balance of power" may be exaggerated. Oliver (1980, p. 263) suggests that the position of manufacturers may be strong where brand differentiation and images are strong. Watkins (1986, p. 131) similarly contends that "By consumer advertising to build up the brand image in consumers' minds, the manufacturer can pressure the retailer to stock particular brands". The basis for such views is expressed by a comment of A.J. O'Reilly, President of Heinz:

> "My acid test on the issue [of brand character] is whether a housewife intending to buy Heinz Tomato Ketchup in a store, finding it to be out of stock, will walk out of the store to buy it elsewhere or switch to an alternative product."
>
> (Quoted in a Saatchi and Saatchi advertisement, Sunday Times, 22 January, 1984.)

This question, whether or not it relates in any way to the strength of brand "image", lies at the crux of the manufacturer-retailer power balance. The point has been made explicitly by Watkins (1986, p. 131):

> "How does the housewife react if a brand is not in stock in her 'usual' retail store? Does she
>
> - Buy an alternative brand from those in stock?
> - Make a separate shopping trip to obtain the brand?
> - Switch store loyalty and do all her shopping elsewhere?

> The answers to this conundrum aggregated across all consumers will determine the power distribution between intermediaries and manufacturers. If the first alternative is generally chosen, retailers have more power to dictate terms to manufacturers. If the final alternative is common, the retailer is pressured not to be out of stock of the brand for fear of losing sales and profits across a broad range of brands."

<u>The need for research.</u>

The.developments in grocery retailing outlined above have generated new demands on the academic research community.

One specific question that needs addressing concerns the relative extents of brand and store loyalty - an issue which, as just argued, is central to the balance of power between manufacturer and retailer.

More generally, the growth in size, competitiveness and in-house expertise of the large retail chains has been accompanied by a demand for new techniques of market analysis. Wrigley (1987) cites store location and performance forecasting as two particular areas of interest. Other concerns include optimizing brand range, assessing relative store performance for specific products and brands, and gauging the effect of promotional activity (at both inter-store and within-store levels).

The present study relates to such concerns in two main ways. First, it addresses specific questions of relevance, such as the balance between brand and store loyalty, and the extent to which store share and store loyalty vary across brands. Second, it investigates the validity of extending a current and valued means of market analysis - based on the NBD and Dirichlet models - to contexts where the crucial interrelationships between brand and store choice are at issue.

1.7. THESIS STRUCTURE.

1.7.1. Basic Terms.

Before the organization of topics is described, it would be appropriate to label the four basic choice contexts studied and the two levels of analysis involved, as extensive use of these terms (and their abbreviations) is made throughout the thesis.

	Choice Context	Abbreviation
1.	**Brand Choice.**	**BC**
2.	**Store Choice.**	**SC**
3.	**Brand Choice within a Store.**	**BCwS**
4.	**Store Choice "within"** (i.e. for) a **Brand.**	**SCwB**

The first two contexts are defined here as representing the **"whole-market"** level of analysis, brand and store choice being studied within the (regional) market in its entirety. The latter two contexts are defined as the **"submarket"** level, since at this level brand choice is studied within individual stores, and store choice with respect to individual brands. The results chapters are divided into two parts (Part III and Part IV) according to the level of analysis involved.

Throughout the thesis, the term **"market"** refers to a given product field within a given region, while the term **"submarket"** refers to the more limited market-place represented by a single store (for brand choice) or by a single brand (for store choice).

Many abbreviations are used other than those cited above, and these are listed prior to this chapter.

1.7.2. Organization of the Thesis.

This section outlines the topics covered by the thesis on a chapter-by-chapter basis.

PART I: INTRODUCTION.

Chapter 1: Introduction.

Chapter 2: Methodology.

Chapter 2 details the way in which the research has been conducted: the panel data used, the measures of behaviour chosen, and the analysis procedure followed. In particular, it describes the form of the Dirichlet model, which is both used and assessed throughout this thesis (the ambivalence of this simultaneous usage and testing being discussed).

The gist of the chapter is that in methodological terms the study accords closely with most other investigations in the area (i.e. concerning the NBD, Dirichlet and related models).

PART II: LITERATURE REVIEW.

Chapter 3: Brand Loyalty.
Chapter 4: Store Loyalty.

That these chapters deal with "loyalty" is not incongruous with the avowed concern of this thesis: brand and store **choice**. Loyalty is effectively an expression of choice over time, and as such is an emphatic concern of the research. The use of the term "choice" in the title of this thesis and several of its chapters simply reflects terminological convention in this area of inquiry.

In brief, Chapters 3 and 4 critically review the literature on brand and store loyalty, and summarize the knowledge gained in this area. In accordance with a basic orientation of this research (see Section 1.5 under "stationary markets"), the review does not deal with the extensive literature seeking to explain why one brand or store should be chosen rather than another. It centres on the patterns of choice over time, of which loyalty is a basic measure; where explanations are cited, it is to account for these **patterns**, not for any discrepancy in market share.

Chapter 5: The Relationship Between Brand Choice and Store Choice.

This chapter aims to review all the main studies that have treated brand choice and store choice simultaneously, and covers many diverse aspects of the relationship between the two choices: are the patterns similar in each case?; does brand choice **within** a store follow the established regularities?; does choice of store influence choice of brand?; are brand loyalty and store loyalty correlated?; what is the relevance of private labels?

PART III: PATTERNS OF CHOICE: THE WHOLE-MARKET LEVEL.

In Part III the first of the results are presented. As noted earlier, the data derive from three product fields - automatic washing powder, tea bags and instant coffee - in two regions of the UK. The actual illustrations cover mainly automatic washing powder in "Region I"; in most cases, the results from other markets are presented in summary form, with full data being provided in the relevant Appendices.

The findings in Part III pertain to choice within the (regional) markets as a whole, i.e. brand choice is not broken down by store, and store choice is not itemized by brand.

Chapter 6: Brand Choice.
Chapter 7: Store Choice.

These chapters are the most replicative of the thesis, as several studies of brand choice and store choice at the whole-market level have already been conducted. Nevertheless, the chapters represent the first application of the Dirichlet to the automatic washing powder and tea bag markets.

There are two main concerns of these chapters.

(i) To illustrate some of the main regularities in choice behaviour, as identified in previous investigations. The purpose here is to both generalize the existing theory and provide a basis for expectation when analysis focuses on patterns of choice at the submarket level..

(ii) To assess the fit of the Dirichlet model at the whole-market level. The approach differs somewhat from previous studies in placing emphasis on **measuring** - and not just illustrating - the degree of fit achieved.

On both these issues, comparisons are made between the six markets studied.

Chapter 8: A Comparison of Brand Loyalty and Store Loyalty.

While Chapters 6 and 7 illustrate that "store choice is like brand choice" in so far as both aspects of behaviour follow the same regularities and are predictable by the same models, Chapter 8 examines whether the correspondence extends to the actual numerical values involved. While results are presented, the orientation is methodological: a means is described of taking account of the crucial market share factor when comparing brand and store loyalty; and a single-value measure is introduced which is capable of summarizing the entire loyalty structure of the the brand and store choice contexts for the purpose of comparison within any given product field.

PART IV: PATTERNS OF CHOICE: THE SUBMARKET LEVEL.

The results presented in Part IV derive from a more disaggregate level of analysis, whereby brand choice is broken down by store, and store choice by brand.

Chapter 9: The Interdependence of Brand Choice and Store Choice.

The purpose of this chapter is to assess the extent to which brand choice is dependent on choice of store, and vice versa. Such analysis is commonplace in industry for specific product classes; but emphasis in this study is placed on **general** patterns, concerning for instance the stability of brand share ratios across stores, or how market leadership effects the relationship between brand and store choice. That interdependence is shown to be strong holds implications for the way in which the Dirichlet is calibrated in the BCwS and SCwB contexts - the focus of the next two chapters.

Chapter 10: Brand Choice Within Individual Stores.
Chapter 11: Store Choice for Individual Brands.

These chapters extend Kau's (1981) study of brand choice within and across stores. For comparability, the approach corresponds to that followed in Chapters 6 and 7 (dealing with the BC and SC contexts), the objectives being:

(i) to establish whether the regularities in choice shown to apply to the whole-market level hold also at the submarket level;

(ii) to determine the validity of the Dirichlet model at this level (this study being the first application of the Dirichlet to the BCwS and SCwB contexts).

Positive results on both counts would support the direct transfer of buying theory from the whole-market level to the submarket level.

Also, comparisons are made between different submarkets. For instance, in the BCwS context, the following questions are addressed: does the Dirichlet fit equally well within each store?; does the overall level of brand loyalty vary from store to store?; is a brand's buying pattern (relative to the Dirichlet norms) consistent across stores?

Chapter 12: A Hierarchical Model of Choice.

The appropriateness of the Dirichlet in the BC, SC, BCwS and SCwB contexts implies that, in previous chapters, two hierarchical models have parenthetically been established:

one describes how consumers choose between stores and then between brands within the chosen store; the other first describes brand choice and then store choice for the chosen brand. Chapter 12 examines whether one model provides a better representation of behaviour than the other, and in so doing makes a direct comparison between the Dirichlet's fit in the BC and SC contexts, and also between the fit achieved in the BCwS and SCwB contexts.

The chapter also considers the validity of simplifying the two-tier model by using the **output** of the first stage as **input** to the second stage.

Chapter 13: The Interaction of Brand Choice and Store Choice.

This chapter brings together three choice contexts: the BCwS and SCwB situations, which have already been studied (in Chapters 10 and 11); and the "aBaS" (across-Brand/across-Store) context, where consumers switch brand and store simultaneously, which has not previously been considered in the thesis. The purpose is to "trace" the choice behaviour of the buyers of a given brand-store combination as they move to other stores and to other brands. For instance, when switching stores, do they tend to buy the **same** brand or switch to alternatives? Some new approaches to modelling the patterns are proposed.

Two particularly important issues fall within the general concern of the chapter. First, a distinction is made between loyalty **within** and **across** submarkets. For example, it is quite possible for consumers to exhibit within-store brand loyalty but not across-store brand loyalty. Second, an assessment is made of whether the buyers of a brand at a store are more likely to buy other brands at the store, or the same brand at other stores. This balance between within-store brand loyalty and within-brand store loyalty is of particular relevance to the delisting issue, and more generally to the "balance of power" between manufacturer and retailer, as noted in Section 1.6.

PART V: SUMMARY AND DISCUSSION.

Chapter 14: Summary and Discussion.

This final chapter summarizes the main findings of the research, assesses their contribution to existing knowledge of consumer behaviour, and discusses their broader marketing and theoretical implications. Some recommendations for further research are also made.

APPENDICES.

The appendices contain all data on which the research findings are based (providing again many of the data presented in the text to facilitate comparison within the appendices).

Each appendix corresponds to a particular chapter, as specified below:

Chapter	Appendix
6	1
7	2
8	3
9	4
10	5
11	6
12	7
13	8

In the text, a table number prefixed by an "A" (e.g. Table A4.8) refers to a table in the Appendices (Appendix 4 in the present instance).

Chapter 2

METHODOLOGY

Contents:

2.1. INTRODUCTION.

This chapter introduces the data used in the study, the way in which buyer behaviour is measured, and the procedure followed in analysing such behaviour. It also describes the form and assumptions of the Dirichlet model, on which much of the study is based, and the codes used to preserve the anonymity of individual brands and stores.

A summary of the main points is provided at the end of the chapter. However, it is worth stating at the outset that in most respects the methodology accords with that adopted by several closely-related studies (e.g. Kau, 1981; Kau and Ehrenberg, 1984; Wrigley and Dunn, 1984c), thereby facilitating comparison.

2.2. DATA.

2.2.1. Markets Analysed.

The data concern three product fields, namely

Automatic washing powder,
tea Bags,
instant Coffee,

in two regions of the UK.

(To preserve anonymity, these regions have been coded "Region I" and "Region II".)

The reasons for choosing these product fields are several. First, their penetrations among the population as a whole and average rates of purchase are high, providing adequate data for analysis at a disaggregate level (i.e. brand choice within individual stores and store choice for individual brands). Second, with replication in mind, they provide both usage similarity (tea bags and instant coffee) and usage diversity (instant coffee versus washing powder). Third, the product set includes a well-studied field (namely instant coffee, which has already been shown to conform closely to the Dirichlet and related models) and two product classes to which the Dirichlet has not previously been applied. Finally, the products satisfy reasonably well two requirements of the Dirichlet: that the markets be stationary and unsegmented.

2.2.2. Time Period.

Unless otherwise stated, **all** results pertain to a 48-week period.

This approach, whereby behaviour is assessed within a distinct time period, differs from the "purchase sequence" analysis popular in the marketing literature. The time-period approach has three advantages. First, it has led to a wide range of generalizable results. Second, these can be easily related to other marketing data (such as sales levels, promotional activity, and seasonal effects) which are usually also measured on a time-period basis. And third, a special feature of this time-period orientation is that it has been established that the behavioural patterns in one period "contain" all the information necessary to predict, quite accurately, those applying to any other time period. For instance, regarding a brand's penetration (b) and average rate of purchase (w), "b and w in a month tell essentially the same story as the numerically different b and w in a year"

(Goodhardt et al., 1984, p. 652). Put another way, "There is therefore little in the longer-term (e.g. annual) penetration figures which is not already implicit in (or predictable from) the shorter-term buying patterns. The amount and complexity of the information that has to be considered is therefore greatly reduced" (Ehrenberg, 1988, p. 34).

These (predictable) changes that occur on specific behavioural measures over time periods of increasing length (e.g. the growth of a brand's penetration and purchase frequency, and the fall in its proportion of 100%-loyal buyers) are well documented for brand buying (e.g. Ehrenberg, 1988), and also in the store choice, within-store brand choice, and within-brand store choice contexts (Kau, 1981). This aspect of buying behaviour is not considered in this thesis.

2.2.3. Brand and Store Categories.

The brand and store categories chosen for analysis are specified, in code form (to ensure the required anonymity), in Table 2.1. In the case of brands, the prefixes A, B and C refer to the associated product field (i.e. whether Automatic washing powder, tea Bags, or instant Coffee). The numbers 1 to 5 refer to the rank, within Region I, of each brand in terms of market share.

TABLE 2.1

Brand and Store Categories.

Brands			Stores
Automatc	**Tea Bags**	**Inst Cof**	**All 3 products**
Brand A1	Brand B1	Brand C1	Store V
Brand A2	Brand B2	Brand C2	Store W
Brand A3	O Brands	Brand C3	Store X
Brand A4	Brand B3	O Brands	Store Y
Brand A5	Brand B4	Brand C4	Store Z
			O Mltps
			Misclns

Notes:
- O Brands = Other Brands.
- O Mltps = Other Multiples.
- Misclns = Miscellaneous.
- The brands above are ranked by Region I market share.

Brands.

With regard to the brand categories chosen, three clarifying remarks can be made.

(i) A brand category in this study is composed of all the items within the product field carrying that brand's name: it includes all the various pack-sizes available to the consumer, and in the case of instant coffee a distinction is not drawn between granules and powder, or "standard" and decaffeinated coffee.

(ii) In the cases of tea bags and instant coffee, a composite "Other Brands" category is included within the choice set. In the tea bag market, this grouping is composed of **all** brands other than the four "named" brands. In the case of instant coffee, however, it excludes seven individual brands (representing 3% of the Region I and Region II markets combined) which were considered to enjoy a special linkage with one or two of the named brands.

(iii) For purposes of replication, the same brand categories were chosen in each region.

Stores.

Regarding the store categories, again three points can be made.

(i) Throughout this thesis (literature review excepted), the term "store" refers to a store **chain** rather than an individual outlet. The panel data used do not differentiate between the various branches of a given chain: regional-level sampling implies geographical disperion of panel members who consequently do not have access to the same individual outlets. Thus a consumer who shops at two branches of a given chain is counted as visiting the same "store". It seems unlikely that this feature of the data will undermine inferences from the present results as to the pattern of choice between individual outlets: "general knowledge of UK shopping habits", note Kau and Ehrenberg (1984, p.400), "suggests that consumers mostly buy at just one or two branches of a particular chain", and recent work by Wrigley and Dunn (1984a; 1984b) indicates that the main store choice patterns reported in this study hold also when individual outlets are considered.

(ii) Composite categories are also included within the store choice set. "Other Multiples" consists of all **grocery** chains other than the named chains. The "Miscellaneous" category is composed of all other shops where purchases of the product in question are recorded:

this diverse set includes independent grocers, "symbol" grocers (i.e. belonging to voluntary wholesale groups), department stores (this group includes chains not specializing in groceries), freezer centres, chemists, market stalls, butchers, bakers and milkmen.

(iii) Unlike the brand situation, the store categories studied are the same for each product field, but vary (partially) across the two regions.

Distribution Gaps.

All brand categories are available at all store categories in Region I. In Region II, however, the following brand-store combinations do not arise (i.e. the brand is not stocked by the store):

Brand A3 at Store V
Brand A3 at Store W
Brand B1 at Store V
Brand C1 at Store V
Brand C3 at Store V

Clearly, Store V provides an opportunity to investigate whether the general multibrand buying patterns hold in stores with restricted brand ranges.

2.2.4. Data Source.

The data derive from two regional subsamples of AGB's well-established Television Consumer Audit (TCA) consumer panel. The panel consists of a large number of households, purchasing data being collected and recorded by an interviewer who visits the household on a weekly basis (rather than by the "diary" method). Information is collected for each item purchased, and concerns - among other variables - the household involved, the week in which the purchase was made, the brand name, the name of the store where the item was bought, the price paid, the pack-size, and the quantity bought.

The crucial feature of any consumer panel lies in its **continuity**, which allows the purchasing behaviour of the **same** group of consumers to be assessed over extended time periods (48 weeks in the present instance). "Snapshots" of purchasing behaviour can be misleading, in particular as to the number of "buyers" involved and the incidence of multibrand buying (both of which have been shown to increase markedly over time - see e.g. Ehrenberg, 1988).

The panel members included in this study are those who reported continuously over the 48-week analysis period.

Households that joined, or left, the panel during this period, or whose records were interrupted or unusable, are excluded.

The sampling approach used in selecting the panel (within each region) is a random three-stage clustered design, based on the Postcode framework. Stratification is carried out at the second stage by degree of urbanization. At the final stage a technique is used to ensure that the TCA samples are representative in terms of four interlaced socio-economic demographic factors (namely age of household, socio-economic classification, household size, and presence of children): random addresses are issued to interviewers together with pre-specified demographic targets; recruitment is then attempted at each of these households provided that there is a requirement for that type of household.

For the specific purposes of this study, a data base for each product field was set up by AGB. The data required for analysis were extracted (by the author) using the RAMIS II computing language.

2.2.5. Sample Sizes.

For each region, the number of continuous reporters generating the data for this study is specified in Table 2.2. Also listed are the percentage of households buying the product at least once over the 48 weeks (penetration) and these buyers' average rate of buying the product. From these figures, it is apparent that around 9000 "purchase occasions" are available in each market, which certainly seems adequate for studying purchase patterns at the whole-market level.

TABLE 2.2

Summary of Panel Data Used in the Study.

Region	Product	Number of continuous reporters	Product Penetration (%)	Product average purchase frequency
Region I	Automatc	879	80	10.8
	Tea Bags	879	81	11.1
	Inst Cof	879	90	11.5
Region II	Automatc	835	77	12.1
	Tea Bags	835	85	15.9
	Inst Cof	835	92	12.1

The main small-sample problems are likely to apply to small brands such as B4, small stores such as Z, and in particular to combinations of such categories. As shown by Table 2.3, at Store Z in Region I the buyers of Brand

TABLE 2.3

The Number of Buyers of Each Brand-Store Combination.

	Store	Brand				
Automatc Rgn I		**A1**	**A2**	**A3**	**A4**	**A5**
	X	198	125	116	79	70
	OM	167	112	82	69	61
	Y	135	97	83	61	39
	Msc	100	72	31	55	37
	Z	55	49	30	27	22
Tea Bags Rgn I		**B1**	**B2**	**OB**	**B3**	**B4**
	X	258	113	120	53	33
	OM	102	136	136	70	51
	Msc	108	98	140	57	44
	Y	80	116	87	53	34
	Z	110	37	20	25	11
Inst Cof Rgn I		**C1**	**C2**	**C3**	**OB**	**C4**
	X	259	168	96	80	53
	OM	135	148	93	100	60
	Y	94	136	82	44	40
	Msc	92	108	66	113	28
	Z	85	44	42	17	9
Automatc Rgn II		**A1**	**A4**	**A2**	**A5**	**A3**
	V	148	77	81	94	0
	OM	98	64	51	62	66
	W	102	69	60	54	0
	Z	87	70	46	41	58
	Y	61	40	41	14	66
Tea Bags Rgn II		**B1**	**B2**	**OB**	**B3**	**B4**
	V	0	166	168	62	140
	Z	211	83	68	60	41
	OM	105	131	119	82	64
	Y	76	87	47	36	31
	W	60	81	77	51	33
Inst Cof Rgn II		**C2**	**OB**	**C1**	**C3**	**C4**
	V	204	160	0	0	19
	OM	176	101	119	82	11
	Z	132	56	150	66	17
	W	100	75	49	51	14
	Y	94	44	62	44	20

B4 and Brand C4 number only 11 and 9 respectively. Clearly, in such instances the associated buying behaviour must be interpreted with caution.

However, small-sample problems do not undermine the main findings of this study in so far as the same patterns, trends and regularities found in many related studies are strongly apparent here, even when analysis is at its most disaggregate level (i.e. the BCwS and SCwB contexts). Where sampling error **is** relevant, it would tend to obscure such patterns rather than hold responsibility for their occurrence.

2.2.6. Errors in the Data.

Beyond the sampling issue, data errors may derive from a number of factors: information may be omitted or wrongly recorded; bias may result from the exclusion of non-continuous panel members (although evidence suggests that cooperators and non-cooperators do not differ in their purchasing behaviour - see Ehrenberg, 1988, pp. 119-121); stores' overall market shares might be incorrectly measured due to the locational clustering of panel members.

However, three points of reassurance can be made. First, the consumer panel from which the current data are drawn is a large, long-established panel, and strenuous efforts are devoted to ensuring that it gives an accurate representation of real-life purchasing patterns. The data from panels of this type have been described as "amongst the most fully checked and reproducible that are available in the social sciences" (Ehrenberg, 1988, p. 9). Second, where bias **does** occur, it generally influences the aggregate totals, such as sales levels or market shares, rather than the relationships between different aspects of buying behaviour (Ehrenberg, 1988, p. 9); and it is these relationships and patterns with which the present study is concerned. Third, as noted in the preceding section, whatever error may be present, it can not be deemed severe in so far as widely-noted behavioural regularities and patterns are clearly visible in the data. As Ehrenberg (1988, p. 9) notes regarding his data,

> "there is little need here to use the possible occurence of measurement or statistical errors in the data to explain away **major** discrepancies in the repeat-buying results, as major discrepancies do not generally occur".

2.2.7. Stationarity.

As noted in Chapter 1, a basic orientation of the present research is that it relates to the "stationary" or "equilibrium" market condition. This is a situation where the sales of the product, brands and stores involved show no marked variation or trend over the analysis period, and represents a basic assumption of the Dirichlet model (see Section 2.4.4).

The sales levels of the three products studied in successive 4-week periods are specified in Table 2.4. All cases exhibit a small "trough" in mid-summer (the holiday season); and the instant drinks markets experience some further seasonality in sales, the peak being in winter. However, the markets appear sufficiently stable for present purposes: "the stationary models to be discussed have tended in fact to give a good fit even in such situations where the stationarity is only approximate" (Ehrenberg, 1988, p. 12).

TABLE 2.4

Product Sales Levels in Successive 4-Week Periods.

	Region I			Region II		
4-week period	Auto-matc	Tea Bags	Inst Cof	Auto-matc	Tea Bags	Inst Cof
1	638	813	823	595	1065	806
2	657	596	807	656	864	807
3	658	670	859	663	897	838
4	618	620	780	649	936	788
5	638	616	747	712	917	797
6	615	604	774	643	938	784
7	649	676	694	671	887	724
8	586	588	678	595	881	665
9	574	610	652	621	901	674
10	692	707	742	678	997	730
11	653	712	768	672	978	786
12	671	720	814	664	964	826
Ave	637	661	762	652	935	769

Notes:
- Sales level measured in terms of purchase occasions.

2.3. MEASUREMENT.

2.3.1. The Buying Unit.

The panel data analysed record behaviour for each **household** rather than each individual within it. Thus a distinction is not made between a household where one member makes the purchases in question and a household where several members perform the task. And for each buyer, no information is provided as to whether he or she is also the decision maker behind the purchases, or indeed the end user. Such considerations are most crucial when investigating the correlates of buyer behaviour, which is not the case here. (As Engel and Blackwell (1982, p. 571) note, "the correlation of **individual** variables with **family** purchases probably accounts for many of the problems in brand loyalty research".)

The use of the household as buying unit in fact accords with the approach of most closely related studies (i.e. using the NBD and Dirichlet models), and thus facilitates comparison.

Given this buying unit, where the term "consumer" is used in this thesis, reference is strictly being made to the household. As another convention, since women are widely regarded as the primary purchasing agents for frequently-bought groceries (Engel and Blackwell, 1982, p. 53), "the consumer" is assumed feminine.

2.3.2. Unit of Analysis.

The unit of analysis employed is the **purchase occasion** rather than money paid, weight, volume, or number of units bought. The reasons for this choice are several: a similar unit has been used by almost all related work on the NBD and Dirichlet models over the last two decades; the purchase occasion approach allows the aggregation of different pack-sizes to be dealt with by the same theory (Ehrenberg, 1988, p. 11); and it has in the past led to a wide range of coherent results. Further, differences with the "packs" approach may in any case be small. Evidence indicates that, for many product fields, "a single unit tends to be purchased on each occasion and the distinction with respect to amount bought is numerically trivial" (Ehrenberg and Goodhardt, 1970, p.78). This point is illustrated by the present data in Table 2.5. (Of particular note here is the **similarity** between different brands and stores: rounded to one decimal place, the average number of packs bought per purchase occasion is 1.1 in 29 of the 30 cases.)

TABLE 2.5

Average Number of Packs Bought per Purchase Occasion.
Region II.

Automatc				
	Brand A1	1.10	Store V	1.12
	Brand A4	1.11	O Mltps	1.06
	Brand A2	1.05	Store W	1.14
	Brand A5	1.15	Store Z	1.11
	Brand A3	1.05	Store Y	1.07
Tea Bags				
	Brand B1	1.09	Store V	1.12
	Brand B2	1.09	Store Z	1.08
	Brand OB	1.08	O Mltps	1.07
	Brand B3	1.08	Store Y	1.09
	Brand B4	1.08	Store W	1.05
Inst Cof				
	Brand C2	1.14	Store V	1.13
	Brand OB	1.12	S Mltps	1.10
	Brand C1	1.09	Store Z	1.11
	Brand C3	1.10	Store W	1.11
	Brand C4	1.07	Store Y	1.07
Average		1.09		1.09

Notes:
- Brands and stores are listed in order of market share.

A few remarks would be appropriate to clarify the definition of "purchase occasion", as the panel data studied record the **week** rather than the day of purchase. Two scenarios illustrate the working of the analysis unit.

(i) If a consumer buys two units (i.e. two packs) of a given brand in a particular week, one purchase occasion is recorded - whether these units were bought at the same time or on separate days.

(ii) However, if a consumer buys units of two **different** brands in a particular week, then **two** purchase occasions are recorded - again whether or not the units involved were bought at the same time. It seems reasonable to record more than one purchase occasion in such instances as more than one "brand decision" has been made.

A similar convention is adopted in closely-related studies, such as those of Jephcott (1972), Chatfield and Goodhardt (1975), Kau (1981), and Kau and Ehrenberg

(1984).

2.3.3. Measures of Buyer Behaviour.

This section introduces the principal measures of buyer behaviour on which the analysis is based. These all refer to overt behaviour (i.e. the "revealed" patterns associated with what is bought, where, when, and by whom) at the aggregate level.

The measures are listed below together with their usual abbreviation and, where appropriate, a brief explanation. Although the same measures are used in all choice contexts studied (i.e. the BC, SC, BCwS and SCwB contexts), they are described with reference to a hypothetical brand ("Brand B") alone. **It must be assumed that all measures relate to a specific time period (48 weeks in the case of the present study).**

Market share: MS

Penetration: b

The proportion of the population buying Brand B at least once.

The term "relative penetration" is employed when the population in question is limited to buyers of the product class, buyers at a store, or buyers of a brand.

Product penetration is denoted by a capital, i.e. **B**.

Average purchase frequency: w

The average number of purchases of Brand B per buyer of Brand B.

Product average purchase frequency is denoted by a capital, i.e. **W**.

Average purchase frequency of the product class per buyer of Brand B: wp

Share of requirement: w/wp

The average proportion of Brand B buyers' total product purchases devoted to Brand B.

The proportion of sole buyers: bs/b

The proportion of Brand B buyers who only buy Brand B. (Correspondingly, 1-bs/b represents the proportion of Brand B buyers who also buy other brands.)

The average purchase frequency of sole buyers: ws

Note that sole buyers' purchasing rate of the brand is by definition equal to their purchasing rate of the product class.

Purchase frequency distribution: (no abbreviation)

The percentage of Brand B buyers making 1, 2, 3, etc. purchases of the brand.

Duplication: dpl

The proportion of Brand B buyers who also buy any other stated brand.

The measures relate to buyer behaviour **within a specified market.** Thus when analysis moves from the whole-market level to the submarket level, appropriate reinterpretation of the measures is required. For example, when brand choice patterns within a given store are considered, the average purchase frequency (w) value for Brand B relates only to the purchasing of Brand B **within that store**; and the proportion of Brand B buyers who are sole buyers (bs/b) refers only to these buyers' behaviour **within the store** (they may well buy other brands when at other stores).

Many well-estalished regularities are associated with the above-listed buyer behaviour measures in the brand choice context. These are summarized by Ehrenberg and Goodhardt (1979), Goodhardt et al. (1984) and Ehrenberg (1988), and are first illustrated by the present data in Chapter 6.

2.4. THE DIRICHLET MODEL.

2.4.1. Introduction.

As emphasized in Chapter 1, much of the current investigation centres on the Dirichlet model of buyer behaviour: its predictive accuracy is assessed in a variety of choice contexts, and in turn the model is used to help structure and interpret the observed behaviour. This section briefly introduces the form of the model, its main assumptions, and its main uses. For its original and more detailed exposition the reader is referred to Goodhardt et al. (1984).

The Dirichlet is a stochastic model of buyer behaviour, describing how frequently-bought nondurable consumer goods are purchased in stationary and unsegmented markets. It has two main submodels, dealing with (i) the purchase incidence of the product field and (ii) the probability of selecting each brand, and in each case allows for consumer heterogeneity. In combining these two aspects of behaviour - purchase incidence and brand choice - which have typically been treated separately in the past, the Dirichlet represents a comprehensive model of buying behaviour. As such, it is able to predict any aspect of overt, aggregated buyer behaviour.

2.4.2. Output.

The Dirichlet can therefore generate predictions for the measures of buyer behaviour listed in Section 2.3.3 (excluding market share), such as how many people buy a brand (b), how often they buy it (w), what proportion of these buyers also buy any other given brand (dpl), how many purchases they make of the product class as a whole (wp), and so on.

The strength of the model is that it not only deals with the buying pattern of any given brand (as did the earlier NBD model), but describes the **relationships** between the buying of one brand and the buying of other brands.

2.4.3. Input.

Despite its comprehensiveness, the model is very parsimonious, requiring only three parameters - denoted **M**, **K** and **S** - and, crucially, only market shares as brand-specific input.

The parameter **M**, defined as the average rate of buying the product class per capita (or per household), simply measures the size of the market. The parameters **K** and **S** - which reflect two aspects of consumer diversity - are described in Section 2.4.5, after the model's distributional assumptions have been specified.

That only market shares are required as brand-specific information is an important feature of the model. It implies that, in the many markets the Dirichlet has successfully described, the various marketing variables at work (product formulation, packaging, pricing, promotion, etc.) have no net effect on the buying pattern for a given brand once account has been taken of market share. Put another way, the differences between the buying pattern of different brands can generally be accounted for solely in terms of market share. This is not to negate the relevance of marketing activity; the point is that the effect of such activity is almost entirely subsumed by market share.

2.4.4. The Main Assumptions.

The first two assumptions concern not the formulation of the model as such, but the circumstances in which the formulation is assumed valid.

(i) Stationarity.

As noted in Section 2.4.1, the model assumes that the market to which it is applied is a stationary one. The justification for such an assumption was provided in Section 1.5.3, and centres on the simple observation that in the medium term most established markets exhibit stability rather than instability.

(ii) Non-segmentation.

The model also assumes that the market is unsegmented, i.e. that across consumers the proportion of purchases devoted to any given brand is independent of the way the remaining purchases are distributed between other brands (beyond the constraint to add to 1). This situation embodies Luce's (1959) "IIA" (Independence from Irrelevant Alternatives) axiom, according to which the **ratio** of the probabilities of choosing different items remains constant when the elements of the choice set are changed. Arguments countering the validity of the axiom have been provided under such headings as the "substitutability" and "dominance" problems (e.g. Debreu, 1960; Huber and Puto, 1983). However, it is clear that in "sensibly" defined yet broad markets (such as, in the present instance, tea bags rather than all tea, instant coffee rather than all coffee, and automatic washing powder rather than all washing powder), the assumed independence structure holds very well. Supportive evidence derives from the wide-ranging applicability of the Duplication of Purchase Law (see Chapter 6), an indirect test of the IIA assumption.

(iii) The Distributional Assumptions.

The basic assumption underlying the Dirichlet - as with all stochastic formulations of choice - is that behaviour is so irregular at the individual level that it occurs in an "as if random" manner, and is consequently capable of being modelled probabilistically.

More specifically, the Dirichlet model is derived from five distributional assumptions. Two concern product purchase incidence (A and B), two brand choice (C and D), and one their interrelationship (E).

A. Purchase incidence (of the product class) for each individual consumer follows a Poisson distribution (i.e. the successive purchases of each individual are assumed independent with a constant mean rate in consecutive equal-length time periods).

B. Mean rates of product purchasing vary across individuals according to a Gamma distribution.

(These two assumptions form the basis of the NBD model, and imply that the product purchasing of all individuals follows a Negative Binomial Distribution.)

C. The number of purchases of each brand that an individual makes in a product-buying sequence follows a multinomial distribution (i.e. successive brand choices are assumed independent and the associated probabilities fixed over time).

D. The probabilities of choosing the various brands (on each purchase occasion) vary across individuals according to a multivariate Beta distribution known as the Dirichlet distribution.

E. Product purchase frequencies and brand choice probabilites are distributed independently over the population.

Such assumptions are not taken to be true to reality. Yet there are cogent a priori arguments in their favour (see Goodhardt et al., 1984, pp. 625-626), and in practice the model as a whole works well under a wide range of market conditions (this being the formulation's most potent justification).

2.4.5. The "Diversity" Parameters.

(i) K.

The standard deviation of the NBD resulting from assumptions A and B is given by:

$$\sqrt{\{ M (1 + M/K) \}}$$

K therefore reflects how much individuals' product purchasing rates differ from the overall mean M. In practice it is estimated from the balance between B and W (the product penetration and average purchase frequency respectively).

(ii) S.

The variance of the probability of choosing a given brand across individuals (in the marginal Beta distribution for that brand) is given by:

$$\{ m(M-m) \} / \{ M^2 (1+S) \}$$

where m = the average rate of buying the brand per household.

S therefore reflects the extent to which people differ in their propensities to buy each brand. In everday terms, it is estimated from the overall balance between b and w **relative to** the balance between B and W. To determine its value, an estimate of S is made for each individual brand, denoted **s**, the overall parameter consisting of the average of all the individual s values, weighted by market share. In practice a brand is sometimes excluded from this calculation to avoid distorting the model if that brand is deemed markedly "atypical" on the basis of its s value.

As exploited in later chapters, the S parameter effectively summarizes the overall degree of switching within a market (for any given value of M and K). This is most clearly apparent when it is allowed to assume its extreme values:

* Where S is very small, the across-consumer variance in brand choice probabilities is high, and buyers therefore tend to fall into discrete groups according to the brand purchased (the minimum switching situation).

* Where S is very large, the variance is near-zero, and consumers therefore tend to divide their purchases almost directly in line with market shares (the maximum switching situation).

2.4.6. Computing Programs Used.

Two programs have been employed to facilitate the otherwise laborious calculation of the Dirichlet predictions. The most extensively used was a program developed by Dr C. Chatfield at the University of Bath. In the later stages of the research a package developed at the London Business School, designed to be used in conjunction with the second edition of Repeat Buying (Ehrenberg, 1988), was employed.

2.4.7. Validity and Utility.

The Dirichlet model describes and, crucially, integrates a wide range of empirically-observed regularities in buying behaviour. It has successfully described, directly or indirectly, the patterns of brand choice in many different product fields under a variety of market conditions, and several recent studies have demonstrated its applicability to store choice (as noted in the previous chapter).

The utility of the model is well established. On a general level, the Dirichlet - as a summary and integration of empirical regularities - helps understand the nature of markets (e.g. that brands differ little in the degree of loyalty they attract, that the main correlate of market share is penetration rather than rate of purchase, and so on). On a more specific level, the value of the model derives from its provision of theoretical norms for a number of key measures of buyer behaviour: these may be "base-line" norms to help gauge the effects of change; predictions of what must be achieved in terms of b, w, etc. to achieve a given sales level; and above all benchmarks against which atypical patterns of behaviour can be identified. This latter use of the model is exploited extensively in the results section of this thesis.

2.5. ANALYSIS PROCEDURE.

2.5.1. Style of Analysis.

As emphasized in Chapter 1, this study is concerned with general patterns in brand and store choice behaviour rather than with any particular brand, store or market in itself. Thus, for each measure used, a description is provided of the main trends and regularities in the observed behaviour, and the extent to which these generalize across product fields and/or regions. Any "unusual" results are also assessed for their generalizability.

The question remains as to how to distinguish between the regular and irregular in behaviour. Even with existing empirical knowledge of choice patterns, it is often difficult to establish whether the purchase frequency of a given brand is "high", "low", or "about right"; whether the loyalty discrepancy between two brands is wholly accounted for by the market share discrepancy; whether the value of one measure of behaviour is unusually high relative to the value of another; and so on.

Such questions call not only for knowledge of empirical regularities but for theoretical benchmarks, specific to each market, against which atypical results or patterns of behaviour can be identified. The Dirichlet model is employed in this study to provide such interpretive norms.

The procedure adopted in this regard accords with usual practice, which is summarized by Wrigley and Dunn (1984b, p.761):

> "The style of analysis associated with the Dirichlet model is very similar to that used with the NBD model. For a number of aspects of consumer behaviour, the Dirichlet provides theoretical norms which are compared to observed figures in tabular form. These tables are then assessed both for the overall goodness-of-fit and for the presence of unusual or atypical results."

2.5.2. Testing the Model or the Data?

However, simultaneously testing the model and interpreting its predictions as theoretical norms implies a certain ambivalence. Such usage raises the difficult issue of where lies the dividing line between model invalidity and "irregular" behaviour. Put another way, are we testing the model or the data?

The Popperian thesis contends that a theory gains in status through withstanding determined efforts at refutation. To the extent that the Dirichlet has successfully described the pattern of consumer choice in a wide variety of situations over many years, sufficient confidence can reasonably be placed in the model to interpret **inconsistent** discrepancies as market-specific or brand-specific features rather than as a model mis-specification as such. Certainly, given the history of previous application, such interpretation is more justified than that of Farley and Ring (1970) who, in the **first** factual test of the Howard-Sheth model, concluded that "the test put extreme pressure on the data", not on the model.

A similar line of reasoning has been advanced by Tuck (1976, pp. 35-36) regarding the work of Ehrenberg (1972):

> "If Ehrenberg's equations do not hold, then one looks for 'what has happened'... and it is always possible to think of explanations of 'what has happened' after the event. [...] In this sense his equations are not, I would suggest, directly 'provable'. It is difficult to think of a test one could put them to which would dis-confirm them. One's judgement of their validity must to a large extent be a pragmatic one, dependent on the conviction carried by his enormous range of examples gathered over the years."

2.5.3. Measures of Dirichlet Fit.

That the Dirichlet's predictions can validly be interpreted as theoretical norms does not negate the importance of **measuring** the degree of fit that has been achieved.

In dealing with this issue a distinction needs to be made between two types of discrepancy, namely **irregular** deviation and **systematic** deviation. Irregular deviation usually derives in part from sampling error, but may also reflect genuinely atypical patterns of purchasing. If such deviation is mainly small and averages out, it need not represent a fundamental failure of the model. Systematic deviation is more serious from the model-validity standpoint. Its clearest manifestation would be in a consistent underprediction or overprediction on a given measure. More subtle variants might concern a predictive bias for a particular **type** of brand category, or regard the degree of across-brand **variation** on any given measure.

A difficulty in assessing the model's fit concerns the lack of any single measure able to summarize the level of agreement on all the aspects of behaviour involved (b, w, w/wp, etc.). Indeed, even taking each of these aspects in turn, different measures of fit may not accord with one another. Kau (1981, p. 412), for instance, concluded with respect to his investigation: "there is no single overall measure of fit suitable for use in this study. Individual judgement coupled with several measures of discrepancy tend to be necessary." A similar approach is adopted here.

Three principal measures of fit are employed, and these are applied separately to each aspect of buying behaviour (b, w, etc.). The measures, together with their abbreviations, are specified below.

Mean Absolute Difference: MAD

Mean Absolute Difference as a proportion of Mean Deviation: MAD/MD

> This measure takes account of the fact that any given MAD value is more "impressive" for a variable that differs substantially across brands than for one that remains relatively constant.
>
> Mean Deviation is defined as mean absolute deviation from the mean.

Predicted (i.e. Dirichlet) Mean Deviation as a proportion of Observed Mean Deviation: MD(D)/MD(O)

> This measure expresses the degree of across-brand variation "explained" by the model.

It is clear that none of these measures can indicate, in themselves, a consistent underprediction or overprediction on any given measure. Another important part of the assessment therefore consists in comparing the average observed and predicted values to establish whether any overall bias is present (giving due account to the distorting effect of exceptional or "outlying" values).

The presentation of results in this thesis contains no formal statistical measures of goodness of fit in the sense of significance tests. This accords with the usual practice surrounding the NBD and Dirichlet models (see e.g. Wrigley and Dunn, 1984a, p. 649). Several reasons can be cited for not applying such tests.

First, the Dirichlet represents an attempt to synthesize prior knowledge of behaviour in a way that generalizes across many different conditions of observation. In consequence emphasis is more appropriately placed on the **consistency** of the results (including discrepancies) than on their "significance" in a rather abstract statistical sense. Chatfield (1982, p. 276) makes an important distinction in this regard:

> "The two dicta which I like to stress are that 'a significant difference is not the same thing as an interesting difference' and that 'a non-significant difference is not the same thing as no difference'. It is usually desirable to see if interesting results are repeatable or generalize to different conditions rather than to see if one particular sample is 'significant'."

Second, the utility of the Dirichlet derives primarily from its provision of theoretical norms against which the observed patterns of behaviour can be assessed. In this way the model has proved extremely useful in distinguishing between the regular and irregular in behaviour. As Ehrenberg and Goodhardt (1982) explain, "The ultimate interest in such work lies not so much in its statistical or mathematical aspects, but in its empirical ones" (quoted by Wrigley and Dunn, 1984a, p. 649). In this light, "to set up a formal statistical test that the predictions of the model are true (or not true), when they are compared against some observed data, is really to miss the point" (Wrigley and Dunn, 1984a, p. 649).

Third, it is not clear which formal statistical testing procedure would be most appropriate. Should the test focus on each measure in turn, on each brand in turn, or on all observed and predicted figures simultaneously? Further, traditional correlational tests can provide misleading impressions of fit (high correlation coefficients being compatible with large discrepancies if the covariation is high).

Fourth, simple measures of fit, such as those used in this study, provide a more direct index of agreement (and hence a better "feel" for the degree of fit) than provided by complex and abstract statistical procedures.

2.6. SUMMARY.

This final section briefly summarizes the main features of the methodology.

Markets studied: automatic washing powder, tea bags, and instant coffee in two regions of the UK (coded "Region I" and "Region II").

Time period: 48 weeks.

Data used: consumer panel data, concerning the buying records of approximately 850 continuous reporters in each market (i.e. product/region combination).

Buying unit: household.

Analysis unit: purchase occasion.

Analysis procedure.
This involves describing the patterns in choice behaviour and their generalizability across markets. The Dirichlet model is used to help distinguish between the regular and irregular in such behaviour, and in turn the model's predictive validity is assessed (via "simple" measures of discrepancy rather than abstract significance tests).

PART II

LITERATURE REVIEW

Chapter 3

BRAND LOYALTY

Contents:

3.1 INTRODUCTION.

In the case of frequently-bought nondurable consumer goods, the success of any brand depends critically on repeat purchasing. It should be of no surprise therefore that brand loyalty has been a central concern of research into consumer behaviour. Indeed, Jacoby and Chestnut (1978) list some 300 published studies on the subject. Concern with this area can be traced to Copeland's (1923) notion of "brand insistence"; more recently the concept of buyer loyalty has broadened to include such areas as industrial purchasing, service agreements, bank accounts and even medical prescriptions (Jacoby and Chestnut, 1978, p. IX).

Despite (or perhaps because of) brand loyalty's popularity as a marketing concept, there exists little agreement as to its precise nature and definition. As illustrated in Section 3.2, the measures employed (and hence definitions assumed) vary widely, ranging from simple preference statements over time to complex mathematical indices.

One issue is whether brand loyalty involves simply repeat buying or a biased concentration of total product purchases on one brand (or even a subset of the available alternatives). Jacoby and Chestnut (1978, p. 6) distinguish the two in terms of their susceptibility to managerial influence, the former being described as an apparently random process (and hence beyond managerial control) and the latter as deterministic in origin (and therefore susceptible to influence).

Another question is whether loyalty is attitudinal or behavioural in nature. Put another way, does loyalty derive from a positive attitude (e.g. preference) towards a brand or from less "deliberate" factors such as habit or availability? Engel and Blackwell (1982, p. 565) describe loyalty as resulting from a "positive attitude toward the brand and an intention to repurchase". Other authors, in contrast, suggest that loyalty may reflect little more than habit (Brown, 1952), an absence of alternatives (Brown, 1952), a policy to "always buy the cheapest" (Brown, 1952), deal-proneness (Frank and Massy, 1965), a policy of risk reduction (Sheth and Venkatesan, 1968), or a desire to reduce cognitive effort via choice heuristics (Jacoby, Szybillo and Busato-Schach, 1977; Hoyer, 1984). Day (1969, p. 30), labelling the two alternative conceptions as "intentional loyalty" and "spurious loyalty", underlines the managerial implications of the distinction (if somewhat simplistically):

> "spuriously loyal buyers lack any attachment to brand attributes, and they can be immediately

captured by another brand that offers a better deal, a coupon, or enhanced point-of-purchase visibility through displays and other devices."

In view of the diverse treatments of brand loyalty, it is unlikely that any single conceptual definition can satisfy all researchers in the area. Nevertheless, that of Jacoby and Chestnut (1978, pp. 80-81) is noted below because it is the most widely referenced, probably the most influential, and raises a number of important issues:

> "BL is (1) the biased (i.e., nonrandom), (2) behavioral response (i.e., purchase), (3) expressed over time, (4) by some decision-making unit, (5) with respect to one or more alternative brands out of a set of such brands, and (6) is a function of psychological (decision-making, evaluative) processes."

The definition is helpful in emphasizing that (2) BL must involve actual purchases (and not just intentions); (3) that it is the pattern of purchases **over time** that is crucial (and not whatever the "next" purchase happens to be); (4) that the decision-maker may be an individual or household, and not necessarily the purchaser or user; (5) that multibrand loyalty may occur, and that BL serves as and acceptance-rejection function (i.e. the opportunity for **dis**loyalty must exist); and finally (6) that some psychological "commitment" is involved, be it on the basis of taste, low price, and so on (although many researchers have, not unreasonably, focused on the **outcome** of the evaluative process in measuring BL).

The remainder of this chapter is organized as follows. Section 3.2 reviews the variety of operational measures of brand loyalty, while Section 3.3 examines the **level** of brand loyalty that is typically exhibited on its various dimensions. Some correlates - and noncorrelates - of brand loyalty are considered in Section 3.4. Section 3.5 provides a review of the main approaches to modelling brand choice behaviour. Finally, Section 3.6 draws together the main findings and offers some concluding remarks.

3.2 MEASURES OF BRAND LOYALTY.

In view of the lack of agreement on a conceptual definition of loyalty, it is not surprising that a wide variety of operational measures have been employed. Jacoby and Chestnut (1978) are well-known for enumerating some 53 different measures of loyalty. The measurement approaches can be placed within three broad categories: behavioural, attitudinal, and composite (i.e. combining both behavioural and attitudinal indices).

3.2.1 Behavioural Measures

Brown's (1952) early study measured loyalty in terms of brand choice sequences, identifying four loyalty patterns on this basis: "undivided loyalty" (represented by the brand choice sequence AAAAAA), "divided loyalty" (e.g. ABABAB), "unstable loyalty" (e.g. AAABBB), and "no loyalty" (e.g. ABCDEF). Brown's approach generated substantial interest in the subject, and is reflected in later measures such as the three-in-a-row criterion (Tucker, 1964; McConnell, 1968) and the number and length of brand "runs" (Massy, Frank and Lodahl, 1968). However, as Charlton and Ehrenberg (1973) point out, the approach has led to few generalizable results due to the difficulties of summarizing purchase sequences quantitatively.

The most frequently used behavioural measure of brand loyalty is the "market share concept", or proportion of purchases index. Its conception is usually credited to Cunningham (1956), who defined loyalty - or more specifically "Single Brand Loyalty" - as the proportion of total purchases accounted for by the largest single brand used. The measure had two main advantages. First, it could cater for the existence of multibrand loyalty (e.g. "dual-brand loyalty" is the cumulative percentage of the two most frequently-bought brands). Second, it expressed loyalty as a continuum (i.e. provided an index of the **strength** of loyalty).

Other behavioural measures include the number of brands used over a given period (Farley, 1964a), and the stability of the most preferred brand (Farley, 1964a, 1964b) or of the brand repertoire (Seggev, 1970).

Recognizing the multidimensional nature of brand loyalty, certain researchers have formulated mathematical indices composed of different behavioural measures. Notable in this regard are Carman and Stromberg's Entropy Loyalty Measure (e.g. Carman, 1970), the factor-score approach of Sheth (1968) and Massy, Frank and Lodahl (1968) (combining proportion-of-purchases and brand sequence measures), and Burford, Enis and Paul's (1971) Loyalty Index (formed from combining the number of brands bought and the number of brand runs). The difficulty with such measures is that, in their abstraction, they can not directly be related to behaviour. As noted by Charlton (1973, p. 38):

> "Simple measures have the advantage of relating to common experience and give a feel for the subject which is often lost when pursuing a more mathematical approach."

3.2.2. Attitudinal Measures.

The attitudinal approach interprets loyalty as a psychological attachment or commitment to a brand. For instance, Guest (1955, 1964) employed preference statements, assuming loyalty to exist if favourable attitudes remained constant over periods of twelve and twenty years. The approach of Jacoby (1971) was novel in using both positive and negative attitudes towards brands in assessing loyalty: regarding a brand preference continuum, the greater the distance between "accepted" and "rejected" brands, the greater the degree of attitudinal brand loyalty. A similar approach has reportedly been adopted by Jarvis and Wilcox (see Jacoby and Chestnut, 1978, p. 49), who measured "cognitive loyalty" as the ratio of rejected brands to accepted brands·weighted by an index of brand awareness.

3.2.3. Composite Measures.

Certain researchers have attempted to incorporate both behavioural and attitudinal components into their measures of loyalty. Notable in this context is Day (1969), who argued that behavioural measures failed to distinguish between his notions of "intentional" and "spurious" loyalty (as mentioned earlier). His loyalty index is defined as the ratio of (i) the proportion of purchases devoted to a brand to (ii) a measure of the positive attitude toward the brand. Probably the earliest example of the composite approach is Pessemier's (1959) "Price until switching" measure, which essentially counted the number of price increases necessary to induce switching.

3.3. THE LEVEL OF BRAND LOYALTY.

The bulk of published research on brand loyalty has been concerned with issues of measurement, modelling and, above all, correlation. Little emphasis has been placed on describing the extent to which loyalty in fact occurs. As Kau and Ehrenberg (1984, p. 400) deplore in their paper on store patronage,

> "even for **brand** choice the already known empirical regularities are seldom described in the marketing literature. A specialist text on consumer behavior reports that American and British repeat-buying habits are the same (e.g., Engel, Blackwell, and Kollat 1978, p. 86), yet does not actually describe these habits."

The results of those studies that **do** offer some description of the level of brand loyalty are noted below.

Brown's (1952) early investigation reported that the proportion of households demonstrating "undivided loyalty" varied from 12% to 73%, depending on the product. Using the more insightful Single Brand Loyalty (SBL) measure, Cunningham (1956) found that, for each of the seven products studied, at least half the panel members concentrated 43% or more of their product purchases on their favourite brand over a one-year period. His later (1961) study indicated an average family SBL rating of 65% over a similar period (although again loyalty varied across the 18 product fields analysed, with SBL ranging from 55% for canned peaches to 84% to flour).

As for the number of brands bought, Seggev determined an average of 3.7 different brands for the nine products studied over a twenty-week period. The lowest product-specific value was 1.9 (for floor polish), the highest 5.5 (for frozen vegetables and toilet soap). He also found some evidence of stability in consumers' brand **repertoires.**

Consumers' perceptions of their own behaviour suggest a higher degree of loyalty than indicated by the above figures. In one survey, 82% of respondents agreed with the statement: "I always buy the same brand if I can" (Stoessl, 1979). Parker (1979) presented comparable results: 76% of his respondents said they would "always" or "usually" buy the same brand.

By far the most extensive and coherent set of findings pertaining to the level of brand loyalty derives from the many studies surrounding the NBD and related models. Unlike the investigations cited above, these studies represent an ongoing and systematic series of analyses, from which the consistency of results can be assessed. Three basic findings are of particular relevance to the present context.

The first, and most important, is that generalizable patterns of behaviour do indeed exist, in that the same theoretical models hold in many different product fields under a wide variety of market conditions. Second, it is found that the actual level of loyalty tends to be quite "low" in most frequently-bought packaged grocery markets. Typically, over a one-year period, the buyers of a brand will devote only a minority of their product purchases to that brand, and only a small proportion of these buyers (perhaps 20%) will be completely loyal to the brand over the period. And third, it transpires from these studies that all aggregate measures of overt (i.e. behavioural rather than attitudinal) brand loyalty are in practice strongly related - a point made explicit by the Dirichlet model.

These features of brand loyalty behaviour are not elaborated here as they are extensively illustrated in a replicative analysis of brand choice in Chapter 6. Appropriate references are also made in this later chapter.

3.4. CORRELATES OF BRAND LOYALTY.

Frank (1967, p. 51) commented some years ago that "little is known about the determinants of brand loyalty". If this is so, it is certainly not through any lack of trying. As Jacoby and Chestnut (1978, pp. 57-58) observe: "Almost every single one of these investigations [into brand loyalty] has been concerned with attempting to identify **relationships** between indices of BL and other variables [...]". This section summarizes some of these studies, grouping results according to the type of variable which is being related to loyalty. These categories concern (i) consumer characteristics, (ii) the product-buying rate of consumers, and (iii) product field characteristics. The relationship between brand loyalty and store loyalty is considered in Chapter 5.

3.4.1. Consumer Characteristics.

Most studies attempting to establish relationships between brand loyalty and the socioeconomic, demographic and personality profile of the consumer have met with negative results. Examples include the large-scale study conducted by the Advertising Research Foundation in 1964 (cited by Engel and Blackwell, 1982, p. 572), and the investigations of Cunningham (1956), Guest (1964), Frank (1967) and Frank, Massy and Lodahl (1969). Another study reports that socioeconomic variables can not differentiate between two **types** of loyalty, namely private-label loyalty and manufacturer-brand loyalty (Frank and Boyd, 1965).

Carman (1970) argued that relationships were not being identified because the data used were insufficiently rich in terms of consumer profiles and because overly simple models (usually linear regression) were being employed. In his study, designed to overcome these two limitations, Carman did find some statistically significant relationships. For instance, the brand-loyal coffee buyer was deemed career-oriented, of high income, and status-conscious; and sociability with neighbours was positively correlated with brand loyalty in all three products analysed, although why this should be so is not clear. Personality and mobility factors remained unrelated to loyalty.

Carman is not entirely alone in identifying relationships. Two studies cited by Jacoby and Chestnut (1978, p. 116) report that working wives tend to be highly brand loyal. Others have pointed to a positive relationship between brand loyalty and age (Day, 1969; Newman and Werbel, 1973).

That both consumers with little discretionary time (working wives) and those with much discretionary time (the elderly) are reportedly brand loyal suggests that loyalty may derive from a wide variety of factors, or alternatively that the same variable may influence consumers in different ways. This latter point is noted by Shairir (1974): hypothesizing that brand loyalty is a function of the value of time to a consumer, he suggests that upper income people have more natural loyalty to a brand, but are more willing to switch to an alternative when their preferred brand is unavailable (rather than search for it elsewhere). Another paradox emerges from Chance and French's (1972) study, in which consumers at both upper and lower levels of income and education were found to be most sensitive in their brand switching behaviour to price differences.

Nonlinear associations such as these, together with the plethora of potentially relevant factors for each individual, may help explain why so few straightforward relationships have been established between brand loyalty and consumer characteristics.

3.4.2. Product Buying Rate.

A number of researchers have sought to establish whether a link exists between brand loyalty and the amount purchased of the product field. As tradition in correlation studies demands, the findings are contradictory.

Day (1969), regarding convenience foods, reports a positive relationship between brand loyalty and weight of product usage. Kuehn's (1962) results for orange juice, based on interpurchase time (which can be taken as a measure of product-class buying rate), are supportive: he observed that the probability of buying the same brand on three consecutive purchase occasions decreased exponentially as time increased between these occasions. In contrast Seggev (1970) identified a negative relationship between product buying rate and brand loyalty, the latter being measured in terms of the size and temporal stability of consumers' brand repertoires.

Most studies, however, describe these two aspects of behaviour as unrelated (Cunningham, 1956; Frank and Boyd, 1965; Cunningham, 1967; Massy, Frank and Lodahl, 1968). These include two investigations based on interpurchase time (Carman, 1966; Morrison, 1966).

The extensive series of studies conducted by Ehrenberg and Goodhardt give good reason to support Seggev's conclusion. Although the measures used describe **brands** rather than consumers, the results make clear that heavy product class buyers tend to engage in more multibrand buying (see e.g. Ehrenberg, 1988, pp. 175-176). The contrast with Day and Kuehn's findings probably reflects different approaches to measuring loyalty: the former's index included an attitudinal component; the latter used a restrictive short-term measure, namely repurchase probability.

3.4.3. Product Field Characteristics.

One feature to emerge strongly from studies of brand loyalty concerns the relevance of the product field. That the overall level of brand loyalty varies from product field to product field was made explicit by the earliest studies in this area. In Brown's (1952) analysis, the percentage of 100%-loyal households varied from 12% to 73% across products, while Cunningham's (1961) average SBL rating ranged from 55% to 84%. Loyalty on Seggev's (1970) two measures (the size and stability of brand repertoires) also varied substantially across product fields.

A number of explanations for such across-product variation have been proposed. Ehrenberg and Goodhardt (1970), in accounting for the differences in duplication coefficients (a parametric measure of brand switching), cite such factors as the number of brands in the product field and the average frequency of buying the product. The former point is supported by Farley (1964a) and Weinberg (1973) who both established a negative association between brand loyalty and the number of brand alternatives. The relevance of product-buying frequency is also reinforced by Farley (1964a) and, more recently, by Wrigley and Dunn (1984c): in both cases, a negative association with brand loyalty is reported.

The degree of brand differentiation within the product field may also be relevant, although whether perceived substitutability should increase or decrease loyalty remains a matter of controversy. The Elimination-By-Aspects (EBA) model of choice (Tversky, 1972) implies that switching will be greater among alternatives sharing salient attributes. The results of Bass, Pessemier and Lehmann (1972) are generally supportive in this respect, indicating predominant switching to "similar" brands, although the authors note extensive switching among some "dissimilar" brands, presumably out of a need for variety (e.g. 10% of the consumers who chose Coke most often chose 7-Up, rather than Pepsi, second most often). McConnell (1968) and Jacoby (1971) also reinforce the point in reporting that individuals who perceive large brand differences in quality tend to be brand loyal. These studies compared individuals rather than products, but it seems reasonable to expect the level of perceived inter-brand quality differentiation to vary by product field (as when comparing instant coffee with petrol).

If differentiation does promote loyalty, the reverse - complete substitutability - does not seemingly erode all loyalty. In "semi-laboratory" experiments conducted by Ehrenberg and Charlton (see Ehrenberg and Goodhardt, 1979, Article No. 17) and Tucker (1964) consumers were seen to develop loyalty to objectively identical "brands" differentiated only by letter codes. Such behaviour was more than an entirely rational response to the identicalness of alternatives (loyalty to a brand being as rational as disloyalty if the alternatives are the same): Tucker noted that loyalty would persist even when a price premium was imposed.

Despite contrasts in the overall degree of brand loyalty exhibited in different product fields, the possibility remains that individual consumers who are brand loyal relative to other consumers will be so whatever the product class.

Cunningham (1956), Massy et al. (1968), and Wind and Frank (1969) examined this issue, and reported little evidence of a "generalized" brand loyalty across product fields. However, the results of Blattberg, Peacock and Sen (1976) pointed to a degree of across-product consistency on the basis of a wider, three-dimensional interpretation of purchasing "strategy" (involving measures of brand loyalty, private brand proneness, and deal proneness). It also transpired that the more similar the product fields, the greater the consistency in consumers' purchasing strategy.

3.4.4. Psychological Factors.

Certain researchers, rather than treating overtly measurable relationships, have sought to identify the **psychological** influences leading to brand loyalty. In the case of high-involvement goods, risk-reduction has been widely cited as one such factor (e.g. Sheth and Venkatesan, 1968; Mittelstaedt, 1969; Newman and Werbel, 1973). In the low-involvement situation, the **absence** of cognitive effort is usually emphasized, with choice behaviour being linked to such notions as routine (Howard and Sheth, 1969), impulse purchasing (Kollat and Willett, 1967; Rook, 1987), and continuous rather than prepurchase evaluation (Hoyer, 1984; Ehrenberg and Goodhardt, 1979).

Of particular relevance to loyalty (rather than simply choice) is the apparent usage by consumers of decision heuristics. Several such strategies have been cited in the literature, notably "buy the cheapest brand" (Brown, 1952), "buy the brand my (e.g.) mother buys" (Hoyer, 1984), "buy a recognizable brand" (Jacoby, Szybillo and Busato-Schach, 1977), and the sequential elimination of alternatives (Kahn, Moore and Glazer, 1987).

Explanations for the use of decision heuristics (which in the consumer behaviour context could easily, though not necessarily, be conducive to loyalty) include limitations in human information processing capacity (Newell and Simon, 1972; Bettman, 1979), time pressure (Wright, 1974), and the wide range of alternatives typically available (Wright, 1975).

3.5. MODELS OF BRAND CHOICE.

Models of behaviour are crucial to the social sciences: they make explicit assumptions which otherwise remain hidden; they provide a basis for theory construction; they reduce the awesome complexities of human behaviour to manageable proportions; and ideally the help identify how behaviour can be predicted and influenced.

Despite sharing these broad objectives, models of brand choice vary substantially in approach (i.e. development, analysis level, complexity, utility, etc.). Traditionally they are categorized according to their underlying "philosophy" of behaviour, be it deterministic or stochastic. The review below follows this basic classification.

3.5.1. Deterministic Models.

The deterministic approach assumes the existence of a number of causes underlying buyer behaviour. Or more specifically, since the alternative (stochastic) view does not reject the existence of such factors, the approach posits that these causes can in fact be identified and that the ability to influence buyer behaviour will consequently be enhanced. Work in this area has been conducted at both the micro (i.e. individual) and macro (i.e. aggregate) levels.

The Micro Level.

At this level models focus on cognitive processing, and generally consist of elaborate flow charts specifying the various stages of decision making (from problem recognition through search, evaluation, choice and purchase feedback) and linking these with internal stimuli (such as memory, beliefs and attitudes) and external stimuli (such as advertising, culture and social influences). The best-known of these are the models of Engel, Kollat and Blackwell (1968) and Howard and Sheth (1969). Nicosia's (1966) model is novel in attempting to quantify the relationships involved.

The emphasis is mainly on high-involvement processes, although modifications are introduced to cater for frequently-purchased products, primarily through specifying "attention" as involuntary, learning as passive, and evaluation as following rather than preceding choice. Howard and Sheth also introduced the notions of "routinized response behavior" and the "evoked set" (where only a subset of brands are considered on each purchase occasion) to describe the low-involvement situation.

Though useful in specifying and organizing variables of potential relevance to the buying decision, these models suffer from two marked deficiencies: they are sparse in operational definition (as noted by Tuck, 1976, p. 31), making difficult any empirical testing of the model (see e.g. Farley and Ring, 1970); and, relatedly, they have little bearing on the known regularities in buyer behaviour, neither explaining nor contradicting the patterns which so patently occur (see Ehrenberg, 1988, pp. 211-213 for a discussion of this point).

The Macro Level

At this level of determinstic modelling is the regression approach, which has led to a plethora of equations relating brand loyalty to consumer and shopping variables. Some correlates so identified were cited in Section 3.4. The equations themselves are best described as "local" models, in that in practice they hold only for the sample data to which they are applied (or rather "fitted"). Instead of building on and integrating prior knowledge, these models are used to "instantly discover and simultaneously describe a previously unknown relationship" (Goodhardt et al., 1984, p. 638). The approach is not conducive to model generalization.

The "explanatory" variables specified by these data-specific equations are themselves often suspect. For instance, that brand loyalty correlates with the size of building lived in (Frank, Douglas and Polli, 1968) raises as many questions as it answers: is this relationship an artefact of income, age, brand availability? This failure to represent the mechanism by which one variable influences another has led Bartholomew (in discussion on Goodhardt et al., 1984) to describe regression methods as "black box" models.

3.5.2. Stochastic Models.

Stochastic models of brand choice differ from the determinstic approach in treating choice as the outcome of some probabilistic process. At their core is the suggestion of a strong random component underlying behaviour. It is not generally contended that a consumer times her purchases and chooses a brand literally at random, although some authors have not ruled out a stochastic element in individual behaviour (Bass, 1974; Bartholomew in disussion on Goodhardt et al., 1984). Rather, it is recognized that people have specific reasons for behaving in the way they do, but that these various causes are so numerous and complex that the outcome displays random characteristics. As Bass (1974, p. 2) asserts: "even if behaviour is caused but the bulk of the explanation lies in a multitude of variables which occur with unpredictable frequency, then, in practice, the process is stochastic."

In reviewing models of this type, a distinction can be drawn between "purchase incidence" models and "brand choice" models. While the former are concerned with purchase timing or the number of purchases made over a time period, the latter predict which of a specified set of brands is chosen on each purchase occasion. Recent work has led to the development of "composite" models which integrate both these components of behaviour.

Purchase Incidence Models.

The best known of these is the "classical" NBD model which, first described by Ehrenberg (1959), assumes the number of purchases in a number of equally long consecutive time periods to be stationary, independent, and Poisson distributed, with mean rates varying across consumers according to a Gamma distribution (allowing thereby for consumer heterogeneity). Its predictive validity - regarding the frequency distribution of purchases and the growth of penetration and purchase frequency over time - has been demonstrated for a wide variety of consumer goods (see e.g. Ehrenberg and Goodhardt, 1979, Table 5.3).

Two "boundary" situations, however, limit its applicability (see Chatfield, Ehrenberg and Goodhardt, 1966; Ehrenberg, 1988). The model breaks down for very short time periods (i.e. close to the minimum inter-purchase period) where more-regular-than-Poisson purchasing leads to underprediction of repeat-buying, and (relatedly) for items bought especially regularly where the proportion of heavy buyers (i.e. buying more than the number of "minimum" inter-purchase time periods in the analysis period) is underestimated. More generally, the stationarity assumption has been deemed restrictive (although in practice mature markets typically exhibit medium-term stability, as noted in Section 1.5.3). Extension of the NBD to include nonstationarity (in the new-product sense) have been proposed (Massy, Montgomery and Morrison, 1970; Schmittlein, Morrison and Colombo, 1987), although empirical support for these models is (so far) sparse.

On a theoretical level, the Poisson assumption has been criticized for its "memoryless" property (implying the probability of purchasing this week is unaffected by the length of time since the last purchase) and for taking no account of the "dead period" following a purchase (see Herniter, 1971, for empirical evidence of this effect). Suggested modifications have centred on the Erlang-2

Distribution (Herniter, 1971; Jeuland, Bass and Wright, 1980; Morrison and Schmittlein, 1981), although data presented by Chatfield and Goodhardt (1973) indicate that the two models are not in practice very different.

Brand Choice Models.

Stochastic brand choice models essentially differ from each other in the extent to which they take account of three potential influences on behaviour: purchase event feedback (the notion that past brand choice behaviour influences current or future choices), population heterogeneity (i.e. choice probability differences across consumers), and nonstationarity (changes in choice probabilities over time due to factors other than experience with the brand, such as marketing activity or changing needs). The following review categorizes the models according to the first of these considerations.

Bernoulli Models.

Early investigators of brand loyalty assumed, at least implicitly, that the behaviour at hand could be described as a Bernoulli process in which each consumer has a constant probability of choosing any given brand (e.g. Brown, 1952; Cunningham, 1967). Empirical support for such a "zero order" process in brand choice is substantial (Frank, 1962; Jeuland et al., 1980; Goodhardt et al., 1984). The main difficulty centres on the homogeneity assumption. (Givon and Horsky (1985) prove analytically that where such an assumption is false, wrong inferences about stochastic processes and aggregated behaviour inevitably follow.) Modifications in this area, rather than disaggregating the consumer "sample" into subgroups, assume choice probabilities to vary across the whole population according to some prespecified probability distribution - most notably the Beta Distribution or its multivariate analogue the Dirichlet (Chatfield and Goodhardt, 1975; Stewart, 1979; Wagner and Taudes, 1986).

Other extensions allow for both heterogeneity and nonstationarity. Howard's (1963) "Dynamic Inference Model" retains the Beta Distribution assumption, but choice probabilities are allowed to vary randomly from one purchase situation to another according to a waiting time process. A variation known as the "New Trier Model" was developed by Aaker (1980) to apply to previously unfamiliar (e.g. newly introduced) brands: here, choice probabilities change only after the consumer tries a brand for a number of periods determined by a Geometric Distribution. Aaker found the model compared favourably with the Linear Learning Model (see below) in predicting the final equlibrium market share. Montgomery's "Probability Diffusion Model" (see Massy et al., 1970, Chapter 6) is based on the assumption that each of two brands is associated with a number of "response elements" (hypothetical constructs characterizing the attractiveness of the alternatives) which flow between alternatives according to a stationary birth-death process; a complex system of differential equations determines the development of brand choice probabilities over time. In the American dentifrice market, Montgomery found the model superior to certain Markov models but inferior to the Linear Learning Model. Jones (1970) proposed a modification to allow for purchase event feedback, the "Dual Effects Model", but a poorer fit resulted.

Markov Models.

Other model builders have sought to apply Markovian theory - initially developed to predict the movement of gas particles in a container - to the "shifts" that occur in brand choice behaviour. These Markov models differ from the Bernoulli approach in considering the influence of past purchases (usually the preceding one) on the probability of current choices. Essentially they consist in a set of transitional probabilities specifying the likelihood of switching between different brands, leading (when the calculation process is continued indefinately) to a set of equlibrium, or steady-state, choice probabilities. Initially proposed by Lipstein (1959) and Maffei (1960), such models have not proved successful. The main difficulty lay in accurately specifying the transitional probabilities which, as noted by Ehrenberg (1988, p. 214), were propounded on an a priori basis, irrespective of penetration, market share, etc. (and assumed to be constant regardless of changes in these latter variables). Indeed, the validity of the NBD and related models have domonstrated that the basic Markovian assumption is flawed: the incidence of repeat buying and switching depends not on the brand as such but simply on its current penetration and purchase frequency.

Nevertheless, Massy et al. (1970, pp. 118-136) report a good fit between coffee purchasing data and a modified Markov model allowing for heterogeneity (where choice probabilities are Beta-distributed across consumers). From comparison with a less successful "last-purchase loyal" variant, the authors conclude that loyalty is most likely to occur towards a specific brand rather than to whichever was most recently purchased, and, relatedly, that loyal consumers are more "Bernoulli" than nonloyals (i.e. recent purchases have less influence on the behaviour of loyal buyers). Attempts to incorporate nonstationarity have, note Wagner and Taudes (1987), achieved mixed results: they apparently tend to achieve good results for market share predictions, but via inaccurately estimated parameters.

Linear Learning Models.

The main precept underlying this model type - introduced to the brand choice context by Kuehn (1962) - is that **all** past brand choices affect current behaviour, and that a linear relationship exists between prepurchase and postpurchase choice probabilities. Carman's (1966) results for dentifrice are notably supportive in this respect. However, as Frank (1962) points out, apparent "learning" in choice behaviour may simply reflect consumer heterogeneity in terms of buying rates. The model is limited by only catering - in its simple form - for dichotomous choice situations; and in practice also by cumbersome data requirements and difficulties in parameter estimation (Engel and Blackwell, 1982, p. 592). A variety of attempts to include heterogeneity and nonstationarity into the model, reviewed by Wagner and Taudes (1987), appear to combine awesome complexity with unimpressive fit.

In sum, the LLM has been used to demonstrate the apparent "purchase event feedback" effect, but has found little other application. In the words of Massy et al. (1970, p. 144):

> "The linear learning model has assumed the curious position of being widely discussed and highly revered in some quarters while remaining an unknown quantity and quite remote in so far as most empirical applications are concerned."

Models Combining Purchase Incidence and Brand Choice.

The parallel development of models dealing with purchase incidence and describing brand choice has logically culminated in formulations combining these two basic components of buying behaviour. The Dirichlet model (Goodhardt et al., 1984), on which much of the present research is based, falls into this category. Its form and assumptions were outlined in Chapter 2.

The most similar formulations are the models of Bass, Jeuland and Wright (1976) and Jeuland et al. (1980), which seem to be influenced by earlier work on the Dirichlet (i.e. Chatfield and Goodhardt, 1975). The main specification differences concern the purchase incidence submodel (which in this case is the **Condensed** NBD), and the estimation procedures for the S parameter equivalent. Application of the 1980 model to cooking oil in France produced a reasonable fit, but further evidence of predictive validity is lacking.

More recently attempts have been made to generalize the approach to include explanatory variables. Jones and Zufryden (1980) integrate the influence of marketing variables via a logit formulation of the brand choice probability. Their empirical results were encouraging, but the model is restrictive in allowing only for a binary choice situation. Wagner and Taudes (1986) sought to generalize the approach further through incorporating the influence of not only marketing mix variables but seasonality and long term trends - effectively through combining a stochastic and econometric approach. Their test of the model, within the German detergent market, was also encouraging. Whether the lost parsimony of the Dirichlet is compensated by generalization to nonstationary situations must await further empirical evidence.

3.6. CONCLUSION.

It will be apparent from the preceding review that researchers have differed widely in their treatments of brand loyalty. In particular, the measures employed are very diverse, impeding the comparison and synthesis of findings. The possibility of consumers being "loyal" on one measure and "disloyal" on another is obvious (although strictly any such "contradiction" arises only through shared nomenclature). Jacoby and Chestnut (1978) argue in favour of strict adherence to a single conceptual definition, but Charlton's (1973, p. 38) more relaxed guideline is more practically oriented: "Any single measure intuitively related to the concept (e.g. the number of brands used) has validity if providing useful generalisable results."

One important lesson for this issue deriving from the Dirichlet's applicability is that stark distinctions between certain loyalty measures are unnecessary. In aggregate, behavioural terms, all measures are strongly related, permitting any single index (such as market share) to act as proxy for all other aspects of the buying pattern.

Another striking feature of brand loyalty research is that concern has focused more on the issue of measurement, corelation and modelling than on the actual degree of loyalty exhibited by consumers. The neglect may derive from the very popularity of loyalty as a concept, leading to the assumption that it must indeed exist! What evidence there is (especially that deriving from the Ehrenberg/Goodhardt studies) makes plain that loyalty is far from emphatic: multibrand buying is very much the norm. Loyalty may also be deemed "low" relative to consumers' perceptions of their own behaviour, which (as noted in Section 3.3) appears somewhat divorced from the levels known to apply empirically.

However, any assessment of "the level of brand loyalty" must recognize the fact of consumer heterogeneity. A clear illustration concerns the rate of purchasing a brand (a basic measure of loyalty): individual consumers' rates typically vary widely around the average figure.

Identifying the reasons why some consumers are loyal and others not has dominated the research into brand loyalty. Variables which have been deemed positively related to brand loyalty include age, status-consciousness, sociability, being a working wife, and being a light buyer of the product class, as detailed in Section 3.4. Other factors of relevance apparently include size of building lived in (Frank et al., 1969), husband's need for affiliation (Frank et al., 1969), and self-confidence (Day, 1969). The list could be extended at length. Undoubtedly it is largely this very diversity in the factors of relevance - which also presumably vary by product class - that accounts for the paucity of **generalizable** relationships reported. Consumers are, it seems reasonable to assume, loyal for different reasons, and this possibility is highlighted by evidence of a nonlinear relationship with income, education, and disposable time, and by apparent contradictions between certain correlates (see Section 3.4).

Other constraints on generalization concern the different measures employed and the mistake of relating **household** purchasing to **individuals'** profiles (as noted by Engel and Blackwell, 1982, p. 571).

Results are more consistent where loyalty (in an overall sense) is related to product-class characteristics. It transpires that loyalty tends to be negatively associated with the number of brand alternatives and the rate of product purchasing, which accords with intuitive expectation. On the issue of product-field influence, there is little evidence that consumers who are relatively loyal in one product class will be similarly loyal in another.

One potentially valuable means of coping with the complexities of brand choice behaviour is via the construction of models, and indeed a wide variety have been proposed. The main difficulty here centres on the crux of any theorectical formulation: generalizability. In the case of the well-known "flow-chart" cognitive models, it is not clear how they can be tested at all, let alone how their generalizability can be assessed. Regression models were described earlier as "local" models, because by their very nature they are tied to, and defined by, the particular sample-data to which they are applied (or rather fitted).

As for stochastic models, the available literature typically focuses on the underlying mathematics, and also on very detailed analysis of very limited empirical data. In one case, the model described is not tested at all (Howard, 1963); in another, a successful initial application was not translated into further testing (i.e. the STEAM model of Massy et al., 1970). The main exceptions concern the NBD, Dirichlet and related models, which have been systematically and successfully applied to many product fields under a wide range of market conditions - an approach corresponding to Jacoby's (1978) notion of "programmatic" research.

Finally, a striking feature to emerge from the preceding review is that little of the research findings noted are directly relevant to the patterns of behaviour reported in this thesis. Aggregated brand choice behaviour can seemingly be well described and predicted without reference to the cognitive processing of consumers, their socioeconomic characteristics, the marketing environment, and so on.

Brand loyalty research will undoubtedly continue in the future, but recent developments in the brand choice environment - notably brand fragmentation, the erosion of traditional market boundaries, and the proliferation of "umbrella" brands - may require a broadening of focus. In particular, the emphasis could usefully turn to **dis**loyalty rather than loyalty, the extent and determinants of loyalty to brand **repertoires**, and loyalty to the same "brand" across product classes. The most important issue, however, remains the **store** influence on brand loyalty. The research conducted to date in this area is reviewed in Chapter 5.

Chapter 4

STORE LOYALTY

Contents:

4.1. INTRODUCTION

Essays on store patronage traditionally begin by noting an emphasis in consumer research on brand choice, and a relative neglect of the store choice issue. Undoubtedly this research imbalance applied in the past, reflecting the dominance of the manufacturers in terms of merchandising, advertising, and market research. Store choice remained the preserve of the geographer, who examined the subject primarily in the context of spatial interaction models (e.g. Reilly, 1931; Huff, 1964). However, the well-documented rise of the supermarket chains has led to increased marketing interest in retail patronage - a trend illustrated by a growing number of treatments of the subject in the consumer literature, several of which involve a direct transfer of methodology and theory from the brand choice context.

Many of these studies report on the supposed determinants of store choice, such as location (Brunner and Mason, 1968; Dietrich, 1973), merchandise assortment (Rosenbloom, 1976), and store image (Lindquist, 1974; Martineau, 1958). Such considerations fall outside the scope of this review. (As noted in Chapter 1, attention throughout this thesis is on **patterns** of choice over time, not on why one store - or brand - should be chosen rather than another.) For reviews in this area the reader is referred to Kau (1981, pp. 116-132) and Engel and Blackwell (1982, pp. 519-531).

The importance of store **loyalty** needs little emphasis: "Whenever possible, all retailers want to build up a sizeable loyal clientele that can be counted upon for repeat purchase" (Engel and Blackwell, 1982, p. 531). Indeed, the concept of loyalty may be more salient to stores than to brands, since the "catchment area" of even store chains is invariably smaller than that of nationally distributed brands.

Treatments of the subject - as for brand loyalty - have varied widely in approach. In his early review, Charlton (1973, p. 35) remarked that the literature did not present a coherent picture of store loyalty, describing relevant investigations as isolated, mostly small-scale, and disparate in terms of measures employed. Fortunately, since then a more systematic series of studies has been conducted, and a good basis for generalization is beginning to emerge.

The structure of this chapter accords with that of the preceding review. The issues of measurement, loyalty level, correlation, and modelling are considered in turn, with some concluding remarks being offered in the final section. It should be noted that in this chapter, unlike the remainder of the thesis, the term "store" generally refers to an individual outlet rather than a chain of stores.

4.2. MEASURES OF STORE LOYALTY

The same definitional problems noted with regard to brand loyalty apply equally to store loyalty. Again the gist is readily comprehended yet the concept resists a simple operational definition.

Not surprisingly a wide variety of measures have in practice been employed. Thompson (1967) categorized degree of loyalty according to the number of supermarkets visited within a given time period. Cunningham (1961, p. 128) in contrast contended that "Store loyalty is not measured by the **number** of stores in which a family shops. What is important is the **proportion** of a family's total food purchases that are made in any one particular store." He measured this proportion in relation to the family's favourite store (a proportion defined as "First Store Loyalty"), second favourite store ("Second Store Loyalty"), and so on. Farley (1968) proposed physical activity rather than expenditure, namely the percentage of **trips** to the favourite store. A similar policy was adopted by Goldman (1977) and Kelly (1967) in defining categories of loyalty. The purchase sequence approach, popular in brand choice studies, is applied to store loyalty by Rao (1969a,b) and Aaker and Jones (1971).

It is again clear that each of these measures may provide different results even when applied to the same individual's shopping behaviour. A consumer may be "loyal" on measure and "disloyal" on another. Several researchers have sought to overcome - or rather conceal - such discrepancies by forming an index of several separate measures, providing thereby an "overall" view of a multidimensional situation. Thus Enis and Paul (1970) used a loyalty index composed of the geometric mean of Cunningham's First Store Loyalty measure, the number of shops visited and the number of runs. The approach of Reynolds, Darden and Martin (1974) was similar in so far as they aggregated the values of four separate loyalty measures, but different in so far as each measure was self-designated by shoppers via a questionnaire. Another index aiming at a "total" view of loyalty is the Carman-Stromberg Entropy Loyalty Measure. Employed notably by Carman (1970), the measure was derived from the maximum likelihood ratio test of complete disloyalty, assuming a zero order multinomial model.

These index measures undoubtedly take the broader view of loyalty: simple operational measures may seem to oversimplify a complex behavioural concept. But the result discrepancies of the simpler measures which the index approach aims to overcome can be exaggerated. True, Cunningham (1961) found no "clear-cut" relationship between the total number of shops visited by a family and that family's store loyalty. But Tate (1961), concentrating on supermarket patronage only, found the relationship to be a strong one; a factor analytic study of Cunningham's data by Farley (1968) suggests that First Store Loyalty provides much the same result whether based on expenditure or trips; and recent successful applications of the Dirichlet model to store choice (e.g. Kau, 1981) make clear that **all** measures of aggregate, overt loyalty to a store are in practice closely tied.

4.3. THE LEVEL OF STORE LOYALTY

The question of the actual degree of loyalty exhibited by consumers is examined here in six sections. The first two focus on two basic aspects of loyalty, namely the number of stores used and the concentration of purchases in a store. The third and fourth sections examine loyalty to store **chains** and store **types** respectively. In the fifth section, attention focuses on loyalty **differences** between stores. Finally, a brief note on the stability of loyalty over time is provided.

4.3.1. The Number of Stores Used.

Before citing findings in this area, it would be appropriate to consider the frequency of shopping trips as this matter clearly impacts on the **opportunity** for multistore patronage. According to Charlton's (1973) review, a study by Alfred Bird and Sons in 1966 found that the average UK housewife made just under 3.5 grocery trips per week (70% of which involved one shop only). In the USA, a survey by Bucklin (1969) presents a similar picture: an average of three grocery shopping trips per week is reported. More recently, Frisbie's (1980) results indicate that just over two **filler** trips (involving low expenditure, i.e. less than $5) are made by the typical housewife in one week. Such results make clear that, even in short time periods, the potential exists for making grocery purchases at several different stores.

Most studies indeed emphasize that multistore buying is in practice very much the norm, although the number of outlets visited inevitably depends on the time period in question. In one week, according to a 1966 Southern Television study (see Charlton, 1973, p. 36), 80% of housewives shop for groceries at only one or two stores. Bucklin (1969) reports an average of two stores visisted over a similar period (rising to three over three weeks). Over a one-year period in contrast, Cunningham (1961) reports that 29 different stores were used by the average household in his study.

The pattern remains broadly similar when supermarkets only are considered. Tate (1961) and Dietrich (1975) both report that over one year only about 10% of consumers confine their purchases to one such store. Schapker's (1966) analysis, based on some 27,000 interviews conducted over a ten-year period, put the figure a little higher at 17%.

A quite different picture might be expected where store loyalty is considered for individual product fields. On the one hand few products are bought on every shopping trip (reducing the scope for multistore buying), and on the other hand it seems likely that shoppers will tend to restrict their purchases of some products to certain types of store. In practice, however, multistore buying remains very much in evidence. In Seggev's (1970) study of nine product classes, the average number of stores used over 20 weeks ranged from 1.9 for floor wax and polish to 3.8 for margarine (figures which incidentally underline the relevance of purchase frequency). Over a 24-week period, corresponding figures reported by others include 3.3 stores visited for dentifrice (Jephcott, 1972), 2.6 for washing up liquid (Jephcott, 1972), and 2.5 for instant coffee (Wrigley and Dunn, 1984b).

4.3.2. The Distribution of Purchases Across Stores.

That consumers typically visit a variety of stores in their procurement of groceries begs the question of how purchases are distributed between these outlets. Most results in this area indicate that consumers tend to concentrate their purchases in one or two outlets. Thus the average household in Cunningham's (1961) study, though patronizing 29 stores over the year, devoted almost half its total food expenditure (49%) to its favourite store. The two favourite stores accounted for 70% of expenditure, the three favourite 80%. The corresponding figures from Enis and Paul's (1970) 10-week study were somewhat higher at 66%, 86%, and 95% respectively, as would be expected given the shorter time period. Recent figures reported by Dunn and Wrigley (1984) in the UK - 42%, 60% and 71% - are close to Cunningham's results. But taking account again of the shorter time period studied (24 weeks), these imply a somewhat lower level of loyalty, which accords with the steady decline in store loyalty over the last three decades (described in a later section).

Tate's (1961) results support the overall picture of quite high concentration on the favourite store. An additional finding of some interest was that the panel members in question concentrated their purchases in a store not so much through spending more on each visit (i.e. relative to their expenditure when visiting any other given store) as through simply visiting the store more often. On a per trip basis, shoppers spent almost as much in their second and third choice stores as in their most preferred store. Farley's (1968) factor analytic study of Cunningham's data reinforces this finding.

For individual product fields, the concentration of purchases in the favourite store seems less marked than reported above for all purchasing. In Wrigley and Dunn's (1984b) 24-week study (based on purchase occasions rather than expenditure), a buyer of instant coffee at the average store would devote only one third of her purchases of the product class to that store. Still lower proportions were reported for baked beans and toilet tissue. It could well be asked why these values are all lower than those reported by the same authors from the same data for **all** grocery purchasing (Dunn and Wrigley, 1984). The answer lies at least in part in the adoption of the "product-buyer-at-a-store" approach, which inevitably involves double-counting those consumers who **do** shop at more than one store when an overall average is calculated.

4.3.3. Loyalty to Store Chains.

An alternative approach to the study of store loyalty is to consider not the store itself but the chain or store group of which it is part. It is not inconceivable that consumers might patronize a variety of individual stores while nevertheless gravitating towards those of a particular chain. In practice, however, one would intuitively expect the opportunity for multistore buying within a single chain to be somewhat limited, given the dispersion of individual branches. Indeed, it has been reported that consumers in general buy at just one or two branches of any particular chain (Kau and Ehrenberg, 1984). It should not be surprising therefore if consumer loyalty to chains follows the same broad patterns as it does for individual stores. This particular approach to the study of store loyalty derives largely from the structure of the commercial consumer panels, broadly based but locally sparse, which in turn reflects the marketing needs of manufacturers rather than retailers.

Crucial to the present context are the panel-data studies of Jephcott (1972), Kau (1981), Kau and Ehrenberg (1984) and Uncles and Ehrenberg (1988), which have examined chain choice using much the same analytical approach as previously developed for brand choice by the Ehrenberg/Goodhardt series of studies. (The emphasis here is on describing the patronage patterns of chains, not of consumers in the first instance - see Section 1.5.4 for a note on this distinction.) In sum, the loyalty patterns and models which held for brands were found to apply equally to chains. The following specific points are particularly notable.

* Chain loyalty follows regular patterns, and these are predictable using only market shares as chain-specific input. Specifically, market share and loyalty (on all measures) are positively related.

* Thus loyalty differences between chains can be largely explained by market share differences alone. Marketing variables appear to have little net effect on the structure of customer loyalty once account has been taken of market share.

* In so far as all aggregated aspects of chain loyalty are preditable by the same variable, they themselves emerge as strongly related.

* Chain loyalty is "fundamentally similar" in different product fields, in that the same models apply in each case (i.e. only the parameters vary).

* Chain loyalty is also quite similar across product classes in terms of absolute level, which is typically "low".

All these findings are in fact extensively illustrated by the present data in Chapter 6, and - the last point excepted - are therefore not expanded here.

To attach figures to the claim that chain loyalty is "low", some results of Kau and Ehrenberg (1984) for instant coffee can be cited. Over a 24-week period, buyers of this product at Tesco would on average buy it there just three times, yet would make over four purchases at other stores; over 40% of these buyers were occasional (i.e. once-only) buyers at the store; only one fifth were totally loyal to Tesco over the period; and buying at Tesco did not inhibit buying the product elsewhere (at least when compared to the whole population's propensity to buy at any other given store). For product classes with higher rates of purchasing (notably RTE cereals), the loyalty level reported was lower still.

Nevertheless, the authors emphasize that chain loyalty does exist in that buyers at a chain typically make more purchases there than at any other single chain. Also, expressing their reported chain duplication figures as a proportion of **relative** rather than **absolute** penetrations (i.e. penetration among buyers of the product class rather than among the whole population) leads to a D coefficient less than 1 (0.8 for instant coffee), implying **some** constraint on multistore buying.

The gist remains that in consumers' patronage of retail chains, loyalty is more conspicuous through its absence than its presence. The fallacy of the distinction between "our" and "their" customers applies as strongly to store chains as it does to brands.

4.3.4. Loyalty to Store Types.

The reality of multistore buying does not deny the possibility of loyalty to a given **type** of store. Wrigley's (1980) results - concerning the four store categories of supermarkets, Co-ops, counter-service grocers and small self-service stores - are relevant to this issue. It transpired that, despite the aggregation of choice options, loyalty remained far from emphatic. Over a twenty-week period, tea buyers at a shop type would tend to make as many purchases "elswhere" as at that type of store (although the precise balance varied considerably from type to type), and a duplication coefficient of 1.0 indicated that the buyers at one type were as likely to buy at any other given type as the average member of the population.

A different question is whether some store types attract more loyalty than others. Cunningham (1961) concluded from his results that branches of retail chains enjoy more loyalty than independent or specialist stores (although strictly his figures only indicate that a chain store is more likely to be the favourite outlet in terms of total grocery expenditure). Loudon and Della Bitta (1984, p. 658) assert that loyalty is "high" to supermarkets but "low" to department stores, the latter point being supported empirically by Donnahoe's (1956) early study.

The most coherent findings in this area are provided by Kau and Ehrenberg (1984). Their results relate not only to store chains, as noted previously, but to **groups** of stores with common characteristics. Thus Tesco is compared to other individual chains, co-operatives, "symbol" grocers (i.e. voluntary groups), independents, and a large miscellaneous category. The loyalty to each of these categories is shown to fall in line with the theoretical estimates (derived from the Dirichlet), thereby highlighting the role of market share in explaining loyalty discrepancies rather than the very real differences that exist between these store types in terms of outlet size, pricing, range, and so forth. In other words, once account has been taken of market share, the category composed of small, independent outlets can be said to receive the same pattern of loyalty as a powerful supermarket chain.

4.3.5. The Temporal Stability of Store Loyalty.

"The construct of loyalty", note Reynolds et al. (1974, p. 75), "has a time dimension, i.e., a time element connects products or stores for persons in groups." This dimension could be described more strongly as inextricably linked to the loyalty issue. Any inconsistency of a supposed "loyalty" through time questions not so much the utility of the measure employed as the validity of the concept itself. As Charlton (1973, p. 48) remarks, "How can we speak of shop loyalty if families that are loyal one week are shown to be disloyal the next?" Essentially the time factor raises two issues.

The first concerns the importance of relating a measure of store loyalty to a specific time period. In this respect, Kau (1981, p. 168) notes that it is a "normal pattern" for a progressively larger percentage of a store's patrons to buy elsewhere over time periods of increasing length. In his study this proportion increased from under half in six weeks to about four fifths in twenty-four weeks. The importance of the time context is particularly striking in the interpretation of duplication analyses: in Wrigley's (1980) study, for example, the duplication coefficient for a ten-week period implied that shopping at one store type **inhibited** shopping elsewhere, while over twenty weeks it suggested that purchasing at one store type **increased** the likelihood of buying elsewhere. Clearly, the manner in which shopping at a store impacts on shopping elsewhere must be assessed with regard to the **opportunity** for multistore patronage.

The second issue concerns whether consumers, to the extent that they exhibit loyalty, do so to the **same** store consistently over time. Cunningham's (1961) analysis suggests that they do. It emerged that, quarter by quarter for a year, 43 out of the 50 families in question retained the same outlet as their "First Store" for at least three out of four quarters. Over three years more switching occurred, although this was partly because for the 25 families studied over this period there was often little discrepancy in the proportion of purchases devoted to the first and second stores. Thompson (1967) similarly found some evidence of loyalty being directed, over a one-year period, to the same supermarket (which, incidentally, was not usually the nearest).

Seggev (1970) studied more broadly the temporal stability of families' store **assortments.** Concern focused not just on the family's favourite store but on the popularity ranking of all the stores it patronized for a given product field. Seggev measure the degree of rank correlation for such store assortments in five successive twenty-week time periods using the Kendall Tau test of significance. On this basis he concluded that, for the product fields analysed, between 52% and 74% of households have "non-stable" store assortments, "i.e., the stores at which they shop vary significantly among the five time periods studied" (p. 21). It may be however that Seggev's test of temporal stability was too strict. Certainly Charlton (1973) holds this view, pointing to Cunningham's finding that the discrepancy between differently-ranked stores in terms of expenditure is often quite small and provides thereby conditions ripe for frequent changes in overall store ranking.

In sum, while measures of store loyalty based on purchase frequencies or the number of stores patronized are clearly highly dependent on the time period analysed, there is some evidence that in terms of ranking at least the favourite shop will tend to retain its hegemony over quite long periods of time.

4.3.6. The Decline in Store Loyalty.

The work reviewed in this section spans some twenty-five years, and a tendency is apparent for the more recent studies to report a lower level of store loyalty than the earlier investigations (although the measures used are not always directly comparable). Explicit reference to a decline in such loyalty is made by Loudon and Della Bitta (1984, p. 658) and Assael (1984, p. 566), and the trend is strongly supported by the findings of Schapker (1966) based on interviews of some 27,000 consumers over a twelve-year period in the USA. Schapker reports that between 1954 and 1965 the percentage of supermarket shoppers who patronized only one such store in a year declined from 41% to 17%. (However, account should be taken of the fact that more of the stores used by a household are now supermarkets - see e.g. Charlton (1973).) The same general trend has been reported in the UK also (see Charlton, 1973, p. 49).

A variety of explanations for the decline in loyalty have been proposed in the literature. Schapker (1966) himself points to the proliferation of supermarkets, increasing retail competition, a widening in the variety of food purchases, and a move toward more frequent shopping (which increases the scope for multistore patronage). Engel and Blackwell (1982, p. 531) cite rising energy costs (presumably the development being held to make local stores more attractive than relatively distant superstores). Assael (1984, p. 566) considers increasing price-consciousness to have promoted multistore patronage. It seems likely that the increasing number of supermarkets in town centres and elsewhere together with the rising mobility consequent from widening car ownership - the growth here being fourfold between 1951 and 1971 (Noble, 1975) - are also of particular relevance to this decline in store loyalty.

Though weak and declining, store loyalty is not extinct. Indeed, such behaviour is manifest among certain sections of the buying population. The next section - dealing with the correlates of store loyalty - offers some clues as to how these store-loyal customers differ from the "disloyal".

4.4. CORRELATES OF STORE LOYALTY.

As with brand loyalty, the most popular approach to the study of store loyalty has been via standard regression techniques, the aim being to identify the factors that differentiate between the "loyal" and the "disloyal". This section summarizes the main findings, grouping them according to the type of variable that has been related to store loyalty. The seven categories in question concern personality, socioeconomic status, demographic status, shopping style, product-buying rate, the product class, and marketing variables.

4.4.1. Personality.

Personality variables do not emerge from the literature as strongly related to store loyalty. Especially notable here is Massy, Frank and Lodahl's (1968) large-scale study which, involving some 3,500 consumer panel members, specifically addressed the relationship between buyer behaviour and personal attributes. Very few significant relationships were identified (one instance being an association between store loyalty and a low "need for change", as might be expected). The widely-referenced Enis and Paul (1970) study also cited some apparent relationships, and argued for their plausibility. But only 13% of the variance in store loyalty could be explained by multiple correlation, and the authors were also forced to concede that "Psychological characteristics were not powerful determinants of store loyalty" (p. 53). Carman's (1970) results, based on the Myers-Briggs test, reinforce the point. Possibly relevant to such conclusions is the warning of Horton (1974) that standard psychological inventories designed for clinical purposes (especially those based on ipsative scaling) may be inappropriate to the consumer behaviour context.

There is evidence that "lifestyle" variables may provide more powerful predictions than the narrower personality factors. Carman (1970) certainly takes this view, describing the store-loyal shopper as time conscious, often a working mother, and devoting little time to cooking or entertaining (although none of these variables appeared individually to be good predictors of the loyalty index used). The lifestyle analysis of Reynolds et al. (1974) portrayed the store-loyal consumer as relatively busy, time-conscious, not venturesome in trying new products, and not an opinion leader (alghough again the predictive potential was not emphatic, with stepwise regression accounting for only some 26% of the variance in loyalty). Although there was little overlap in the specific lifestyle variables used in these studies, both analyses do point to time-consiousness and, to a lesser extent, some form of introversion as likely correlates of store loyalty.

4.4.2. Socioeconomic Status.

A stronger relationship seems to exist between store loyalty and certain socioeconomic variables, the most consistently-reported correlates being occupational status (Tate, 1961; Massy et al., 1968; Enis and Paul, 1970), income level (Tate, 1961; Massy et al., 1968; Carman, 1970; Reynolds et al., 1974; Dunn and Wrigley, 1984), and education (Tate, 1961; Enis and Paul, 1970; Reynolds et al., 1974). Where a significant association is reported, it is in every case negative, and that this applies to each of the above socioeconomic variables undoubtedly reflects the usual covariance among factors of this type. This overall picture is reinforced by investigations of consumer spatial behaviour, which have typically found higher income groups to engage in more extensive "intermarket" shopping (e.g. Herrman and Beik, 1968; Thompson, 1971; Darden and Perreault, 1976). In sum, store loyalty appears to be most prevalent among consumers of relatively low occupational status, income, and education.

Why this should be so is open to speculation. It seems to conform to the "restricted scope" hypothesis (see e.g. Caplovitz, 1967) whereby consumers of relatively low occupational status are assumed to be less able to make effective use of market opportunities than their higher-paid, more mobile, and better-educated counterparts. On the other hand it contradicts the economist's perspective on behaviour, according to which lower-income consumers are considered to have a lower opportunity cost for time and to attach more importance to the price benefits consequent from search for alternatives (see e.g. Becker, 1965). On this latter conjecture the lower-paid should be relatively **dis**loyal in their patronage behaviour.

As a final remark, socioeconomic variables are not so relevant that they always emerge as significantly related to store loyalty. Rothberg's (1971) large-scale study specifically addressed this type of relationship, yet found none of the associations reported here. And in Goldman's (1977) study, occupational status and income level emerged as relevant for only one of the three store types involved. Importantly, however, results specifically contradicting the apparent **negative** association between socioeconomic status and store loyalty have yet to emerge.

4.4.3. Demographic Variables.

The results for demographic factors are far from clear-cut. Household size is described as irrelevant in one study (Reynolds et al., 1974), and both positively and negatively related to store loyalty in another, the direction of association depending on the type of store involved (Rothberg, 1971). Results are still more variable with regard to age: the association with store loyalty has been reported as non-existant (Enis and Paul, 1970), positive (Reynolds et al., 1974), negative (Tate, 1961), and both positive and negative (Rothberg, 1971). (In the latter case the type of association depends again on whether food stores, drugstores or discount houses are involved.)

Inevitably some such "contradiction" could be rationalized (at least in part) through disparities in method, and especially in the measures employed: for instance "age" refers to the housewife in Tate's and Rothberg's analyses but to family life-cycle stage in the Enis and Paul case. But the degree of result inconsistency is such as to preclude any generalization at this stage. On a positive note the results may validly serve to emphasize the relevance of context (e.g. the store type in question, the number and proximity of alternatives, etc.) to a variable's influence on behaviour.

Geographical mobility, in the demographic sense of home relocation frequency, has been studied in relation to store loyalty by both Enis and Paul (1970) and Carman (1970). Neither study reported any association, and this despite Carman's use of one particularly rigorous measure of geographical mobility - "proximity of mother-in-law".

4.4.4. The Product Field.

It has been seen that, while some studies examine store loyalty for all grocery puchases, others proceed on a product by product basis. In this latter case, a consistent pattern is for the overall level of store loyalty to vary by product class. For instance, Cunningham (1961) noted that the average First Store Loyalty rating varied from 58% for bread to 81% for canned peaches, and Seggev (1970) showed the number of stores used in 20 weeks to range from 1.9 for floor wax to 3.8 for margarine. As in the case of brands, the product-buying rate appears to account in large part for such disparities - a point made explicity by Kau and Ehrenberg (1984) and Wrigley and Dunn (1984c).

Another question is whether a relatively store-loyal shopper for one product will be relatively store-loyal for another. This issue is raised by Walters (1974, pp. 445-446), who suggests a store's patrons "may be loyal for all its products or for only one of its products"; he also points to "considerable interdependence between product and store loyalty", though providing no supportive data. Empirical results are in fact mixed. Neither Cunningham (1956) nor Goldman (1977) could find any evidence of such "generalized store loyalty". In contrast Blattberg et al. (1976), taking two product pairs in turn, determined that roughly half of the buyers involved would exhibit a similar level of store loyalty in each product class - far more than would be expected by chance alone.

A relevant consideration in interpreting these results is the degree of product similarity. Where products are comparable, and in particular available at the same store, it is not unreasonable to expect store loyalty for one of these items to influence the patronage pattern for the others. Certainly Blattberg et al. (1976) found the consistency in loyalty to be higher for the "similar" than the "dissimilar" product pairs. And it is notable that Goldman's (1977) negative findings relate to furniture, shoes and clothing - products unlikely to permit any carry-over effects from similar availability.

4.4.5. Purchasing Level.

The issue at hand in this section is essentially whether loyal shoppers are heavy buyers. This itself raises two questions. First, do store-loyal consumers spend more in total than other shoppers? And second, do they spend more at their favourite store than their less loyal counterparts?

With regard to the first question, the results of Cunningham (1961), Enis and Paul (1970), and Tate (1961) all point to a negative relationship between store loyalty and total grocery expenditure. However, the pattern is not emphatic, the relationship being statistically insignificant in the first two of these studies. Carman (1969) in fact proposed that the reverse would apply, hypothesizing that non-loyal consumers, through engaging in interstore comparison, would pay less on average for the goods they buy. But he found no evidence to support this conjecture.

The pattern for individual product fields supports the overall picture of a negative association between store loyalty and total expenditure. In Seggev's (1970) analysis (where loyalty was measured by the number of stores used), the negative association between store loyalty and amount bought was significant in each of the nine product fields studied. Perhaps most convincing is the finding of Kau (1981) and Kau and Ehrenberg (1984) that 100% chain-loyal shoppers are invariably light buyers of the product class in question - a well-established pattern in the brand choice context. (Their results lead to much the same conclusion where loyalty is measured by purchase rate at the chain or by share of requirement.)

In accounting for the relationship, it seems most plausible to explain store loyalty in terms of amount bought rather than the reverse. Light buyers, it seems, are "predisposed" to be store-loyal through having less **opportunity** for multistore buying. The point may also have some bearing on the relationship where total grocery expenditure is used to measure weight of purchase, although in this case the evidence (cited in Section 4.4.2) linking loyal shoppers with low incomes (implying less scope for high grocery expenditure) seems more pertinent.

Turning to the second basic question of this section, it seems that loyal shoppers - though apparently light buyers overall - do indeed spend more in their favourite store than their less loyal counterparts. Such is the conclusion of Enis and Paul (1970), who infer that (in terms of grocery expenditure) loyal shoppers are especially valuable customers. But their point is almost tautological in that one component of their index of loyalty itself was the proportion of expenditure devoted to the favourite store. More convincing are, again, the results of the Kau/Ehrenberg studies concerning 100%-loyal shoppers for individual product classes: these buyers generally emerge as relatively heavy buyers of the product at the chain in question, although it is worth emphasizing that the discrepancy with the average buyer is only a small one.

In sum, the evidence suggests that the store-loyal consumer is a relatively heavy (and therefore valuable) buyer at the favourite store but a light buyer overall - and this seems to hold whether analysis focuses on total grocery expenditure or the amount bought of a single product.

4.4.6. Store Characteristics.

The notion that loyal customers are valuable customers - for which there is some evidence, as revealed by the previous section - has prompted several researchers to question which are the factors that foster loyalty among a store's customers.

At the most general level, the availability of alternatives has (as in the case of brand loyalty) been cited as relevant. For instance, Schapker (1966) points to a negative relationship between the number of competing supermarkets and loyalty. And a study by Bucklin (1971) concluded that both interstore comparison and multistore patronage increase as the distance between alternatives decreases.

Others have emphasized the relevance of store image - a notion originally popularized by Martineau (1958) - to store loyalty. In this regard Bellenger, Steinberg and Stanton (1976) provide empirical evidence that loyalty is strongest where self and store image are congruent. (The importance of image congruence is also highlighted by Dornoff and Tatham (1972), but in this case with regard to store preference rather than loyalty.) Lessig (1973) takes a broader perspective in taking account of the image of "other" stores: he proposes an "avoidance hypothesis" whereby loyalty develops partly through negative perceptions of competing outlets, although on the basis of his empirical results the development of loyalty could just as well be explained in terms of relative preference. (For a critique of the methodological approach involved, see Murphy and Coney (1975).)

Among other retail characteristics of relevance to store loyalty, store ownership (presumably a proxy for many other factors) was highlighted by Nordstrom and Swan's (1976) study of a car franchise. The role of "key items" (e.g. bread, butter, milk) is noted by Charlton (1973): a consumer may develop loyalty to a store on the basis of these products alone, but make other purchases there as a matter of convenience. The results of Thompson (1967) suggest that meat in particular may act in this way.

Finally, Enis and Paul (1970, p. 54) cite a variety of factors such as prices, trading stamps and parking facilities in accounting for the particularly high level of loyalty received by one store in their study, but add that "it cannot be definitely concluded that store loyalty is the result of marketing strategy".

The caveat now seems propitious. The results of several applications of the Dirichlet model, regarding both individual outlets and retail chains, have made clear that loyalty disparities across stores can largely be explained through market share differences alone (Kau, 1981; Kau and Ehrenberg, 1984; Wrigley and Dunn, 1984b; Uncles and Ehrenberg, 1987). The point is best made by Kau and Ehrenberg (1984, p. 407).

> "The close fit of the Dirichlet or related models [...] implies that after we allow for each chain's market share there are no intrinsic differences in any aggregate aspects of customer

loyalty. Such a strong causal interpretation about the role of marketing-mix and market factors seems possible because it is negative. It is based on the **non-correlation** of all the other variables with consumers' observed patterns of buying after market share is partialed out. Lack of correlation implies lack of causation."

This is not to deny the relevance of marketing variables (e.g. store size, location, layout, range, pricing, advertising, trading hours, and so on) to the achievement and maintenance of any particular sales level. The point is that, for a given product class, all outlets and chains seem in practice more or less tied to the same relationship between market share and loyalty, whatever the differences in marketing strategy. In sum, there is good reason to believe that the ability of stores to manipulate the loyalty structure of their customer base is subject to the same constraints and "law-like" regularities as have long been known to apply to brands.

4.4.7. Cognitive Processing.

Few studies have addressed the potential correlates of store loyalty in terms of underlying cognitive processes. Certainly Monroe and Guiltinan (1975) and Engel, Blackwell and Kollat (1978) have proposed "sequence of effects" models of store choice, but these are not susceptible to empirical testing (although the former authors do provide tentative evidence in support of their flow-chart structure) and even if validated would hold little direct bearing on the known patterns of retailer loyalty over time. Sheth (1974, p. 80) describes store loyalty as "an indicator of cognitive style" and "a technique for problem simplification", but does not expand on this perspective (at least in the store choice context).

Much attention has, however, been accorded to one stage of the choice process, namely external information search - or more specifically interstore comparison. Most studies in this area emphasize the **absence** of such pre-purchase activity even for consumer durables (e.g. Udell, 1966; Dommermuth, 1965; Rothe and Lamont, 1973).

A slightly different perspective is provided by Bucklin (1966) who found that more interstore comparisons are made the higher the value of the product and the lower the cost of search - a view that accords with economic theories of utility maximization (see e.g. Stigler, 1961; Becker, 1965). More recently Brown (1988) concluded that consumers acquire store information that is **incidental** to the main trip purpose but which may later be accessed by

internal search when a relevant purchase is envisaged. Unfortunately the relationship between the lack (or presence) of information search and any store loyalty is rarely considered. One exception is Goldman's (1977) analysis, which pointed to a marked negative association between interstore comparison and store loyalty - an intuitively plausible result.

Bucklin's reference to product value as a motive for interstore search could logically be expanded to take account of perceived risk. Certainly some researchers have cited risk as a significant determinant of store choice (Hisrich, Dornoff and Kernan, 1972), but only Assael (1984, p. 567) has drawn a direct connection between risk (or more specifically a desire for risk reduction) and store loyalty itself.

4.5. MODELS OF STORE CHOICE.

Most models of retail patronage behaviour have been propounded in a geographic rather than marketing mode. Best-known are the early gravity models of Reilly (1931), Converse (1949), and the more recent probabilistic variants of Huff (1964) and Lakshmanan and Hansen (1965). The emphasis here is on retail **centre** patronage, and on choice rather than loyalty over time, and as such the approach is not directly relevant to the present issue.

Of the store loyalty models that are described in the marketing literature, most represent a direct importation of technique from the brand choice context. In one case, the value of the store model is enhanced by this very transfer. The four main formulations in question are an information-processing model, the Linear Learning Model, the NBD, and the Dirichlet. The ubiquitous correlation-regression approach is not reviewed here: the main findings from this school were summarized in the previous section and, as emphasized in Chapter 3, by their very nature regression models are condemned to be "local" rather than generalizable.

The information processing model in question is that of Monroe and Guiltinan (1975). As a verbal flow-chart, linking together notions such as buyer characteristics, attitudes, store attributes and choice, it differs little in concept from the high-involvement brand choice models described in Chapter 3. The authors provide tentative empirical support, obtained via time-path analysis, for the "hierarchy of effects" contained in their model, but how this should impact on the pattern of store choice over time - store loyalty - is not explored.

The use of the Linear Learning Model for store choice was initially proposed by Rao (1969a) who, from analysis of a four-purchase sequence in three product fields, established empirical support for the "purchase event feedback" effect underlying the model:

> "A consumer's selection of a store for the purchase of any product is not completely random and she exhibits bias in her choice of the store. The more recent her purchase experience in a particular store and the more frequent her visits to the store, the more likely she is to repurchase the product in that store" (pp. 323-324).

Aaker and Jones (1971) specifically tested the LLM using Rao's data. In general the model performed well for toothpaste, but less impressively for coffee (which the authors attributed to the presence of private labels). The authors' main concern was with the fit of the model, and no specific implications to store loyalty are mentioned. Nevertheless the authors do note across-product differences in the level of the feedback parameter B - a finding which suggests the level of influence of previous decisions on store choice may be a product-specific characteristic.

No replicative studies have apparently been conducted, presumably due to the severe limitations of the model (concerning complex parameter estimation, restriction to dichotomous choice, and an unrealistic assumption of consumer homogeneity). Indeed, a tendency to discuss rather than apply the model has also held in the brand choice context.

Another stochastic model - the NBD - has been more successfully applied to store choice. Jephcott's (1972) initial study suggested that the model, well-established in the brand choice situation, fitted equally well for store chains as regards penetration and purchase frequency growth over time. Several studies extended these results to the cases of store types (Wrigley, 1980), store chains again (Kau, 1981; Kau and Ehrenberg, 1984), individual outlets (Wrigley and Dunn, 1984a), and ancillary shopping trips (Frisbie, 1980), demonstrating also (except in Frisbie's case) the repeat-buying facility of the model and the relevance of the Duplication of Purchase Law to these contexts.

In view of the suitability of the NBD and this latter Law, a logical extension was to apply the Dirichlet - which effectively subsumes both these models - to store choice, and the results of Kau (1981), Kau and Ehrenberg (1984), Wrigley and Dunn (1984b), and Uncles and Ehrenberg (1987) in this area are very encouraging. Taken together, these studies were highly valuable in demonstrating that store choice patterns (whether "store" be a type, chain, or individual outlet) are highly predictable using the same models as developed for brand buying, and that much of the theory of brand choice accumulated over three decades could be directly transferred to the store choice context.

This conclusion must be qualified by the basic requirement for the stores or chains analysed to cover broadly the same geographical markets, without which the independence structure of the model would probably not apply. This need was made explicit in Wrigley and Dunn's (1984b) local-level analysis, where the differing "catchment areas" of central and suburban stores precluded their inclusion within the same choice set.

A technique for integrating exogenous variables - such as the socioeconomic, locational, and attitudinal characteristics of consumers - into the Dirichlet model has recently been proposed by Wrigley and Dunn (1985). Essentially, this involves making the parameters of the model functions of a set of explanatory variables, and disaggregating the predictions accordingly. The approach counters the precept underlying the Dirichlet: that exogenous variables are notable through their **non**-correlation with buying patterns. Whether the lost parsimony in pursuing this course is justified by any marginal predictive improvement must await further empirical evidence.

4.6. CONCLUSION.

Researchers have differed widely in their interpretation of store loyalty, as revealed by the diversity of measures employed. Some have used simple measures, such as the number of shops used, while others have proposed complex composite indices aiming to provide an overall view of a multidimensional concept. The latter approach, as in the case of brand loyalty, suffers from its abstraction and its inability to express consumer disparities on specific measures of potential import to marketing policy. Perhaps for these reasons it is a direct measure, namely Cunningham's "First Store Loyalty", that has proved most popular in practice. This measure benefits also from its flexibility, with applications involving expenditure, trips and purchase occasions, and with extensions easily made to gauge the level of multistore loyalty.

Probably the most important recent development on the measurement issue is that the strong interrelationships between different (aggregate-behavioural) loyalty measures in the brand choice context have been found to hold also in the case of stores. This feature underlies the extension of the Dirichlet model to store choice behaviour, and implies that any single index of store loyalty can in effect act as proxy for all others.

That behavioural measures of loyalty are strongly tied simplifies the question of overall "loyalty level". Nevertheless, just what is "high" or "low" loyalty remains subjective. For instance, while Bucklin (1969, p. 419) felt that the increase in the number of shops used from 2.1 in one week to 3.3 in three weeks indicated that "exposure to the offerings of competitive stores was rather widespread", Charlton (1973, p. 37), reviewing the study, concluded that "On the whole figures of this order suggest the consumer does not do a great deal of shopping around and that habit or loyalty is an important factor in shopping behaviour".

In general terms, recent studies based on the Dirichlet indicate that multistore buying is a more striking feature of consumer behaviour than store loyalty. Some numerical expressions of this picture were provided in Section 4.3.3, and the point is further illustrated in Chapter 6. It is worth noting that these studies' focus on "the buyers at a store" as opposed to all consumers gives additional weight to those engaging in the most extensive multistore buying (as such buyers are inevitably double-counted in calculating an average-store value). Nevertheless the results make clear that the distinction between "our buyers" and "their buyers" is as inappropriate in the case of stores as in that of brands.

Other evidence suggests that store loyalty is not only low but is falling. Certainly comparing the findings of early studies with those of more recent investigations supports this view. Factors such as the proliferation of supermarkets, increasing mobility, and a widening in the variety of grocery purchases seem especially relevant to the apparent decline in loyalty. In contrast, the increasing size of supermarkets (as illustrated by the appearance of large out-of-town superstores in recent years, often in combination with non-grocery retailers), in promoting the notion of one-stop shopping, may be working in the other direction.

Though in overall terms quite low, the level of store loyalty has been shown to vary markedly across consumers. This result has prompted many attempts to identify the variables which discriminate between the loyal and nonloyal. As in the brand choice context, such studies have provided few consistent findings, presumably reflecting the sheer variety of relevant factors - "potentially infinite" being one assessment of their number (Enis and Paul, 1970, p. 49) - and the complex interplay between them. On this latter point, Farley (1964b) has suggested that income and education are proxies for one another but wield opposite influences on loyalty. The relevance of context is highlighted by the case of age: its association with store loyalty was found in four separate studies to be non-existant, positive, negative, and (depending on the store type) both positive and negative! Sometimes only proxies for other variables emerge as significant, as when Rothberg (1971) found the number of television sets per household to be related to store loyalty.

Nevertheless, three areas of consistency have emerged. First, store loyalty seems negatively associated with socioeconomic status, as measured by occupation, income and education. This finding contradicts the economist's perspective of behaviour, according to which lower-income consumers are considered to attach more importance to the price benefits consequent from search for alternatives (see e.g. Becker, 1965). On the other hand it accords with the "restricted scope" hypothesis whereby consumers of low socioeconomic status are assumed to be less able to make effective use of market opportunities than their higher-paid, more mobile and better-educated counterparts (see e.g. Caplovitz, 1967), and lends support to Charlton's (1974, p.44) view that "shop loyalty is a negative attribute - possessed of a household of necessity rather than choice".

The second consistent factor is the product class. Specifically, multistore buying - in overall terms - appears to increase with the purchase frequency of the product class. As noted for brands, buying frequency is related to the **opportunity** for disloyalty. When comparing consumers rather than products, however, little evidence emerges of store loyalty "proneness" across product fields. This emphasizes the importance of talking in terms of loyal **behaviour** rather than "the loyal consumer". To quote Enis and Paul (1970, p. 55): "loyalty is not a strongly inherent consumer trait [...]. Loyalty is manifest only through action."

Finally, marketing characteristics of the store itself have been consistently found (in studies based on the Dirichlet) to be unrelated to the level of loyalty it attracts - at least once account has been taken of market share. This finding severely delimits the ability of marketing variables to manipulate the loyalty structure of a store's customer base.

Few explicit models have been proposed of store loyalty behaviour. Certain approaches popular in the brand choice context - notably the information processing and linear learning perspectives - have been transferred to the case of stores, but with either no or minimal empirical application. A marked exception concerns the NBD and Dirichlet models, which have been shown in several studies to provide an accurate description of store loyalty behaviour (whether "store" is defined as an outlet, chain, group, or retailer type). This development represents a major advance: it demonstrates that store choice as a subject of inquiry can be treated in much the same way as brand choice; and it allows a large body of brand choice theory accumulated over many years to be directly transferred to the context of store choice.

Charlton (1973) remarked, in his early review of store loyalty, that the marketing literature did not then present a coherent view of shop loyalty. He described relevant studies as isolated, disparate in terms of measures used, and generally on a small scale. Since then, work centering on the Dirichlet and related models has provided a more systematic approach to this important field of inquiry, and a good basis for generalization is building up. The research outlined in later chapters represents a logical extension to this investigatory effort.

Chapter 5

THE RELATIONSHIP BETWEEN BRAND CHOICE AND STORE CHOICE.

Contents:

5.1. INTRODUCTION.

The relationship between consumers' brand and store choice is an increasingly topical one in marketing. The ascendancy of the large supermarket chains and the growth of image-led retail advertising has led to such notions as "the retailer as brand" and to suggestions that store loyalty may be "taking over" from brand loyalty (e.g. Stoessl, 1979). However, as noted at the outset of Chapter 1, despite numerous studies of brand choice and store choice, few attempts have been made to relate the two. Only quite recently has significant progress been made, notably via the work of Kau (1981), Kau and Ehrenberg (1984), and Wrigley and Dunn (1984c). These analyses provide valuable starting points for much of the research outlined in later chapters.

The "relationship" between brand and store choice is a multifaceted issue, as illustrated by the variety of questions posed in this general area in Section 1.4. This chapter divides relevant work into four sections. Section 5.2 examines what is probably the most obvious manifestation of a brand-store relationship: the variation in brand shares (or penetrations) from store to store. Section 5.3 deals with the relative "importance" to consumers of brand and store choice: the traditional question of which choice comes first is discussed, and results which compare the levels of brand and store loyalty are reviewed. In Section 5.4, results pertaining to the correlation between consumers' brand and store loyalty are examined. Section 5.5 describes what progress has been made in modelling brand choice and store choice together. Finally, in Section 5.6, the main lessons of the work reviewed are drawn together.

5.2. THE INTERDEPENDENCE OF BRAND CHOICE & STORE CHOICE.

This section examines the extent to which brand choice probabilities vary from store to store. This is perhaps the simplest aspect of brand-store interaction. It is also the most widely studied, at least in industry, where so-called "source-of-trade" analyses are frequently used to demonstrate the competitive performance of brands in different store submarkets.

In the marketing literature, however, two studies alone have addressed this issue. First, Kau (1981) noted that if brand choice is independent of store choice ("store" being a chain or store group in this case), then the following mathematical relationship should hold:

$$bIX = bI.bX$$

where b = penetration
I = a given store
X = a given brand.

Kau found the equation, when applied to the instant coffee market over a 24-week period, to hold quite well in most cases, implying a reasonable degree of brand-store independence. This was most marked for the two major manufacturers' brands Nescafe and Maxwell House. The main exceptions concerned the private-label brand at Co-op and Mantunna at Kwik Save, a positive relationship arising in each case (i.e. relative to the "independence" equation). The reasons are not hard to see: as Kau notes, Co-op follows a policy of concentrating on its own brands, and Mantunna is available at only one store group other than Kwik Save. This latter question of distribution also seemed relevant to the grouping of miscellaneous brands, for which the observed bIX value was lower than expected for two stores well-known for their restricted brand-range policies (Co-op and Kwik Save) and higher than expected for the remaining three groups which offer a wider choice set to the consumer (notably Asda and the Miscellaneous store grouping).

A somewhat higher level of brand-store interdependence emerged from Wrigley and Dunn's (1984c) analysis. Here, brands' relative penetration (i.e. the proportion of product buyers at a store who purchase the brand in question over the 24-week period) were found to vary quite markedly from store to store. As in Kau's study, interdependence was strongest for the private label grouping, with relative penetrations ranging from 12% to 34%.

An obvious question is why such interaction between brand

and store choice should arise, given that most major brands are widely distributed, and that (private labels excepted) a brand is essentially the same item in all the stores where it is available. Wrigley and Dunn (1984c, p. 1234) themselves point to

> "factors which vary between individual stores, such as the price and perceived quality of private labels; the pricing of, and marketing strategy towards, national brands; and the socioeconomic and household characteristics of the 'typical' buyer".

Certainly the marketing literature has cited a variety of retailer influences on brand choice, and these can reasonably be expected to vary in nature from store to store.

First, presentational factors reported to contribute positively to a brand's sales include eye-level shelf location (Reynolds and Wells, 1977, pp. 351-353), a large number of shelf facings (Cox 1970; Hubbard, 1969), location in areas of high traffic density (Reynolds and Wells, 1977, pp. 347-349), and point-of-purchase displays, particularly those at aisle-ends or that stand out through movement or striking design (see Engel and Blackwell, 1982, p.555, for references to studies in this area).

Second, pricing might also be relevant. The price advantage (or disadvantage) of one brand over another will tend to vary from store to store - reflecting perhaps differential discounts from suppliers - and this might be expected to exert some influence on brand choice. However, the apparent inaccuracy of consumers' price perceptions (Brown, 1971; Dietrich, 1977) must dilute the validity of this hypothesis. Better documented is the effect of short-term within-store price changes (e.g. Cotton and Babb, 1978). Also, there is evidence that stores providing price-per-unit-weight information, especially in the form of an organized list, tend to bias purchasing towards less expensive items (Russo, Krieser and Miyashita, 1975), and to private labels in particular (Russo, 1977).

Third, retailer advertising may play a role in generating brand-store interdependence. The large multiples in the UK have become major advertisers, and some brands now receive more television exposure in the advertisements of retailers than in those of the manufacturer itself (Oliver, 1980, p. 259). Indeed, one intention of such advertising is to promote a positive relationship between buying the advertised brand and visiting the sponsoring store.

The fourth consideration concerns brand range. The set of brands stocked clearly varies from store to store: some retailers, notably Safeway and Asda, offer a wide selection of brands whereas others such as Co-op and Kwik Save are renowned for following a more restricted brand range policy. Indeed the latter store has in the past offered a within-chain monopoly to the supplier offering the most advantageous terms (Watkins, 1986, p. 132). The effect of a relatively wide brand range on within-store brand share may take several forms. At the simplest level, it may involve an evening-out of shares: evidence provided by Farley (1964a) and Weinberg (1973) indicates that consumers tend to distribute their purchases more widely in markets with many available options. Alternatively the "additional" brands may draw disproportionately from the common offerings, especially if the "additional" brands in question themselves differ from store to store.

Finally, mention must be made of the role played by private labels. It was evident from the studies of Kau (1981) and Wrigley and Dunn (1984c) that brand-store interdependence was most marked in the case of such brands. This finding is reinforced by the figures in Table 5.1 below which highlight the variation in private-label share from store to store. And to these could be added the extremes of Kwik Save (0%) and Marks and Spencer (100%).

TABLE 5.1

Private Label Share of Packaged Grocery Sales by Major Multiple (1983).

	Share %
Sainsbury	53
Waitrose	48
Safeway	34
Tesco	30
Fine Fare	24
International	21
Total Allied/Argyll	21
Hillards	15
Asda	7

Source: Simmons and Meredith (1984, p. 9).

That brand-store interdependence is apparently strongest for private labels can be rationalized on two counts. First, unlike manufacturer brands, private labels represent different product entities in competing stores: even if the product formulation is the same the packaging will vary. Indeed, a major objective of stocking private labels is to differentiate a store's offerings from those of its competitors (Frank and Boyd, 1965). Second, stores differ markedly in their commitment to, and promotional support for, private labels (Simmons and Meredith, 1984; Watkins, 1986, p. 130). For instance Sainsbury and to a lesser extent Waitrose are noted for strongly supporting their private label offerings (in the former case through such means as press advertising), while Asda - often cited as "the brand's friend" (Randall, 1985) - has until recently focused on manufacturer brands and Gateway is remarkably self-effacing in its packaging of private labels.

In essence, the argument is that private labels are more differentiated across stores (be it in objective, perceptual or promotional terms) than are manufacturer brands. However, it is interesting to note that while such differentiation translates into particularly disparate within-store market shares (or relative penetrations), it does **not** lead to any especially high store loyalty for this brand category: the results of Kau (1981) and Kau and Ehrenberg (1984) indicate that within-brand store duplication coefficients are much the same for private labels as for manufacturer brands. Rao (1969b) also deals with this question, but his conclusion that consumers differentiate little between the private-label offerings of competing stores rests primarily on the observation that recent users of private labels are more likely than non-users to purchase this brand category at a "different" store; the conclusion is especially surprising in view of Rao's (1969a) previous recognitition of the dependence of current buying on previous purchases.

5.3. THE HIERARCHY OF CHOICE.

This section deals with what has been described as the "traditional question" about consumers' brand and store choice (Kau and Ehrenberg, 1984): do consumers first choose a store to visit and then a brand to buy, or does brand choice precede store choice? The order of these choices is of both theoretical and practical interest. It would help establish the direction of influence underlying the apparent interdependence, noted in the previous section, between the two choices. And in the words of Uncles and Ehrenberg (1988, p. 293):

> "If selection of a shopping centre is the primary decision, then the success of a store depends on how the centre is perceived, its layout, ease of access, etc. If, by contrast, consumers choose a store knowing that they can obtain a desired brand there, then branding, promotion and advertising support are that much more important."

Most references to this issue seem to suggest that store choice comes first.

* Monroe and Guiltinan (1975, p. 20) explained that product and brand choice variables were not included within their store patronage model "since these behaviors tend to follow the store choice decision".

* Cunningham (1961, p. 137) states that "store loyalty [...] will at times override brand loyalty" on the grounds that "brand annoyance" would probably be tolerated if the store provides satisfaction in terms of convenience, product range, and so forth.

* Hisrich, Dornoff and Kernan (1972, p. 435) report that in their study of high involvement purchasing store choice appeared to "dominate" brand choice. (This was held to occur because brand recognition was low, which seemed to lead to the retailer being used as a brand surrogate.)

* Sheth (1974, p. 80) talks of store loyalty being a key determinant of brand choice rather than the reverse.

* In Burger and Schott's (1972) questionnaire survey, buyers of a household appliance overwhelmingly considered the store to be "more

> important" than the brand (although the pattern was less emphatic among respondents who had just bought a private-label product).

In contrast Engel and Blackwell's (1982, p. 514) assertion that "The most obvious factor in initial store choice is to culminate a brand choice decision" points to an alternative hierarchy, and Dommermuth (1965, p. 129) explicitly recognized the possibility of brand choice preceding store choice. However, these remain no more than suggestions.

It seems reasonable to assume that store choice precedes brand choice on the grounds of geographical accessibility (which restricts the set of practicable store alternatives), the fact of multi-product buying within a store (which dilutes the plausibility of store choice resting on a single brand decision), and the necessity - in behaviourist terms - of the store visit preceding the brand purchase. On the other hand it is the brand that is consumed, and competing brands generally offer different consumption experiences (taste, efficacy, etc.) - such factors may be held to strengthen the relative importance of the brand choice decision.

It will be clear from the above-listed references that this question of hierarchy has not been the subject of focused enquiry. One difficulty, highlighted by Kau and Ehrenberg (1984, p. 406), derives from the apparent variability of consumers' choice behaviour:

> "If over time a consumer fairly regularly buys different brands at different chains, it is unlikely that there is a simple answer to the traditional question about consumers' store and brand choice, namely to what extent consumers first decide on a store to visit and then on a brand to buy, or vice versa."

Wrigley and Dunn (1984, p. 1234) agree, concluding:

> "Our results suggest that there is no meaningful answer to the question of whether store choice precedes brand choice, or vice versa. For any practical purpose, since consumer behaviour is so variable, either may be regarded as coming first."

A perennial difficulty in consumer behaviour is establishing how elements of cognitive processing should translate into overt choice, especially when this "revealed" behaviour is examined at the aggregate level. The problem is illustrated by the rift between the information processing models (such as the "EKB" and

Howard/Sheth formulations) and the known regularities in aggregated choice behaviour (see e.g. Ehrenberg, 1988, p. 211 on this point). But it is of interest that the two remarks quoted above seem to posit a link between the sequential ordering of choice and overt loyalty. This connection has been made more explicitly by Dommermuth (1965, p. 129) in interpreting possible locations within his "shopping matrix":

> "Those consumers whose shopping behavior is described by any of the cells marked B [i.e. a position denoting only one brand bought, but several stores visited] would clearly be exhibiting high loyalty to a given brand, but little or no innate preference among retail outlets. They selected a brand before beginning to shop and then visited two or more outlets carrying that brand."

While intuitively plausible, this proposed link between relative brand and store loyalty and the sequential order of brand and store choice does not necessarily hold. It rests on the assumption that loyalty equates with indifference among the alternatives, which may not be the case in practice. Certainly several studies (e.g. Debreu, 1960; Huber and Puto, 1983) purporting to demonstrate the empirical fallacy of Luce's (1959) IIA axiom have shown switching to be higher among "similar" alternatives (e.g. Coke and Pepsi) then between "dissimilar" options (e.g. Coke and Seven-Up). But equally relevant is the finding that loyalty can develop towards brands even where the alternatives are almost identical (see e.g. Ehrenberg and Goodhardt, 1979, Article 17). And it is not difficult to think of product fields, most notably breakfast cereals, where marked switching occurs despite strong differences in product formulation (Ehrenberg and Goodhardt, 1979, Article 9; Kau and Ehrenberg, 1984).

In essence the point is that brand or store disloyalty does not necessarily represent **indifference** towards the alternatives, or an "unimportant" (and hence secondary) decision to the consumer. Consumers who exhibit disloyalty may do so precisely because of strongly felt but different requirements on each purchase occasion, or indeed out of the very human need for variety. The reality of "variety seeking" behaviour has been noted by Bass et al. (1972), and McAlister (1982) refers to brand attribute "satiation" as a cause of brand switching. It can also be stated that, as a response to indifference among alternatives, loyalty is as **rational** as disloyalty.

Beyond the difficulty of relating cognitive to overt behaviour lies the more basic problem of what is understood by a "choice". More specifically, at what point is the brand or store decision made? To illustrate the problem, the view that store choice comes first rests on the notion that the brand decision is in fact made in-store. But if alternative evaluation is **continuous** rather than directly preceding choice, as several authors have contended (e.g. Ehrenberg and Goodhardt, 1979; Hoyer, 1984), then within-store "choice" of brand is to some extent predetermined. Clearly this consideration dilutes the validity of treating consumer choice - be it of brand or of store - as a discrete action, and thereby questions the notion of a sequential "order" itself.

In view of these difficulties, an alternative approach to studying the "hierarchy" of choice is simply to compare the observed levels of brand and store loyalty (i.e. without drawing inferences as to the sequential ordering of the associated choices). This straightforward comparison is of value in itself: as described in Section 1.6), the balance would help establish the relative power of manufacturer and retailer regarding such matters as merchandising and supply terms. Work in this area is reviewed in the next section.

5.4. BRAND LOYALTY VERSUS STORE LOYALTY.

This comparison can be made in two ways: first, in terms of loyalty at what has been described as the "whole-market" level; and second, in terms of **brand loyalty within individual stores** and **store loyalty for individual brands**. This latter approach is more insightful in so far as it takes account of the interaction that may arise between brand and store choice.

5.4.1. The Whole-Market Level.

At this level the evidence indicates that brand and store loyalty are much the same in degree, although surprisingly only one author (Jephcott, 1972) draws attention to this result.

Cunningham (1961) was the first to provide comparative data in this area, calculating his "Single Brand Loyalty" and "First Store Loyalty" measures (in this case the proportion of **product-field** expenditure devoted to the favourite brand or store) for eighteen product classes over a one-year period. The overall averages were quite similar at 65% and 73% respectively, as were the extreme values in each context. However, only in three product fields (bread, tea and flour) did brand loyalty exceed store loyalty. There was no obvious relationship between the two loyalties across product fields.

A later study by Seggev (1970) focused on the size of consumers' brand and store assortments over a 20-week period. For all nine product classes analysed, the average number of brands bought exceeded the average number of stores patronized. The overall averages were 3.7 and 2.8 respectively. In this case, a marked positive relationship between these two aspects of "disloyalty" did emerge: the higher a product field's average brand repertoire, the higher its average store assortment.

Jephcott's (1972) investigation is particularly relevant to the present context as it was directed specifically at comparing patterns of brand choice and store (i.e. chain) choice. On the basis of four measures (w, w/wp, bs/b and repertoire size), average brand loyalty and store loyalty were remarkably similar for the two products studied. If anything, the former loyalty exceeded the latter. The products in question - dentifrice and washing up liquid - were perhaps not typical of packaged groceries: dentifrice is widely available at chemists as well as grocers, which may weaken store loyalty; and the washing up liquid market is dominated by one brand, which may strengthen the overall level of brand loyalty.

Nevertheless, the similarity between the two loyalties remains a striking result, and one which may not have been expected on intuitive grounds.

5.4.2. The Submarket Level.

In this context, the studies of Wrigley and Dunn (1984c) and Kau and Ehrenberg (1984) are especially relevant. These authors took the buyers of a given brand at a given store (say Brand B at Store S) and measured the extent to which they also bought other brands at that store, the same brand at other stores, and other brands at other stores. From these results, it is possible to assess the balance between within-store brand loyalty and within-brand store loyalty.

In Wrigley and Dunn's study, which was concerned with individual outlets rather than retail groups, the buyers of a brand at a store typically exhibited a higher propensity to buy that brand elsewhere than buy alternative brands within the same store. This overall result held for all three product fields studied, and whether duplication or purchase frequency was the measure used. Nevertheless, the precise balance between the two loyalties varied considerably according to the brand-store pair in question.

The results of Kau and Ehrenberg pointed to a more even balance between the propensities to buy other brands at the same store and the same brand at other stores, although again considerable variation was apparent across individual brand-store combinations.

The main point of agreement was that, whatever the relative extents of the two loyalties (an issue which was not in fact referred to by either analysis), consumers do typically show a high level of both multibrand buying within a store and multistore buying for a brand. Also, both studies compared manufacturer brands with private labels, and noted little difference between them. If anything, private-label buyers at a given store did tend to exhibit a lower propensity to buy both other brands at the same store and the same brand (i.e. other stores' private labels) elsewhere. Put another way, such buyers are relatively brand-loyal within the store, and relatively store-loyal for the brand.

One difficulty in interpreting the above results in detail is that information on brand and store shares was not provided. It is well established at the whole-market level that the degree of loyalty varies according to market share, and it seems likely that a similar relationship would hold at the submarket level. If so, the differing market sizes of brands and stores could have accounted for much of the observed variation across brand-store combinations in the balance between within-store brand loyalty and within-brand store loyalty.

5.5. THE CORRELATION BETWEEN BRAND LOYALTY AND STORE LOYALTY.

Consumer loyalty has been defined as the tendency for a person "to continue to purchase the same brand and product in the same store each time he needs or wants an identical or similar item" (Reynolds et al. 1974, p. 75). The definition is novel in combining brand and store patronage into one construct. However, brand-loyal consumers are not necessarily store-loyal, and vice versa. Several researchers have examined this issue.

Cunningham (1961), for instance, compared households' SBL (the proportion of product class purchases devoted to the favourite brand) with their "1SL-T" rating (the proportion of total grocery expenditure devoted to the favourite store). The results gave little indication of any correlation betwen the two. This is not surprising in view of evidence (cited in Chapters 3 and 4) refuting the notion of "generalized" brand or store loyalty (i.e. where a consumer loyal in one product class is similarly loyal in another). Indeed, when Cunningham compared the two loyalties on a product-by-product basis, he found a statistically significant positive association for ten out of eighteen product classes. He felt the relationship emerged in these cases because of a high incidence of private label brands.

A similar opinion was expressed by Jephcott (1972). Employing the same proportion-of-purchases measure as Cunningham (though based on packs rather than expenditure in this case), and also the number of brands or stores used, Jephcott noted a much stronger positive association for washing up liquid than for dentifrice, which had fewer private labels. Indeed, in the latter case brand and store loyalty are described as possibly independent characteristics.

Rao (1969a) specifically excluded private labels when testing the hypothesis that "store switching increases brand switching". Comparing observed brand and store choices with the expected probability, conditional on three previous brand-store decisions, Rao concluded that store change consistently increased the probability of brand change for all three grocery products studied.

Seggev (1970), regarding nine different products, and more recently Wrigley (1980), regarding packet tea, both support Jephcott's conclusion that the number of brands bought and the number of stores used are positively correlated ("store" being defined in the latter case as retailer type rather than individual outlet). Blattberg, et al. (1976) report similar findings from an unpublished working paper. Seggev also noted a positive correlation between the stability of households' brand **assortment** (over successive 20-week periods) and the stability of their store assortment, again for all nine product fields. In other words, households loyal to a **repertoire** of brands (for the time period in question) tended to be loyal to a **repertoire** of stores.

Carman (1970) is perhaps most emphatic in positing a relationship between brand and store loyalty. Using the Carman-Stromberg Entropy Loyalty Measure and multiple regression, he investigated the degree of association between brand loyalty and some 54 personality, socio-economic and behavioural variables (including store loyalty). It transpired that store loyalty (defined as the number of chains visited during a 15-week period) was the single most important predictor of brand loyalty. In each of the three product fields considered, store loyalty explained over 60% of the total variance in the brand loyalty index. (The possible influence of private labels in this relationship was acknowledged for only one of the three product fields.)

Results contrary to those reported above have emerged. Neither Massy (1966) nor Rothberg (1971) (the latter focusing on store types) found a significant degree of association between the two loyalties. However, the bulk of the evidence indicates that, though it may not be emphatic or present in every product field, a positive relationship between consumer (or household) brand loyalty and store loyalty is an important feature of buyer behaviour.

An obvious question is why such a relationship should arise. One possibility is that store loyalty restricts the number of brand alternatives available to the consumer (Engel and Blackwell, 1982, p. 574). This consideration may not be especially relevant to present-day grocery retailing in the UK, where major brands of most product classes enjoy wide distribution, and where the level of multibrand buying is almost as high in certain respects within a single chain as in the market as a whole (see Chapter 10). Certainly Carman (1970, p. 73) recognized that "store loyalty indicates more than a simple decrease in possible outcomes of the brand-choice experiment".

An alternative hypothesis is that brand choice and store choice are sufficiently "similar" for the factors motivating loyalty in one context to exert a corresponding influence in the other. Assael (1984, p. 567), for instance, describes loyalty as a time-minimization strategy in both choice situations. On this perspective consumers with little disposable time will be prone to be loyal in each context. Other consumer characteristics may operate similarly: age and income have been cited as, respectively, positively and negatively related to loyalty in the cases of both brand choice (Day, 1969) and store choice (Reynolds et al., 1974). However, these loyalty correlates are insufficiently consistent, especially in the brand context, for firm conclusions to be drawn.

Due account must be given to the role of private labels. It was seen earlier that both Cunningham (1961) and Jephcott (1972) suggested the importance of this brand category in certain product fields might explain the observed correlation between brand and store loyalty. As Cunningham (p. 134) observed: "with private labels available only in the sponsoring store, a high brand loyalty rating would **necessarily** result in a high store-loyalty rating for that product". And even where such brands are considered as a group, private label loyalty could reasonably be expected to be more closely tied than manufacturer-brand loyalty to store choice since the private label offerings of competing stores differ physically (if only, in certain cases, in terms of packaging, pricing, promotion, and so forth).

However, the extent to which store and private-label loyalty are in fact mutually reinforcing is not entirely clear. Rao (1969b) concluded that the proportion of product purchases devoted to a store was positively and significantly related to the proportion of product purchases within that store devoted to its private labels. However, Tate (1961) found this relationship to be a weak one. The difference here may reflect the fact that Rao focused on a single product field (coffee) whereas the latter author based his store loyalty index on total grocery purchases (which, as noted earlier, would tend to blur any product-specific relationship between brand and store loyalty).

In sum, the view that private labels promote a positive association between brand and store loyalty is supported mainly by the simple comparison of product fields with and without a strong private label presence. Firm evidence that loyalty to a store is associated with loyalty - within that store - to its private label offerings is not as yet forthcoming.

The most likely factor accounting for the apparent brand-store loyalty correlation is a simple one: the rate of buying the product class. It has been seen in Chapters 3 and 4 that product purchase frequency appears to explain (at least in part) differences between product fields in the overall level of both brand and store loyalty. Product buying rates can similarly be expected to account for differences between individual **consumers**, again in terms of both brand and store loyalty. Clearly the more frequently a consumer purchases a product class, the greater the opportunity for multibrand buying **and** for multistore patronage. In this light, it seems almost inevitable that a positive relationship between the two loyalties will emerge.

5.6. MODELS OF BRAND AND STORE CHOICE.

It has been seen in earlier chapters that a variety of models have been proposed to describe brand choice or store choice. However, very few attempts have been made to model these two aspects of consumer behaviour simultaneously.

Dommermuth's (1965) "shopping matrix" provided not so much a model as a framework for relating brand and store choice. Consumers would be located in cells according to the number of shops visited (the X axis) and the number of brands examined (the Y axis) during pre-purchase search. The framework could easily be adapted for the case of brand and store repertoires - the approach notably of Wrigley and Dunn (1984c) when illustrating the variety of individual-level brand and store loyalty patterns.

A genuine model of choice incorporating both brand and store elements was proposed by Rao (1969a). Noting from his empirical work that the previous stores used appeared to influence consumers' current choice of brand, Rao outlined a simple information processing model (of the flow-chart variety) in which the store acts as an intervening variable between the consumer's brand preferences and the brand purchase probability. The two main components of the store effect were held to be brand availability and promotional environment. However, the model has not since been elaborated or subjected to empirical testing.

The most successful work in this area is that of Kau (1981), Kau and Ehrenberg (1984) and Wrigley and Dunn (1984c) who, between them, have demonstrated the applicability of the NBD model and Duplication of Purchase Law to the submarket context. Thus, within a given store, a brand's repeat buying pattern, penetration growth, purchase frequency distribution and duplication with other brands is found to follow the same basic regularities as have long been known to apply to the whole-market level. And the same point holds for the context of within-brand store choice.

Strictly, these are not models of brand-store interaction, as they do not **relate** choice at the whole-market level to choice in the submarket context: the submarket in question is taken as given. However, the prospect of extending the Dirichlet to this latter context raises the possibility of constructing a two-tier model incorporating both brand and store choice (see e.g. Wrigley and Dunn, 1984c, p. 1230; Uncles and Ehrenberg, 1988, p. 293). Representing brand and store choice in this way would find support in Tversky and Sattath's (1979) "Elimination By

Tree" model, which treats decision making as a sequential elimination process.

Increasing the dimensions to two raises the question of which hierarchy is most appropriate (Goodhardt et al., 1984). Wrigley and Dunn (1984c, p. 1230) argue for taking store choice first, "since this is the more complex choice, being constrained by the interaction of urban structure, the retailing system, and the location of consumers". But given the appropriateness of the model to both brand choice and store choice at the whole-market level, it seems likely that either hierarchy will be valid for modelling purposes.

5.7. CONCLUSION.

From the preceding review, it will be clear that the brand-store relationship is a complex issue which can, and has been, approached from a number of different perspectives. It will also be clear that, excepting the Kau/Ehrenberg and Wrigley/Dunn studies, the issue has been treated as an appendage to research in other areas rather than subjected to systematic and focused enquiry. Indeed, some authors provide data of relevance but do not interpret these with regard to the brand-store relationship. For instance, Cunningham (1961), in his well-known study, does not draw attention to the fact that his reported brand and store loyalty levels are, in overall terms, very similar in degree.

Probably the simplest manifestation of a brand-store relationship concerns the variation in brand choice probabilities from store to store, as illustrated by Kau (1981) and Wrigley and Dunn (1984c). The rationale for such interaction is not entirely clear, given the wide distribution of most major brands and the apparent absence of any marked segmentation among store or store groups. However, the literature has cited a variety of within-store influences on choice, from promotions and pricing to brand range and own brands, and it seems likely that such factors - differing as they do across stores - account for much of the apparent interdependence between brand and store choice.

In contrast the "hierarchy of choice" is a more complex matter. The question "which comes first, brand choice or store choice?" is deceptively simple: in practice it is far from obvious how this aspect (as with other aspects) of cognitive processing should translate into overt behaviour, especially at the aggregate level. Several authors have also noted the confounding effect of high multibrand and multistore buying levels. And given the reality of **continuous** alternative evaluation the instant of choice must itself remain an elusive notion. Such difficulties probably explain why the issue is more often referred to than studied.

On a broader interpretation of "hierarchy", the levels of loyalty to brand and stores can be compared. This may say little of the sequential ordering of choice - indeed, it was argued that the equation of loyalty with even choice "importance" is erroneous - but the balance is in itself valuable in gauging the relative power of manufacturer and retailer. (This point was discussed more fully in Section 1.6.) From the literature in this area, two points can be made. First, views differ on what the balance **should** be: while Cunningham (1961, p. 137) proposed that "store loyalty, especially for the favorite store, will at times override brand loyalty", Jephcott (1972, p. 25) felt that "Prior consideration would certainly lead one to expect higher brand loyalty [...] than store loyalty". Second, the available results support such ambiguity. Whether relating to the whole-market or submarket levels, the balance has favoured each side, depending on the product, brand, and store in question. One difficulty in interpreting these results is that market shares - on which loyalty levels are now known to depend - were not reported, presumably (in the most recent studies) because the question of balance and its variation was deemed secondary to the **overall** level of brand and store loyalty (or rather disloyalty) exhibited by consumers. Indeed, Jephcott is alone in referring to the relative extents of the two loyalties.

Given the popularity of correlation analysis in the field of consumer behaviour (as elsewhere in the social sciences), it should be of no surprise that the association between consumers' brand and store loyalty levels has been quite widely measured. Most results point to a positive relationship, with one report describing the relationship as "overwhelming" in each of the three product fields studied (Carman, 1970). Some authors suggest that store loyalty restricts the number of brand alternatives available; others point to the influence of private labels. But the most likely factor seems to be the purchase frequency of the product class, which increases the **opportunity** for disloyalty - in both the brand choice and store choice contexts.

The relevance of private labels to the brand-store relationship depends on which aspect of that relationship is being considered. As for the across-store variation in brand choice probabilities, this was highest for private labels in both the studies reviewed in this area. The result can be rationalized on two counts: first, unlike manufacturer brands, private labels differ physically from store to store (if only in terms of packaging in some cases); and second, retailers clearly differ more in their commitment to private labels than to manufacturer brands (Sainsbury and Gateway being one instance of contrasting attitudes towards own brands). However, it is of interest to note that, if the marked variation in private-label share reflects a high level of differentiation between the private-label offerings of competing stores, such differentiation does **not** lead to low store switching within this brand category. Such, at least, is the implication of the store duplication coefficients reported by Kau and Ehrenberg (1984), which are much the same for manufacturer brands and private labels.

The role played by private labels is less clear with regard to the apparent positive correlation between brand loyalty and store loyalty (i.e. across consumers). Certainly two studies noted a higher correlation in product fields with a high incidence of private labels. But one of these (Cunningham, 1961) measured each private label separately (in which case high own-brand loyalty would necessarily lead to a high store loyalty rating for the product class). Disaggregated results specifically indicating that consumers loyal to private labels (i.e. as a group of brands) also tend to be store-loyal is not as yet forthcoming.

Models of brand and store choice together have not emerged in extreme profusion, "almost none" being one assessment of their number (Kau and Ehrenberg, 1984, p. 400). However, recent studies confirm the applicability of the NBD model and Duplication of Purchase Law to the contexts of within-store brand choice and within-brand store choice. Such developments augur well for extending the Dirichlet to the submarket level, which itself raises the possibility of constructing a genuinely hierarchical model of brand and store choice. This possibility is explored, in the context of the present research, in Chapter 12. In general terms, the extension of the above models to the submarket level provides the means of bringing a disciplined and systematic methodology to the complex issue of brand-store interaction.

PART III

PATTERNS OF CHOICE: THE WHOLE-MARKET LEVEL

Chapter 6

BRAND CHOICE

Contents:

6.1. INTRODUCTION.

This chapter is concerned with patterns of brand choice at the whole-market level (i.e. these patterns are not broken down by store group). Its purpose is to establish for this market level

(i) the basic regularities in brand choice behaviour, and

(ii) the fit of the Dirichlet model in this area.

The Chapter thereby provides a basis on which to examine (in Part IV) the less familiar context of brand choice within individual stores.

The measures used are those "standard" indices of buyer behaviour specified in Chapter 2. Analysis is arranged by measure rather than by product field as concern centres on generalizable behavioural patterns rather than on the product markets in themselves. Results for each measure are divided into two sections in accordance with objectives (i) and (ii) above. The first section illustrates the main regularities associated with the measure (with references being made to previous work where appropriate); the second assesses how well the Dirichlet describes the pattern of behaviour in question.

Given that the three product fields to be analysed do not represent radical departures from the contexts to which the Dirichlet has already been successfully applied (mainly branded, frequently-bought products in mature, largely unsegmented markets - see Ehrenberg and Goodhardt, 1979, Table 5.3), it is expected that the behaviour in each market will conform to the "usual" regularities and will be at least reasonably well described by the Dirichlet. The model's fit for automatic washing powder and tea bags is of particular interest, however, as this study represents the first application of the Dirichlet to these product fields. As applies throughout this thesis, analysis initially focuses on automatic washing powder in Region I. Subsequently results from other markets are introduced - usually in summary form - at which point the generalizability of observations can be assessed.

To recap, all results relate to a 48-week period unless otherwise stated. As regards notation, Brand A1-II refers to Brand A1 in Region II (etc.); and "O" and "D" in the tables refer to the Observed and Dirichlet (i.e. predicted) figures respectively.

6.2. PENETRATION AND PURCHASE FREQUENCY.

6.2.1. Regularities.

Table 6.1 sets out, for brands within the automatic washing powder market, Region I, the observed and predicted values for penetration (b) and average purchase frequency (w) together with the associated market shares. Dealing first with the observed behaviour, it can be seen that the figures conform to what are two well-established regularities (see e.g. Ehrenberg, 1988; Ehrenberg, Goodhardt and Barwise, 1989). First, average purchase frequency varies much less across brands than does penetration. In this case w varies between 4.7 and 5.7 while b ranges from 18 to 48 (a difference factor of 2.7). Second, average purchase frequency tends to decrease as penetration falls (the so-called "double jeopardy" effect), such that the expression (1-b)w (where b is a proportion) remains roughly constant across brands. The main exception apparently concerns Brand A3, which is bought less frequently than two brands of lower penetration.

TABLE 6.1

Penetration (b) and Average Purchase Frequency (w). Automatic Washing Powder, Region I.

	Market Share (%)	b (%) O	b (%) D	w O	w D
Brand A1	31	48	46	5.7	5.9
Brand A2	22	34	36	5.5	5.3
Brand A3	15	28	27	4.7	4.9
Brand A4	14	24	26	5.3	4.8
Brand A5	10	18	19	4.8	4.6
Average	18	30	31	5.2	5.1

Notes:
- E.g. 48% of the population buy Brand A1 at least once over the 48-week period, and these buyers buy the brand 5.7 times on average.

A similar pattern holds in the other markets analysed (see Appendix 1), with only a few breaks in the double jeopardy trend (e.g. Brands C4-I, A5-II, and C1-II) arising mainly where market share differences are small. However, to identify the true exceptions to this trend, theoretical norms are required.

The double jeopardy effect has been found to occur in a variety of consumer choice situations. These include brand, store and television channel choice, and attitudinal beliefs towards brands and television programmes (Ehrenberg et al., 1989). McPhee (1963), who named the effect, explained it in terms of differing "merit" (which he left largely undefined), or differing "exposure" (i.e. awareness and availability) in cases of similar merit. Taking a different approach, Ehrenberg et al. (1989) demonstrate that on assumptions of consumer homogeneity and fixed, independent choice probabilities the "DJ" effect is in fact a statistical necessity. And under certain patterns of consumer heterogeneity - notably the Dirichlet distribution - the effect is shown to persist.

TABLE 6.2

Dirichlet Fit in the Brand Choice Context: Penetration (b) and Average Purchase Frequency (w).

	MAD	MD O	MD D	MD(D)/ MD(O) (%)	MAD/ MD(O) (%)
Penetration (b)					
Automatc Rgn I	1.4	8.6	8.3	96	17
Tea Bags Rgn I	3.8	12.0	14.2	118	32
Inst Cof Rgn I	2.0	11.4	13.0	113	17
Automatc Rgn II	1.6	5.8	6.4	110	28
Tea Bags Rgn II	2.9	7.8	8.4	107	37
Inst Cof Rgn II	2.2	15.2	15.7	103	14
Average	2.3	10.1	11.0	108	24
Ave Prchse Frquncy (w)					
Automatc Rgn I	0.25	0.36	0.38	106	69
Tea Bags Rgn I	0.68	1.23	0.65	53	55
Inst Cof Rgn I	0.42	0.74	0.55	74	57
Automatc Rgn II	0.34	0.64	0.34	53	53
Tea Bags Rgn II	0.47	0.92	0.53	58	51
Inst Cof Rgn II	0.34	0.85	0.63	74	40
Average	0.42	0.79	0.51	70	54

Notes:
- MAD = mean absolute difference between observed and predicted.
- MD = mean (absolute) deviation (from the mean).

6.2.2. Dirichlet Fit.

From the theoretical values in Table 6.1 it can be seen that the Dirichlet picks up the two trends described above, and that its predictions are of the right numerical level. The average discrepancy is just 1.4 and 0.3 for b and w respectively. The former discrepancy seems particularly small when assessed against the large deviation in observed penetration across brands (the mean deviation being 8.6 for this measure, and 0.4 for w).

In terms of mean absolute difference the fit is in fact best for automatic washing powder - and worst for tea bags - in both regions (Table 6.2). Despite the poorer agreement in other markets, the Dirichlet consistently represents a marked improvement on the average brand "as predictor", with mean discrepancy typically being a quarter of the mean deviation in the case of b, and a half of mean deviation in the case of w.

Predictive bias, in the sense of a consistent underprediction or overprediction, does not usually arise with regard to b and w because one of the Dirichlet's structural parameters (S) is designed to reflect the overall balance between these two measures (through a weighted average of the individual s values). This point is illustrated by the approximate similarity between the averages of the observed and theoretical figures for b and w in Table 6.3.

TABLE 6.3

Penetration (b) and Average Purchase Frequency (w) of the Average Brand.

Product/Region	Market Share (%)	b (%) O	b (%) D	w O	w D
Automatc Rgn I	18	30	31	5.2	5.1
Tea Bags Rgn I	20	34	32	4.8	5.2
Inst Cof Rgn I	19	34	34	5.7	5.7
Automatc Rgn II	17	29	29	5.6	5.6
Tea Bags Rgn II	20	41	39	6.4	6.7
Inst Cof Rgn II	20	35	35	5.6	5.7
Average	19	33	33	5.6	5.7

Bias can occur however where predictions are tabulated for brands that have been excluded from the S calculation (by virtue of their "atypical" behaviour threatening to distort the model's predictions). For instance, in the case of tea bags the overprediction of w (and underprediction of b) for the average brand occurs because the S parameter does not take account of the behaviour for Brand B4 in Region I and Other Brands in Region II.

Despite the absence of bias as defined above, there are two areas where consistent discrepancies do occur. The first concerns the miscellaneous "Other Brands" category, which in all four contexts in which it appears has more buyers and a lower purchase frequency than predicted.

The second area of consistent discrepancy concerns the degree of variation in b and w "explained" by the model. As can be seen from the MD(D)/MD(O) values in Table 6.2, the Dirichlet shows a slight tendency to overestimate the variation in b and underestimate that in w. This occurs for every market except automatic washing powder, Region I, and translates into a pattern whereby for large brands b and w are overpredicted and underpredicted respectively, and conversely for small brands. This is illustrated in Table 6.4: if "large" brands are defined as those ranked 1 or 2 in a given market, and "small" brands those ranked 4 or 5, then the above pattern holds for 18 of the 24 cases.

TABLE 6.4

Difference Between Observed and Predicted Average Purchase Frequency (w) for "Large" and "Small" Brands.

Product/Region	Observed w - predicted w for brand of rank: 1	2	4	5
Automatc Rgn I	- 0.2	+ 0.2	+ 0.4	+ 0.2
Tea Bags Rgn I	+ 0.6	+ 0.1	- 0.6	- 1.5
Inst Cof Rgn I	+ 0.3	+ 0.2	- 0.9	+ 0.6
Automatc Rgn II	+ 0.04	+ 0.7	+ 0.1	- 0.4
Tea Bags Rgn II	+ 0.3	+ 0.2	- 0.4	- 0.5
Inst Cof Rgn II	+ 0.6	- 0.5	- 0.3	- 0.3
Average	+ 0.3	+ 0.2	- 0.3	- 0.3

As an alternative expression of this tendency, Table 6.5 indicates that, excluding automatic washing powder in Region I, S parameters estimated from the largest two brands (i.e. from a weighted average of the two individual s values) are consistently lower than the overall S parameters, while the S parameters estimated from only the smallest two brands are consistently higher than the overall parameters. Since within any given market only one parameter can be chosen, such a pattern would necessarily tend to result in underpredicting w for large brands and overpredicting on this measure for small brands (and conversely for b).

The importance of this pattern of deviation from the model is discussed in Section 6.7.

TABLE 6.5

S Parameters Estimated from (i) Largest Two Brands, (ii) All Five Brands, and (iii) Smallest Two Brands.

Rank of Brands Used to Calculate S	Product/Region					
	Auto-matc I	Tea Bags I	Inst Cof I	Auto-matc II	Tea Bags II	Inst Cof II
1,2	1.18	.90	.75	.96	1.14	.91
1,2,3,4,5	1.14	1.23*	.88	1.11	1.29*	.96
4,5	.93	2.68	1.17	1.18	1.62	1.12

Notes:
* These parameters calculated from 4 brands only. The corresponding estimates from 5 brands (1.38 and 1.50) do not affect the general pattern in the Table.

6.3. PRODUCT BUYING AND SHARE OF REQUIREMENT.

The previous section was concerned with the buying of individual brands. Here, attention focuses on the relationship between brand buying and product buying.

6.3.1. Regularities.

Table 6.6 specifies the average purchase frequency of the product per brand buyer (wp) for the five brands within the automatic washing powder market, Region I. Three well-established empirical regularities are present. First, as comparison with Table 6.1 indicates, the product purchasing rate wp is much higher than the brand purchasing rate w. Thus buyers of any given brand also buy other brands extensively. Second, like w, these product buying rates vary little from brand to brand. Different brands are therefore attracting consumers with approximately similar product class requirements. Third, unlike w, wp tends to **increase** slightly as market share falls. In other words small brands tend to be bought by slightly heavier buyers of the product field than do large brands. This divergence of w and wp as market share falls (which is in fact a statistical selection effect, as implied by the specification of the Dirichlet model) implies that small brands suffer from what can be described as a type of double jeopardy loyalty pattern: they are bought less often, and their buyers buy more of other brands.

TABLE 6.6

Ave. Purchase Frequency of Product per Buyer of Brand (wp) and Share of Requirment (w/wp). Automatic Washing Powder, Region I.

	Market Share (%)	wp O	wp D	w/wp % O	w/wp % D
Brand A1	31	12.2	13.2	46	44
Brand A2	22	13.7	13.7	40	38
Brand A3	15	14.1	14.1	33	35
Brand A4	14	14.6	14.1	36	34
Brand A5	10	14.8	14.4	32	32
Average	18	13.9	13.9	38	37

Notes:
- E.g. on average, the buyers of Brand A1 make 12.2 purchases of the product class, and devote 46% of these product-class purchases to Brand A1.

This latter pattern is reflected in the w/wp (or "share of requirement") values, also listed in Table 6.6, which fall with decreasing market share. The average value of 38% accords with that found in other markets (Table 6.7): typically, the buyers of a given brand devote only a minority of their total product purchases to that brand. Brand loyalty may seem low on this basis, but it exists to the extent that the buyers of any given brand make more purchases of that brand than of any other **single** brand, as illustrated in Table 6.8 for automatic washing powder.

TABLE 6.7

Ave. Purchase Frequency of Product per Buyer of Brand (wp) and Share of Requirement (w/wp) for the Average Brand.

Product/Region	Market Share (%)	wp		w/wp %	
		O	D	O	D
Automatc Rgn I	18	13.9	13.9	38	37
Tea Bags Rgn I	20	14.2	14.2	35	37
Inst Cof Rgn I	19	13.4	13.8	42	41
Automatc Rgn II	17	15.0	15.7	37	36
Tea Bags Rgn II	20	19.4	20.0	34	34
Inst Cof Rgn II	20	14.4	14.6	39	40
Average	19	15.0	15.4	38	38

Also notable in Table 6.8 is the stability of the **residual** share of requirement values within each column (the main exception concerning the buyers of Brand A5 who devote a relatively large proportion of their residual purchases to Brand A3). This pattern reflects the well-established within-column stability in standard duplication tables (regarding both the proportion and purchase frequency of duplicating buyers) - an aspect of multibrand buying examined in a later section. A further parallel with duplication tables can be found in the fairly consistent proportionality between the share of requirement values of "residual" brands and these brands' shares of the market as a whole. The average proportionality factor of .75 provides quite good predictions of the average (residual) share of requirements.

6.3.2. Dirichlet Fit.

The three main regularities noted above are closely predicted by the Dirichlet. In the case of Table 6.6 the numerical agreement is very close, the average discrepancy

TABLE 6.8

Share of Requirement (w/wp) for Residual Purchases. Automatic Washing Powder, Region I.

Buyers of:	Share of Requirement (%) of: A1	A2	A3	A4	A5	OB
Brand A1	**46**	16	12	10	9	7
Brand A2	21	**40**	10	14	7	6
Brand A3	20	17	**33**	10	11	7
Brand A4	17	20	11	**36**	8	8
Brand A5	18	11	20	9	**32**	8
Ave of rsdl prchs *	19	16	13	11	9	7
.75 x Brnd Shr (WM) **	23	17	11	11	8	6
Brnd Shr (WM) ***	31	22	15	14	10	8

Notes:

* Average of **residual** purchases only.
** .75 is the average proportionality coefficient.
*** Brand share at the whole-market level.
\- **Non**-residual purchases are emboldened.
\- E.g. on average, the buyers of Brand A1 devote 46% of their product-class purchases to that brand, 16% to Brand A2, etc.

being just 0.4 and 1.5 for wp and w/wp respectively. Notable is a tendency for overprediction and underprediction of wp to be associated with a corresponding discrepancy for w (see Table 6.1). This (apparent) association improves the fit for w/wp: predictive inaccuracies regarding w and wp (in this market) tend to cancel each other out rather than compound the discrepancy for w/wp.

The fit achieved in the five other markets is generally close for both measures, as suggested by the average values in Table 6.7. As with b and w, the fit in terms of mean absolute difference (see Table 6.9) is best for automatic washing powder and worst for tea bags in both regions (although the relatively large mean deviation on each measure in the latter product field is a mitigating feature).

Again, observed variation across brands is greater than assumed by the Dirichlet: as indicated in Table 6.9, typically only about two-thirds of the mean deviation is "explained" by the model for each measure. This translates into a strong tendency to overpredict wp and underpredict w/wp for large brands. For the largest two brands in each market, such discrepancies occur in 11 of the 12 possible cases on each measure. A corresponding discrepancy for the smaller brands does not emerge so emphatically, mainly because the model shows a slight tendency to overpredict wp. Such overprediction is apparent from the average figures in Table 6.7, and occurs in 22 of the 30 individual cases (see Appendix 1).

The observation that the direction of discrepancy for wp and w are associated in the case of automatic washing powder, Region I, does not generalize to the other markets analysed.

TABLE 6.9

Dirichlet Fit in the Brand Choice Context: Ave. Purchase Frequency of Product per Buyer of Brand (wp) and Share of Requirment (w/wp).

		MAD	MD O	MD D	MD(D)/ MD(O) (%)	MAD/ MD(O) (%)
Ave Prdct Purchses (wp)						
Automatc	Rgn I	0.37	0.73	0.37	51	51
Tea Bags	Rgn I	0.74	1.15	0.66	57	64
Inst Cof	Rgn I	0.40	0.31	0.39	126	129
Automatc	Rgn II	0.78	0.36	0.35	97	217
Tea Bags	Rgn II	1.09	1.51	0.53	35	72
Inst Cof	Rgn II	0.67	1.10	0.46	42	61
Average		0.68	0.86	0.46	68	99
Shr of Rqurmnt (w/wp)						
Automatc	Rgn I	1.5	4.5	3.8	84	33
Tea Bags	Rgn I	5.1	10.9	6.3	57	46
Inst Cof	Rgn I	3.4	6.6	5.2	80	51
Automatc	Rgn II	2.4	5.2	3.0	57	45
Tea Bags	Rgn II	3.8	7.2	3.5	49	53
Inst Cof	Rgn II	2.7	8.1	5.5	68	33
Average		3.1	7.1	4.6	66	44

6.4. SOLE BUYERS.

6.4.1. Regularities.

Studying loyalty through "sole buyers" - consumers who buy only one brand over the analysis period - may seem to focus on a rather extreme measure of loyalty. But as Ehrenberg and Goodhardt (1979, p. 3.10) point out, milder measures have not led to such clear-cut insights. Analysis in this area traditionally divides into the proportion of sole buyers and the average purchase frequency of these buyers.

The proportion of a brand's buyers who are sole buyers (bs/b) is typically very high in time periods close to the minimum inter-purchase period, but falls dramatically as the analysis period increases. This is illustrated in Table 6.10. Figures of around 20% for a full year are common, which may be deemed low - at least relative to "what is popularly believed".

TABLE 6.10

Percentage of Sole Buyers in Different Time Periods. Automatic Washing Powder, Region I.

	Time Period (wks)			
	1	**12**	**24**	**48**
Average Brand	94	43	28	17

As with the previous measures considered, and as shown in Table 6.11, the incidence of sole buyers varies across brands in accordance with market share. A factor of the (1-b) form, cited earlier with regard to w, has generally been found to account for much of the observed variation on this measure across brands (e.g. Ehrenberg, 1988, p. 200).

Turning to the average purchase frequency of sole buyers (ws), it is apparent through comparing Table 6.12 (which gives the average value for each market) with Table 6.3 that the purchasing rate of sole buyers tends to be slightly higher than that of **all** buyers of the brand in question. But as these sole buyers' purchases of the brand necessarily equal their purchases of the product, they emerge as light buyers of the product class as a whole. These are general findings (see e.g. Ehrenberg and Goodhardt, 1979, pp. 3.4-3.5; Ehrenberg, 1988, pp.

TABLE 6.11

Proportion of Sole Buyers (bs/b) and Average Purchase Frequency of Sole Buyers (ws). Automatic Washing Powder, Region I.

	Market Share (%)	bs/b (%) O	bs/b (%) D	ws O	ws D
Brand A1	31	28	20	7.4	4.7
Brand A2	22	18	16	5.3	4.1
Brand A3	15	12	14	5.8	3.8
Brand A4	14	13	14	7.3	3.7
Brand A5	10	12	13	4.6	3.5
Average	18	17	15	6.1	4.0

Notes:
- E.g. 28% of the buyers of Brand A1 buy only that brand during the period in question, and these buyers make 7.4 purchases of the brand on average.

174-175), and suggest that sole buying reflects not so much intense, deliberate brand loyalty as a lack of **opportunity** to switch brands, and that heavy buyers of the product class may have a particularly strong need for brand variety.

6.4.2. Dirichlet Fit.

The data in Table 6.11 suggest that the fit of the Dirichlet in the area of sole buyers is less good than for the measures considered earlier. In the case of bs/b a sizeable discrepancy occurs for one brand (A1), although a good fit obtains for the remaining categories.

The main problem clearly concerns ws. The fit is poor, with an average discrepancy of 2.1 for a mean deviation of only 1.0. More important however is the **consistency** of the discrepancy: underprediction occurs for every brand.

The averaged results from other product fields in Table 6.12 support these observations. Agreement is again quite close for bs/b, although a slight tendency to underpredict does emerge. In the case of ws underprediction is emphatic, occurring in fact for 26 out of the 30 brands under scrutiny (see Appendix 1). And for five of the six markets, the average difference between observed and predicted figures - usually about 2.0 but rising to 4.8 in one case - exceeds the oberved mean deviation, as shown in Table 6.13.

TABLE 6.12

Proportion of Sole Buyers (bs/b) and Average Purchase Frequency of Sole Buyers (ws) for the Average Brand.

Product/Region	Market Share (%)	bs/b (%) O	bs/b (%) D	ws O	ws D
Automatc Rgn I	18	17	15	6.1	4.0
Tea Bags Rgn I	20	15	15	4.7	3.9
Inst Cof Rgn I	19	19	17	7.3	5.8
Automatc Rgn II	17	16	15	6.3	4.1
Tea Bags Rgn II	20	12	11	9.3	4.5
Inst Cof Rgn II	20	16	15	7.9	5.8
Average	19	16	15	6.9	4.7

TABLE 6.13

Dirichlet Fit in the Brand Choice Context: Proportion of Sole Buyers (bs/b) and Average Purchase Frequency of Sole Buyers (ws).

		MAD	MD O	MD D	MD(D)/ MD(O) (%)	MAD/ MD(O) (%)
Proportion of Sole Buyers (bs/b)						
Automatc	Rgn I	2.9	5.5	2.3	42	53
Tea Bags	Rgn I	3.8	7.4	3.6	49	52
Inst Cof	Rgn I	2.8	5.5	3.5	64	51
Automatc	Rgn II	2.3	3.6	1.8	50	65
Tea Bags	Rgn II	3.5	4.1	1.6	38	85
Inst Cof	Rgn II	1.8	5.2	3.4	66	35
Average		2.9	5.2	2.7	52	57
Ave Prchs Frqncy of Sl Brs (ws)						
Automatc	Rgn I	2.11	1.02	0.35	34	207
Tea Bags	Rgn I	1.44	2.10	0.58	28	69
Inst Cof	Rgn I	1.84	1.28	0.54	42	144
Automatc	Rgn II	2.29	1.20	0.30	25	191
Tea Bags	Rgn II	4.84	1.90	0.43	23	255
Inst Cof	Rgn II	2.12	0.75	0.62	83	283
Average		2.44	1.38	0.47	39	191

This ws measure appears to be a relatively "erratic" feature of buyer behaviour. Excepting automatic washing powder in Region I, there is no clear trend with market share - a point noted by Ehrenberg (1988, p. 199). And variation across brands is high relative to both the predicted variation (see Table 6.13) and the observed variation in w, which is numerically quite similar in terms of average values. Undoubtedly the particularly small samples involved when focusing on 100%-loyal buyers are at least partly responsible for these results.

The Dirichlet's consistent underprediction of ws represents the first serious fault in the model, and is discussed further in Section 6.7.2.

6.5. PURCHASE FREQUENCY DISTRIBUTION.

6.5.1. Regularities.

Individual consumers' rates of brand purchasing vary widely around the average values listed earlier, as can be seen from Table 6.14. Typically, within this market, about half a brand's buyers purchase that brand only once or twice over the 48-week period. To those unfamiliar with facts on consumer behaviour this may seem a surprisingly high proportion of occasional buyers. In fact this reverse-J-shaped distribution is one of the best-established regularities in buyer behaviour and has long been shown to conform to a Negative Binomial

TABLE 6.14

Purchase Frequency Distribution:
Observed (O); Dirichlet (D) and NBD (N) Predictions.
Automatic Washing Powder, Region I.

Buyers of:		% Making X Purchases of the Brand: 1	2	3	4	5	6	7	8+
Brand A1	O	27	16	11	7	5	5	4	25
	D	28	16	10	8	6	5	4	24
	N	27	15	11	8	6	5	4	24
Brand A2	O	29	18	10	6	7	4	4	22
	D	32	16	11	8	6	4	3	20
	N	30	16	11	8	6	5	4	21
Brand A3	O	36	15	12	6	6	5	1	23
	D	34	17	10	7	5	4	3	18
	N	32	17	11	8	6	4	4	19
Brand A4	O	37	14	8	6	6	5	1	23
	D	35	17	10	7	5	4	3	18
	N	33	17	11	8	6	4	4	19
Brand A5	O	39	18	7	6	5	4	4	16
	D	36	17	11	7	5	4	3	17
	N	34	17	11	7	6	4	3	17
Average	O	34	16	10	6	6	4	3	21
	D	33	16	10	7	5	4	3	20
	N	31	16	11	8	6	4	4	20

Notes:
- E.g. of the buyers of Brand A1, 27% buy the brand only once over the period, 16% buy it twice, etc.

Distribution (Ehrenberg, 1959; Chatfield, Ehrenberg and Goodhardt, 1966).

Such a skewed distribution implies that there can be no "typical" inter-purchase time for a brand. Brand A1's average purchase frequency of about 6 - implying an average inter-purchase time of 8 weeks - accurately reflects the purchasing rate of just 5% of that brand's buyers over the period.

"Heavy" buyers may be few in number but their sales importance is high. In the present case, the 20% heaviest buyers of a brand typically account for about 60% of sales, with the "heavy half" accounting for almost 90% of sales, as indicated in Table 6.15. This pattern is even more skew than the "80/20" rule, which has been found to apply quite widely (Ehrenberg and Goodhardt, 1979, p. 10.6).

TABLE 6.15

The Sales Importance of Light and Heavy Buyers: The Percentage of Total Purchases of the Stated Brand Accounted for by People Buying the Brand Once, Twice, etc. Automatic Washing Powder, Region I.

		Number of Purchases							
		1	2	3	4	5	6	7	8+
Brand A1	O	5	6	6	5	5	5	5	64
	D	5	5	5	5	5	5	4	66
Brand A2	O	5	6	6	4	6	5	5	63
	D	6	6	6	6	5	5	4	61
Brand A3	O	8	6	8	6	7	4	4	57
	D	7	7	6	6	5	5	5	58
Brand A4	O	7	5	4	5	6	6	2	65
	D	7	7	7	6	6	5	5	58
Brand A5	O	8	8	4	5	5	5	6	58
	D	8	7	7	6	6	5	5	56
Average	O	7	6	6	5	6	5	5	61
	D	7	7	6	6	5	5	5	60

6.5.2. Dirichlet Fit.

Under the Dirichlet model the purchase frequency distribution does not conform to a Negative Binomial Distribution (except in the case of independence, where S = K). The Dirichlet predicts a higher proportion of light (i.e. once-only) buyers than does the NBD model, as illustrated in Table 6.14. Nevertheless, here as elsewhere, the two models tend to agree quite closely in practice.

The agreement between observed and predicted (D) figures in Table 6.14 is also close, with no marked discrepancies. However, taking all three product fields together, there is evidence of a slight tendency to underpredict the proportion of once-only buyers (Table 6.16). This may reflect the strictly unrealistic stationarity assumption: consumers drawn into the market during the peak-season only are almost inevitably light buyers over the full analysis period, as has been observed empirically (Ehrenberg and Goodhardt, 1979, p. 12.11; Kau, 1981, p. 189). Certainly the excess of once-only buyers is most marked for tea bags, which is the most seasonal of the three product fields.

TABLE 6.16

Purchase Frequency Distribution for the Average Brand.

Buyers of Ave Brand:		% Making X Purchases of the Brand: 1	2	3	4	5	6	7	8+
Automatc Rgn I	O	34	16	10	6	6	4	3	21
	D	33	16	10	7	5	4	3	20
Tea Bags Rgn I	O	40	15	9	6	4	4	3	19
	D	33	16	10	7	5	4	3	20
Inst Cof Rgn I	O	33	15	8	6	6	4	4	25
	D	29	16	10	8	6	5	4	23
Average	O	36	15	9	6	5	4	3	22
	D	32	16	10	7	5	4	3	21

6.6. DUPLICATION.

It was noted in Section 3 that buyers of any given brand tend to buy other brands extensively. This section is concerned with breaking down these "other" purchases into the individual brands involved.

Brand duplication refers to the overlap between the buyers of any two brands. It is usually studied through the number of buyers involved (e.g. what proportion of the buyers of Brand B also buy Brand C ?) and the purchasing rates of these buyers (e.g. how many purchases do B's buyers who also buy C make of this latter brand?). Both these aspects of duplication follow regular and generalizable patterns.

6.6.1. Regularities

It has long been known that the proportion of a brand's buyers who also buy any other given brand - within a specific product field and time period - tends to vary with this latter brand's penetration (Ehrenberg and Goodhardt, 1970). This pattern is represented by the model

$$bxy \,/\, bx = D\, by$$ (Ehrenberg and Goodhardt, 1970)

where bx is the proportion of the population buying Brand X at least once over the time period, bxy the proportion buying both Brand X and Brand Y in the period, and D is - for practical purposes - the ratio of the average duplication to the average penetration and hence held to be the same for all pairs of brands.

This "Duplication of Purchase Law" can be seen in operation in Table 6.17. (As an example, of those consumers who bought Brand A1 over the period, 38% also bought Brand A2, 35% also bought Brand A3, and so on.) For reasons noted below, the penetration figures shown are **relative** penetrations (i.e. brand penetrations among buyers of the product class), but this does not affect the applicability or predictions of the above model. As expected, the figures within each column - relating therefore to the same penetration - are fairly stable, and certainly the scatter is small compared to the systematic difference between the columns. Further, there is no obvious clustering of brands, beyond perhaps the A3/A5 combination. Here as elsewhere, such cases usually stand out only as "local densities" superimposed upon a clear underlying pattern (Collins, 1971).

TABLE 6.17

Brand Duplication.
Automatic Washing Powder, Region I.

Buyers of:	% also buying:				
	A1	A2	A3	A4	A5
Brand A1	--	38	35	26	23
Brand A2	53	--	34	34	21
Brand A3	60	42	--	30	34
Brand A4	53	50	36	--	22
Brand A5	61	39	53	29	--
Average	57	42	40	30	25
D x rltv b	61	44	36	30	23
D = 1.02					
Relative b *	60	43	35	29	23

Notes:
* Relative b (rltv b) is the penetration of the brand among product buyers.
- E.g. 53% of the buyers of Brand A2 also buy Brand A1; 60% of the buyers of Brand A3 also buy Brand A1; etc.

The predicted duplications, obtained by multiplying the observed relative penetration figures by the average proportionality factor D, provide a good fit. The average discrepancy between observed and predicted duplication is about 4 percentage points for the individual figures, and 2.5 points for the averages. A roughly similar level of agreement emerges from the other markets analysed, as summarized by Tables 6.18 and 6.19.

It is apparent from Table 6.18 that duplication with the brand leader is lower than expected in five of the six markets. This deviation is also reflected in a small upward trend in the individual duplications with decreasing market share which, though not clearly visible in Table 6.17, is apparent in most of the other markets studied (see Appendix 1) and has been widely noted elsewhere (e.g. Ehrenberg and Goodhardt, 1970). "This discrepancy is of a common type, in that for brands with high penetration levels the model generally over-estimates the duplication - a general failure in the mathematical model as such and not a matter of direct marketing significance" (Ehrenberg, 1988, p. 178). Table 6.18 also points to a similar - though less emphatic - tendency with regard to the second largest brand, and to a necessarily opposite tendency regarding the smaller brands. Thus the Duplication of Purchase Law overestimates the variation in duplication across brands; or, like the Dirichlet model on

TABLE 6.18

Average Brand Duplication.

Buyers of average brand		% also buying brand ranked: 1	2	3	4	5
Automatc Rgn I	O	57	42	40	30	25
	T	61	44	36	30	23
Tea Bags Rgn I	O	58	50	57	34	24
	T	69	50	54	28	21
Inst Cof Rgn I	O	49	48	31	31	14
	T	53	45	29	29	15
Automatc Rgn II	O	53	33	38	34	28
	T	56	34	36	32	27
Tea Bags Rgn II	O	56	57	62	40	43
	T	59	59	61	39	40
Inst Cof Rgn II	O	60	47	41	27	7
	T	58	48	42	25	8
Average	O	56	46	45	33	24
	T	60	47	43	31	22

Notes:
- T = Theoretical (i.e. predicted from Duplication of Purchase Law).
- E.g., regarding Automatc Rgn I, on average 57% of a brand's buyers also buy the brand ranked 1 in this market.

TABLE 6.19

Mean Absolute Difference (MAD) Between Individual Observed Duplications and Predictions from Duplication of Purchase Law.

Product/Region	MAD
Automatc Rgn I	4.0
Tea Bags Rgn I	8.0
Inst Cof Rgn I	5.0
Automatc Rgn II	5.7
Tea Bags Rgn II	3.5
Inst Cof Rgn II	5.6
Average	5.3

the measures considered earlier, it underestimates the variation in loyalty (duplication being an inverse measure of loyalty).

Considerable interest centres on the D coefficient. First, since the equality bxy = by does not in practice hold (Ehrenberg and Goodhardt, 1970), it expresses the degree of correlation - whether positive or negative - between the purchasing of Brand X and Brand Y. On the traditional interpretation, for D > 1 buying X is taken to **encourage** buying Y (in the sense that buyers of X are more likely than the rest of the population to buy Y); for D < 1 buying of one brand is taken to **inhibit** buying the other brand. Second, the D coefficient - in theory and usually in practice - provides a single-value summary of the proneness to "also buy" other brands within the market as a whole: it is a parameter of the product field, not a characterization of any particular brand or brands considered in isolation.

The D coefficients reported in this thesis are, unless otherwise stated, calculated using **relative** penetration - as defined earlier - rather than penetration among the population as a whole. This approach has two main advantages. First, it avoids the situation where high D values arise (suggesting a positive correlation between brands) simply because a large proportion of the population do not buy the product at all. Second, it allows comparison between different product fields, since account is taken of differing product-class penetrations. Clearly, this approach requires that any inferences from D as to the correlation between brands be related to buyers of the product class alone.

TABLE 6.20

Brand Duplication Coefficients.

	Region I	**Region II**
Automatc	1.02	1.00
Tea Bags	1.06	1.07
Inst Cof	.92	.94

Notes:
- Note that these coefficients are calculated using **relative** penetration, i.e. brand penetration among buyers of the product class.

The D values determined for the six markets under analysis are presented in Table 6.20. They are all close to 1, indicating that buying any given brand in these markets does not actively encourage or inhibit the buying of any other given brand. There is however slight variation in D across product fields, with instant coffee brands receiving the most loyalty on this measure and tea bag brands the least (duplication being an inverse measure of loyalty). Also notable is the virtual identity of the coefficients for each product field in the two regions, which suggests that D is product-specific rather than a characterization of the region (or product/region combination).

Table 6.21 sets out data regarding the purchasing **rate** of duplicating buyers within the usual washing powder market. (To illustrate, the buyers of Brand A2 who also buy Brand A1 buy this latter brand on average 5.4 times over the period.) The figures conform to two well-established regularities (see Ehrenberg and Goodhardt, 1970; Ehrenberg, 1988, pp. 181-182). First, they are remarkably stable within each column, indicating that the average rate of buying a brand by its duplicating buyers depends little on which other brand is also being bought. Second, the purchasing rate of a brand by its duplicating buyers is close to, but slightly lower than, its average rate of purchase by **all** its buyers. In fact the similarity here is stronger than is typically the case (the former figure being usually about 20% lower than the latter - Ehrenberg, 1988, p. 197). Such correspondence - which shows that buying one brand hardly inhibits the rate of buying

TABLE 6.21

The Average Frequency of Buying a Brand by Buyers of Other Brands. Automatic Washing Powder, Region I.

by consumers who also bought:	The average number of purchases of: A1	A2	A3	A4	A5
Brand A1	---	5.0	4.1	4.6	4.7
Brand A2	5.4	---	4.2	5.8	4.7
Brand A3	4.8	5.6	---	4.5	4.8
Brand A4	4.6	5.8	4.4	---	5.0
Brand A5	4.4	4.2	5.6	4.7	---
Average	4.8	5.2	4.6	4.9	4.8
w *	5.7	5.5	4.7	5.3	4.8

Notes:
* Average purchase frequency of **all** the brand's buyers.
- E.g. the buyers of Brand A2 who also buy Brand A1 make 5.4 purchases of this latter brand on average.

another brand - portrays duplicating buyers within this market as relatively heavy buyers with an apparent need for brand variety.

TABLE 6.22

**Average Brand Duplication:
Observed Figures, and Predictions from Both
the Duplication of Purchase Law (T)
and the Dirichlet Model (D).**

Buyers of average brand:		% also buying brand ranked: 1	2	3	4	5	D Coef-ficient
Automatc Rgn I	O	57	42	40	30	25	
	T	61	44	36	30	23	1.02
	D	54	42	31	30	22	.94
Tea Bags Rgn I	O	58	50	57	34	24	
	T	69	50	54	28	21	1.06
	D	67	45	43	22	12	.95
Inst Cof Rgn I	O	49	48	31	31	14	
	T	53	45	29	29	15	.92
	D	54	45	27	25	16	.89
Automatc Rgn II	O	53	33	38	34	28	
	T	56	34	36	32	27	1.00
	D	52	36	31	31	24	.95
Tea Bags Rgn II	O	56	57	62	40	43	
	T	59	59	61	39	40	1.07
	D	56	56	48	34	33	.98
Inst Cof Rgn II	O	60	47	41	27	7	
	T	58	48	42	25	8	.94
	D	61	43	40	23	8	.91
Average	O	56	46	45	33	24	
	T	60	47	43	31	22	1.00
	D	57	45	37	28	19	.94

Notes:

- E.g. regarding Automatc Rgn I, on average 57% of a brand's buyers will also buy the brand ranked 1 in this market.

6.6.2. Dirichlet Fit.

The Dirichlet's predictions of duplication are generally close to those derived from the Duplication of Purchase Law (Goodhardt et al., 1984). However, they differ in picking up that small upward trend in the duplications with falling market share. The theoretical trend is especially slight (e.g. regarding Table 6.17, the predicted duplications with Brand A1 would vary only from 53.5% to 53.8%), and is not illustrated here.

Table 6.22 lists however the **average** Dirichlet predictions of duplication for each brand, together with the observed averages and the Duplication of Purchase Law predictions. It is apparent that in most cases the Dirichlet predicts a slightly lower level of duplication between brands than does the latter "Law". This difference is summarized by the D coefficients, the Dirichlet values being the lower of the two in every market. It appears to derive from the positive correlation between certain brands (or "clustering") that exists in practice but of which no account is taken by the Dirichlet (which assumes a perfectly unsegmented market).

6.7. DIRICHLET FIT: SUMMARY.

6.7.1. Overall Fit.

The Dirichlet has successfully described the pattern of brand choice within the six markets analysed. The model picks up the various trends with market share, such as the divergence of w and wp as share falls, and its predictions are in most cases of the right numerical level. Thus the generally low degree of loyalty noted in previous sections is encapsulated theoretically.

Table 6.23 sets out for six buyer behaviour measures the average difference between observed and theoretical figures within each market, together with other indices of fit averaged across all these markets. The overall average discrepancies appear quite small, especially for the "proportional" measures (i.e. b, w/wp and bs/b) which have high absolute values. And for all measures except ws, the average discrepancy is smaller than the observed mean deviation (MD): the Dirichlet has substantially improved on the average brand "as predictor".

The good fit overall is particularly impressive when it is recalled that the various measures of buyer behaviour are integrated by the model and predicted from the same - and minimal - input data. However, there remain two areas of concern (other than the specific issue of **bias**, considered later).

First, substantial disagreement between observed and predicted behaviour occurs for the average purchase frequency of sole buyers (ws). The average discrepancy of 2.4 is particularly high when related to the overall average ws value of only 6.9 and the mean deviation for this measure of just 1.4. Indeed, a better prediction of ws is obtained from the average ws value than from the model.

Buyer behaviour on this measure seems particularly "erratic": a trend with market share is far from obvious, and some very large individual discrepancies arise. The observed value is about twice the predicted in several cases (e.g. Brands A4-I, A4-II, and B3-II) and as much as three-and-a-half times the predicted figure for one brand (Brand B4-II) - see Appendix 1. Undoubtedly the particularly small samples used when focusing on 100%-loyal buyers accounts for much of the across-brand variation on this measure.

The second area of concern is the tea bag market which, excepting ws in Region I, provides the widest difference between observed and predicted figures on every measure in

TABLE 6.23

Summary of Dirichlet Fit in the Brand Choice Context For Six Measures of Buyer Behaviour.

Measure of fit:	**Measure of buyer behaviour:**					
MAD	**b**	**w**	**wp**	**w/wp**	**bs/b**	**ws**
Automatc Rgn I	1.4	.25	.37	1.5	2.9	2.11
Tea Bags Rgn I	3.8	.68	.74	5.1	3.8	1.44
Inst Cof Rgn I	2.0	.42	.40	3.4	2.8	1.84
Automatc Rgn II	1.6	.34	.78	2.4	2.3	2.29
Tea Bags Rgn II	2.9	.47	1.09	3.8	3.5	4.84
Inst Cof Rgn II	2.2	.34	.67	2.7	1.8	2.12
Average	2.3	.42	.68	3.1	2.9	2.44
Oth measures of fit, ave values, 6 mkts: *						
Ave (O) **	33	5.6	15.0	38	16	6.9
Ave (D) ***	33	5.7	15.4	38	15	4.7
MD (O)	10	.8	.9	7	5	1.4
MAD/MD(O) (%)	24	54	99	44	57	191
MD(D)/MD(O) (%)	108	70	68	66	52	39

Notes:
* Values averaged across all 6 markets.
** Ave. observed value for the buyer behaviour measure.
*** Ave. Dirichlet value for the buyer behaviour measure.

both regions. The NBD model has been successfully applied to packet tea (Wrigley, 1980), but this first application of the Dirichlet to tea bags suggests that this market differs structurally from other product fields which have been well described by the model. In terms of the average tea bag brand the observed behaviour conforms closely to the predicted (i.e. there is no **fundamental** failure of the model), but differences across individual brands do not follow market share differences as closely as the Dirichlet assumes. Possible factors include "interference" from the other segment of the tea market (packet tea), the seasonality in sales (the most marked of the three products considered), and the large differences in brand shares from store to store (a matter examined in Chapter 9). Also relevant is the relatively high across-brand variation in market shares within the Region

I tea bag market, leading to a correspondingly high variation in other buyer behaviour measures. Indeed, when expressed as a proportion of mean deviation, the mean absolute differences between observed and predicted values within this market are on most measures of a similar level to those of other markets (see Tables 6.2, 6.9, and 6.13).

6.7.2. Bias.

Bias in the present context refers to a consistent underprediction or overprediction. It can apply to a given measure across all brands, or to a given brand across all measures.

The first of these possibilities (bias on one measure across all brands) will in general not apply to b and w unless a brand category has been excluded from the calibration of the model, as noted earlier. However, the results do point to a slight proneness on the part of the Dirichlet to overpredict the product-buying rate wp and to underpredict the proportion of once-only buyers and of sole buyers. These disparities may reflect unstationarity in the markets, or more specifically the presence of "additional" buyers in some weeks (especially during the peak season) who, almost by definition, are light buyers of both product and brand, and hence more likely to be sole buyers.

Sole Buyers.

The main bias in the present sense occurs for ws, the average purchase frequency of sole buyers, which tends to be substantially underpredicted (accounting for the large average discrepancy on this measure noted in the previous section). This occurs for 26 of the 30 brand cases studied, and for these 26 brands the observed value is on average 50% greater than the predicted (even excluding the extreme case of Brand B4, Region II). This underprediction combined with the less extreme one for the proportion of sole buyers implies that the sales accounted for by these "highly loyal" buyers are in practice greater than assumed by the model.

It is clearly on this ws measure that the specification of the Dirichlet is most questionable. However, the scope for improvement through refining the model is constrained by the "erratic" behaviour on this measure noted earlier, or more specifically by the weak association with market share (on which the model's predictions depend).

Composite Categories.

The second aspect of predictive bias - involving one brand category across all measures - applies to the "Other Brands" grouping. Loyalty to this category on various measures is consistently lower than predicted, as illustrated by Table 6.24 which specifies the shortfalls. The grouping of brands into a miscellaneous category does not in itself cause theoretical problems because of the assumption of independence in the Dirichlet distribution (Assumption D in Section 2.4.4). However, if in practice this category differs in behavioural terms from the named brands, as here, it may be preferable to exclude it when calibrating the model (Wrigley and Dunn, 1984b). Such an exclusion was made in the tea bag market in both regions. But the fit for most of the named brands could have been improved in other markets if a similar tactic had been employed. (In terms of individual s values, the Other Brands grouping has the highest value in three of the four markets in which it was analysed.)

TABLE 6.24

The Loyalty Discrepancy for "Other Brands": Observed - Predicted Values.

Product/Region	w	w/wp	bs/b	8+	dpl *
Tea Bags Rgn I	-0.6	-2	-1	-4	+3
Inst Cof Rgn I	-0.9	-5	-1	-4	0
Tea Bags Rgn II	-0.9	-3	-1	NA	+1
Inst Cof Rgn II	-0.5	0	+2	NA	-1

Notes:
- 8+ = percentage of brand buyers making 8 or more purchases.
- NA = not available.
* In the case of duplication positive values imply a loyalty overprediction. (Predicted values from Duplication of Purchase Law.) E.g. regarding tea bags, Region I, on average the proportion of a brand's buyers who also buy "Other Brands" is 3 percentage points higher than predicted.

Variance Discrepancy.

This second bias type - involving a brand category across all measures - also applies to individual brands in a way that depends on their rank in the market. As noted earlier, the aim of the Dirichlet is not to take account of every variable that may conceivably differentiate between brands but to "take out" the influence of market share. Consequently the model generally "explains" only a proportion of the observed variation across brands. In terms of mean deviation this proportion is typically about 60% for the measures listed in Table 6.23 (excepting penetration).

The relevance to predictive bias is that such a discrepancy will tend to translate into underprediction for large brands and overprediction for small brands (or vice versa if the measure is inversely related to market share). Table 6.25 expresses this point for tea bags, Region I, via loyalty indices. (These loyalty indices represent the observed measure value as a percentage of the predicted, except for duplication where the indices represent the predicted measure value as a percentage of the observed so that higher index values consistently imply higher loyalty.) The results indicate that, in addition to receiving more loyalty than small brands in absolute terms, large brands tend to receive more loyalty than predicted whereas small brands generally receive less loyalty than predicted.

TABLE 6.25

Loyalty Indices: * Tea Bags, Region I.

	w	w/wp	bs/b	ws	8+ **	dpl ***	Ave
Brand B1	109	113	121	138	130	119	122
Brand B2	102	103	127	183	110	100	121
O Brands	88	94	93	105	80	95	93
Brand B3	87	78	36	70	75	82	71
Brand B4	64	67	80	77	53	88	72
Average	90	91	91	114	90	97	96

Notes:

* I.e. observed value as % of predicted value, but vice versa for duplication. (Predicted duplication from Duplication of Purchase Law.)

** 8+ = percentage of brand buyers making 8 or more purchases.

*** E.g., on average, the predicted proportion of a (non-B1) brand's buyers who also buy Brand B1 is 19% greater than the observed proportion. This (necessarily) implies that the proportion of B1 buyers who also buy any other given brand tends to be lower than predicted - hence the high loyalty rating for this brand in terms of duplication.

The fall of the loyalty indices with market share is not as regular within other markets (see Table A1.16), but averaged across all markets the pattern is much the same, as illustrated in Table 6.26. An underprediction of loyalty for large brands (i.e. those ranked 1 and 2) and an overprediction of loyalty for small brands (i.e. those ranked 4 and 5) occurs - on these average figures - for every measure except ws.

TABLE 6.26

Loyalty Indices for Brands Ranked 1-5 Averaged Across 6 Markets.

Brand Rank	**w**	**w/wp**	**bs/b**	**ws**	**8+**	**dpl**	**Ave excl ws**
1	104	109	127	142	111	122	115
2	103	106	120	151	108	101	108
3	93	97	93	145	95	96	95
4	95	93	92	148	95	95	94
5	93	94	86	126*	96	98	93
Average	98	100	104	142	101	102	101

Notes:
- * Excludes Brand B4 Rgn II where index is 355.
- \- For clarification of "Loyalty Indices", and of the 8+ and duplication figures, see Table 6.25.

Researchers have often noted a loyalty excess for large brands and described this as a "brand leader effect". The present results suggest that such a discrepancy is part of a broader effect whereby the Dirichlet underestimates the degree of loyalty variation across brands, and that where such discrepancy occurs, it is appropriately interpreted at least in part as an effect of the model and not just as a characterization of the brand in question.

Although this pattern of deviation from the model appears to be a consistent one, it remains quite small and is best described as a "second order effect". Certainly the overall validity of the Dirichlet and the model's usefulness in providing theoretical norms for interpreting the observed data are not undermined.

As a final remark, it is worth recalling that the underestimation and overestimation of loyalty to large and small brands respectively is summarized by the individual s values, which follow a slight inverse relationship with market share. (As illustrated in the following section, the s value acts to some extent as a proxy for all other measures of a brand's loyalty.)

6.8. MEASURE RELIABILITY.

This section is concerned with across-measure reliability. In other words, if w, w/wp, bs/b and duplication are taken to be measures of "loyalty", do they present a consistent picture? If they are in fact measuring the same construct, it would be expected that a high loyalty rating on one measure would be reflected by the other measures.

When comparing a brand's loyalty on different measures, an obvious question is how to define "high" or "low" loyalty on each measure. A similar issue arises when the loyalty of different brands is compared, since account must be taken of the influence of market share on the degree of loyalty received. The approach taken here is to employ the "loyalty indices" used earlier for each measure: these express the degree of loyalty relative to the Dirichlet predictions (which take account of market share).

An issue which can be integrated into this examination of measure reliability is whether a brand's s value can act as a proxy for the more direct measures of loyalty. This value, estimated by the Dirichlet, effectively reflects the balance between a brand's observed b and w values: where a brand has a low purchase rate relative to its penetration the s value would be high, implying high switching; and vice versa. However, it is in practice the S parameter - usually calculated as the average of the s values, weighted by market share - and not the individual s values themselves on which the Dirichlet predictions depend. Consequently where a brand's s value is higher than the S parameter, the Dirichlet will (necessarily) underpredict b and overpredict w for that brand; and vice versa.

Under the Dirichlet model, the s value and indeed **all** measures of buyer behaviour (within a given product field) are inextricably tied. This is illustrated in Table 6.27 for a brand with a 20% market share: as s increases in value, loyalty in terms of w, w/wp, bs/b and ws (and any other measure) decreases. It may be hypothesized therefore that if a brand's s value is lower than the market parameter S then observed loyalty on all the direct measures of loyalty will exceed the predicted loyalty, and vice versa.

The loyalty indices (derived from all six markets) in Table 6.28 support such expectation. (These indices were calculated in the same way as those in Table 6.25, except that they have been ranked by s index and averaged by quintile. Also, the indices for s express the relevant S parameter as a percentage of the individual s values -

TABLE 6.27

Predictions Regarding a Brand with a 20% Market Share for Various s Values. Automatic Washing Powder, Region I.

s	b	w	wp	w/wp	bs/b	ws
.0	16	10.8	10.8	100	100	10.8
.2	21	8.3	12.2	68	56	9.0
.4	25	7.0	12.8	55	37	7.5
.6	28	6.2	13.2	47	27	6.2
.8	30	5.7	13.5	42	21	5.2
1.0	32	5.4	13.7	39	18	4.5
1.2	34	5.1	13.8	37	15	3.9
1.4	36	4.9	14.0	35	13	3.4
1.6	37	4.7	14.0	34	12	3.1
1.8	38	4.6	14.1	33	11	2.8
2.0	39	4.4	14.2	31	10	2.5
50.0	55	3.2	14.3	22	5	1.2

Notes:
- For each row of predictions, an S parameter has been used that is equal to the individual s value shown in the left-hand column.

TABLE 6.28

Loyalty Indices Ranked by s Index, Averaged by Quintile. Automatc, Tea Bags, Inst Cof; Regions I and II.

Quintile	s *	w	w/wp	bs/b	dpl	Ave excl s
1	139	109	112	115	106	111
2	113	103	107	117	99	107
3	95	99	102	110	100	103
4	81	93	93	92	98	94
5	58	83	86	85	94	87

Notes:
* Loyalty index for s = (S Parameter / s)100.
- For clarification of "Loyalty Indices" and of the duplication figures see Table 6.25.

thus the higher this index, the higher the expected loyalty.) Where the s index is greater - or less - than 100 (the loyalty "norm"), this tends to be reflected by

TABLE 6.29

The Association Between Loyalty Indices for Different Measures of Buyer Behaviour: Correlation Coefficients.

Buyer behaviour measures:

	s	w	w/wp	bs/b
w	.947			
w/wp	.864	.916		
bs/b	.486	.502	.662	
dpl	.534	.489	.589	.668

Notes:
- The full data underlying these coefficients are provided in Table A1.17.

the indices for w, w/wp, bs/b and duplication. Table A1.17 indicates that this agreement occurs for 99 of the 120 individual figures relating to these latter four measures. (Since the indices for s and w are necessarily related in view of the derivation of s, a more appropriate count is 69 of the 90 non-w cases.)

However, on closer inspection, the full figures in Table A1.17 underline that this positive association is not an emphatic one. Brand A1-I, for instance, has an index of 86 for s (suggesting low loyalty) but indices of 105, 140 and 107 for w/wp, bs/b and duplication respectively, and there are numerous cases where a brand receives a high index on one loyalty measure and a low index on another. In correlational terms, a strong association occurs only between s, w and w/wp (and as noted above such a correlation necessarily arises between s and w), as shown in Table 6.29.

A persistent challenge to the social sciences is how complex patterns of behaviour are to be summarized. The s value held initial promise in this regard (especially since, via the comprehensive Dirichlet model, it encapsulates every aspect of the brand's theoretical buying pattern). However, the above data suggest that it can act as an accurate proxy for only certain measures of brand loyalty (w and w/wp in the present instance). For other measures such as duplication and bs/b it is best taken as a rough approximation to the behaviour at hand. Larger samples might have allowed a more positive conclusion: undoubtedly measurement errors in the present data, particularly for small brands, have weakened the observed correlation between loyalty indices.

An implication of the correlation that **does** exist between s and loyalty is that a better fit would obtain if the Dirichlet were calibrated separately for each brand (i.e. using each individual s value in turn as the S parameter). However, such an approach defeats the entire purpose of the Dirichlet model, namely to **integrate** the buying pattern for different brands.

It can be concluded from the above study of the s-value-as-proxy that a correspondence **does** typically exist between different direct measures of loyalty ("loyalty" being assessed relative to the Dirichlet predictions), but that this positive association is by no means emphatic (except in the case of w and w/wp). The results show that the oft-noted possiblity for consumers to be relatively loyal on one measure but relatively disloyal on another (see e.g. Charlton, 1973; Engel and Blackwell, 1982, p. 569) applies also when brands rather than consumers are being compared.

6.9. DIFFERENCES BETWEEN MARKETS.

In so far as the same model - the Dirichlet - successfully describes the pattern of behaviour in each of the six markets analysed, it can be said that these brand choice contexts are **fundamentally** similar. Nevertheless, scope remains for the six markets to differ in parametric terms, and hence in the numerical values involved.

Table 6.30 sets out the three Dirichlet parameters M, K and S - which for modelling purposes summarize the structure of each market - together with the penetration and purchase frequency of the product class (on which M and K depend). With regard to these latter measures, two points are notable. First, while varying in terms of penetration (B), the different products are bought at much the same rate in each market (with tea bags Rgn II being a marked exception). Second, the "popularity" of each product, as measured by its penetration, hardly differs by region.

TABLE 6.30

Dirichlet (Brand Choice) Parameters * for Six Markets.

Product/Region	B (%)	W	M	K	S
Automatc Rgn I	80	10.8	8.7	.59	1.14
Tea Bags Rgn I	81	11.1	9.0	.61	1.23
Inst Cof Rgn I	90	11.5	10.4	.94	.88
Automatc Rgn II	77	12.1	9.4	.50	1.11
Tea Bags Rgn II	85	15.9	13.4	.60	1.29
Inst Cof Rgn II	92	12.1	11.0	.99	.96
Average	84	12.3	10.3	.71	1.10

Notes:
* The Dirichlet parameters are M, K and S. The B and W values (on which both M and K are based) are included to provide more direct measures of market structure.
- For explanations of the Dirichlet parameters, see Section 2.4.

Across-market comparison via the Dirichlet parameters M, K or S is made difficult by the relationships between these measures. (K depends partly on M, and S depends partly on M and K.) For instance, a relatively low S value may not imply low switching if the K value is relatively high (as in the case of instant coffee - see Tables 6.30 and 6.31). It is notable however that the three parameters for each product are remarkably similar across regions (excepting tea bags with regard to M), which suggests that these parameters are characterizations of the product class rather than of the region or specific product/region combination.

Table 6.31 illustrates what these parameters represent in direct behavioural terms. The figures derive from the Dirichlet's predictions for a hypothetical brand of which an average of 2 purchases per household are made over the 24-week period (implying a market share of around 20%). A number of differences between markets can be noted: the tea bag brand in Region II stands out with relatively high w and wp values (reflecting the high W in this market) and a low bs/b proportion; more generally the brands in Region II have slightly higher purchase frequencies in terms of w and wp (and a lower penetration) than those in Region I; and brand loyalty, in terms of w, w/wp, bs/b and ws, tends to be highest for instant coffee. However, beyond these features, the across-market similarity on all measures is striking. While the products under scrutiny are quite different from one another (especially in the case of the washing-powder/ instant-drinks distinction) and the regions geographically (and presumably culturally) distinct, buyer behaviour hardly varies from market to market in terms of market fundamentals (i.e. the same model applies to each) **and** the numerical measure values involved.

TABLE 6.31

Dirichlet Predictions for a Hypothetical Brand.
Brand Size: Average of 2 Purchase Occasions per Household.

Product/Region	b (%)	w	wp	w/wp (%)	bs/b (%)	ws
Automatc Rgn I	37	5.3	13.7	39	17	4.2
Tea Bags Rgn I	38	5.3	14.1	37	15	4.0
Inst Cof Rgn I	36	5.6	13.8	41	16	5.8
Automatc Rgn II	34	5.8	15.5	38	16	4.3
Tea Bags Rgn II	32	6.2	20.7	30	9	4.1
Inst Cof Rgn II	36	5.6	14.6	38	14	5.7
Average	36	5.6	15.4	37	15	4.7

The danger of assessing "loyalty" on one measure alone, noted in Section 6.8 with regard to individual brands, applies also to inter-market comparison. In Region II for instance, the instant coffee market has the lowest S parameter value (suggesting high loyalty) and yet has a lower repeat-buying rate (w) than the tea bag market, which has the highest S parameter value.

The values of the D coefficient - a useful summary measure of market structure - presented in Section 6.6 support two of the points made above. They indicate that loyalty, as measured by D, is much the same in the two regions (the average difference in D across regions being just 0.02) and that loyalty is strongest within the instant coffee market (D being lowest in this context). However, again the similarity between the figures (ranging from 0.92 to 1.07) is arguably more striking than the differences.

6.10. CONCLUSIONS.

This chapter has examined patterns of brand choice at the whole-market level, and in particular the fit of the Dirichlet model in this context. There are four main conclusions.

1. Brand choice patterns in the markets studied follow the usual trends and regularities.

For instance, the double jeopardy trend has held well, as has the divergence of w and wp as market share falls. Behaviour is not so regular that exceptions do not arise, but these are mostly small "local" deviations from a clear overall pattern.

Further corroboration of the "established" picture of behaviour derives from the low degree of brand loyalty observed. For example, buyers of the average brand of instant coffee in Region I (the market where loyalty is **strongest** in the present study) make fewer than 6 purchases of the brand over the year; they make almost 8 purchases of **other** brands (i.e. a **majority** of their product class requirement); and only about a fifth of these buyers remain 100%-loyal to the brand over the period. This level of loyalty can justifiably be described as "low" to the extent that it diverges from consumers' perceptions of their own behaviour (see Section 3.3).

2. The Dirichlet successfully describes the patterns of brand choice, although some (relatively minor) evidence of systematic deviation from the model is apparent.

In accordance with previous studies, the Dirichlet is shown here to pick up the various trends and regularities mentioned or implied in Conclusion 1 above, and its predictions are generally of the right numerical level. The degree of fit is especially impressive in view of (i) the minimal input data required (only three parameters, and crucially only market shares as brand-specific information) and (ii) the breadth of behaviour covered and integrated by the model.

The fit of the Dirichlet - in terms of mean absolute difference between observed and predicted behaviour - is least good for tea bags in both regions. Possible explanations include the seasonality in sales (which for tea bags is the most marked of the three product fields studied) and the high across-brand variation in market share (ranging from just 5% to a dominant 42%) in

Region I.

Three aspects of systematic deviation from the model have been identified, and these are listed below.

(i) The purchase frequency of sole buyers is consistently and significantly underpredicted. This discrepancy combined with the far weaker tendency to underpredict on the bs/b measure implies that it is with respect to sole buyers that the specification of the Dirichlet is most questionable. The scope for improvement regarding the purchase frequency of such buyers is constrained by the somewhat "erratic" behaviour on this measure, or more specifically by the lack of any marked trend with market share (on which the model's predictions depend). (Undoubtedly the particularly small samples used when focusing on 100%-loyal buyers account for much of the across-brand variation in ws.)

(ii) The Dirichlet tends to underpredict the variation in loyalty across brands. Consequently brand leaders usually receive higher-than-expected loyalty and the reverse holds for small brands. The "brand leader effect" noted in other studies is therefore appropriately interpreted at least in part as an effect of the model. However, this "variance discrepancy" is generally quite small and is best described as a second order effect. Certainly it does not undermine the model's main utility in providing theoretical norms to help understand the observed behaviour.

(iii) Loyalty to the "Other Brands" category is consistently lower than predicted (in all four markets where it is present). When interest centres on specific, named brands, this miscellaneous grouping therefore can be reasonably excluded from the calibration of the Dirichlet (i.e. when estimating the S parameter).

3. The association between different loyalty measures is positive but not strong.

This conclusion applies to brand loyalty **when assessed relative to the Dirichlet predictions.**

In other words, a **tendency** does emerge for high loyalty on one measure to be reflected by the loyalty rating on other measures, but the correlations involved are too low and the individual exceptions too numerous to posit that a brand's loyalty pattern can be reliably summarized by any single measure. These findings show that the oft-noted possiblity for consumers to be relatively loyal on one measure but relatively disloyal on another applies also when brands rather than consumers are being considered.

4. The differences in brand loyalty across product fields and regions are small.

A difficulty in comparing the loyalty in different markets centres on the lack of an overall "summary measure" of each market structure. (The three Dirichlet parameters usually can not individually fulfil this task as they are not fully independent of each other.) Nevertheless, across-market comparison of loyalty to the average brand, of predicted loyalty to a hypothetical brand of a given size, and of the D coefficient leads strongly to the above conclusion.

It in fact transpires that brand loyalty is strongest for instant coffee and weakest for tea bags in both regions (a finding which may reflect wider perceived differences between brands in the former market). But again, the across-product similarities are arguably more striking than the discrepancies, especially in view of differences in product usage (most marked regarding the washing-powder/instant-drinks distinction).

Chapter 7

STORE CHOICE

Contents:

7.1. INTRODUCTION.

As described in Chapter 1, the changes that have occurred in the grocery retailing environment in recent years have generated new demands on the academic research community. A number of researchers have responded by demonstrating that certain models of brand choice, notably the NBD and Dirichlet, can be successfully transferred to the context of store choice.

This chapter replicates such analyses, but with a greater emphasis than before on **measuring** the fit of the theoretical formulation (the Dirichlet), and on inter-market comparisons. As with the previous chapter, its aims are:

(i) to illustrate the basic regularities in store choice behaviour, and

(ii) to establish the fit of the Dirichlet model in this area.

The approach corresponds to that of Chapter 6: the structure of the chapter is the same; the same measures of buyer behaviour and goodness of fit are employed; and again five choice categories (i.e. store groups) are studied. A point of difference however is that now within each region the choice alternatives remain constant across the three product fields. And indeed three categories (Other Multiples, Store Y and Store Z) are present in all six markets. It is therefore possible to examine whether a store is treated in the same way for different products and/or regions.

Two composite categories are present, namely "Other Multiples" (a grouping of all grocery multiples other than those with letter-codes) and "Miscellaneous" (containing all remaining outlets for the products in question, from department stores and bakers to market stalls and milkmen). (See Section 2.2.3 for a more detailed account of these groupings' composition.) As detailed later, the Miscellaneous category in particular differs in behavioural terms from the individually-coded chains. It has consequently been excluded from the calibration of the Dirichlet model (i.e. in determining the S parameter) in every market where it appears (as specified by the detailed results presented in Appendix 2).

7.2. PENETRATION AND PURCHASE FREQUENCY.

7.2.1 Regularities.

The two main trends on these measures which have long been known to characterize brand choice can be seen in Table 7.1 to apply also to the context of store choice. First, average purchase frequency varies much less across stores than does penetration. Second, both measures tend to fall in value with decreasing market share. This second trend is slightly distorted by the presence of the two composite categories Other Multiples and Miscellaneous which appear to have relatively low purchase frequencies (and high penetrations).

TABLE 7.1

Penetration (b) and Average Purchase Frequency (w). Automatic Washing Powder, Region I.

	Market Share (%)	b (%) O	b (%) D	w O	w D
Store X	36	43	45	7.2	6.9
O Mltps	23	38	32	5.3	6.2
Store Y	21	30	30	6.2	6.1
Misclns	11	27	16	3.4	5.6
Store Z	9	14	14	5.5	5.5
Average	20	30	28	5.5	6.1

As with brand choice, store penetration typically grows rapidly (though less than pro rata) with the length of time period analysed, while the corresponding increase in average purchase frequency is much lower. Kau and Ehrenberg (1984) cite one example (concerning instant coffee) of store penetration growing from 2% in a week to 30% in 24 weeks, with purchase frequency increasing from 1.0 to 3.1. This pattern - which is successfully described by the NBD model - is well documented (Jephcott, 1972; Wrigley, 1980; Wrigley and Dunn, 1984; Kau, 1981; Kau and Ehrenberg, 1984; Uncles and Ehrenberg, 1988) and is not illustrated here. The main lesson from this growth trend is that a store's customers for a particular product are far more numerous than might be suggested by short-term sales data or store traffic counts.

7.2.2 Dirichlet Fit.

The agreement between observed and predicted figures in Table 7.1 is very good for stores X, Y and Z (with an average discrepancy of just 0.8 and 0.13 for b and w respectively) but poor for the two composite groups (where on average b is underpredicted by about 8 percentage points and w is overpredicted by some 1.5 units). This discrepancy for the latter two groups is reflected in the other markets (although Other Multiples is well described in two cases), as shown in Appendix 2, and lends support to the notion that smaller outlets tend to be used as "filler" stores rather than as the primary source of a given product. The disruptive effect of Miscellaneous in particular is highlighted in Table 7.2, where the average

TABLE 7.2

Dirichlet Fit in the Store Choice Context: Penetration (b) and Average Purchase Frequency (w).

	MAD *	MD O	MD D	MD(D)/ MD(O) (%)	MAD/ MD(O) (%)
Penetration (b)					
Automatc Rgn I	3.6 (1.9)	8.1	10.0	123	45
Tea Bags Rgn I	3.2 (2.3)	7.7	7.3	95	42
Inst Cof Rgn I	3.6 (1.8)	8.7	10.3	118	41
Automatc Rgn II	4.3	4.6	6.6	143	93
Tea Bags Rgn II	2.6	6.5	8.4	128	39
Inst Cof Rgn II	2.5	7.0	6.4	92	35
Average	3.3	7.1	8.2	116	49
Ave Prchse Frqncy (w)					
Automatc Rgn I	.69 (.33)	.94	.41	44	73
Tea Bags Rgn I	.60 (.45)	.69	.32	46	87
Inst Cof Rgn I	.64 (.30)	.84	.42	50	76
Automatc Rgn II	.99	1.23	.36	29	80
Tea Bags Rgn II	.67	.93	.46	49	72
Inst Cof Rgn II	.44	.45	.24	53	98
Average	.67	.85	.37	45	81

Notes:
* Figures in brackets exclude Miscellaneous.
- MAD = mean absolute difference between observed and predicted.
- MD = mean (absolute) deviation (from the mean).

discrepancy is typically halved when this category is excluded.

Overall, the average discrepancies of 3.3 for b and .67 for w suggest a reasonable fit, and these figures fall to 2.2 and .48 if both composite categories are excluded. The model has improved - in most cases substantially - on the average measure value "as predictor" for both b and w, as indicated by the MAD/MD values.

As with brand choice, the variation in b and w is overpredicted and underpredicted respectively. Accordingly, w is higher than expected for the largest store within each market (the average discrepancy being 0.27 for Store X in Region I and somewhat higher at 1.2 for Store V in Region II), although the reverse is not apparent for the smallest stores.

7.3. PRODUCT BUYING AND SHARE OF REQUIREMENT.

7.3.1. Regularities.

The main regularities on these measures for brands hold also for stores, as illustrated by Table 7.3. First, wp is much the same for the different categories: like brands, stores differ little in the extent to which they attract heavy buyers of the product class. Second, this measure does however exhibit a slight upward trend with decreasing market share. (In Table 7.3 the variation associated with this trend is large relative to that in other markets.) Third, share of requirement (w/wp) falls with decreasing market share, although this fall is made slightly irregular in this case by the less than smooth fall in w (noted earlier). Fourth, the absolute values of w/wp, as a measure of loyalty, seem quite low: product buyers at a store typically give the majority of their product purchases to "other" stores (Store X being the only exception).

TABLE 7.3

Ave. Purchase Frequency of Product per Buyer at Store (wp) and Share of Requirement (w/wp). Automatic Washing Powder, Region I.

	wp		w/wp (%)	
	O	D	O	D
Store X	12.2	12.7	59	54
O Mltps	12.6	13.2	42	47
Store Y	12.7	13.3	49	46
Misclns	13.7	13.7	25	41
Store Z	15.9	13.8	35	40
Average	13.4	13.3	42	46

These observations apply to the other markets analysed, except that the above relationship between wp and market share does not seem to hold for tea bags in Region II (Table A2.12). A point of interest is the marked similarity across markets in terms of share of requirement (see Table 7.4): average values are all between 41% and 43%.

7.3.2. Dirichlet Fit.

The agreement between observed and theoretical figures appears good in the case of wp: the average figures for

TABLE 7.4

Ave. Purchase Frequency of Product per Buyer at Store (wp) and Share of Requirement (w/wp) for the Average Store.

Product/Region	wp O	wp D	w/wp % O	w/wp % D
Automatc Rgn I	13.4	13.3	42	46
Tea Bags Rgn I	13.6	13.7	43	44
Inst Cof Rgn I	14.0	13.6	43	46
Automatc Rgn II	14.8	15.3	42	41
Tea Bags Rgn II	18.2	19.7	41	38
Inst Cof Rgn II	14.3	14.3	43	44
Average	14.7	15.0	42	43

the various markets (Table 7.4) are quite close, and as regards individual figures the discrepancy is typically less than 1 (Table 7.5). The two composite groups do not stand out on this measure. Thus both the Miscellaneous and Other Multiples categories are patronized by consumers with neither a particularly high nor low product requirement. The consistently low share of requirement value calculated for these groups therefore derives from a low purchasing rate **at the store group** rather than a high product buying rate.

For this share of requirement measure (w/wp) the overall fit is fair with an average discrepancy of nearly 5. However, much of this discrepancy is accounted for by Miscellaneous and Other Multiples.

In terms of variation "explained" by the Dirichlet, the predictions are less good than for the measures considered earlier. Typically the theoretical deviation is half the observed for both measures.

There are no stores - other than the composite categories - that differ emphatically and consistently from the theoretical norms provided by the Dirichlet on these measures. However, the data do suggest that Store Z, for each product field in Region I, attracts relatively heavy buyers of the product field. And the reverse applies, though less strongly, to Store W in Region II (see Appendix 2).

TABLE 7.5

Dirichlet Fit in the Store Choice Context:
Ave. Purchase Frequency of Product per Buyer at Store (wp)
and Share of Requirement (w/wp).

	MAD *	MD O	MD D	MD(D)/ MD(O) (%)	MAD/ MD(O) (%)
Ave Prdct Prchses (wp)					
Automatc Rgn I	.76 (.95)	1.11	.34	31	68
Tea Bags Rgn I	.44 (.45)	.69	.26	38	64
Inst Cof Rgn I	.76 (.83)	.88	.28	32	86
Automatc Rgn II	1.02	.72	.32	44	142
Tea Bags Rgn II	1.68	.81	.41	51	207
Inst Cof Rgn II	.40	.44	.16	36	91
Average	.84	.78	.30	39	110
Shr of Rqurmnt (w/wp)					
Automatc Rgn I	6.7 (4.5)	9.7	4.2	44	69
Tea Bags Rgn I	5.0 (3.8)	6.2	3.2	52	80
Inst Cof Rgn I	4.9 (2.2)	7.5	4.1	55	65
Automatc Rgn II	3.6	6.0	3.3	55	60
Tea Bags Rgn II	2.8	4.6	3.1	68	61
Inst Cof Rgn II	3.9	4.1	2.2	53	95
Average	4.5	6.4	3.4	55	72

Notes:
* Figures in brackets exclude Miscellaneous.

7.4. SOLE BUYERS.

7.4.1. Regularities.

The proportion of a store's buyers for a given product who remain 100%-loyal to the store over the period normally falls with decreasing market share, as exemplified in Table 7.6. However, the expected corresponding fall in the purchase frequency of such sole buyers is less apparent: indeed, for the three markets in Region II it is not apparent at all, and for instant coffee in this region ws actually **rises** smoothly with decreasing share (Table A2.14).

TABLE 7.6

Proportion of Sole Buyer (bs/b) and Average Purchase Frequency of Sole Buyers (ws). Automatic Washing Powder, Region I.

	Market Share (%)	bs/b (%) O	bs/b (%) D	ws O	ws D
Store X	36	30	33	8.1	6.8
O Mltps	23	21	26	5.6	6.1
Store Y	21	24	26	6.7	6.0
Misclns	11	14	21	2.7	5.4
Store Z	9	10	21	5.3	5.4
Average	20	20	25	5.7	5.9

TABLE 7.7

Proportion of Sole Buyers (bs/b) and Average Purchase Frequency of Sole Buyers (ws) for the Average Store.

Product/Region	bs/b (%) O	bs/b (%) D	ws O	ws D
Automatc Rgn I	20	25	5.7	5.9
Tea Bags Rgn I	21	23	6.7	5.7
Inst Cof Rgn I	19	22	6.8	6.9
Automatc Rgn II	21	21	7.3	5.5
Tea Bags Rgn II	16	16	9.8	6.6
Inst Cof Rgn II	17	20	7.5	7.2
Average	19	21	7.3	6.3

Similar results were noted in the brand choice context. And there are two further points of correspondance. First, the proportion of 100%-loyal customers seems low in absolute terms: the average value is about 20% for all markets analysed (Table 7.7). Second, the observed purchasing rates of sole buyers is only slightly higher than the rates for all buyers at the store in question. Thus the low incidence of sole buyers is no great drawback as such consumers are not especially heavy buyers at the store in question. Similar findings were reported by Kau and Ehrenberg (1984).

7.4.2. Dirichlet Fit.

On the question of fit the most important observations are that the Dirichlet exhibits a tendency to overpredict the

TABLE 7.8

Dirichlet Fit in the Store Choice Context: Proportion of Sole Buyers (bs/b) and Average Purchase Frequency of Sole Buyers (ws)

	MAD *	MD O	MD D	MD(D)/ MD(O) (%)	MAD/ MD(O) (%)
Proportion of Sole Buyers (bs/b)					
Automatc Rgn I	5.5 (5.0)	6.5	3.5	55	85
Tea Bags Rgn I	4.8 (4.8)	6.6	2.7	41	72
Inst Cof Rgn I	5.4 (5.3)	6.4	3.2	50	84
Automatc Rgn II	2.5	1.9	2.6	134	131
Tea Bags Rgn II	2.2	2.1	1.9	91	106
Inst Cof Rgn II	3.8	2.1	1.7	82	183
Average	4.0	4.3	2.6	75	110
Ave Prchs Frqncy of Sl Brs (ws)					
Automatc Rgn I	1.09 (.68)	1.40	0.42	30	78
Tea Bags Rgn I	0.98 (.98)	0.74	0.32	43	132
Inst Cof Rgn I	0.96 (.70)	1.18	0.40	34	81
Automatc Rgn II	2.01	1.78	0.36	20	113
Tea Bags Rgn II	3.20	1.56	0.45	29	205
Inst Cof Rgn II	1.16	0.90	0.23	26	129
Average	1.57	1.26	0.36	30	123

Notes:
* Figures in brackets exclude Miscellaneous.

proportion of sole buyers and underpredict their purchase frequency. The underprediction of ws is not apparent in the full results of Table 7.6, but both tendencies do emerge from the averaged results for all markets in Table 7.7. (In terms of individual stores, bs/b is overpredicted in 23 of the 30 total cases, and ws underpredicted in 21 of the 30 cases.)

The proportion of sole buyers is the better predicted of the two measures with an overall average discrepancy of 4.0 (Table 7.8). The corresponding figure for ws is 1.6, which seems high against the typical ws value of about 7. The MAD/MD(O) values in Table 7.8 indicate that the average store for both these measures would be a better predictor in several markets - and especially in Region II, as occurred also for wp and w/wp.

The results indicate that, as in the brand choice context, it is in the area of sole buying that the Dirichlet is least accurate.

7.5. PURCHASE FREQUENCY DISTRIBUTION.

7.5.1. Regularities.

Individual consumers' frequency of buying a product at a store vary widely around the averages noted in Section 7.2. This is illustrated in Table 7.9, where typically half of a store's buyers buy the product there only once or twice over the year and only about a quarter buy it as often as once every 6 weeks (on average). The distribution pattern is numerically very similar for the other product fields (Table 7.10).

TABLE 7.9

Purchase Frequency Distribution.
Automatic Washing Powder, Region I.

Buyers at:		% Making X Purchases at the Store: 1	2	3	4	5	6	7	8+
Store X	O	25	10	10	7	7	4	5	33
	D	25	14	10	7	6	5	4	29
O Mltps	O	28	18	11	5	5	6	3	24
	D	29	15	10	7	6	4	4	25
Store Y	O	25	16	12	7	3	4	5	27
	D	29	15	10	7	6	5	4	25
Misclns	O	40	17	11	7	5	7	3	9
	D	32	16	10	7	5	4	4	21
Store Z	O	43	17	7	7	2	1	1	24
	D	33	16	10	7	6	4	4	21
Average	O	32	16	10	7	4	4	3	23
	D	30	15	10	7	6	4	4	24

In terms of the proportion of heavy buyers, the degree of loyalty received by a store seems low. On the other hand, these relatively few heavy buyers account for a large percentage of store sales, as illustrated in Table 7.11. The distribution is again even more skew than the "80/20 rule" (Ehrenberg and Goodhardt, 1979, p. 10.6). On average, the "heavy half" of a store's buyers (in this case the 52% buying three or more times) account for 87% of total store sales.

TABLE 7.10

Purchase Frequency Distribution for the Average Store.

Buyers at the Average Store:		% Making X Purchases at the Store: 1	2	3	4	5	6	7	8+
Automatc Rgn I	O	32	16	10	7	4	4	3	23
	D	30	15	10	7	6	4	4	24
Tea Bags Rgn I	O	32	14	9	7	4	5	4	24
	D	30	15	10	7	6	4	4	24
Inst Cof Rgn I	O	30	13	9	8	6	5	4	24
	D	27	15	10	8	6	5	4	26
Average	O	31	14	9	7	5	5	4	24
	D	29	15	10	7	6	4	4	25

7.5.2. Dirichlet Fit.

The frequency distribution for individual stores is well modelled by the Dirichlet (Table 7.9). Substantial discrepancy occurs for Miscellaneous, as would be expected given the large shortfall in average purchase frequency noted earlier. Specifically, this store group has a disproportionately large number of occasional buyers which supports the "filler" store characterization. The main other disparity concerns Store Z, which is **tending** to a polarized situation where sales derive from either very light or very heavy customers. However, this disparity does not occur in the two other markets (Tables A2.5 and A2.8).

The tendency for the Dirichlet to underpredict the proportion of once-only buyers, noted with regard to brand buying, appears from the averages in Table 7.10 to occur also in the store choice context. However, on close inspection the disagreement is almost entirely accounted for by the Miscellaneous category (the average observed **and** theoretical proportions for all these product fields being 29% when this group is excluded).

It has been noted elsewhere (Wrigley and Dunn, 1984a) that suburban stores tend to have a high proportion of heavy buyers (relative to the NBD norms), but the present regional-level analysis does not allow for locational considerations of this type.

TABLE 7.11

The Sales Importance of Light and Heavy Buyers:
The Percentage of Total Purchases at the Stated Store
Accounted for by Consumers Buying at the Store Once,
Twice, etc.
Automatic Washing Powder, Region I.

		Number of Purchases							
		1	2	3	4	5	6	7	8+
Store X	O	3	3	4	4	5	3	4	73
	D	4	4	4	4	4	4	4	71
O Mltps	O	5	7	6	4	4	7	4	63
	D	5	5	5	5	5	4	4	68
Store Y	O	4	5	6	5	2	4	6	68
	D	5	5	5	5	5	5	4	68
Misclns	O	12	10	10	8	7	13	7	34
	D	6	6	5	5	5	5	5	64
Store Z	O	8	6	4	5	2	1	1	74
	D	6	6	5	5	5	5	5	63
Average	O	6	6	6	5	4	6	5	62
	D	5	5	5	5	5	4	4	67

7.6. DUPLICATION.

7.6.1. Regularities.

Table 7.12 illustrates the general finding that duplication is proportional to penetration - in this case in the store choice context. The higher a store's relative penetration (i.e. penetration among product buyers), the higher its duplication with other stores. The comparability with the pattern for brands extends, within each column, to the slight upward trend of duplication with decreasing market share that has often been noted empirically (e.g. Ehrenberg and Goodhardt, 1970).

TABLE 7.12

Store Duplication.
Automatic Washing Powder, Region I.

Buyers at:	% also buying at:				
	X	OM	Y	Ms	Z
Store X	--	38	31	28	15
O Mltps	44	--	31	34	19
Store Y	44	38	--	34	16
Misclns	45	48	39	--	22
Store Z	47	52	35	42	--
Average	45	44	34	35	18
D x rltv b	50	43	35	31	16
D = .93					
Relative b *	54	47	38	33	18

Notes:
* Relative b (rltv b) = penetration of the store among buyers of the product class.

The predicted duplications (i.e. D x average relative penetration) are quite close to the average observed duplications in each market, as can be seen in Table 7.13. The fit is particularly good in Region II, where the average discrepancy for the three product fields is less than 1. The tendency for the market leader in the brand choice context to have lower-than-expected duplication (e.g. Ehrenberg, 1988, p. 193; Wrigley and Dunn, 1984b) can be seen to apply also to store choice in Region I. However, in Region II, and in other studies of store duplication (Kau and Ehrenberg, 1984; Wrigley and Dunn, 1984b; Uncles and Ehrenberg, 1988), there is little evidence of such a discrepancy. Store X's low duplication may therefore be a store-specific discrepancy rather than a failure of the Duplication of Purchase Law as such.

TABLE 7.13

Average Store Duplication.

Buyers at Average Store:		% Also Buying at Store:				
		X	OM	Y	Ms	Z
Automatc Rgn I	O	45	44	34	35	18
	T	50	43	35	31	16
Tea Bags Rgn I	O	40	41	31	45	20
	T	49	39	30	39	19
Inst Cof Rgn I	O	40	34	20	14	8
	T	46	30	17	14	9
Average	O	42	40	28	31	15
	T	48	37	27	28	15
		V	OM	W	Z	Y
Automatc Rgn II	O	39	36	26	27	20
	T	38	34	27	28	20
Tea Bags Rgn II	O	41	37	25	36	24
	T	40	37	25	38	22
Inst Cof Rgn II	O	35	39	23	33	20
	T	35	38	23	34	20
Average	O	38	37	25	32	21
	T	38	36	25	33	21

Notes:
- T = theoretical values predicted from Duplication of Purchase Law.
- E.g., regarding Automatc Rgn I, on average 45% of the buyers of the product at a (non-X) store also buy the product at Store X.

The duplication coefficients in all six markets are less than one (see Table 7.14) indicating that buying the product at one store does inhibit buying it elsewhere, but only slightly. (In other words, buyers of the product P at Store S are only marginally less likely to buy P at any other given store than the average buyer of P.) These D values appear relatively low: even when they are re-calculated using penetrations rather than **relative** penetrations, they equate roughly with the SC coefficients of about 1.1 reported by Kau and Ehrenberg (1984) over a **24**-week (i.e. shorter) period. The general pattern is for D to **rise** in value with increasing length of analysis period (Ehrenberg and Goodhardt, 1970).

TABLE 7.14

Store Duplication Coefficients.

	Region I	Region II
Automatc	.93	.88
Tea Bags	.93	.90
Inst Cof	.92	.87

Notes:
- These D coefficients are calculated using relative penetrations, i.e. store penetrations among buyers of the product class.

Also notable in Table 7.14 is the marked similarity in the D coefficients in all six markets. Thus within these markets consumers exhibit much the same propensity to "also buy" at other stores. Such similarity from product to product was also noted by Kau and Ehrenberg (1984).

7.7. DIRICHLET FIT: SUMMARY.

7.7.1. Overall Fit.

In the preceding sections, patterns of store choice have been seen to display the same trends and regularities as are associated with brand choice behaviour and assumed by the Dirichlet model. To that extent, the Dirichlet "works" for store choice. However, the summary measures of fit in Table 7.15 suggest that the actual agreement between store choice behaviour and the model's predictions is not especially close. Averaged across all six markets, the mean absolute differences are at least 10% of each measure's average value. And only in the case of

TABLE 7.15

Summary of Dirichlet Fit in the Store Choice Context for Six Measures of Buyer Behaviour.

Measure of fit:	Measure of buyer behaviour:					
MAD	**b**	**w**	**wp**	**w/wp**	**bs/b**	**ws**
Automatc Rgn I	3.6	.69	.76	6.7	5.5	1.09
Tea Bags Rgn I	3.2	.60	.44	5.0	4.8	.98
Inst Cof Rgn I	3.6	.64	.76	4.9	5.4	.96
Automatc Rgn II	4.3	.99	1.02	3.6	2.5	2.01
Tea Bags Rgn II	2.6	.67	1.68	2.8	2.2	3.20
Inst Cof Rgn II	2.5	.44	.40	3.9	3.8	1.16
Average	3.3	.67	.84	4.5	4.0	1.57
Oth measures of fit, ave values, 6 mkts: *						
Ave (O) **	31	6.2	14.7	42	19	7.3
Ave (D) ***	29	6.4	15.0	43	21	6.3
MD (O)	7.1	.85	.78	6.4	4.3	1.26
MAD/MD(O) (%)	49	81	110	72	110	123
MD(D)/MD(O) (%)	116	45	39	55	75	30

Notes:
* Values averaged across all 6 markets.
** Ave. observed value for the buyer behaviour measure.
*** Ave. Dirichlet value for the buyer behaviour measure.

penetration do the predictions represent a substantial improvement on the average value "as predictor".

The composite categories Miscellaneous and Other Multiples can be held largely responsible for this magnitude of discrepancy. This is especially so regarding b and w, where exclusion of Miscellaneous alone typically halves the mean absolute difference between observed and predicted figures (see Table 7.2). Results presented in Chapter 12 indicate that a very good fit obtains when the Dirichlet is calibrated specifically to the three non-composite store groups in Region I (the improvement being most marked for the measures b, w and w/wp). Indeed, if anything the fit is closer than that applying to the three largest non-composite brand categories.

Regarding the present data, the main area of discrepancy concerns sole buyers - as in the brand choice context. The average MAD figures for both the proportion and purchase frequency of such buyers (4 and 1.6 respectively) seem quite high relative to the overall average value on each measure (19 and 7.3). As emphasized in Section 7.4, ws retains its "erratic" characteristic: a trend with market share is far from obvious (except in the instant coffee, Region II, case where it occurs smoothly but in a direction **opposite** to that predicted by the model!). Sampling error is undoubtedly relevant to the poor fit on this measure (in view of the low incidence of sole buying). There is no evidence that the discrepancy regarding bs/b and ws concentrates on the composite store groups.

Tea bags do not stand out as a generally "poor-fitting" product field as they did for brand choice. However, the Region II market contains especially large discrepancies regarding wp, where the relatively high observed values are typically overpredicted, and regarding ws, where underprediction is very severe. (In one case, namely Store Y, the observed ws is twice the predicted - see Table A2.12.)

7.7.2. Bias.

Again bias is defined here as a consistent overprediction or underprediction, and may regard a given measure across all stores, or a given store across all measures.

As the following paragraphs show, such bias emerges in the present context in much the same ways as in the brand choice case. This finding indicates that "store choice is like brand choice" in terms of both general conformity to the Dirichlet and the pattern of **deviation** from the model.

Sole Buyers.

The first bias type applies most notably to the purchase frequency of sole buyers (ws), which tends to be underpredicted by the model. The underprediction is not however as severe as in the brand choice context (and indeed it is not apparent at all in two markets - Automatic Washing Powder Region I and Tea Bags Region I).

Turning to other measures, the average observed and predicted figures for each market suggest that the Dirichlet underpredicts loyalty in terms of w, w/wp and bs/b. However, this result appears to reflect the distorting influence of the composite store categories - a point considered further below.

Variance Discrepancy.

As with brands, the Dirichlet underestimates the across-store variation on the measures listed in Table 7.15 (excluding penetration). However, such "error" translates only into a slight tendency to underpredict loyalty for large stores and to overpredict loyalty for small stores. This is illustrated by the loyalty indices in Table A2.16, which exhibit only a small trend with market share.

Composite Categories.

As with the Other Brands case, loyalty to the composite **store** categories - Other Multiples and Miscellaneous - is considerably lower than predicted (on several measures), as indicated in Table 7.16. (An exception concerns Other Multiples for tea bags, Region II, where the category conforms very much to expectation.) At first sight, these results point not to a failure of the model as such, but to a distinction in the way consumers behave towards the major chains on the one hand and the smaller chains or non-supermarket outlets (of which the composite categories are formed) on the other hand. However, it is argued in Chapter 14 that the predictive bias regarding composite categories may in fact be an expression of the variance discrepancy noted above.

TABLE 7.16

The Loyalty Discrepancy for Composite Store Categories: Observed - Predicted Values.

Store Category and Product/Region	w %	w/wp %	bs/b %	* 8+ %	** dpl %
Miscellaneous					
Automatc Rgn I	-2.2	-16	-7	-12	+4
Tea Bags Rgn I	-1.2	-10	-5	-8	+6
Inst Cof Rgn I	-2.0	-16	-6	-13	+3
Other Multiples					
Automatc Rgn I	-0.9	-5	-5	-1	-5
Tea Bags Rgn I	-0.6	-3	-3	-1	+2
Inst Cof Rgn I	-0.3	-4	-7	-1	+5
Automatc Rgn II	-1.2	-13	-1	NA	+2
Tea Bags Rgn II	-0.1	+2	+1	NA	0
Inst Cof Rgn II	-1.1	-7	-4	NA	+1

Notes:
* 8+ = % of buyers at a store making 8 or more purchases there.
** In the case of duplication positive values imply a loyalty overprediction. (Predicted duplications from Duplication of Purchase Law.) E.g., regarding Automatc Rgn I, the average proportion of buyers at a (non-Miscellaneous) store who also buy at Miscellaneous is 4 percentage points greater than predicted by the Duplication Law.
- NA = not available.

7.8. DIFFERENCES BETWEEN MARKETS.

Results presented earlier indicate that store choice behaviour is similar across both product fields and regions in so far as the same trends and regularities obtain (as implied by the fit of the Dirichlet). This section examines whether such similarity extends to the actual numerical values involved. First studied are differences in the overall degree of store loyalty for each market. Subsequently across-market differences in the loyalty pattern for individual stores are considered.

7.8.1. Across-Market Differences in Structure.

Table 7.17 gives the Dirichlet's parameters for each store choice context. The S parameter can be seen to exhibit considerable stability across both regions and product fields. This does not imply that the degree of store loyalty must be the same in each market because S is not independent of M and K. But in so far as these latter two parameters hardly vary across regions for each product (excepting M for tea bags), it can be expected that the overall level of store loyalty will be much the same in each region.

TABLE 7.17

Dirichlet (Store Choice) Parameters for Six Markets.

	M	K	S
Automatc Rgn I	8.7	.59	.74
Tea Bags Rgn I	9.0	.61	.73
Inst Cof Rgn I	10.4	.94	.66
Automatc Rgn II	9.4	.50	.76
Tea Bags Rgn II	13.4	.60	.82
Inst Cof Rgn II	11.0	.99	.65

Notes:
- For explanations of these parameters, see Section 2.4.

Table 7.18, using more direct measures of behaviour, indicates that loyalty to the average store is indeed much the same from market to market (i.e. across both regions and products). The main exceptions concern the relatively high w and ws values for tea bags in Region II. But these reflect a product-buying rather than a store-patronage characteristic, namely the high W value for this market (see Table 6.30 in the previous chapter).

TABLE 7.18

Loyalty to the Average Store and the D Coefficient Within Each Market.

	w	w/wp (%)	bs/b (%)	ws	D
Automatc Rgn I	5.5	42	20	5.7	.93
Tea Bags Rgn I	5.8	43	21	6.7	.93
Inst Cof Rgn I	5.9	43	19	6.8	.92
Automatc Rgn II	6.3	42	21	7.3	.88
Tea Bags Rgn II	7.4	41	16	9.8	.90
Inst Cof Rgn II	6.1	43	17	7.5	.87
Average	6.2	42	19	7.3	.91

Such comparability in store loyalty from product to product within each region may seem inevitable in so far as the store choice set remains largely unchanged. However, the marked similarity across both products and regions suggests that the level of loyalty at hand may be a characteristic of shopping behaviour in general rather than a manifestation of each specific product/region combination.

7.8.2. Across-Market Differences in Loyalty to Individual Stores.

The results of the preceding section suggest that a store will not receive radically different levels of loyalty in different markets; but the precise level in each case is likely to reflect (at least in part) the small differences that **do** exist in market structure/size and differences in the store's market share. The approach taken is therefore, as in Chapter 6, to measure loyalty relative to the Dirichlet predictions (which take account of both structure/size and market share), i.e. via loyalty indices.

The indices in Table 7.19 (regarding the non-composite store categories) do point to **some** across-market stability in store loyalty (as defined above): Store X receives more loyalty than predicted on every measure in each product field (excluding bs/b, Automatc Rgn I), and by a fairly constant margin (taking each measure in turn); Store Y's loyalty (excluding ws, Region II) is relativley close to the predictions, whatever the product or region; and Store W's loyalty rating is, for each product, low for w, high for bs/b and ws, and "normal" for duplication. However, excepting Store X, across-market variation for each measure remains more apparent than across-market stability.

TABLE 7.19

Loyalty Indices * for Each Store in Each Market.

	w	w/wp	bs/b	ws	dpl **
Store X					
Automatc Rgn I	104	109	92	120	111
Tea Bags Rgn I	104	113	131	118	123
Inst Cof Rgn I	103	107	121	108	121
Store Y					
Automatc Rgn I	101	106	95	112	103
Tea Bags Rgn I	98	99	86	105	97
Inst Cof Rgn I	98	100	76	91	94
Automatc Rgn II	111	89	104	190	100
Tea Bags Rgn II	104	106	92	198	92
Inst Cof Rgn II	97	91	77	125	100
Store Z					
Automatc Rgn I	99	86	47	98	89
Tea Bags Rgn I	115	112	79	144	95
Inst Cof Rgn I	111	97	83	125	100
Automatc Rgn II	88	71	101	116	104
Tea Bags Rgn II	98	108	120	128	106
Inst Cof Rgn II	95	94	69	109	103
Store V					
Automatc Rgn I	127	84	80	142	97
Tea Bags Rgn I	114	112	81	153	98
Inst Cof Rgn I	108	109	84	80	100
Store W					
Automatc Rgn I	91	58	127	122	104
Tea Bags Rgn I	76	98	116	118	100
Inst Cof Rgn I	98	104	103	121	100

Notes:
* I.e. observed loyalty as a percentage of predicted loyalty, but vice versa for duplication. (Predicted duplication from Duplication of Purchase Law.)
** E.g., regarding Automatc Rgn I, the predicted proportion of product buyers at a (non-X) store who also buy the product at Store X is 11% higher than the average observed proportion.

To conclude, there is no marked evidence that the precise level of loyalty received by a store, **measured relative to the Dirichlet norms**, remains constant across product fields: it is quiet common for a store to receive higher-than-predicted loyalty (on any measure) for one product, and lower-than-predicted loyalty for another. But since the discrepancies (for the stores shown) are generally small, variation of this order could well be expected on the basis of sampling error alone.

7.9. CONCLUSIONS.

This chapter has examined patterns of store choice at the whole-market level, and in particular has considered the fit of the Dirichlet - a model initially developed for brands - in the store choice context. Three main conclusions can be drawn from the results.

1. Patterns of store choice are similar to those of brand choice.

The trends and regularities that are well established in the brand choice context are found to apply also to the store choice situation. For instance, the double jeopardy effect, the Duplication of Purchase Law, the association between loyalty and market share, all hold for store choice. The correspondence between the two choice contexts extends to the most subtle of behavioural patterns, such as the slight increase in the product buying rate wp as market share falls, and indeed the **lack** of a clear trend with market share in the case of sole buyers' purchasing rate (ws).

Further resemblance derives from the level of loyalty: as for brands, loyalty to stores seems quite "low" in so far as a store's buyers will typically make the **majority** of their product purchases elsewhere. A direct comparison between the levels of brand and store loyalty is made in the next chapter.

In general, the present results for store choice corroborate the findings or earlier studies in this area, cited in Section 4.3.3.

2. The Dirichlet model successfully describes the patterns of store choice.

As implied above, the trends and regularities assumed by the Dirichlet are appropriate to the store choice context, and the model's predictions in this area are generally of the right numerical level. However, this conclusion must be qualified by the observation that composite store groups - in the present instance Other Multiples and Miscellaneous - exhibit a different patronage pattern from the large named chains. Specifically, loyalty to these categories is consistently lower than predicted (on all measures), which supports the view that smaller chains and non-supermarket outlets are especially likely to be used as "filler" outlets rather than as the primary source of groceries. The inclusion of these categories in the present analysis, in view of the "atypical" behaviour involved, has a deleterious effect on the overall fit of the Dirichlet.

Two other areas of predictive bias are apparent. First, the Dirichlet tends to underpredict the purchasing rate of sole buyers, though not as severely as in the brand choice context. Second, the across-store variation on all measures except penetration is underestimated, although unlike the brand case this does not translate into a clear tendency to underpredict loyalty to large stores and overpredict loyalty to small stores.

These three main areas of discrepancy also applied to the brand choice context. Thus the similarity between store choice and brand choice extends from general conformity to the Dirichlet to the actual pattern of **deviation** from the model.

In view of the differences that exist between choosing brands and choosing stores (e.g., unlike brands, stores are locationally dispersed and many different product purchases are typically associated with each), it is far from inevitable that the same model should apply to each context. That the Dirichlet **does** hold for stores consequently raises questions as to which **other** choice contexts might be well described by the model. This issue is considered further in Chapter 14.

3. The overall level of store loyalty is much the same within different product fields and within different regions.

For instance, for the average store the w, w/wp and bs/b values hardly vary by market. And the D coefficients are virtually identical in each market. Such similarity across product fields need not be surprising since the store choice set remains the same (within each region). However, the further similarity across regions (where the choice set **does** vary) suggests that the level of loyalty at hand may be a characteristic of shopping behaviour in general rather than a manifestation of each product/region combination in question.

Despite the across-market affinities in the **overall** level of store loyalty, the precise pattern for individual stores, measured relative to the Dirichlet norms, often varies across product fields and/or regions. Thus a store may receive higher-than-predicted loyalty for one product, and lower-than-predicted loyalty for another (undoubtedly due in part to measurement errors). The main exception concerns Store X, which consistently enjoys a high loyalty rating (on several measures) in each product field.

Chapter 8

A COMPARISON OF BRAND LOYALTY AND STORE LOYALTY

Contents:

8.1. INTRODUCTION.

The previous two chapters have indicated that the patterns of brand and store choice are similar to the extent that they follow the same regularities and are predictable by the same model. However, scope remains for the two contexts to differ in terms of the numerical values - and hence loyalty - involved. This chapter outlines a methodology for comparing brand and store loyalty, and reports results from its application to all three product fields in Region I.

The brand and store choice sets analysed are narrower than in the preceding two chapters (excepting brands of automatic washing powder). Specifically, all composite categories (Other Brands, Other Multiples, and Miscellaneous) have been excluded from consideration to avoid their "distorting" influence on the overall pattern of behaviour. Brand B5 is also excluded by virtue of its particularly low market share (implying a relatively small sample size) and atypical buying pattern (which may reflect the first point). The Dirichlet has been recalibrated to each market so that the S parameter (on which all predictions depend) relates specifically to the new choice sets. (None of the brands and stores involved has been excluded from the calculation of this parameter.) In view of alterations to the choice sets studied, a brief reassessment of the Dirichlet's fit is provided.

The remainder of this chapter is arranged, and can be summarized, under the following headings:

8.2. Background.

The "balance of power" between manufacturer and retailer is closely tied to the brand-store loyalty issue, although only recently have relevant research findings emerged.

8.3. A Simple Measure of Loyalty.

Loyalty can profitably be expressed in terms of the balance between penetration and purchase frequency.

8.4. The Problem.

For any given brand, how can we estimate how a store of similar market share would differ in terms of penetration and purchase frequency?

8.5. Methodology.

One answer is to calibrate the Dirichlet model to the store choice context and compare its predictions with the observed values for brands.

8.6. Results.

Store loyalty generally exceeds brand loyalty, although the discrepancy is not great and varies by product field.

8.7. A Composite Measure of Loyalty.

The entire loyalty structure of a given market can be expressed by the Dirichlet parameter S, loyalty differences between brands and between stores being accounted for by market share.

8.8. Conclusions.

The brand-store loyalty disparity possibly reflects disparities in the availability of choice alternatives, in the differentiation between these alternatives, and in "catchment areas" (i.e. the number of potential buyers).

8.2. BACKGROUND.

The importance of comparing brand and store loyalty was noted in Chapter 1 (Section 1.6). Knowledge of their relative extents would help establish the dependence of manufacturers on the channel of distribution represented by any given grocery chain, and the importance to retailers of stocking particular brands. For instance, if brand loyalty exceeds store loyalty, the retailer is pressured to stock the brand in question to discourage customers from shopping elsewhere for the item (and any associated products). Conversely, if store loyalty exceeds brand loyalty, retailers have more power to dictate terms to manufacturers.

Strictly, the issue needs to be approached through comparing brand loyalty within individual stores and store loyalty for individual brands to take account of any brand-store interaction that should arise. But investigation along these lines raises methodological complexities (regarding how account can be taken of the crucial market share factor), and is postponed until Chapter 13. In the meantime, the current analysis provides an initial insight into what the balance of power is, or should be, between manufacturer and retailer.

As noted in Chapter 5, information on the relative extents of brand and store loyalty has until recently not been forthcoming from the marketing literature. This is in part due to the traditional emphasis on **brand** choice in studies of buyer behaviour, reflecting the one-time domination of the manufacturers in terms of advertising, merchandising and market research. Other factors include the diversity of loyalty measures employed (precluding meaningful comparison between the two contexts), and the fact that this question of comparison has rarely been the subject of focused enquiry. The treatments of brand and store loyalty together which did surface generally examined the two behaviours in terms of correlation rather than extent. Most report a positive association (e.g. Rao, 1969; Seggev, 1970), particularly in product fields with high private-label share (Cunningham, 1961; Carman, 1970; Jephcott, 1972).

Several recent studies, based on the NBD and Dirichlet models, have contributed more relevantly to the issue at hand (Jephcott, 1972; Wrigley, 1980; Wrigley and Dunn, 1984b,c). Not only do they support the findings of Chapters 6 and 7 - that the same regularities apply to both brand choice and store choice contexts - but some of the data reported point to a degree of similarity, on certain measures, between the numerical values involved in these two choice situations. However, the fit of the models being of primary concern, the numerical comparison was rarely a direct one, and no account was taken of brand and store market shares on which the level of loyalty is known to depend. The likeness indentified between the two choice contexts is summarized by Wrigley and Dunn (1984c, p. 1234): "the levels both of brand loyalty and of store loyalty, as they have been defined here, are extremely low across a range of product fields, brands, and stores."

If this is so, it would be appropriate to examine **which** loyalty is lower, on which measures the discrepancy is most marked, and whether the loyalty balance differs across product fields and specific brands or stores. A major purpose of this chapter is to describe a methodology for dealing with such questions.

8.3. A SIMPLE MEASURE OF LOYALTY.

This section introduces a straightforward measure of loyalty which will be used in initial comparison of brands and stores.

At its simplest level, the buying pattern for a brand or store can be expressed in terms of the number and purchase frequency of its buyers. This is sometimes referred to as the "sales equation":

$$\text{purchases}/100 = \mathbf{b} \times \mathbf{w}$$

In Table 8.1 brands and stores with various shares of the automatic washing powder market are described in terms of these two measures. The figures conform to what are now two well-established regularities (see e.g. Chapters 6 and 7). First, average purchase frequency varies much less between brands and between stores than does penetration. In the brand context for instance w varies between 4.7 and 5.7 while b ranges from 18 to 48 (a difference factor of 2.7). Second, average purchase frequency tends to decrease as penetration falls (the "double jeopardy" effect), such that the expression (1-b)w remains roughly constant across brands and across stores. (The main

TABLE 8.1

Market Share (MS), Penetration (b), and Average Purchase Frequency (w) of Brands and Stores. Automatic Washing Powder, Region I.

	MS (%)	b (%)	w
BRANDS			
Brand A1	31	48	5.7
Brand A2	22	34	5.5
Brand A3	15	28	4.7
Brand A4	14	24	5.3
Brand A5	10	18	4.8
Average	18	30	5.2
STORES			
Store X	36	43	7.2
Store Y	21	30	6.2
Store Z	9	14	5.5
Average	22	29	6.3

exception apparently concerns Brand A3, which is bought less frequently than two brands of lower penetration.) The important consequence of this second regularity is that average purchase frequency can not be deemed "high" or "low" without reference to penetration, and vice versa.

Despite the general patterns, the balance between b and w can differ across brands and across stores. For instance, Brand A3 and Brand A4 possess quite similar market shares (and hence sales levels), but the latter brand has fewer buyers, and these purchase the brand more frequently. How should such differences be interpreted? One way is to take penetration as an index of "popularity" and average purchase frequency as a measure of repeat buying. However, it is proposed that b and w can also be interpreted as measures of **switching** and **loyalty** respectively. Justification for such interpretation is most readily apparent when b and w are allowed to assume their extreme values, as illustrated in Table 8.2.

TABLE 8.2

Penetration (b) and Average Purchase Frequency (w): Extreme Values for Two Hypothetical Brands.

	MS (%)	b (%)	w
Total Product Class	100	80	10
Brand A (max. switching)	20	80	2
Brand B (max. loyalty)	20	16	10

For each brand in a given market, the maximum value b can assume (see Brand A) is equal to product penetration (with w falling accordingly). At this level switching is at its extreme since all product buyers buy every brand, distributing their purchases directly in line with market shares. Each consumer is in effect a "microcosm" of the market as a whole. This is the minimum-loyalty/ maximum-switching situation.

The other extreme occurs where, for each brand in the market, w takes a value (see Brand B) equal to the average product purchasing rate (with b falling accordingly). At this level there can be no brand switching since brand buying equates with product buying: consumers are divided into discrete groups according to the brand purchased. This is the maximum-loyalty/minimum-switching situation.

These extreme cases are expressed algebraically as follows:

Minimum loyalty:	$b = B$
	$w = MS.W$
Maximum loyalty:	$b = MS.B$
	$w = W$

where MS = market share = $(b.w)/(B.W)$
b = brand penetration.
w = average purchase frequency of the brand per brand buyer.
B = product penetration.
W = average purchase frequency of the product per product buyer.
$b <= B$
$w >= 1$

A further justification for employing the b-w combination as a loyalty measure derives from its function as proxy for several other measures of loyalty. Ehrenberg (1972) showed long ago that the degree and rate of repeat buying depend critically on w (and to a lesser extent b), and more recent work by Goodhardt et al. (1984) shows that the general balance between b and w within a given product field determines for predictive purposes the whole loyalty structure of the market.

To summarize, penetration (b) and average purchase frequency (w) are generally both positively related to market share. But the balance between the two measures can vary across brands and across stores, and may be interpreted as a point on an axis between "loyalty" and "switching". Specifically, a brand with a high average purchase frequency relative to penetration tends to loyalty rather than switching. It will be apparent in a later section that the modelling approach adopted in this chapter provides theoretical norms which allow identification of what is a "high" or "low" average purchase frequency.

8.4. THE PROBLEM.

The balance between penetration and average purchase frequency provides an initial basis on which to compare brand and store loyalty. Since both measures are positively related to market share, comparison is most meaningful between categories of similar size. Possible such pairings in Table 8.1 are Brand-A2/Store-Y and Brand-A5/Store-Z. In both these cases, loyalty (as defined above) to the store exceeds that to the brand. Comparison is not so straightforward for Brands A1, A3 and A4, for which no stores of corresponding market share are available. And conversely for Store X.

The problem at hand can be summarized as follows: for a brand (or store) of any given market share, how can we estimate what the penetration and average purchase frequency **would be** for a store (or brand) of similar market share?

8.5. METHODOLOGY.

The proposed methodology centres on the Dirichlet model, the form of which was detailed in Chapter 2. For present purposes, three crucial features of the model should be recalled. First, combining purchase incidence and brand choice into one model, the Dirichlet describes and integrates a wide range of empirical regularities concerning b, w, wp, bs/b, duplication, and other variables. Second, the model is very parsimonious, requiring only market shares as brand-specific input, and three parameters. Third, recent studies (see Chapter 4) have demonstrated that the model applies also to the context of store choice.

The Dirichlet thus enables comparison of the observed values of b, w and other measures for any given brand with the expected values for a hypothetical store of corresponding market share. For instance, Brand A2 has a market share of 22%, a penetration of 34% and a purchase frequency of 5.5; the Dirichlet, calibrated to the store choice context of the same product field, could predict what the penetration and purchase frequency **would be** for a store with exactly the same market share. Conversely, it is possible to compare the observed pattern for a real store with the predicted pattern for a hypothetical brand with the same market share. The crucial point of the methodology is that it enables comparison of brands and stores on equal terms (i.e. where market share, on which loyalty is known to depend, is the same in each context).

The first step in applying this methodology is to calibrate the Dirichlet to the choice context where hypothetical categories are required. This involves estimating the model's three parameters which, between them, summarize all that is required in terms of market structure. Subsequently only market shares are required to activate the model.

8.6. RESULTS.

The illustrations mainly cover automatic washing powder in Region I, although results are also reported in summary form for tea bags and instant coffee (full data being provided in Appendix 3). Conclusions from all three product fields are drawn together towards the end of this section.

8.6.1. Penetration and Purchase Frequency.

The validity of the methodology depends on that of the model. It would be appropriate therefore to first demonstrate the predictive accuracy of the Dirichlet. (Although the Dirichlet's validity was established in Chapters 6 and 7, results are again presented in this area as the current reduced-choice-set markets allow for an improved fit, especially in the store choice context.)

TABLE 8.3

Penetration (b) and Average Purchase Frequency (w): Observed (O) and Dirichlet (D). Automatic Washing Powder, Region I.

	MS (%)	b (%)		w	
		O	D	O	D
BRANDS					
Brand A1	31	48	46	5.7	5.9
Brand A2	22	34	36	5.5	5.3
Brand A3	15	28	27	4.7	4.9
Brand A4	14	24	26	5.3	4.8
Brand A5	10	18	19	4.8	4.6
Average	18	30	31	5.2	5.1
STORES					
Store X	36	43	44	7.2	7.1
Store Y	21	30	30	6.2	6.3
Store Z	9	14	13	5.5	5.7
Average	22	29	29	6.3	6.4

Table 8.3 sets out the observed and predicted values of b and w previously reported for the automatic washing powder market together with the corresponding values predicted by the Dirichlet. The main discrepancy concerns Brand A4, which is bought somewhat more frequently than expected.

(From the theoretical norms provided by the model, it is thus apparent that the dissimilarity noted earlier between Brands A3 and A4 derives from "irregular" purchasing behaviour for Brand A4 rather than for Brand A3.) Otherwise the agreement is very close for both brands and stores: the average discrepancy is only about 1.3 for penetration and 0.2 for purchase frequency. This indicates that confidence can be placed in the Dirichlet's estimates of behaviour for hypothetical brands or stores.

TABLE 8.4

Penetration (b) and Average Purchase Frequency (w): Observed (O) and Dirichlet (D) for Real Brands/Stores and Hypothetical Stores/Brands. Automatic Washing Powder, Region I.

	MS (%)	b (%)		w	
		Brand O	Store D	Brand O	Store D
BRANDS					
Brand A1	31	48	40	5.7	6.8
Brand A2	22	34	30	5.5	6.3
Brand A3	15	28	22	4.7	6.0
Brand A4	14	24	21	5.3	6.0
Brand A5	10	18	15	4.8	5.8
Average	18	30	26	5.2	6.2
		Store O	Brand D	Store O	Brand D
STORES					
Store X	36	43	51	7.2	6.2
Store Y	21	30	36	6.2	5.3
Store Z	9	14	17	5.5	4.5
Average	22	29	35	6.3	5.3

Proceeding, then, with the proposed methodology, Table 8.4 presents observed b and w values for real brands/stores next to theoretical b an w values for hypothetical stores/brands of corresponding market share. For example, while Brand A1, with a market share of 31%, is bought by 48% of the population on average 5.7 times over the period, a store of similar size can be expected under the Dirichlet model to be patronized by 40% of the population, buying on average 6.8 times; and while Store X, with a market share of 36%, has a penetration of 43% and an average purchase frequency of 7.2, a brand of similar share would, according to the Dirichlet, have a penetration of 51% and a purchase frequency of 6.2. These disparities are representative of the overall pattern: for any given market share, a store, relative to a brand, has fewer buyers, but these buy more frequently. On this basis, for this product field, store loyalty is greater than brand loyalty.

8.6.2. Other Measures of Buyer Behaviour.

The analysis can be extended to other aspects of buyer behaviour. Again the predictive accuracy of the Dirichlet (on which the validity of the methodology depends) is checked before proceeding with the brand-store comparison. Table 8.5 presents observed and predicted figures for four additional measures concerning the product-buying rate (wp), the concentration of total product purchases in one brand or store (w/wp), and sole buyers (bs/b and ws). The agreement is very close, exceptions being the proportion of store sole buyers (bs/b), which tends to be overpredicted, and the average purchase frequency of brand sole buyers (ws), which is consistently underpredicted. Estimates for hypothetical categories in these two areas must accordingly be interpreted with caution.

TABLE 8.5

Four Measures of Buyer Behaviour: Observed (O) and Dirichlet (D). Automatic Washing Powder, Region I.

	wp		w/wp (%)		bs/b (%)		ws	
	O	D	O	D	O	D	O	D
BRANDS								
Brand A1	12.2	13.2	46	44	28	20	7.4	4.7
Brand A2	13.7	13.7	40	38	18	16	5.3	4.1
Brand A3	14.1	14.1	33	35	12	14	5.8	3.8
Brand A4	14.6	14.1	36	34	13	14	7.3	3.7
Brand A5	14.8	14.4	32	32	12	13	4.6	3.5
Average	13.9	13.9	38	37	17	15	6.1	4.0
STORES								
Store X	12.2	12.6	59	56	30	35	8.1	7.1
Store Y	12.7	13.2	49	48	24	28	6.7	6.3
Store Z	15.9	13.7	35	42	10	23	5.3	5.7
Average	13.6	13.2	48	49	21	29	6.7	6.4

Table 8.6 compares real and hypothetical brands and stores of similar market share in terms of these four measures. As an example, Brand A2 buyers devote 40% of their total product purchases to that brand, and 18% of these buyers buy only that brand, at an average rate of 5.3 times during the period. The model predicts that a store of similar market size would receive more loyalty on all these measures, the values being 48%, 28%, and 6.4 respectively. In terms of the concentration of purchases (w/wp) and the proportion of sole buyers (bs/b), loyalty to stores again consistently exceeds that to brands, lending support to the argument that the balance between b and w can act as proxy for other measures of loyalty.

TABLE 8.6

Four Measures of Buyer Behaviour:
Observed (O) and Dirichlet (D)
for Real Brands/Stores and Hypothetical Stores/Brands.
Automatic Washing Powder, Region I.

	wp		w/wp (%)		bs/b (%)		ws	
	Brd	**Str**	**Brd**	**Str**	**Brd**	**Str**	**Brd**	**Str**
BRANDS	**O**	**D**	**O**	**D**	**O**	**D**	**O**	**D**
Brand A1	12.2	12.8	46	53	28	33	7.4	6.8
Brand A2	13.7	13.1	40	48	18	28	5.3	6.4
Brand A3	14.1	13.4	33	45	12	25	5.8	6.0
Brand A4	14.6	13.4	36	45	13	25	7.3	6.0
Brand A5	14.8	13.6	32	43	12	23	4.6	5.8
Average	13.9	13.3	38	47	17	27	6.1	6.2
	Str	**Brd**	**Str**	**Brd**	**Str**	**Brd**	**Str**	**Brd**
STORES	**O**	**D**	**O**	**D**	**O**	**D**	**O**	**D**
Store X	12.2	13.0	59	48	30	23	8.1	5.0
Store Y	12.7	13.7	49	38	24	16	6.7	4.1
Store Z	15.9	14.5	35	31	10	12	5.3	3.5
Average	13.6	13.7	48	39	21	17	6.7	4.2

Notes:
- Brd = Brand; Str = Store.

Regarding the purchase frequency of sole buyers (ws), comparison of real brands with hypothetical stores (the converse comparison being precluded by the poor fit of the model for brands in this area) reveals no consistent pattern of discrepancy. From the theoretical norms provided in Table 8.5 it is apparent that this similarity is attributable to particularly high sole-buying rates for brands rather than low rates for stores.

8.6.3. Results from Other Product Fields.

Extending the preceding analyses to the product fields tea bags and instant coffee yields broadly similar results. These are reported in Tables A3.5-A3.12, and summarized in average terms in Tables 8.7 and 8.8 below. First, again the Dirichlet successfully describes the patterns of both brand and store choice on all measures except the purchase frequency of sole buyers which, as before, is underpredicted. The only other area of substantial discrepancy concerns one brand (B3) in the tea bag market for which loyalty is lower than expected on all measures. Second, again store loyalty consistently exceeds brand loyalty. It is worth noting however that the discrepancy is very small in the instant coffee market.

TABLE 8.7

Five Measures of Buyer Behaviour: Observed (O) and Dirichlet (D) Values for the Average Brand and Store.

	b (%)		w		w/wp (%)		bs/b. (%)		ws	
AVE BRAND	**O**	**D**	**O**	**D**	**O**	**D**	**O**	**D**	**O**	**D**
A.I	30	31	5.2	5.1	38	37	17	15	6.1	4.0
B.I	37	36	5.5	5.7	40	42	17	19	5.6	4.8
C.I	35	35	6.0	6.0	45	44	20	19	8.0	6.3
AVE STORE	**O**	**D**	**O**	**D**	**O**	**D**	**O**	**D**	**O**	**D**
A.I	29	29	6.3	6.4	48	49	21	29	6.7	6.4
B.I	28	28	6.4	6.3	48	47	24	26	7.0	6.3
C.I	33	33	6.5	6.5	47	48	22	25	7.5	7.2

Notes:
- A.I = Automatc, Rgn I.
- B.I = Tea Bags, Rgn I.
- C.I = Inst Cof, Rgn I.

TABLE 8.8

Five Measures of Buyer Behaviour:
Average Observed (O) and Dirichlet (D) Values
for Real Brands/Stores and Hypothetical Stores/Brands.

	b % O	b % D	w O	w D	w/wp % O	w/wp % D	bs/b % O	bs/b % D	ws O	ws D
AVE BRAND	**Brd**	**Str**	**Brd**	**Str**	**Brd**	**Str**	**Brd**	**Str**	**Brd**	**Str**
A.I	30	26	5.2	6.2	38	47	17	27	6.1	6.2
B.I	37	32	5.5	6.5	40	49	17	28	5.6	6.5
C.I	35	33	6.0	6.5	45	48	20	24	8.0	7.2
AVE STORE	**Str**	**Brd**	**Str**	**Brd**	**Str**	**Brd**	**Str**	**Brd**	**Str**	**Brd**
A.I	29	35	6.3	5.3	48	39	21	17	6.7	4.2
B.I	28	33	6.4	5.5	48	39	24	17	7.0	4.6
C.I	33	36	6.5	6.0	47	44	22	19	7.5	6.3

8.6.4. Main observations.

Four main lessons can be drawn from the results for the three product fields. (The first three points draw together observations previously made in Chapters 6 and 7.)

1. Patterns of both brand and store choice - and hence loyalty - are similar to the extent that they show the same trends and regularities. In each store choice context, as for brand choice, average purchase frequency (w) varies much less across stores than does penetration (b), but tends to decrease as penetration falls; average purchase frequency of the product class per buyer at a given store (wp) is much larger than w, and tends to increase slightly as store share decreases (implying that buyers at relatively small stores are relatively heavy buyers of the product class); and the proportion of sole buyers (bs/b) tends to fall with decreasing store share.

2. Neither brand nor store loyalty is strongly in evidence at the aggregate level. For example, in the case of store choice for automatic washing powder - the context in which loyalty is most marked in the present study - the average buyer of a product at a store buys it there infrequently (about 6 times a year), these purchases

account for a minority of total product purchases (i.e. at any store), and only a small proportion (about one fifth) of a store's buyers purchase the product at only that store in a year.

3. The extent of brand and store loyalty - on a variety of measures - can be accurately predicted by the Dirichlet using only market shares as brand-specific or store-specific input. The main exception concerns ws, the average purchase frequency of sole buyers, for which values are consistently and substantially underpredicted in the brand choice context of all three product fields. Consequently estimates of ws for hypothetical brands can not be treated as realistic expectations.

4. Comparing observed loyalty to brands/stores with the expected loyalty to hypothetical stores/brands of corresponding market share indicates that store loyalty is more pronounced than brand loyalty. This is in general evidenced in all three product fields, for all brands and stores, and for all measures except ws in the instant coffee market. Indeed, exluding this measure, there are only two individual cases (Store Z, automatic washing powder; Store Y, instant coffee) where the reverse obtains, both concerning the proportion of sole buyers. The generally good fit of the Dirichlet implies that there is no measure of loyalty, apart from ws, and no brand or store within a given product field, apart from Brand B3, for which the brand-store discrepancy is especially great or small.

Although store loyalty consistently exceeds brand loyalty, the discrepancy is not great and varies by product field. For instance, in the automatic washing powder market, where the disparity is **widest**, the average store accounts for about 50% of its buyers' total purchases, and the average brand about 40%: while discrepant, these values are of the same order. In the instant coffee market, the average brand and store differ only by about 3% in this respect, and are equally similar on other measures.

8.7. A COMPOSITE MEASURE OF LOYALTY.

This section introduces a measure capable of summarizing the various aspects of loyalty considered in this chapter.

It has been seen that, within a given product field, the Dirichlet is able to provide an accurate description of the loyalty pattern for brands or stores using only market shares as brand-specific or store-specific input. Consequently the degree of loyalty shown to a brand or store can reasonably be interpreted as a **characterization of the product class**, not of the individual brand or store concerned: apparent loyalty differences between particular brands or particular stores can generally be accounted for solely in terms of market share.

The Dirichlet model encompasses this product class characteristic through its three structural parameters M, K and S. The first of these (M) simply refers to the size of the market in question (in terms of product purchases per capita); the latter two reflect two aspects of consumer diversity, namely how much people differ from each other in (i) their product-purchasing rates and (ii) their brand choice preferences.

In terms of market structure, as modelled by the Dirichlet, these are the only parameters that vary (or may vary) across product fields. But importantly, only the S parameter is determined separately for the brand choice and store choice contexts within a given product field. Consequently this parameter can on its own summarize the difference in loyalty structure between these two contexts within a specified market.

In everyday terms, the S parameter reflects the extent of brand (or store) switching, and is estimated from the overall balance between b and w **relative to** the balance between B and W (the product penetration and purchase frequency). A detailed account of the calculation procedure is provided by Goodhardt et al. (1984), and a step-by-step guide is given by Ehrenberg (1988, Appendix C). For practical purposes the important point is that **all** measures predicted by the Dirichlet - not only those considered in this chapter, but others such as the proportion of heavy buyers, and the duplication of purchase between brands or stores - depend on this parameter. It can thus be interpreted as a proxy for all these measures for the purpose of comparing the overall degree of brand and store loyalty within a given product field.

TABLE 8.9

S Parameter Values for Brand Choice and Store Choice Contexts. Region I.

	Brand Choice	Store Choice
Automatc Rgn I	1.14	.59
Tea Bags Rgn I	1.03	.63
Inst Cof Rgn I	.78	.61

TABLE 8.10

Dirichlet Predictions for a Brand (or Store) with a 20% Market Share for Various S Parameter Values.

S	b (%)	w	wp	w/wp (%)	bs/b (%)	ws
.0	16	10.8	10.8	100	100	10.8
.2	21	8.3	12.2	68	56	9.0
.4	25	7.0	12.8	55	37	7.5
.6	28	6.2	13.2	47	27	6.2
.8	30	5.7	13.5	42	21	5.2
1.0	32	5.4	13.7	39	18	4.5
1.2	34	5.1	13.8	37	15	3.9
1.4	36	4.9	14.0	35	13	3.4
1.6	37	4.7	14.0	34	12	3.1
1.8	38	4.6	14.1	33	11	2.8
2.0	39	4.4	14.2	31	10	2.5
50.0	55	3.2	14.3	22	5	1.2

The S parameters determined for the six choice contexts treated in this study are presented in Table 8.9. Higher S values imply lower loyalty (or greater switching). However, these figures can not be directly related to behaviour: to help with interpretation, Table 8.10 illustrates, for a brand (or store) with a 20% share of the automatic washing powder market, how different S values translate themselves into predictions on the more direct measures of loyalty. It is apparent that the Dirichlet's sensitivity to S increases as the value of the parameter falls. Also, it can be seen from the table that where S is zero, it expresses the maximum-loyalty/minimum-switching case of Brand B in Table 8.2 (although the actual numbers involved are different); conversely, where S equals infinity, it represents the case of Brand A in Table 8.2.

The S values in Table 8.9 reflect the earlier observation that the brand/store loyalty discrepancy is greatest for automatic washing powder and smallest for instant coffee. Such cross-product discrepancies appear to derive more from variation in brand loyalty structure than from variation in store loyalty structure. The S parameter is indeed remarkably similar in the store choice context of each product field. As emphasized above, S is only one of three parameters determining market structure (regarding the Dirichlet); so such constancy does not necessarily imply similarity in the numerical values associated with the more direct measures of loyalty in each context. However, the influence of cross-product variation in the M and K parameters is in this case small, as illustrated in Table 8.11 by the Dirichlet's predictions for a hypothetical store with a 20% share of each market. It thus appears that store loyalty is similar in degree for each product field analysed.

TABLE 8.11

Dirichlet Predictions for a Hypothetical Store with a 20% Market Share in Three Product Fields, Region I.

	S	b (%)	w	wp	w/wp (%)	bs/b (%)	ws
Automatc	**.59**	28	6.3	13.2	47	27	6.3
Tea Bags	**.63**	29	6.3	13.6	46	26	6.2
Inst Cof	**.61**	33	6.4	13.5	47	23	7.2

This point is illustrated also by the duplication coefficients reported in Chapters 6 and 7. As recalled by Table 8.12, within each region the D values vary slightly from product to product in the brand choice context, but are virtually constant in the case of store choice.

In view of the power of the S parameter as a summary measure of loyalty structure, Professor Gerald Goodhardt has proposed a Loyalty Index "L", defined as 100/(1+S), on which higher values imply higher loyalty. The L indices calculated for the three markets studied above, and for the three Region II markets (where the choice sets remain the same as in previous chapters), are specified in Table 8.13. These "translations" of S make clear the discrepancy between brand loyalty and store loyalty, and also reflect the similarity in store loyalty across product fields within each region.

TABLE 8.12

Duplication Coefficients in the Brand Choice and Store Choice Contexts.

	Brand Choice	Store Choice
Automatc Rgn I	1.02	.93
Tea Bags Rgn I	1.06	.93
Inst Cof Rgn I	.92	.92
Automatc Rgn II	1.00	.88
Tea Bags Rgn II	1.07	.90
Inst Cof Rgn II	.94	.87

Notes:
- These D coefficients are calculated using relative penetration, i.e. the penetration of the brand or store among buyers of the product class.

TABLE 8.13

The Loyalty Index "L" in the Brand Choice and Store Choice Contexts.

	Brand Choice	Store Choice
Automatc Rgn I	45	63
Tea Bags Rgn I	49	61
Inst Cof Rgn I	56	62
Automatc Rgn II	47	57
Tea Bags Rgn II	40	55
Inst Cof Rgn II	51	57

Notes:
- $L = 100/(1+S)$.
- In Region II, all five brand or store categories are considered within each market in determining the S parameter. And for consistency, no brands or stores are excluded from the calculation of the S parameter underlying the L indices shown.

8.8. CONCLUSIONS.

This chapter has outlined a methodology for comparing brand loyalty and store loyalty, the main strength of which is the ability to "take out" the influence of market share on the degree of loyalty received. The results from applying this methodology lead to four main conclusions.

1. Store loyalty generally exceeds brand loyalty, although the discrepancy is not great and varies by product field.

The imbalance between the two loyalties emerges from all three markets studied, and on all measures except the purchase frequency of sole buyers in the instant coffee market. Within each market, the discrepancy is also a "regular" one across measures, brands and stores: the generally good fit of the Dirichlet implies that there is no measure of loyalty, apart from ws, and no brand or store (Brand B3 excepted) for which the brand-store disparity is especially large or small.

That store loyalty should exceed brand loyalty seems intuitively plausible. First, brand alternatives are usually available side-by-side, whereas store alternatives tend to be geographically dispersed with all the time, stress and financial costs this may imply. Second, brand alternatives generally imply differences in product quality (whether real or perceived) whereas store alternatives do not (Brand A1 being the same in Store X as in Store Y). (On this latter point it should be noted that whether loyalty is encouraged by complementarity or substitutability is still a controversial issue.) Third, the "catchment area" (i.e. the number of potential buyers) of store chains is inevitably smaller than that of widely distributed brands, which would tend to depress the penetration level relative to the frequency of purchase (and thereby impact on all other aspects of loyalty, given the strong relationships between different measures).

However, in view of such differences between the two choice contexts, it is perhaps surprising that brand and store loyalty should be **so similar**. In the instant coffee market a discrepancy is only just apparent. In the case of automatic washing powder, where the discrepancy is **widest**, the figures are still of the same order: for instance, the average w/wp value is 50% for stores and 40% for brands. Such results suggest that the "imbalance of power" between manufacturer and retailer may not be as great as is popularly assumed.

2. Brand loyalty varies more than store loyalty across product fields.

This point is illustrated by both the product-field S parameters and Duplication coefficients which, while varying slightly across markets in the brand choice context, were virtually constant in the case of stores.

Such a pattern can reasonably be explained in terms of the choice set which (in this study) differs across product fields for brands but not for stores.

3. Both brand loyalty and store loyalty are product field characteristics.

The generally good fit of the Dirichlet in each choice context implies that the degree of loyalty shown to a brand or store can in large part be interpreted as a **characterization of the product field**, not of the individual brand or store concerned: apparent loyalty differences between brands and between stores can generally be accounted for solely in terms of market share differences.

4. The difference between brand loyalty and store loyalty on all measures within a given market can be summarized by the difference between the S parameter of each context.

The brand loyalty and store loyalty "product characterization" just mentioned can usefully be summarized by the S parameter for the purpose of inter-context comparison. (The S parameter can perform this function because, of the three Dirichlet parameters, only S varies across choice contexts within the same product field; indeed, if flavour choice, pack-size choice, etc. conform to the Dirichlet model, this summary measure could be extended to these contexts also.) As all the direct measures of behaviour relate to S (under the Dirichlet model), the parameters of the two choice contexts effectively "contain" all aspects of brand or store loyalty, greatly reducing the amount of information that need be compared.

It is a telling comment on the regularity of consumer behaviour in the aggregate that comparison of the brand loyalty and store loyalty structures within a product field can be reduced to the comparison of just two figures.

PART IV

PATTERNS OF CHOICE: THE SUBMARKET LEVEL

Chapter 9

THE INTERDEPENDENCE OF BRAND CHOICE AND STORE CHOICE

Contents:

9.1. INTRODUCTION.

In this Part IV of the thesis, analysis proceeds at a deeper level of disaggregation than in Chapters 6 to 8. Concern centres on brand choice **within individual stores** and store choice **for individual brands**, the object being to establish how these two central components of buyer behaviour - brand and store choice - interact.

As emphasized in Chapter 1, brand-store interaction is a multi-faceted and complex matter. This chapter deals with its most straightforward manifestation. Specifically, the issue at hand is how brand choice probabilities vary across stores, and correspondingly how store choice probablities vary across brands. Such variation is defined here as **interdependence** between brand and store choice. Where it is strong, the probability of choosing a given brand will differ substantially from store to store, and that of choosing a given store will differ markedly according to the brand in question.

It should be noted that "choice probability" is measured for **all** the buyers at a store or of a brand - in terms of market share (or more precisely brand or store share of the submarket in question) and penetration. For instance, brand shares within Store X are compared with brand shares within Store Y. Only in Chapter 13 is the across-store and across-brand stability of choice probabilities assessed for specific groups of consumers (e.g. the buyers of Brand A1 at Store X) as they move from store to store and from brand to brand.

Market share and penetration represent two alternative views of choice probability. While the first measures the overall probability of choosing alternative Q on each purchase occasion, the second measures the probability of choosing Q at least once over the time period. However, as the two indices have generally been found to be closely correlated (see e.g. Section 6.2) it would be surprising if they led to radically different pictures of brand-store interdependence.

Analyses of brand-store interdependence (in the present sense) are commonplace in industry. Generally known as "source of trade" analyses, they are valued as indices of the competitive performance of the brand or store in question within different submarkets. The issue has received little attention in the marketing literature, although two recent studies report some results of relevance. First, Kau (1981) indicated that the observed penetration of brand-store combinations (regarding instant coffee) tended to agree quite closely with a value predicted from the penetration of the brand and store in the market as a whole, the most marked exceptions concerning a private label and a brand with limited distribution. The penetration figures presented probably concealed some interdependence due to rounding and their low absolute value. Wrigley and Dunn's (1984c) results (concerning baked beans and margarine) pointed to stronger interaction, the authors concluding that "brand penetrations [among product buyers at the store] do in fact vary markedly between individual stores" (p. 1234). As in Kau's study, a particularly high degree of variation occurred for private label penetrations.

Section 9.2 of this chapter accords broadly with Wrigley and Dunn's approach in examining the stability of brand (or store) choice probabilities across stores (or brands). Section 9.3 adopts Kau's methodology in comparing the probability of choosing a particular brand-store combination with the simple non-interaction values. In each case both market shares and penetrations are considered.

9.2. THE STABILITY OF BRAND AND STORE CHOICE PROBABILITIES.

9.2.1. Market Shares.

While there exist many means of comparing choice alternatives, it is ultimately in terms of market share that the competitive standing of brands or stores is assessed. The present data indicate that competitive structure measured on this basis may vary substantially across store and brand submarkets, and may therefore differ from the overall - i.e. whole-market - context. More specifically, the following observations can be made.

(i) Brand shares vary substantially from store to store.

For instance, in the case of tea bags, Region I, the mean deviation is typically about 40% of the value of the mean (Table 9.1). And some cases of very marked variation

TABLE 9.1

Brand Shares (%) Within Individual Stores. Tea Bags, Region I.

	Brand					
	B1	**B2**	**OB**	**B3**	**B4**	**Ave**
Store X	58	18	15	7	3	
O Mltps	19	32	27	13	8	
Misclns	28	24	32	9	7	
Store Y	29	27	26	11	7	
Store Z	80	10	4	5	1	
Average	43	22	21	9	5	20
MD	21.0	6.6	9.0	2.4	2.6	8.3
MD/Ave (%)	49.0	29.5	43.5	26.7	49.2	39.6

Notes:
- E.g. Brand B1's share within Store X is 58%; within Store Y, its share is 29%.
- MD = mean deviation.

occur: in the present example, Brand B1 ranges in share from about 20% at Other Multiples to 80% at Store Z. The extreme situation, where a major brand is not stocked at all by a store, occurs in each Region II market.

(ii) The degree of brand-store interdependence varies by product field.

In terms of both mean deviation and mean deviation as a proportion of the mean, the variation in brand shares across stores is highest for tea bags and lowest for automatic washing powder in both regions (Table 9.2). Table 9.3 sets out the pattern for this latter product in Region I which, in its stability, contrasts somewhat with the tea bag data in Table 9.1. However, beyond these two extreme cases, the difference between markets is not emphatic: mean deviation is typically about a third of the mean.

TABLE 9.2

Brand Share Variation Across Stores.

Product/Region	Mean Deviation	MD/Ave (%)
Automatc Rgn I	2.9	17
Tea Bags Rgn I	8.3	40
Inst Cof Rgn I	7.1	37
Automatc Rgn II	3.7	21
Tea Bags Rgn II	7.3	36
Inst Cof Rgn II	5.9	30
Average	5.9	30

TABLE 9.3

Brand Shares (%) Within Individual Stores.
Automatic Washing Powder, Region I.

	Brand A1	A2	A3	A4	A5	Ave
Store X	36	21	15	11	12	
O Mltps	33	19	17	13	10	
Store Y	25	26	18	16	7	
Misclns	27	23	8	21	9	
Store Z	25	21	12	20	11	
Average	29	22	14	16	10	18
MD	4.4	1.9	3.3	3.3	1.5	2.9
MD/Ave %	15.0	8.7	23.4	20.5	15.9	16.7

(iii) Within a given market, the degree of brand-store interdependence varies by brand.

In Table 9.1, for example, brand share is unstable for Brand B1 but relatively constant in the case of Brand B3. In Region II Brand B3's share is again quite stable (see Table A4.5) while Brand B4's share varies substantially (from 4% to 28%).

(iv) Relative brand shares vary across stores.

Clearly, with regard to the previous observation, the across-store share variation of different brands can not be independent since within each store brand shares must total 100%. But the possibility remains that **relative** shares (i.e. share ratios) will for certain brands remain constant across stores. Such constancy would conform to an IIA (Independence from Irrelevant Alternatives) pattern **across** different choice contexts, according to which a brand with a particularly large share in one context (in a sense the "irrelevant alternative") should draw sales equally from all other brands. In Table 9.1 there is some evidence of constant brand share ratios: the share of Brand B2 is usually about 2.5 times that of Brand B3, and differs little in absolute terms from that of Other Brands; and the share of Brand B4 seems positively associated with these three brand categories. However, beyond perhaps the C2/C3 brand pair in Region I (Brand C2's share being almost exactly twice that of Brand C3 in four of the five stores - see Table A4.3) there is little further suggestion of constant brand share ratios across stores for even specific pairs of brands. In other words, brand choice probabilities vary from store to store in both absolute and relative terms.

(v) Tea bag and instant coffee brands have similar across-store share variation in each region.

Put another way, if a brand's share varies strongly from store to store in Region I, this will tend to occur also in Region II. The pattern is illustrated in Table 9.4, where variation is measured by mean deviation as a percentage of the mean. For tea bags and instant coffee, the values in both columns tend to fall together. The pattern is not reflected by the automatic washing powder markets, probably due in part to the lower absolute MD/mean values for this product. Thus certain brands, such as B4, B1 and C1, seem especially susceptible to the "store factor" with regard to their market share (i.e. regardless of the region in question).

TABLE 9.4

Brand Share Variation Across Stores:
Mean Deviation as a Percentage of the Mean
for Each Brand in Two Regions.
Brands Ranked by Region I Values.

Product	Brand	Rgn I	Rgn II
Automatc	A3	23	24
	A4	21	11
	A5	16	47
	A1	15	9
	A2	9	14
Tea Bags	B4	49	61
	B1	49	32
	OB	44	37
	B2	30	28
	B3	27	24
Inst Cof	OB	52	39
	C1	46	38
	C4	42	42
	C2	24	20
	C3	19	10

(vi) The "Other Brands" category enjoys a particularly large market share within non-supermarket stores and relatively small chains.

This is apparent at Miscellaneous stores in the tea bag and instant coffee markets in Region I (the only cases where this brand-store combination arises), where Other Brands is the largest brand category with a market share of about one third in each case. The tendency is also apparent, though less strongly, for Other Multiples in three of the four markets in which this store grouping is considered. This pattern probably reflects the wider range often offered by minor stores as a means of countering the price advantage of the supermarket chains.

(vii) Store shares vary from brand to brand.

This alternative way of examining brand-store interdependence reflects the pattern described above - and necessarily so, as implied by the simple probability equation

$$p(B|S) * p(S) = p(S|B) * p(B)$$

where p(B) and p(S) are the probabilities of choosing Brand B and Store S respectively. (This section in fact refers to **average** within-store or within-brand shares rather than p(B) or p(S) in the market as a whole, but in practice the two figures are very similar.) Thus if B's market share within S is 50% larger than its share within the market as a whole, S's share for B will also be 50% larger than its share of the market as a whole.

Table 9.5 presents store shares for tea bag brands in Region I (and corresponds therefore with Table 9.1). Again, the degree of variation is high. For instance, Store Z's market share for Brand B1 is seven times its share for Brand B4. Store Y's variation in the automatic washing powder market, Region II, is larger still, with shares ranging from 3% for Brand A5 to 39% for Brand A3 (Table A4.10). Variation of this order could well reflect gaps in distribution (i.e. a brand being unavailable at certain of a chain's outlets).

The study of store shares for individual brands differs in the present case from that of brand shares at individual stores in that the choice set (stores) is constant across product fields but varies (partially) across regions. There is little evidence however of stores having similar across-brand share variations in each product/region context. (Store Z is perhaps the only exception in this respect, having the highest MD/mean value in four of the six markets.)

TABLE 9.5

Store Shares (%) For Individual Brands. Tea Bags, Region I.

	Store					
	X	OM	Msc	Y	Z	Ave
Brand B1	47	10	12	11	21	
Brand B2	27	30	19	19	5	
O Brands	24	27	27	20	2	
Brand B3	26	30	17	19	7	
Brand B4	18	33	24	22	3	
Average	28	26	20	18	8	20
MD	7.4	6.4	4.6	2.9	5.4	5.3
MD/Ave (%)	26.2	24.6	23.0	15.8	70.5	32.0

Notes:
- E.g. Store X's share of the Brand B1 submarket is 47%; its share of the Brand B2 submarket is 27%; etc.

9.2.2. Relative Penetration.

Table 9.6 shows the penetration of tea bag brands among buyers of the product class at the five store groups in Region I. Using these **relative** penetrations implies that under conditions of brand-store independence the figures within each column should be stable; if penetrations among the population as a whole were employed the figures would tend to fall with decreasing store size.

TABLE 9.6

Brand Relative Penetrations (%) Within Individual Stores. Tea Bags, Region I.

	Brand					
	B1	**B2**	**OB**	**B3**	**B4**	Ave
Store X	68	30	32	14	9	
O Mltps	34	45	45	23	17	
Misclns	36	33	47	19	15	
Store Y	35	51	39	23	15	
Store Z	78	26	14	18	8	
Ave	50	37	35	19	13	31
MD	18.2	8.8	9.9	2.9	3.4	8.7
MD/Ave (%)	36.3	23.8	28.0	14.8	26.9	26.0

Notes:
- E.g. Brand B1's penetration among product buyers at Store X is 68%; Brand B1's penetration among product buyers at O Mltps is 34%; etc.

The degree of variation between stores is generally large, mean deviation being on average a quarter of the value of the mean. Comparable variation emerges from the other markets analysed, as summarized in Table 9.7, with the notable exception of automatic washing powder in Region I. This picture of marked interdependence between brand and store chains reflects that reported by Wrigley and Dunn (1984c) regarding brands and individual outlets.

One advantage of employing relative penetrations as opposed to market shares for present purposes is that brand values within the same store and across different stores are not inextricably related (by the constraint to add to 100%). However, as mentioned earlier, penetration is a major correlate of market share and in practice this measure generates much the same patterns as noted above for market share.

TABLE 9.7

Variation in Brand Relative Penetration Across Stores.

Product/Region	Mean Deviation	MD/Ave %
Automatc Rgn I	2.7	9
Tea Bags Rgn I	8.7	26
Inst Cof Rgn I	6.1	23
Automatc Rgn II	5.2	18
Tea Bags Rgn II	8.3	25
Inst Cof Rgn II	5.0	19
Average	6.0	20

9.3. OBSERVED VERSUS NON-INTERACTION CHOICE PROBABILITIES.

9.3.1. Market Share.

Under conditions of brand-store independence, brand shares within each store should be equal to brand shares in the market as a whole, and correspondingly for store shares. If such conditions obtain the following equation will hold

$$p(BS) = p(B) * p(S)$$

where p(BS) is the probability of buying Brand B at Store S.

It was noted earlier that the automatic washing powder market in Region I is closest to the state of brand-store independence. This is reflected in Table 9.8, where the shares of brand-store combinations within the market as a whole are compared with the theoretical "non-interaction" values derived from the above formula. The two sets of

TABLE 9.8

Market Share (%) of Brand-Store Combinations: Observed (O) and Theoretical (T). Automatic Washing Powder, Region I.

		Brand					
		A1	A2	A3	A4	A5	SC MS
Store X	O	13.1	7.5	5.4	4.0	4.4	36.7
	T	10.7	8.1	5.1	5.9	3.6	
O Mltps	O	7.6	4.4	4.0	3.0	2.3	22.9
	T	6.7	5.0	3.2	3.7	2.2	
Store Y	O	5.4	5.6	3.9	3.5	1.4	21.4
	T	6.3	4.7	3.0	3.4	2.1	
Misclns	O	2.9	2.4	0.8	2.2	0.9	10.1
	T	2.9	2.2	1.4	1.6	1.0	
Store Z	O	2.2	1.9	1.1	1.8	1.0	8.9
	T	2.6	2.0	1.3	1.4	0.9	
BC Mkt Shr		29.2	22.0	14.0	16.1	9.7	

Notes:
- BC Mkt Shr = brand share at whole-market level.
- SC MS = store share at whole-market level.

figures agree closely, with brands A1 and A4 at Store X providing the most marked discrepancy. The average difference is just 0.6 for an average market share of 4%.

TABLE 9.9

Mean Absolute Difference Between Observed (O) and Theoretical (T) (i) Market Shares and (ii) Penetrations of Brand-Store Combinations.

Product/Region	Mean Absolute Difference: Market Share	Penetration
Automatc Rgn I	0.6	0.9
Tea Bags Rgn I	1.5	2.6
Inst Cof Rgn I	1.2	2.6
Automatc Rgn II	0.9	1.7
Tea Bags Rgn II	1.7	4.0
Inst Cof Rgn II	1.5	3.1
Average	1.2	2.5

Notes:
- MAD figures include differences between observed and theoretical values where a brand is not stocked by a store.

Elsewhere the fit is poorer, indicating more marked interdependence, as summarized by Table 9.9. (The MAD figures in Region II are inflated by the absence of at least one brand-store combination in each market.) For instance, several substantial discrepancies arise in the case of tea bags, Region I, especially for Brand B1 and Other Brands (Table 9.10). Clearly, any such discrepancy must have a compensating, opposite discrepancy elsewhere: thus the apparent positive association between Store X and Brand B1, and between Store Z and Brand B1, is largely compensated by a negative association between Store X and Other Brands, and Store Z and Other Brands.

A point of interest in this particular market is the high absolute market share of the B1-X brand-store pair: one fifth of all tea bag sales in the region are accounted for by this category.

There is some evidence that the market shares of brand and store leaders are positively associated. The observed share substantially exceeds the non-interaction value in four of the five markets where the two leaders combine (see Tables A4.25-A4.30).

TABLE 9.10

Market Share (%) of Brand-Store Combinations: Observed (O) and Theoretical (T). Tea Bags, Region I.

		Brand					
		B1	**B2**	**OB**	**B3**	**B4**	SC MS
Store X	O	19.8	6.1	5.0	2.4	0.9	34.2
	T	14.5	7.7	7.2	3.1	1.7	
O Mltps	O	4.0	6.7	5.7	2.8	1.6	20.8
	T	8.8	4.7	4.4	1.9	1.0	
Misclns	O	5.0	4.3	5.6	1.6	1.2	7.7
	T	7.5	4.0	3.7	1.6	0.9	
Store Y	O	4.7	4.4	4.2	1.8	1.1	16.2
	T	6.9	3.6	3.4	1.5	0.8	
Store Z	O	8.9	1.1	0.4	0.6	0.2	11.1
	T	4.7	2.5	2.3	1.0	0.5	
BC Mkt Shr		42.5	22.5	21.0	9.2	4.9.	

Notes:
- BC Mkt Shr = brand share at whole-market level.
- SC MS = store share at whole-market level.

9.3.2. Penetration.

Similar analysis of the penetrations of brand-store combinations yields much the same pattern (see Tables A4.31-A4.36). Again, interdependence between brands and stores is apparent, and is strongest for tea bags and weakest for automatic washing powder in both regions (Table 9.9). The example shown below (Table 9.11) is that of instant coffee, Region II, which is most similar to the market analysed by Kau (1981): the product is the same, and there are again instances of limited brand availability. A higher degree of brand-store interdependence is apparent in this case than in Kau's example. (The average discrepancy here is over 3 for an average penetration of under 10.) And the marked cases of interdependence are not confined to the brands with limited distribution - see the brand-store combinations C2-Z, OB-Z, OB-Y, and C4-OM.

TABLE 9.11

Penetration (%) of Brand-Store Combinations:
Observed (O) and Theoretical (T).
Instant Coffee, Region II.

		Brand					
		C2	OB	C1	C3	C4	SC b
Store V	O	24.4	19.2	0.0	0.0	2.3	37.0
	T	21.0	17.5	15.0	9.2	3.0	
O Mltps	O	21.1	12.1	14.3	9.8	1.3	39.9
	T	22.6	18.9	16.2	9.9	3.2	
Store Z	O	15.8	6.7	18.0	7.9	2.0	35.3
	T	20.0	16.7	14.3	8.8	2.9	
Store W	O	12.0	9.0	5.9	6.1	1.7	24.4
	T	13.8	11.6	9.9	6.1	2.0	
Store Y	O	11.3	5.3	7.4	5.3	2.4	21.1
	T	11.9	10.0	8.6	5.2	1.7	
BC b		56.7	47.3	40.6	24.8	8.1	

Notes:
- BC b = brand penetration at whole-market level.
- SC b = store penetration at whole-market level.

The earlier observation that brand and store leaders are positively associated in terms of choice probability is supported by the current penetration figures (Tables A4.31-A4.36). In all five cases where the two categories combine, observed penetration exceeds the non-interaction value - by 3.6 percentage points on average.

9.4. CONCLUSIONS.

This chapter has examined the extent to which brand choice probabilities differ from store to store, and correspondingly how store choice probabilities vary across brands. Aside perhaps from conclusion 2 below, the most notable feature of the results in this area is the lack of any **regular patterns** in the data.

1. Brand choice and store choice probabilities are quite strongly interdependent.

In other words the probability of buying a brand - as measured by market share or penetration - typically varies by store; correspondingly, the probability of buying at a particular store varies according to the brand in question. This is the main lesson of the preceding results, and accords closely with the exploratory findings of Wrigley and Dunn (1984c) in this area.

The overall level of interdependence is not constant across product fields: on almost all measures used it is shown to be strongest for tea bags and weakest for automatic washing powder in both regions. The level of interdependence also varies across individual brands and stores within the same market: for some brands it is emphatic (e.g. Brand B1's within-store share in Region I varies from under 20% to 80%), while for others it is barely apparent.

2. The choice probabilities of brand and store leaders tend to be positively correlated.

Put another way, when they combine, these two choice categories tend to strengthen each other's choice probability. This is the only clear **pattern** of interdependence that emerges from the present data, and probably reflects deliberate support for the brand leader on the part of the main supermarket chain.

3. Brand shares vary across stores in both absolute and relative terms.

Indeed, brand share **ratios** are rarely constant even for specific pairs of brands. It might be thought that, say, Brands B and C have different shares within Store T as they do within Store S simply because Store T heavily promotes another brand - D - which draws sales from brands B and C. If the across-store share variation in B and C's share depended only on the variation in D's share, then it would be expected that the brand share of B **relative** to that of C (i.e. the ratio of shares) would remain constant. But this does not happen in practice. Buyers at different stores generally exhibit different **relative** preferences for all the brands in question. This suggests that the factors underlying brand-store interdependence are likely to be complex.

4. Brand-store interdependence holds implications for the calibration of the Dirichlet at the submarket level.

That brand shares vary by store and store shares vary by brand does not invalidate the use of the Dirichlet for within-store brand choice or within-brand store choice, but it does imply that the model has to be calibrated separately for each submarket (i.e. it can not be assumed that the whole-market brand or store shares would apply in each case), as noted earlier by Wrigley and Dunn (1984c). Results from applying the Dirichlet at this level are reported in the next two chapters.

Chapter 10

BRAND CHOICE WITHIN INDIVIDUAL STORES

Contents:

10.1. INTRODUCTION.

In this chapter, attention focuses on patterns of brand choice within individual stores. Two main questions are addressed.

(i) Do the basic regularities in brand choice behaviour at the whole-market level apply also to the within-store context?

(ii) Can the Dirichlet model successfully describe the patterns of brand choice within individual stores?

The same measures of buyer behaviour as those used in Chapter 6 are employed, and analysis proceeds in a similar order: the basic regularities associated with each measure at the whole-market level are recalled, and are treated as the expected pattern within the present submarket context.

It is important to note that the measures in question need some reinterpretation at the submarket level. Each measure of brand choice behaviour relates now to the behaviour **within the specified store alone.** For instance wp, the product buying rate per brand buyer, now concerns product buying only **within the stated store;** and sole buyers are defined now as buyers of a brand at a store who buy only that brand **within that store** - they may well buy other brands when at other stores.

This chapter represents the first direct investigation of the Dirichlet's validity for brand choice within individual stores. A number of earlier studies gave grounds for optimism in this regard. First Kau (1981) indicated that repeat buying patterns within individual store groups conformed closely to those expected under the NBD model. Subsequently Kau and Ehrenberg (1984) and Wrigley and Dunn (1984c) demonstrated that the Duplication of Purchase Law - an indirect test of the IIA assumption of the Dirichlet model - is appropriate to the within-store context ("store" being individual outlets in the latter study).

Analysis of brand choice within individual stores poses two difficulties: the data are too few, and too many. The data **shortage** relates to small-sample problems, most acute for small brands at small stores: in two cases the number of buyers is only 9 and 11. Further details in this area were provided in Section 2.2.5. Clearly account must be taken of the likely sampling error in assessing the observed behaviour (in particular when in relation to the predicted pattern). The data **excess** relates to the volume of information generated by examining both observed and predicted behaviour for five brands within five stores for three products in two regions on eight measures. In consequence many summary results are presented in the text, with full data being provided in Appendix 5.

As in previous chapters, the main illustrations cover automatic washing powder in Region I. The examples also focus on brand choice behaviour within just three of the five store groups studied (i.e. Stores X, Y and Z). However, the results presented in tables referring to the **average** store were calculated using all five store groups.

10.2. PENETRATION AND PURCHASE FREQUENCY.

10.2.1. Regularities.

It was seen in Chapter 6 that, at the whole-market level, two principal regularities are associated with these measures.

A. Different brands are bought at much the same rate.

B. Both penetration and (to a lesser extent) purchase frequency tend to fall with decreasing market share (the Double Jeopardy effect).

These regularities can be taken as expected patterns for the present BCwS context.

Table 10.1 sets out, for the automatic washing powder market in Region I, the b and w values of five brands within each of three store groups. For instance, over the analysis period, 23% of the population buy Brand A1 at Store X, and they buy the brand there 5.1 times on average. (In this and all other tables in this chapter, brands are ordered by their market share within each store, unless otherwise stated.)

The data support regularity A above: purchasing rates (w) do not differ markedly from brand to brand within each store; and averaged across all 5 store categories, the w of the smallest brand is on average 80% of the value of the largest brand in this market (see Table 10.2). The pattern within other markets is similar (though w is not quite as stable as in the present example): the overall average mean deviation of 0.7 (Table 10.3) represents just one fifth of the value of the overall mean purchase frequency.

There are exceptions, however, such as Store Z for the tea bag market in Region I, where w ranges from 6.4 for Brand B1 to 1.1 for Brand B4 (Table A5.13). But such cases usually reflect very large market share differences (80% versus 1% in the present instance), and probably also sampling error (there being only 11 buyers of Brand B4 at Store Z in Region I).

Regularity B (Double Jeopardy) is less apparent in Table 10.1. While penetration does decrease in line with market share, the expected fall in purchase frequency is not always visible - see the case of Store Z, and also that of Miscellaneous (Table A5.1). In other markets the fall in w is more emphatic, as can be seen in Table 10.2 which gives the average value for each brand rank.

TABLE 10.1

Penetration (b) and Average Purchase Frequency per Brand Buyer (w). Brands within Stores X, Y and Z, Automatic Washing Powder, Region I.

	Market Share (%)	b (%) O	b (%) D	w O	w D
Store X					
Brand A1	36	23	23	5.1	4.9
Brand A2	21	14	15	4.6	4.4
Brand A3	15	13	11	3.5	4.2
Brand A5	12	8	9	4.8	4.1
Brand A4	11	9	9	3.9	4.1
Store Y					
Brand A2	26	11	14	4.4	3.5
Brand A1	25	15	13	3.0	3.5
Brand A3	18	9	10	3.6	3.3
Brand A4	16	7	9	4.3	3.2
Brand A5	7	4	4	2.8	2.9
Store Z					
Brand A1	25	6	6	3.1	3.3
Brand A2	21	6	5	3.0	3.2
Brand A4	20	3	5	5.0	3.1
Brand A3	12	3	3	2.7	2.9
Brand A5	11	3	3	3.3	2.9
Average	18	9	9	3.8	3.6

Notes:
- E.g. Brand A1 has a 36% share of the Store X submarket; 23% of the Region I population buy Brand A1 at Store X; and they buy the brand there 5.1 times on average.

In general both regularities, which are well-established at the whole-market level, can be said to apply also to the BCwS level.

10.2.2. Dirichlet Fit.

The agreement between observed and predicted figures in Table 10.1 is reasonably close, with a mean difference of just 1.0 for b and 0.4 for w. The degree of fit in other markets is very similar (Table 10.3). There is - as in Chapter 6 - slight evidence that, in terms of mean absolute difference, automatic washing powder and tea bags are the best and worst fitted product fields respectively, although this disparity disappears when MAD is related to the mean deviation of both b and w.

TABLE 10.2

Brand Average Purchase Frequency (w): Values Averaged Across Stores for Each Brand Rank.

	Product/Region						
Brand Rank	**A.I**	**B.I**	**C.I**	**A.II**	**B.II**	**C.II**	**Ave**
1	3.7	4.8	5.0	4.2	5.9	5.0	4.8
2	3.2	3.3	3.6	4.2	4.6	3.9	3.8
3	3.8	3.1	3.3	4.0	4.1	4.0	3.7
4	3.4	2.7	3.5	3.4	3.3	3.2	3.2
5	3.0	2.1	3.3	2.5	2.7	3.0	2.7

Notes:
- A.I = Automatc Rgn I
  B.I = Tea Bags Rgn I
  C.I = Inst Cof Rgn I
- E.g. if the w values of the largest brand within each of the stores in the automatic washing powder market are averaged, a figure of 3.66 results. (Note that the largest brand in one store may be different from the largest brand in another store.)
- Note that, to avoid biasing the results, when a brand is not stocked by a store, the brands ranked 3 and 4 are redefined as ranks 4 and 5 respectively. When two brands are not stocked, the brands ranked 2 and 3 are redefined as ranks 3 and 5 respectively.

Comparing the fit in the present context with that achieved at the BC level is appropriately examined in terms of mean absolute difference as a proportion of mean deviation (MAD/MD), since absolute values are almost inevitably smaller in the BCwS case. On this basis the Dirichlet's fit is not as good within individual stores, as shown in Table 10.3. However, the difference is not emphatic, and the model still represents a marked improvement on the average "as predictor".

TABLE 10.3

Dirichlet Fit in the BCwS Context:
Penetration (b) and Average Purchase Frequency (w).

Product/Region	b: MAD	b: MD	b: MAD/ MD %	w: MAD	w: MD	w: MAD/ MD %
Automatc Rgn I	1.0	2.9	36	.41	.47	85
Tea Bags Rgn I	1.2	3.9	31	.60	.83	74
Inst Cof Rgn I	1.0	3.8	31	.56	.73	73
Automatc Rgn II	.7	1.9	40	.38	.49	75
Tea Bags Rgn II	1.4	3.4	45	.70	1.01	72
Inst Cof Rgn II	1.0	4.9	24	.51	.68	71
Average	1.1	3.5	35	.53	.70	75
Average (BC) *	2.3	10.1	24	.42	.79	54

Notes:
- * Overall average values from the whole-market brand choice context.
- MAD = mean absolute difference between observed and predicted values.
- MD = mean (absolute) deviation (from the mean).

10.3. PRODUCT BUYING AND SHARE OF REQUIREMENT.

10.3.1. Regularities.

Three main regularities are associated with these measures within the whole-market BC context.

C. wp is much higher than w.

D. wp varies little from brand to brand.

E. wp tends to increase slightly with decreasing market share.

TABLE 10.4

Average Purchase Frequency of Product per Brand Buyer (wp) and Share of Requirement (w/wp). Brands Within Stores X, Y and Z. Automatic Washing Powder, Region I.

	Market Share (%)	wp O	wp D	w/wp % O	w/wp % D
Store X					
Brand A1	36	8.8	8.9	58	55
Brand A2	21	9.4	9.4	49	46
Brand A3	15	8.3	9.6	43	43
Brand A5	12	9.9	9.8	48	42
Brand A4	11	10.5	9.8	37	42
Store Y					
Brand A2	26	9.1	8.5	48	41
Brand A1	25	6.7	8.6	45	41
Brand A3	18	8.6	8.9	42	37
Brand A4	16	10.3	9.1	42	35
Brand A5	7	8.3	9.7	34	30
Store Z					
Brand A1	25	7.0	7.5	44	43
Brand A2	21	7.2	7.7	41	41
Brand A4	20	11.3	7.7	44	40
Brand A3	12	8.4	8.1	32	36
Brand A5	11	8.4	8.2	40	35
Average	18	8.8	8.8	43	41

Notes:
- E.g. buyers of Brand A1 at Store X make 8.8 purchases of the product class within that store, and they devote 58% of these purchases to Brand A1.

Regularity C is apparent from the w/wp values in Table 10.4. Typically, wp tends to be at least twice as high as w. The share of requirement values in the whole-market BC context indicated that buyers of any given brand habitually buy other brands as well, but the possibility remained that consumers would be loyal to a brand **within a particular store**, switching to other brands only when switching stores. The present data underline that this is not so: buyers of a brand at a store also buy other brands at the same store extensively - indeed, these "other" brands usually account for the **majority** of product purchases within the store. The average w/wp values in Table 10.5 indicate that this pattern generalizes across all markets analysed.

TABLE 10.5

Average Purchase Frequency of Product per Brand Buyer (wp) and Share of Requirement (w/wp): Average Brand within the Average Store.

Product/Region	wp		w/wp	
	O	D	O	D
Automatc Rgn I	7.7	7.6	45	43
Tea Bags Rgn I	8.2	8.1	41	44
Inst Cof Rgn I	7.3	7.7	51	49
Automatc Rgn II	8.3	8.5	46	45
Tea Bags Rgn II	10.0	10.0	43	45
Inst Cof Rgn II	8.0	7.9	49	50
Average	8.3	8.3	46	46
Average (BC)	15.0	15.4	38	38

Notes:
- E.g. regarding Automatc Rgn I, buyers of the average brand at the average store make on average 7.7 purchases of the product class at that store, and devote 45% of these purchases to the brand in question.

Regularity D also emerges from Table 10.4. Different brands within a store generally attract buyers with roughly similar product purchasing rates **within that store.** Averaged across all six markets, the mean deviation of this wp measure, 0.9 (Table 10.7), is typically only about 10% of the mean value. Exceptions do arise however: in the current market, Brand A4 appears to be bought by relatively heavy product buyers at Store Z, and also, to a lesser extent, at Store X and Store Y.

Further, a tendency is observable in Table 10.4 for wp to increase slightly with falling market share (Regularity E). However, this increase is not a particularly steady one. Table 10.6, which gives average wp values for the five brand ranks, shows that the trend is strong within the two tea bag markets, but rather uneven elsewhere.

TABLE 10.6

Ave. Purchase Frequency of Product per Brand Buyer (wp): Values Averaged Across Stores for Each Brand Rank.

Brand Rank	A.I	B.I	C.I	A.II	B.II	C.II	Ave
	Product/Region						
1	6.9	7.2	7.5	7.7	9.4	7.3	7.7
2	7.0	7.6	7.0	8.7	9.6	7.0	7.8
3	8.3	7.9	6.9	8.1	9.8	8.8	8.3
4	8.1	8.6	7.9	8.8	10.4	8.2	8.7
5	8.3	9.5	7.3	8.2	10.8	7.3	8.6

Notes:
- See Table 10.2 for clarification.

10.3.2. Dirichlet Fit.

Overall, within the automatic washing powder market, the Dirichlet's predictions for wp and w/wp are of the right numerical level, and show no consistent bias (except within Store Y, where brands' share of requirements are consistently larger than expected). This is reflected in the five other markets, as summarized by the average values in Table 10.5. However, as the observed variation in wp and w (and hence w/wp) with market share is not especially smooth at the current BCwS level, the discrepancies between individual observed and predicted figures are sizeable. Regarding wp, the mean difference (averaged across all brands, all stores, and all markets) of 0.8 is high relative to the overall mean deviation of just 0.9 (Table 10.7). In the case of w/wp, the mean discrepancy is about 6 percentage points, which seems quite high in an absolute sense.

In terms of the measure MAD/MD, the fit achieved for wp is similar to that obtained at the BC level, but for w/wp the fit is less good.

TABLE 10.7

Dirichlet Fit in the BCwS Context:
Average Purchase Frequency of Product per Brand Buyer (wp)
and Share of Requirement (w/wp).

	---- wp ------			---- w/wp ----		
Product/Region	MAD	MD	MAD/ MD %	MAD	MD	MAD/ MD %
Automatc Rgn I	.73	.79	92	3.9	5.2	80
Tea Bags Rgn I	.78	.94	88	7.2	13.7	56
Inst Cof Rgn I	1.15	.84	179	5.8	8.9	77
Automatc Rgn II	.78	.78	107	5.2	6.9	76
Tea Bags Rgn II	.72	.96	80	7.0	11.2	65
Inst Cof Rgn II	.74	.96	76	6.0	11.0	54
Average	.82	.88	104	5.9	9.5	68
Average (BC)	.68	.86	99	3.1	7.1	44

10.4. SOLE BUYERS.

As noted in Section 10.1, the term "sole buyers" in the present BCwS context refers to buyers of a brand at a store who, over the time period, buy only that brand **at that store** - they may well buy other brands when at other stores.

10.4.1. Regularities.

Regarding sole buyers, the expected regularities are as follows.

F. The proportion of sole buyers is "low".

G. The purchase frequency of sole buyers is slightly higher than that of all buyers of the brand.

H. Both measures fall in value with decreasing market share.

Regarding regularity F, within the automatic washing powder market (Region I) on average one third of the buyers of a brand at a store are 100%-loyal to that brand within the store in question (Table 10.8), although this proportion does vary from brand to brand and from store to store (as discussed below). A similar average value emerges from the other five markets (Table 10.9). This average value is more than twice that calculated in the BC context: in a multistore-buying situation, purchasing rates within individual stores are necessarily lower than within the market as a whole, providing less opportunity for brand "disloyalty".

Whether one-third is a high or low proportion of sole buyers is clearly subjective without reference to theoretical norms, but from the perspective of store management it may seem encouraging to the extent that the majority of a brand's buyers within a store seem willing to buy alternatives - which might include a new addition to the store's brand range.

Regularity G emerged clearly at the BC level, where ws values were on average almost 25% greater than the corresponding w values. At the present BCwS level however, w is on average about 10% **lower** than ws, as indicated in Table 10.10. Thus within individual stores, 100% brand-loyal consumers are light buyers of both product and brand, and are accordingly not especially valuable in sales terms.

TABLE 10.8

Proportion of Sole Buyers (bs/b) and Average Purchase Frequency of Sole Buyers (ws). Brands Within Stores X, Y and Z. Automatic Washing Powder, Region I.

	Market Share (%)	bs/b (%) O	bs/b (%) D	ws O	ws D
Store X					
Brand A1	36	43	40	5.2	4.1
Brand A2	21	35	32	3.4	3.6
Brand A3	15	31	30	3.2	3.4
Brand A5	12	26	29	3.9	3.3
Brand A4	11	25	28	5.0	3.3
Store Y					
Brand A2	26	33	27	4.0	2.3
Brand A1	25	42	27	3.5	2.2
Brand A3	18	23	24	2.6	2.1
Brand A4	16	26	23	4.5	2.0
Brand A5	7	26	20	2.0	1.8
Store Z					
Brand A1	25	51	31	2.4	2.2
Brand A2	21	47	29	1.2	2.1
Brand A4	20	22	29	1.7	2.1
Brand A3	12	37	25	4.2	1.9
Brand A5	11	27	25	1.0	1.9
Average	18	33	28	3.2	2.6

Notes:
- E.g. 43% of the buyers of Brand A1 at Store X are 100%-loyal to Brand A1 when at that store, and these buyers buy the brand there 5.2 times on average.

In accordance with regularity H above, the incidence of sole buyers in Table 10.4 does tend to fall with decreasing share. The corresponding trend for purchase frequency (ws) is less apparent here than in other markets (see Table 10.11). This latter measure retains its somewhat "erratic" variation noted in Chapter 6. (For instance, the **smallest** instant coffee brand category at Store Y in Region I has the **highest** ws value within that store - see Table A5.26.)

TABLE 10.9

Proportion of Sole Buyers (bs/b) and Average Purchase Frequency of Sole Buyers (ws). Average Brand within the Average Store.

Product/Region	bs/b (%)		ws	
Automatc Rgn I	35	31	3.0	2.4
Tea Bags Rgn I	33	33	2.6	2.7
Inst Cof Rgn I	43	38	3.6	3.2
Automatc Rgn II	34	33	3.5	2.8
Tea Bags Rgn II	33	32	3.9	3.3
Inst Cof Rgn II	38	39	3.7	3.3
Average	36	34	3.4	3.0
Average (BC)	16	15	6.9	4.7

Notes:
- E.g. regarding Automatc Rgn I, 35% of the buyers of the average brand at the average store are 100%-loyal to the brand within the store, and these buyers buy the brand there 3.0 times.

TABLE 10.10

Average Purchase Frequency of Sole Buyers (ws) Compared With Average Purchase Frequency of All Buyers (w). Average Brand at Average Store.

Product/Region	ws	w	ws/w (%)
Automatc Rgn I	3.0	3.4	88
Tea Bags Rgn I	2.6	3.2	81
Inst Cof Rgn I	3.6	3.7	95
Automatc Rgn II	3.5	3.8	92
Tea Bags Rgn II	3.9	4.2	93
Inst Cof Rgn II	3.7	3.9	95
Average	3.4	3.7	91
Average (BC)	6.9	5.6	124

TABLE 10.11

Average Purchase Frequency of Sole Buyers (ws): Values Averaged Across Stores for Each Brand Rank.

Brand Rank	Product/Region A.I	B.1	C.I	A.II	B.II	C.II	Ave
1	3.4	4.5	5.2	3.5	5.7	4.7	4.5
2	2.6	3.1	3.5	4.3	4.8	3.6	3.7
3	3.0	2.1	2.9	3.9	4.0	3.9	3.3
4	3.6	2.1	2.5	3.0	2.5	3.3	2.8
5	2.4	1.2	3.7	2.3	2.1	2.8	2.4

Notes:
- See Table 10.2 for clarification.

TABLE 10.12

Dirichlet Fit in the BCwS Context: Proportion of Sole Buyers (bs/b) and Average Purchase Frequency of Sole Buyers (ws).

	---- bs/b -----			----- ws -----		
Product/Region	**MAD**	**MD**	**MAD/ MD %**	**MAD**	**MD**	**MAD/ MD %**
Automatc Rgn I	6.4	6.9	91	.83	.71	120
Tea Bags Rgn I	7.7	11.7	68	.82	1.01	90
Inst Cof Rgn I	6.6	7.2	95	.96	.92	116
Automatc Rgn II	4.5	5.7	78	1.31	1.15	119
Tea Bags Rgn II	6.1	8.5	73	1.20	1.41	89
Inst Cof Rgn II	6.4	11.8	58	.73	.79	94
Average	6.3	8.6	77	.98	1.00	105
Average (BC)	2.9	5.2	57	2.44	1.38	191

10.4.2. Dirichlet Fit.

The fit obtained in Table 10.8 seems quite poor in average terms, the mean discrepancy being almost 7 for bs/b and 1.0 for ws. Using the average values of bs/b and ws as predictors within this market would have produced a quite similar degree of fit (Table 10.12). However, on closer inspection the average disagreement between observed and predicted bs/b is inflated by a small number of very large discrepancies concerning Brand A1 and Store Z (i.e. A1-Y, A1-Misclns, A1-Z, A2-Z, and A3-Z). For other brand-store combinations the agreement is reasonably close. The poor fit for ws simply reflects the BC-level pattern (and undoubtedly the especially small samples associated with this measure at the present BCwS level). In particular, ws is again underpredicted in most cases.

The data from other markets present a similar picture. The degree of fit is comparable on both MAD and MAD/MD measures (Table 10.12). And a strong tendency to underpredict ws, together with a much weaker similar tendency regarding bs/b, is apparent, with the notable exception of tea bags in Region I (Table 10.9).

10.5. PURCHASE FREQUENCY DISTRIBUTION.

10.5.1. Regularities.

The principal BC-level regularity is noted below.

I. The distribution of brand purchasing rates across consumers is reversed-J-shaped, implying a large proportion of light buyers.

This feature of brand purchasing is illustrated for the BCwS context in Table 10.13. The averages for all five stores within this automatic washing powder market (Table 10.14) indicate that as many as half of a brand's buyers at a store buy it there only once over 48 weeks, and almost three-quarters buy it there three times or less (i.e. no more than once every four months). For products defined as frequently-bought consumer goods, such

TABLE 10.13

Purchase Frequency Distribution.
Brands Within Store X.
Automatic Washing Powder, Region I.

Buyers of:		% making X purchases of brand							
		1	2	3	4	5	6	7	8+
Brand A1	O	33	19	8	8	6	5	2	21
	D	35	17	10	7	5	4	3	19
Brand A2	O	40	19	7	3	6	2	2	19
	D	39	17	10	7	5	3	3	17
Brand A3	O	35	20	16	6	8	3	1	12
	D	40	17	10	6	4	4	3	16
Brand A4	O	41	18	9	6	3	5	3	17
	D	41	18	9	7	5	4	2	14
Brand A5	O	44	14	3	11	3	6	3	16
	D	41	17	10	6	4	3	3	15
Average	O	39	18	9	7	5	4	2	17
	D	39	17	10	7	5	4	3	16

Notes:
- E.g. of the buyers of Brand A1 at Store X, 33% buy the brand there only once, 19% buy the brand there twice, etc.

proportions of occasional buyers may seem surprisingly high.

Results from other product fields are of a similar order (see Table 10.14). As implied by the positive association between average purchase frequency and market share, distributions are more skewed than at the whole-market level, and become especially so for smaller brand-store combinations (e.g. almost three-quarters of Brand A5 buyers at Store Z buy the brand there only once over the year).

TABLE 10.14

Purchase Frequency Distribution: Average Brand within the Average Store.

Buyers of ave brand at ave store		% making X purchases of the brand 1	2	3	4	5	6	7	8+
Automatc Rgn I	O	49	17	8	6	5	3	3	10
	D	47	18	10	6	4	3	2	9
Tea Bags Rgn I	O	55	15	9	5	3	2	2	10
	D	46	18	10	6	4	3	2	12
Inst Cof Rgn I	O	47	16	7	6	4	3	2	14
	D	43	18	10	6	4	3	3	13
Average	O	50	16	8	6	4	3	2	11
	D	45	18	10	6	4	3	2	11
Average (BC)	O	36	15	9	6	5	4	3	22
	D	32	16	10	7	5	4	3	21

Notes:
- E.g. in the Automatc Rgn I market, 49% of the buyers of the average brand at the average store buy the brand at that store only once, 17% buy the brand at that store twice, etc.

10.5.2. Dirichlet Fit.

The agreement between the observed and predicted distributions within Store X in Table 10.13 is clearly very close. The picture from other stores in the same market supports this view, and includes only a few sizeable discrepancies (concerning A1-Y, and three brands at the smallest store, Store Z, probably largely due to sampling error).

The overall results from other product fields in Table 10.14 highlight a predictive bias noted at the BC level, namely a tendency to underestimate the proportion of once-only buyers. As in the whole-market context, the discrepancy is largest for the product tea bags. Contained within this **overall** underprediction is an overestimation of the across-brand variation in the proportion of once-only buyers (an inverse reflection of the general underestimation of across-brand **loyalty** variation - see Section 10.7.2): thus the underprediction is strongest for smaller brands, and is in fact reversed for several large brands, as illustrated in summary form by Table 10.15.

TABLE 10.15

The Proportion of Once-Only Buyers: Average Observed and Predicted Values for Brands Ranked 1 and 5 Within a Store. Region I.

Product/Region	Brand rank	% of once-only buyers O	D
Automatc Rgn I	1	40	44
	5	58	50
Tea Bags Rgn I	1	39	39
	5	70	50
Inst Cof Rgn I	1	36	39
	5	56	46

Notes:
- E.g., regarding Automatc Rgn I, on average 40% of the buyers of the brand ranked 1 in a store buy that brand there only once over the period.

10.6. DUPLICATION.

10.6.1. Regularities.

The main BC-level regularity is clearly the Duplication of Purchase Law, which can be restated as follows.

> J. The percentage of a brand's buyers also buying any other given brand is proportional to this latter brand's penetration.

As in Chapter 6, duplication is compared with **relative** penetration, which in the present within-store context refers to the percentage of product buyers **at the store** buying the brand in question.

TABLE 10.16

Brand Duplication
Within Store X.
Automatic Washing Powder, Region I.

Buyers of:	% also buying Brand:				
	A1	**A2**	**A3**	**A5**	**A4**
Brand A1	--	26	21	15	16
Brand A2	41	--	19	14	17
Brand A3	37	20	--	20	19
Brand A5	42	25	34	--	17
Brand A4	40	27	29	15	--
Average	40	25	26	16	17
D x rltv b	42	26	24	15	17
D = .80					
Relative b *	52	33	30	18	21

Notes:
- E.g. 41% of the buyers of Brand A2 at Store X also buy Brand A1 at Store X.
* Relative b (rltv b) is the penetration of the brand among buyers of the product class at Store X. Note that the D value shown is calculated using relative penetration.

Earlier studies by Kau (1981) and Kau and Ehrenberg (1984) of the Duplication of Purchase Law within individual store chains produced encouraging results. And from their test of the Law within individual outlets, Wrigley and Dunn (1984c, p. 1232) concluded that there is "certainly no clear evidence that the law breaks down when the focus of interest is on multibrand purchasing within individual stores".

TABLE 10.17

Brand Duplication
Within Store Y.
Instant Coffee, Region I.

Buyers of:	% also buying Brand:				
	C2	**C1**	**C3**	**C4**	**OB**
Brand C2	--	17	30	11	11
Brand C1	25	--	23	5	14
Brand C3	51	26	--	8	14
Brand C4	37	12	17	--	9
Brand OB	36	31	27	9	--
Average	37	22	24	8	12
D x rltv b	35	24	22	10	12
D = .72					
Relative b	49	34	30	14	16
Dirichlet *	37	21	20	12	11

Notes:
- See Table 10.16 for clarification.
* Dirichlet predictions of average duplication. E.g. the Dirichlet predicts that 21% of the buyers of a (non-C1) brand at Store X will also buy Brand C1 at Store X.

The present results are strongly corroborative. The examples (from two different product fields) in Table 10.16 and 10.17 display the usual scatter within the columns (undoubtedly due in part to sampling error), but the predictions (respectively .8 and .7 times relative penetration) are accurate to within two percent of the average duplication in all cases.

A similarly good fit occurs within most other stores, as summarized for Region I by Table 10.18. There is some evidence of the bias noted at the BC level, namely the tendency to overpredict duplication with the brand leader. This applies to the brand leader both within each store and within the market as a whole (the two not always coinciding). But the agreement for these and other brands remains close.

TABLE 10.18
Within-Store Brand Duplication:
Average Values per Brand.

Buyers of ave brand
at stated store: % also buying Brand:

Automatc Rgn I		A1	A2	A3	A4	A5
Store X	O	40	25	26	17	16
	T	42	26	24	17	15
O Mltps	O	38	28	23	18	18
	T	42	28	21	17	15
Store Y	O	43	34	34	20	15
	T	47	34	29	21	14
Misclns	O	29	25	11	19	12
	T	32	23	10	18	12
Store Z	O	37	31	24	21	17
	T	39	35	21	19	16

Tea Bags Rgn I		B1	B2	OB	B3	B4
Store X	O	46	30	37	16	10
	T	61	27	29	13	8
O Mltps	O	26	38	41	25	18
	T	30	40	40	21	15
Store Y	O	30	39	39	30	17
	T	33	48	37	22	14
Misclns	O	22	33	38	19	15
	T	31	28	40	16	13
Store Z	O	60	32	22	29	17
	T	87	29	16	20	9

Inst Cof Rgn I		C1	C2	C3	OB	C4
Store X	O	40	34	20	14	8
	T	46	30	17	14	9
O Mltps	O	28	30	18	20	9
	T	26	29	19	19	11
Store Y	O	22	37	24	12	8
	T	24	35	22	12	10
Misclns	O	18	26	19	24	6
	T	21	25	15	26	7
Store Z	O	27	22	27	8	3
	T	37	19	19	7	4

Notes to Table 10.18 on previous page:

- E.g. in the Automatc market, on average 40% of the buyers of a (non-A1) brand at Store X also buy Brand A1 at that store. The Duplication of Purchase Law, applied within Store X, predicts this proportion should be 42%.
- T = Theoretical prediction from Duplication of Purchase Law.

A notable exception concerns Store Z in the Region I tea bag market (full details being provided in Table A5.24). Here, Duplication Law predictions differ widely from the average observed duplications (see Table 10.18), and the average discrepancy for individual duplications is on average over 13 (Table 10.19). This especially poor fit is presumably due in part to the especially small samples in this submarket (with the number of brand buyers at the store falling to 25 or below in the case of three brands), but possibly reflects also the unusual brand share - and hence penetration - structure within this store.

TABLE 10.19

Mean Absolute Difference Between Observed and Theoretical Duplication. (Individual Figures.) *

	Product/Region		
Store	A.I	B.I	C.I
X	2.6	8.3	5.0
OM	4.0	5.7	4.4
Y	3.9	7.6	4.6
Msc	3.1	6.8	5.4
Z	5.6	13.4	8.4
Ave	3.8	8.4	5.6

	Product/Region		
Store	A.II	B.II	C.II
V	3.3	4.0	8.7
OM	4.0	4.8	4.0
Y	4.7	6.7	4.0
W	4.5	5.0	6.2
Z	4.9	6.2	7.2
	4.3	5.3	6.0

Notes:

* I.e. these MAD values concern the discrepancies between the Duplication Law predictions and each (corresponding) duplication figure within the body of the duplication table.

Across all six markets, the discrepancy between predictions and **individual** duplications averages at about 6 (Table 10.19), which seems quite high in absolute terms. Given the generally good fit for the average duplications, this can reasonably be attributed in part to small-sample problems.

A point of some interest concerns the duplication coefficients. These are very similar from store to store, as shown in Table 10.20. It appears from this stability that consumers divide their purchases between the various brands in much the same way within each store. Similar findings were reported by Kau and Ehrenberg (1984) and Wrigley and Dunn (1984c).

TABLE 10.20

Within-Store Brand Duplication Coefficients.

	Product/Region				Product/Region		
Store	A.I	B.I	C.I	Store	A.II	B.II	C.II
X	.80	.90	.78	V	.95	.96	.74
OM	.83	.89	.71	OM	.70	.89	.86
Y	.93	.95	.72	Y	.92	.95	.83
Msc	.76	.85	.67	W	.87	.82	.69
Z	.87	1.11	.67	Z	.80	.96	.84
Ave	.84	.94	.71		.85	.92	.79
MD	.05	.07	.03		.06	.05	.06
MD/Ave %	6.0	7.7	4.5		6.8	5.2	7.8
Ave(BC)	1.02	1.06	.92		1.00	1.07	.94

Notes:
- MD (mean deviation) refers to the variation in D coefficient values from store to store.
- All D values have been calculated using relative penetration.

Differences between **product fields** follow the BC-level pattern with D coefficients being lowest for automatic washing powder and highest for instant coffee in both regions. Thus, within any individual store, the propensity for consumers to "also buy" other brands (as measured by D) is more appropriately interpreted as a characterization of the product field than as a special feature of the store in question.

10.6.2. Dirichlet Fit.

As noted by Wrigley and Dunn (1984c), the Duplication of Purchase Law is an indirect test of one of the main assumptions of the Dirichlet model, namely that the probability of purchasing one brand is independent of the probability of purchasing any other brand. The results reported in the previous section indicate that this assumption is valid at the BCwS level. Instances of marked segmentation do arise (such as the positive correlation between Brand B4 and Other Brands at Store X in Region I, and the negative one between brands C1 and C4 at Store Y in Region I, and at Store Z in Region II). But such cases are few, despite the small samples involved.

In such circumstances it is not surprising that the Dirichlet's predictions of duplication describe the observed data well, as illustrated for the case of Store Y in Table 10.17.

10.7. DIRICHLET FIT: SUMMARY.

10.7.1. Overall Fit.

The Dirichlet's fit within individual stores is not as good as at the whole-market level, as summarized by Table 10.21. In terms of mean discrepancy as a proportion of mean deviation (MAD/MD), this applies to every measure except ws. And for the two "principal" purchase frequencies w and wp, discrepancies tend to be larger within individual stores despite the generally lower absolute values for these measures at the submarket level. Nevertheless, the predictions are in general of the right numerical order (see Table 10.22) and represent an

TABLE 10.21

Summary of Dirichlet Fit in the BCwS Context for Six Measures of Buyer Behaviour.

Measure of fit:	Measure of buyer behaviour:					
	b	**w**	**wp**	**w/wp**	**bs/b**	**ws**
MAD						
Automatc Rgn I	1.0	.41	.73	3.9	6.4	.83
Tea Bags Rgn I	1.2	.60	.78	7.2	7.7	.82
Inst Cof Rgn I	1.0	.56	1.15	5.8	6.6	.96
Automatc Rgn II	.7	.38	.78	5.2	4.5	1.31
Tea Bags Rgn II	1.4	.70	.72	7.0	6.1	1.20
Inst Cof Rgn II	1.0	.51	.74	6.0	6.4	.73
Average	1.1	.53	.82	5.9	6.3	.98
Oth measures of fit, ave values, 6 mkts: *						
MD	3.5	.70	.88	9.5	8.6	1.00
MAD/MD %	35	75	104	68	77	105
MAD (BC) **	2.3	.42	.68	3.1	2.9	2.44
MAD/MD % (BC) **	24	54	99	44	57	191

Notes:
* Other measures of fit, averaged across all stores and all six markets.
** Corresponding values from the whole-market brand choice context.

improvement on the average "as predictor" for all measures except wp and ws (as expressed by the average MAD/MD values in Table 10.21). A deterioration of fit from the whole-market to within-store level is not surprising in view of the far smaller samples employed in the latter case.

Some similarity with the BC context derives from the **relative** fit for different buyer behaviour measures. For instance, in terms of MAD/MD the fit is relatively good for b and w/wp but poor for wp and ws. This reinforces the observations made throughout this chapter that the structure of brand choice behaviour within individual stores is fundamentally similar to that within the market as a whole.

TABLE 10.22

Buyer Behaviour Measures in the BCwS Context: Average Value for Each Market.

Prdct/ Rgn	MS (%)	b (%) O	b (%) D	w O	w D	wp O	wp D
A.I	18	9	9	3.4	3.2	7.7	7.6
B.I	20	9	9	3.2	3.5	8.2	8.1
C.I	19	10	10	3.7	3.8	7.3	7.7
A.II	19	8	8	3.8	3.8	8.3	8.5
B.II	21	10	10	4.2	4.4	10.0	10.0
C.II	21	10	10	3.9	3.9	8.0	7.9
Ave	20	9	9	3.7	3.8	8.3	8.3

Prdct/ Rgn	w/wp (%) O	w/wp (%) D	bs/b (%) O	bs/b (%) D	ws O	ws D
A.I	45	43	35	31	3.0	2.4
B.I	41	44	33	33	2.6	2.7
C.I	51	49	43	38	3.6	3.2
A.II	46	45	34	33	3.5	2.8
B.II	43	45	33	32	3.9	3.3
C.II	49	50	38	39	3.7	3.3
Ave	46	46	36	34	3.4	3.0

Notes:
- E.g. regarding Automatc Rgn I, 9% of the population buy the average brand at the average store; these buyers buy it there 3.4 times; they make 7.7 purchases of the product class at the store; etc.

There is little divergence in the degree of fit obtained for the different product fields. The MAD values in Table 10.21 do suggest that the fit is usually best for automatic washing powder and worst for tea bags in both regions (as at the BC level), but if anything the reverse applies when such values are expressed as a proportion of mean deviation (see Tables 10.3, 10.7 and 10.12).

10.7.2. Bias.

Three main areas of predictive bias were noted at the BC level, and each applies also to the BCwS context.

Sole Buyers.

The average observed and predicted ws values in Table 10.22 point to a substantial underprediction on this measure for five of the six markets analysed. Observed ws is on average about 20% higher than the predicted figure. The discrepancy is not fully consistent, however, with overprediction occurring for over a third of brand/store combinations (53 out of 145). Also, as at the whole-market level, a very slight tendency to underpredict bs/b is apparent.

Variance Discrepancy.

The Dirichlet appears to maintain at the BCwS level its underestimation of loyalty variation across brands in so far as a tendency again emerges to underpredict loyalty for large brands and overpredict it for small brands. Table 10.23 illustrates this predictive bias with regard to tea bags, Region I, using loyalty indices (averaged across stores for each brand rank). The corresponding data in the Region II markets exhibit much the same pattern (the trend in the other Region I markets being less apparent), as shown in Tables A5.64-A5.66.

Composite Categories.

Loyalty to the "other brands" category is usually lower than predicted within each store, as summarized by Table 10.24.

The main exceptions concern Store Y (tea bags Rgn I and instant coffee Rgn II), Store V (instant coffee Rgn II), Other Multiples (tea bags Rgn I) and Miscellaneous (instant coffee Rgn I). Such cases - where Other Brands receives "normal" loyalty - may stem from a different or wider brand range within the store category, or in the latter case (Miscellaneous) from a dominant market share (34%) within the store grouping.

TABLE 10.23

Loyalty Indices * for Each Brand Rank, Averaged Across Stores. Tea Bags, Region I.

Brand Rank	s **	w	w/wp	bs/b	ws	8+	dpl ***	Ave excl s
1	283	113	111	110	135	125	120	119
2	89	94	100	135	116	100	109	109
3	100	93	95	107	86	95	88	94
4	58	84	83	91	90	72	79	83
5	36	69	63	65	51	66	77	65

Notes:

* I.e. observed value as a percentage of predicted value, but vice versa for duplication.

** Loyalty index for s = (S parameter / s)100. (Not included in averages in right-hand column.)

*** Predicted duplication derived from duplication of purchase law. E.g. the predicted proportion of the buyers of a brand at a store who also buy the largest brand within that store is 20% greater than the average observed proportion.

\- E.g. the largest brand (whichever that might be) at a store typically has an observed w value 13% higher than the predicted w value.

TABLE 10.24

The Loyalty Discrepancy for "Other Brands": Observed - Predicted Values, Averaged for Each Market.

	w	w/wp	bs/b	dpl *
Tea Bags Rgn I	-0.4	-2	+3	+3
Inst Cof Rgn I	0.0	-1	-1	0
Tea Bags Rgn II	-0.7	-4	-1	+3
Inst Cof Rgn II	-0.3	-2	0	+3

Notes:

* In the case of duplication, positive values imply a loyalty overprediction. (Predicted values from Duplication of Purchase Law.) E.g. in the case of Tea Bags Rgn I, on average the proportion of the buyers of a brand at a store who also buy "Other Brands" there is 3% greater than predicted by the Duplication Law.

\- E.g. in the case of Tea Bags Rgn I, the w value of the Other Brands grouping within a store is typically 0.4 lower than predicted.

10.7.3. Dirichlet Fit at Different Stores.

This section examines whether the degree of fit differs substantially at different store groups.

Since thirty distinct submarkets are involved, comparison would be much facilitated by summary measures of fit. Unfortunately there is no suitable formal testing procedure to apply simultaneously to the various measures in question (Wrigley and Dunn, 1984a). One possibility is to concentrate on the s value (of individual brand-store combinations) which, as detailed in Section 6.8, acts as an approximative proxy for the more direct measures of behaviour. If within a given store s values differ markedly across brands, it would be expected that the fit on other measures would be poor (this being necessarily so for b and w) since only one overall S parameter can be chosen. However, mean deviations calculated for s within each store (see Table A5.67) provide in practice a poor summary of overall fit, as indicated from comparing these deviation figures with the more direct measures of fit in Table 10.25. An individual brand with a very high s value often greatly inflates the overall deviation of s while the fit remains good for other brands at the store. Only very low s-deviation values (suggesting a good fit) reflect the more direct measures (most notably at Store V, where the mean deviation of s is just .06 and .11 in two product fields).

In the absence of suitable summary measures of fit, Table 10.25 provides an individual index of fit for each buyer behaviour measure and for all store submarkets in Region I (the corresponding Region II data being provided in Tables A5.58-A5.60). The measure used is mean discrepancy as a proportion of mean deviation (to take account of across-store differences in the absolute value and variation of the buyer behaviour measures). Three main observations can be made.

First, the degree of fit, on this basis, does not differ substantially from store to store. There are cases where a store will stand out on a particular measure, such as Miscellaneous (Tea Bags Rgn I) and Store X (Inst Cof Rgn I) in terms of wp. But such instances of poor fit - and the cases of good fit - are not in general reflected for the same store on other measures, for other products, or in the other region. The main exceptions concern Store X and Store V, where (aside from the above discrepancy at Store X) the fit is consistently better than average across both buyer behaviour measures and regions.

Table 10.26 gives the MAD/MD values averaged across product fields for each store group (taking each region in turn), and supports the above points: the degree of fit

TABLE 10.25

Summary of Dirichlet Fit in Each BCwS Submarket:
Mean Absolute Difference
as a Percentage of Mean Deviation.

	b	w	wp	w/wp	bs/b	ws
Automatc Rgn I						
Store X	27	72	69	59	45	97
O Mltps	19	85	78	70	61	97
Store Y	55	98	121	146	103	155
Misclns	35	80	102	55	128	151
Store Z	46	92	89	72	118	99
Average	36	85	92	80	91	120
Tea Bags Rgn I						
Store X	30	73	63	57	51	77
O Mltps	24	81	70	50	66	92
Misclns	33	76	154	78	64	160
Store Y	37	74	73	61	91	88
Store Z	30	67	82	35	66	35
Average	31	74	88	56	68	90
Inst Cof Rgn I						
Store X	19	67	361	32	32	89
O Mltps	20	53	206	134	92	150
Store Y	19	80	102	79	86	178
Misclns	47	85	114	92	151	87
Store Z	48	82	114	47	114	76
Average	31	73	179	77	95	116

does not markedly differ across stores, although the Store X and Store V submarkets appear relatively well described.

Second, aside from Store X and Store V - which are the largest stores in each product field - there is little evidence that the Dirichlet's fit deteriorates with falling store size (as might be expected on the basis of sample size differences). This is apparent from the lack of any marked tendency in Table 10.25 for values to fall moving down each column (within each market). The clearest pointers to small-sample problems are to be found in specific brand-store combinations, most notably B4-Z and C4-Z in Region I (see Appendix 5) where the fit is poor on almost all measures (the number of buyers being just 11 and 9 respectively).

TABLE 10.26

Dirichlet Fit in Each BCwS Submarket: Mean Absolute Difference as a Percentage of Mean Deviation, Averaged Across Product Fields for Each Store.

	b	w	wp	w/wp	bs/b	ws	Ave
Region I							
Store X	25	71	164	49	43	88	73
O Mltps	21	73	118	85	73	113	81
Store Y	37	84	99	95	93	140	91
Misclns	38	80	123	75	114	133	94
Store Z	41	80	95	51	99	70	73
Average	32	78	120	71	84	109	82
Region II							
Store V	17	50	75	49	47	103	57
O Mltps	46	78	95	74	79	120	82
Store W	54	84	102	85	91	91	85
Store Z	35	73	96	57	63	88	69
Store Y	29	78	70	59	67	102	68
Average	36	73	88	65	69	101	72

Third, the degree of fit obtained for brand choice within a given store does not appear to be related to the fit achieved for that store in the whole-market store choice context. This is most clearly illustrated for Miscellaneous: while store choice behaviour for this store group differed substantially from the expected pattern, brand choice behaviour **within** the category conforms quite closely to the prediction. The above conclusion does not hold where the Dirichlet output at the SC level is used as input for the five BCwS submarkets, as will be seen in Chapter 12.

10.8. DIFFERENCES BETWEEN STORES.

That the same model applies to every store submarket implies that each of these contexts is subject to the same regularities and broad patterns in brand choice behaviour. However, buyer behaviour may differ from store to store in two main ways. First, submarket structure - as measured by the overall degree of brand loyalty - may vary. Second, once account has been taken of differing market structures (and market shares), a brand's buying pattern may differ from store to store (i.e. in relation to the Dirichlet norms).

10.8.1. Submarket Structure.

Goodhardt et al. (1984, p. 639) raised this issue in their recommendations for future work: "An empirical question is whether the two basic 'diversity' parameters K and S are product-class characteristics which are the same for different demographic sub-groups, different store-groups, different countries, and so on." The present data indicate that, with regard to differing store groups, the answer is "no". As shown in Table 10.27 for Region I, both K and S values vary substantially from store to store within the same product field.

However, K (though not S) can be seen to be remarkably stable for each store group across product fields within each region. (The mean deviation of K for each store across products within each region is under 0.02.) Although K is not a highly variable parameter - in the present instance its value is usually about 0.14 - the degree of across-product stability just mentioned does suggest that K is a constant for each store within a given region. In terms of the Dirichlet model, this implies that the "balance" between a store's penetration and purchase frequency is much the same for different product classes (even though the actual values on these latter two measures may differ). The result need not be surprising: K relates to purchasing of the product class (at the store); and since consumers typically visit the same store for a variety of products, it seems unlikely that - in the aggregate - their choice behaviour towards that store would differ markedly across product classes (assuming similar distribution patterns).

Interpreting variation in K and S across stores is not straightforward since it is only in conjunction with each other and with the third parameter M that these measures can be used to generate specific buyer behaviour predictions. One possibility is to compare how each combination of these three parameters translates into

TABLE 10.27

Dirichlet Parameters
for Brand Choice Within Individual Stores.

Automatc Rgn I	M	K	S
Store X	3.13	.20	.76
O Mltps	2.00	.20	.97
Store Y	1.87	.13	1.50
Misclns	.92	.17	1.11
Store Z	.78	.06	1.33
Tea Bags Rgn I			
Store X	3.09	.20	.67
O Mltps	1.88	.17	.97
Store Y	1.46	.11	1.38
Misclns	1.60	.18	.84
Store Z	1.01	.06	1.75
Inst Cof Rgn I			
Store X	3.66	.26	.64
O Mltps	2.51	.21	.71
Store Y	1.88	.14	.62
Misclns	1.27	.21	1.08
Store Z	1.08	.07	.70
Automatc Rgn II			
Store V	3.05	.13	.80
O Mltps	1.51	.15	.72
Store W	1.33	.11	1.32
Store Z	1.30	.11	1.00
Store Y	1.19	.07	.83
Tea Bags Rgn II			
Store V	3.50	.14	.89
O Mltps	2.68	.15	1.01
Store W	1.22	.11	1.03
Store Z	2.69	.15	.74
Store Y	1.55	.08	.67
Inst Cof Rgn II			
Store V	2.68	.16	.38
O Mltps	2.17	.21	.80
Store W	1.46	.10	.67
Store Z	2.16	.17	.86
Store Y	1.22	.09	.81

direct measures of behaviour (b, w, etc.), i.e. through Dirichlet predictions. Table 10.28 presents such predictions for the Automatic Washing Powder market, Region I, regarding (i) a brand with the same sales level in each store (allowing market shares to vary) and (ii) a brand with constant market share in each store (allowing sales levels to vary).

TABLE 10.28

Dirichlet Predictions for Two Hypothetical Brands Within Each Store. Automatic Washing Powder, Region I.

	b (%)	b/B (%)	w	wp	w/wp (%)	bs/b (%)	ws	dpl (%) ***
(i) m = 0.4 *								
Store X	9.7	22	4.1	9.8	42	29	3.3	18
O Mltps	12.4	33	3.2	7.1	46	33	2.6	26
Store Y	11.9	39	3.4	8.8	39	25	2.2	36
Misclns	15.4	58	2.6	4.1	63	53	2.3	41
Store Z	9.9	70	4.0	6.6	61	47	3.0	58
(ii) MS = 20% **								
Store X	14.4	33	4.4	9.6	46	32	3.5	26
O Mltps	12.4	33	3.2	7.1	46	33	2.6	26
Store Y	11.3	37	3.3	8.8	38	24	2.1	34
Misclns	8.1	30	2.3	4.5	50	40	1.9	21
Store Z	4.9	35	3.1	7.8	40	29	2.1	29

Notes:

* m = the average rate of buying the brand per capita (i.e. per household).

** I.e. market share of the brand within the store.

*** E.g. within Store X (for m = 0.4), the Dirichlet predicts that 18% of the buyers of any other brand will also buy the brand in question.

b/B = relative penetration, i.e. brand penetration among buyers of the product class at the store.

Where brand sales are constant, three main observations can be made. First, the balance between b and w varies from store to store. Thus, for a given number of purchases, a brand at Store X will have fewer, but more frequent, buyers than would be the case at Store Y. Second, there is no clear association between K or S, considered individually, and the direct measures of behaviour. For example, the S parameter is relatively high at Store Z (suggesting high switching, low loyalty) and low at Store X (suggesting low switching, high loyalty), yet the b and w values hardly vary across the two stores. Third, the "proportional" brand-buying measures b/B, w/wp, bs/b and duplication increase in line with within-store brand share which in this case necessarily accompanies falling store size.

Where within-store brand shares are constant (at 20%), these proportional measures remain fairly stable across stores. These are arguably more appropriate than actual purchase frequencies (e.g. w, wp, ws) as indices of market structure as they are less sensitive to differences in market (or in this case store) size.

Such across-store stability on these measures is expressed also by the average observed value within each store (associated with an average market share of around 20%). This is shown in Table 10.29 for share of requirement, the proportion of sole buyers, and relative penetration (an inverse measure of loyalty, since higher values imply higher duplication). Three main points can be drawn from the table.

First, within each market, loyalty to the average brand in each store hardly varies from store to store. There are exceptions: for all three products, w/wp values are relatively low at Store Z (Region I), bs/b values are relatively high at Miscellaneous (Region I), and similarly for b/B values at Store V (Region II). But these discrepancies are not large, and are confined to one measure for each store.

Second, differences between regions are barely apparent (in overall terms and regarding the three individual store groups present in both regions) for the products automatic washing powder and tea bags. In the case of instant coffee, within-store brand loyalty - in terms of w/wp and bs/b - appears to be slightly higher in Region I than in Region II (reflecting the small discrepancy in D coefficients revealed earlier by Table 10.20).

Third, differences between product fields themselves are small. However, for both regions and all three measures, loyalty is strongest for instant coffee and weakest for tea bags, in accordance with the BC-level pattern.

The overall picture is that, while the Dirichlet's parameters may vary, in these direct behavioural terms within-store brand loyalty is much the same in different stores. Certainly there is no evidence of radically diverging market structures. Further, this loyalty stability applies across regions and to a lesser extent across products. Values of w/wp, bs/b and b/B of 45, 35 and 30 respectively would in most cases represent a good estimate of loyalty to the average brand within a store,

TABLE 10.29

Three Measures of Loyalty to the Average Brand Within a Store.

	w/wp (%) Product Aut	Tea	Cof	Ave	bs/b (%) Product Aut	Tea	Cof	Ave
Region I								
Store X	47	44	52	48	32	31	34	32
O Mltps	45	46	52	48	32	32	40	35
Store Y	42	43	53	46	30	33	44	36
Misclns	50	41	54	48	46	40	47	44
Store Z	40	33	47	40	37	30	49	39
Average	45	41	51	46	35	33	43	37
Region II								
Store V	46	40	63*	43	30	28	50*	29
O Mltps	51	44	44	46	40	30	34	35
Store W	47	48	49	48	34	38	35	36
Store Z	44	41	48	44	31	31	41	34
Store Y	42	43	47	44	33	36	36	35
Average	46	43	47	45	34	33	37	34

	b/B (%) Product Aut	Tea	Cof	Ave
Region I				
Store X	31	31	30	31
O Mltps	30	33	29	31
Store Y	31	33	29	31
Misclns	25	30	28	28
Store Z	30	29	26	28
Average	29	31	28	30
Region II				
Store V	36	43	41*	40
O Mltps	27	34	29	30
Store W	36	31	28	32
Store Z	30	31	29	30
Store Y	30	31	30	30
Average	32	34	29	32

Notes:

* These figures are excluded from the averages as the average brand share within Store V is especially high at 33% (which itself reflects a restricted brand range).

whatever the region or product.

These results are supported by the D coefficients reported earlier in Table 10.20. D values were much the same at different stores, and varied little across regions (although they tended to be lower in Region I for instant coffee) and across product fields (although the usual loyalty ranking - instant coffee first, tea bags third - did emerge).

10.8.2. The Buying Pattern for a Brand at Different Stores.

This section is concerned not with market structure but with the buying pattern for individual brands. More specifically, it examines the consistency of divergences from Dirichlet predictions across stores. For instance, if a brand receives higher-than-expected loyalty in one store, will this discrepancy be reflected at other stores? Marked inconsistency across stores would point to some degree of brand-store interaction (if not sampling error).

There are numerous cases where a brand's buying pattern is broadly similar at different stores. In Table 10.30, which gives loyalty indices for the tea bag market in Region II, Brand B1 can be seen to receive higher-than-expected loyalty at each store (and usually on every measure). (To illustrate, in Store Z, Brand B1's observed purchase frequency (w) is 7% greater than the predicted value; within Other Multiples it is 33% greater than the predicted value.) And the Other Brands category is shown to receive lower-than-expected loyalty in most cases.

Many examples of across-store consistency for specific measures can also be drawn from other product fields. Brand A4 in Region I and Brand C4 in Region II attract particularly heavy buyers of the product field (i.e. they have high wp values) at every store. (Curiously, these brands are bought by light buyers at almost every store in the other region.)

Alongside the above examples are many cases of **inconsistency** across stores. In Table 10.30, Brand B3's loyalty rating (especially regarding purchase frequency and share of requirement) appears relatively low at Store V. And Brand B4's loyalty rating is especially high at Store V (relative to the pattern at other stores).

Such cases are abundant elsewhere, the most marked of which are noted below.

TABLE 10.30

Loyalty Indices * for Brand Choice Within Stores, Figures Grouped by Brand. Tea Bags, Region II.

	MS **	w	w/wp	bs/b	dpl ***
Brand B1					
Store V	--	---	---	---	---
Store Z	61	107	107	95	115
O Mltps	29	133	131	105	107
Store Y	31	104	108	121	114
Store W	29	144	135	111	125
Brand B2					
Store V	35	103	109	103	100
Store Z	13	82	92	138	113
O Mltps	23	89	105	138	108
Store Y	39	111	104	115	115
Store W	27	101	110	105	89
O Brands					
Store V	32	95	99	103	102
Store Z	9	71	78	79	81
O Mltps	22	93	98	107	95
Store Y	12	72	73	72	81
Store W	21	88	97	130	97
Brand B3					
Store V	5	54	48	94	90
Store Z	13	109	95	62	83
O Mltps	17	111	114	129	104
Store Y	12	99	103	110	95
Store W	15	100	116	138	100
Brand B4					
Store V	28	104	96	86	100
Store Z	4	53	53	75	76
O Mltps	10	88	86	76	83
Store Y	7	64	53	53	77
Store W	7	79	72	86	88

Notes:

* I.e. observed value as a percentage of predicted value, but vice versa for duplication.

** I.e. market share of the brand within the stated store.

*** Predicted values from Duplication of Purchase Law. E.g. the predicted proportion of the buyers of a (non-B1) brand within Store Z who also buy Brand B1 at that store is 15% greater than the average observed proportion.

* Brand A4 (Rgn I) is bought particularly frequently at every store except Store X.

* Brand C1 (Rgn I) is bought infrequently (and by light product buyers) at Store Y, but is bought frequently (and by heavy product buyers) at Store Z.

* A similar difference occurs for Brand A5 (Rgn II) between Stores Z and W, and for Brand C1 (Rgn II) between Stores Y and Z.

* Brand C4 (Rgn I) receives very high loyalty on all measures at Store Y and Miscellaneous, but not elsewhere.

For the markets analysed here, inconsistency in a brand's buying pattern across stores appears more general than consistency. Three main reasons can be offered.

First, there is undoubtedly a random element in the fit achieved: the model is not perfect in all circumstances (nor is it expected to be), and sampling errors are especially relevant at the present submarket level of analysis. As a brand's buying pattern does not in general differ emphatically across stores, this may be the most important factor.

Second, the variance discrepancy noted in Section 10.7.2 (i.e. an underestimation of loyalty differences across brands) implies that a brand will tend to receive an "excess" of loyalty in a store where its market share is large and a "deficiency" in a store where its share is small. This factor probably accounts for the across-store inconsistency of Brands B3 and B4 in Table 10.30: for each brand the "maverick" within-store pattern involves a particularly small and particularly large brand share respectively. Another example concerns the purchase frequency of Brand C1 in Region I. As shown in Table 10.31, which orders the stores by this brand's share within them, observed purchase frequency relative to the predicted value increases in line with within-store brand share.

Third, some genuine brand-store interaction may be involved. Stores differ in terms of customers, brand range, the brands they promote, the manner of promotion, private labels, and so on. Such differences may explain the large brand share variation across stores (noted in the previous chapter), and if so, there is little reason to suppose that they should not also account partly for the variation in the loyalty (i.e. relative to the theoretical norms) a brand receives at different stores.

TABLE 10.31

Market Share
and Observed and Predicted Average Purchase Frequency (w)
of Brand C1 Within Different Stores in Region I.

Store	Market Share Within Store (%)	w O	w D	w O - D
Misclns	18	2.2	2.4	- 0.2
Store Y	20	3.5	4.0	- 0.5
O Mltps	25	4.1	4.0	+ 0.1
Store X	48	5.9	5.4	+ 0.5
Store Z	60	6.7	5.1	+ 1.6

10.9. CONCLUSIONS.

This chapter has examined patterns of brand choice within individual stores, and in particular has assessed the fit of the Dirichlet model in this submarket context. There are four main conclusions.

1. Brand choice patterns within individual stores follow the same trends and regularities as have long been associated with brand choice behaviour at the whole-market level.

First, the usual trends with market share, with one or two exceptions (see below), were again apparent: within a given store, small brands tend to be bought less frequently, have fewer buyers, have a lower proportion of sole buyers, and so on. Second, multibrand buying is still very much the norm. In absolute terms brand loyalty seems quite low: typically, over the 48-week period, the buyers of a brand at a store make as many purchases of other brands at that store as of the brand in question; only about a third of these buyers will be 100%-loyal to the brand within the store; and about half will buy the brand no more than once at the store. Brand loyalty on these and all other measures is nevertheless stronger in the within-store context than in the market as a whole, since product purchasing rates are invariably lower in store submarkets, reducing the opportunity for disloyalty.

In general the trends with market share are less clear at the submarket level. In particular, the (negative) association between wp and market share is far from smooth in most submarkets, and there are numerous breaks in double jeopardy. Yet the broad patterns remain, and undoubtedly the small samples involved play some part in blurring the more subtle regularities.

It seems reasonable to conclude that, within individual stores, brands are subject to the same broad behavioural parameters (in a general sense) that they face in the market as a whole. The same constraints on marketers' ability to **change** buyer behaviour therefore still hold: sales increases derive from increases in both penetration and purchase frequency, but primarily the former; attempting to raise sales through generating 100%-loyalty among buyers would be aiming at something altogether unusual; and so on. Such constraints will be of particular relevance to stores wishing to promote private-label brands within their stores.

2. The Dirichlet successfully describes brand choice patterns within individual stores.

This finding represents a logical extension to the results of Kau (1981) and Kau and Ehrenberg (1984), who demonstrated the applicability of the NBD model and the Duplication of Purchase Law - effectively two "special cases" of the Dirichlet - to the within-store brand buying context.

In practical terms, generalizing the Dirichlet to the whithin-store case means that the traditional utility of the model - helping to structure complex behavioural patterns, identify irregularities, and measure the effects of change - relates also to the needs of retail managers concerned with within-store brand choice patterns.

The fit of the Dirichlet is not as good as at the whole-market level, but such a deterioration is to be expected in view of the smaller samples employed. The correspondence between the two contexts in fact extends beyond the Dirichlet's validity to the pattern of **deviation** from the model. As with the BC context, the fit at the BCwS level appears somewhat closer for b and and w/wp than for wp and ws. And the main instances of bias remain the same: the purchase frequency of sole buyers is typically underestimated; across-brand variation in loyalty tends to be underestimated; and loyalty to the Other Brands grouping is consistently lower than predicted.

In so far as an **overall** picture of fit (i.e. across several measures of behaviour) can be attained, the Dirichlet's validity differs little from store to store. (However, there are numerous instances where the fit varies strongly for an individual measure.) Further, the good fit achieved within the Other Multiples and Miscellaneous categories (which were poorly described at the SC level) suggests that the predictive accuracy for brand choice within an individual store is independent of that relating to the store's choice pattern at the whole-market level.

3. The level of brand loyalty differs little from store to store.

This conclusion holds for the "proportional" loyalty measures, such as w/wp, bs/b and the D coefficient, rather than for the "frequency" measures such as w and ws. (These latter measures inevitably vary strongly with the purchase frequency of the product at the store.) Indeed, reflecting the BC-level pattern, the stability of within-store brand loyalty extends across regions and, to a lesser extent, product fields. Values for w/wp, bs/b and D of 45%, 35% and 0.85 respectively would in most cases represent a good estimate of loyalty to the average brand within a store, whatever the region or product.

The loyalty pattern for **individual** brands - when measured relative to the Dirichlet's predictions - was found to vary across stores. (The absolute values inevitably vary with differences in store size - for the "frequency" measures especially - and in the brand's within-store market share.) Thus it is quite common for a brand to receive higher-than-expected loyalty (on some measure) in one store and lower-than-expected loyalty in another. However, much of this instability can reasonably be attributed to sampling error.

4. The Dirichlet Parameter K varies little across product fields for each store.

This suggests that K, within a given region, is a constant for each store, and implies that the "balance" between a store's penetration and purchase frequency is much the same for different product classes (even though the actual values on the latter two measures may vary). The result probably reflects the fact that consumers visit a store for a variety of products, and, given the wide availability of the products considered in this study, are unlikely to fundamentally vary their store patronage behaviour from one product field to another.

Chapter 11

STORE CHOICE FOR INDIVIDUAL BRANDS

Contents:

11.1. INTRODUCTION.

This chapter is concerned with patterns of store choice for individual brands. Two main questions are addressed.

(i) Does store choice behaviour for individual brands follow the same "standard" regularities as apply to store choice behaviour for a whole product field?

(ii) Can the Dirichlet model successfully describe the patterns of store choice for individual brands?

The approach corresponds to that of the previous chapter: various aspects of buyer behaviour are considered in turn; and the basic regularities associated with each measure at the whole-market level are recalled, and treated as the expected pattern within the present submarket context.

Again, at this submarket level it is important to interpret all buyer behaviour measures as relating to the stated submarket alone. The "market" is now the brand, not the product class. For instance wp in this chapter refers to the **brand**-buying rate (at any store) of the buyers of a given brand at a given store.

This chapter represents the first direct investigation of the Dirichlet's validity for "within-brand" store choice. As in the BCwS case, Kau (1981) and Kau and Ehrenberg (1984) have demonstrated that the store choice behaviour at hand coforms closely to the pattern predicted by the NBD model and Duplication of Purchase Law. Such results give grounds for optimism regarding the Dirichlet's suitability, the NBD being a "special case" of the Dirichlet and the Duplication of Purchase Law an indirect test of the IIA assumption underlying the Dirichlet model.

To assess its validity, the Dirichlet has been calibrated to the 30 submarkets represented by the 5 brand categories of each product field in each region. In view of the volume of data thus generated, many summary results are presented in this chapter with full results being provided in Appendix 6. This Appendix includes details of where a store category (usually Miscellaneous) has been excluded from the calculation of the S parameter. As in the previous chapter, attention focuses on three submarkets in Region I - in this case Brands A1, A2 and A3 - although the results presented in tables referring to the **average** brand submarket were calculated using all five brand categories within each market.

11.2. PENETRATION AND PURCHASE FREQUENCY.

11.2.1. Regularities.

The main regularities at the whole-market level for these measures are twofold.

A. The frequency of buying a product at a store differs little from store to store.

B. Both store penetration and purchase frequency tend to fall with decreasing market share.

Table 11.1 displays the b and w values of five stores for each of three brands within the automatic washing powder market, Region I. To clarify, 23% of the population buy Brand A1 at Store X, and they buy the brand there 5.1 times on average.

Regularity A above - the approximate constancy of w from store to store - is apparent in Table 11.1 (in so far as purchasing rates do not differ radically across stores), but only if the "maverick" Miscellaneous category is excluded. Averaged across these three SCwB submarkets (and leaving aside Miscellaneous), the mean deviation is about 0.6, representing about a fifth of the value of the mean.

The results from other markets are mixed. Instances of virtual constancy in w across stores can be found, e.g. regarding Brand B4 in Region I (Table A6.13), Brand C3 in Region I (Table A6.25), Other Brands of instant coffee in Region I (Table A6.25), and Brand A1 in Region II (Table A6.37). Yet other submarkets show w to be quite variable across stores, e.g. regarding Brand B4 in Region II, where the values range from 2.2 to 5.8 (Table A6.44). Cases such as this typically reflect large differences in market share (6% versus 56% in the present instance), as would in fact be expected under regularity B above. Overall, taking account of the small samples involved, the expected (approximate) similarity between the w values of stores for a given brand is upheld.

Regularity B (the Double Jeopardy effect) emerges clearly from Table 11.1 (excluding Miscellaneous): the smaller a store's market share for a give brand, the lower its average rate of purchase. The pattern holds elsewhere, as summarized by Table 11.2, giving the average w value for each store rank.

TABLE 11.1

Penetration (b) and Average Purchase Frequency (w): Store Choice for Brands A1, A2 and A3. Automatic Washing Powder, Region I.

	MS (%)	b (%) O	b (%) D	w O	w D
Brand A1					
Store X	42	23	27	5.1	4.2
O Mltps	24	19	18	3.5	3.8
Store Y	17	15	13	3.0	3.6
Misclns	9	11	7	2.2	3.4
Store Z	7	6	6	3.1	3.4
Brand A2					
Store X	35	14	16	4.6	4.0
Store Y	26	11	13	4.4	3.8
O Mltps	20	13	10	3.0	3.7
Misclns	11	8	6	2.6	3.5
Store Z	9	6	5	3.0	3.4
Brand A3					
Store X	36	13	13	3.5	3.6
O Mltps	26	9	10	3.7	3.5
Store Y	26	9	10	3.6	3.5
Store Z	7	3	3	2.7	3.2
Misclns	6	4	2	2.1	3.2
Average	20	11	11	3.3	3.6

Notes:
- E.g. 23% of the population buy Brand A1 at Store X, and these buyers buy the brand there 5.1 times on average.

11.2.2. Dirichlet Fit.

The fit of the Dirichlet is not especially close for the first two brand submarkets in Table 11.1, but the discrepancies at least conform to a now-familiar pattern: underprediction of w for categories with large shares, and the reverse for those with small shares. The degree of fit does not improve in other markets, as summarized by Table 11.3. (As the Table shows, excluding the Miscellaneous category from Region I leads to better overall agreement for washing powder and instant coffee, but not for tea bags where this composite store category is surprisingly well predicted for the two measures in question.)

TABLE 11.2

Store Average Purchase Frequency (w), Averaged Across Brands for each Store Rank.

Store Rank	Product/Region A.I	B.I	C.I	A.II	B.II	C.II	Ave
1	4.4	3.8	4.3	4.3	5.7	5.2	4.6
2	3.8	3.9	4.4	3.5	4.5	3.6	3.9
3	3.1	3.0	4.1	3.3	3.8	4.1	3.6
4	2.8	3.3	3.3	3.2	3.5	3.7	3.3
5	3.0	2.0	2.7	3.4	3.3	2.8	2.9

Notes:
- E.g. in the Automatc Rgn I market (A.I), on average a brand is bought at the largest store (whichever that may be for each of the five brands) 4.4 times, at the 2nd largest store 3.8 times, etc.
- In cases where a brand is not stocked by a store, ranks are redefined in much the same way as in the BCwS context - see Table 10.2 for details.

TABLE 11.3

Dirichlet Fit in the SCwB Context: Penetration (b) and Average Purchase Frequency (w).

Prdct/ Rgn		------ b ------ MAD	MD	MAD/ MD %		----- w ----- MAD	MD	MAD/ MD %
	*				*			
A.I	(1.3)	1.4	2.9	51	(.49)	.59	.69	85
B.I	(1.1)	1.0	3.0	35	(.56)	.52	.66	81
C.I	(0.8)	1.2	3.4	33	(.53)	.66	.79	84
A.II		1.5	1.6	114		.72	.82	85
B.II		1.7	3.9	54		.77	.91	80
C.II		1.7	3.1	63		.65	.73	84
Ave		1.4	3.0	58		.65	.77	83
Ave (SC) **		3.3	7.1	49		.67	.85	81

Notes:
* Figures in brackets are MAD values that exclude the Miscellaneous category.
** Overall average values for the Store Choice (i.e. whole-market) context.

As measured by mean absolute difference as a proportion of mean deviation, the fit is remarkably stable from market to market. Indeed, such similarity extends to comparison with the SC context.

11.3. BRAND BUYING AND SHARE OF REQUIREMENT.

11.3.1. Regularities.

The principal whole-market regularities in this area are as follows.

C. wp is much higher than w, i.e. a store's buyers' rate of buying the product class (anywhere) is much higher than their rate of buying the product at that store.

D. The product buying rate per buyer at a store (wp) varies little from store to store.

E. However, the product buying rate per buyer at a store (wp) does tend to increase slightly with decreasing market share.

The first of these regularities at the SC level implies that buyers of a product at a store typically buy the product elsewhere extensively. It may be thought however that consumers would remain loyal to a store **for an individual brand,** on the assumption that consumers only switch stores when switching brands. The present data indicate that this is not so: regularity C applies strongly to the present SCwB context, as illustrated by the w/wp values in Table 11.4. Buyers of a brand at a store typically make as many purchases of that brand elsewhere as they do at that store. The degree of within-brand store loyalty measured on this basis is very similar from market to market (Table 11.5).

Regularity D also emerges clearly from Table 11.4: regarding any specific brand, different stores attract buyers with much the same rate of buying that brand. The average mean deviation of this wp measure for the 30 submarkets studied is only about 0.7 (Table 11.7), representing (as in the BCwS context) about 10% of the value of the overall mean (given in Table 11.5). The most marked exception concerns Store Z in Region I, which attracts especially heavy buyers of Brands C1, C2 and Other Brands (but not of Brands C3 or C4), as shown in Table A6.26.

The tendency at the SC level for wp to increase slightly as market share falls is not strongly apparent in Table 11.4, and a similar conclusion applies to other markets, as is suggested by the average values for each store rank in Table 11.6.

TABLE 11.4

Average Purchases Frequency of Brand per Buyer at a Store (wp) and Share of Requirement (w/wp): Store Choice for Brands A1, A2 and A3. Automatic Washing Powder, Region I.

	MS (%)	wp O	wp D	w/wp % O	w/wp % D
Brand A1					
Store X	42	7.4	6.7	68	62
O Mltps	24	7.1	7.1	49	53
Store Y	17	6.2	7.3	49	49
Misclns	9	8.2	7.5	27	45
Store Z	7	8.7	7.6	35	45
Average	20	7.5	7.2	46	51
Brand A2					
Store X	35	6.6	6.7	70	59
Store Y	26	7.1	6.9	62	54
O Mltps	20	6.5	7.1	46	52
Misclns	11	8.2	7.3	32	48
Store Z	9	7.1	7.4	42	46
Average	20	7.1	7.1	50	52
Brand A3					
Store X	36	6.1	5.6	58	65
O Mltps	26	6.6	5.7	56	61
Store Y	26	5.6	5.7	64	61
Store Z	7	6.4	6.1	42	53
Misclns	6	7.4	6.1	28	52
Average	20	6.4	5.8	50	58

Notes:
- E.g. buyers of Brand A1 at Store X make 7.4 purchases of the brand in total (i.e. at any store), and devote 68% of these purchases to Store X.

11.3.2. Dirichlet Fit.

The agreement between observed and predicted figures in Table 11.4 is reasonably close in most cases. (Miscellaneous stands out with a higher-than-predicted wp value and lower-than-predicted w/wp proportion, but the former discrepancy is not consistent across other submarkets in this and other product fields.) Here as elsewhere, the predictions are generally of the right

TABLE 11.5

Average Purchase Frequency of Brand per Buyer at a Store (wp) and Share of Requirement (w/wp). Average Store for the Average Brand.

Product/Region	wp O	wp D	w/wp % O	w/wp % D
Automatc Rgn I	6.8	6.6	51	54
Tea Bags Rgn I	5.9	6.0	54	58
Inst Cof Rgn I	7.6	7.1	50	56
Automatc Rgn II	7.2	7.3	54	54
Tea Bags Rgn II	7.9	8.1	52	54
Inst Cof Rgn II	7.2	7.1	55	55
Average	7.1	7.0	53	55
Average (SC)	14.7	15.0	42	43

Notes:
- E.g. regarding Automatc Rgn I, the buyers of the average brand at the average store make 6.8 purchases of the brand in total (i.e. at any store), and devote 51% of these purchases to the store in question.

TABLE 11.6

Average Purchase Frequency of Brand per Buyer of the Brand at a Store (wp): Values Averaged Across Brands for Each Store Rank.

Store Rank	A.I	B.I	C.I	A.II	B.II	C.II	Ave
1	6.4	5.9	6.9	7.5	8.4	7.6	7.1
2	6.7	6.5	7.7	6.9	8.1	7.2	7.2
3	6.5	5.7	7.3	6.7	8.5	7.3	7.0
4	7.4	6.6	7.5	7.9	7.5	7.3	7.4
5	7.2	4.8	8.6	7.2	6.8	6.5	6.9

(Product/Region)

Notes:
- E.g. regarding Automatc Rgn I, on average buyers of a brand at the largest store (whichever that may be for each brand) make 6.4 purchases of the brand in total (i.e. at any store).
- For further clarification see Table 11.2.

numerical level (see Table 11.5), with no obvious bias beyond a slight overprediction of w/wp in Region I (largely attributable to the Miscellaneous category).

However, the summary measures of agreement in Table 11.7 do not point to an especially good fit overall. The mean discrepancies of 0.8 and 7 for wp and w/wp respectively seem quite high relative to the average values of 7.1 and 53 (Table 11.5) for these two measures of buyer behaviour, and in the former case seem also high relative to the low mean deviation of wp.

TABLE 11.7

Dirichlet Fit in the SCwB Context: Average Purchase Frequency of Brand per Buyer at a Store (wp) and Share of Requirement (w/wp).

	----- wp ------				---- w/wp ----			
Prdct/ Rgn	*	MAD	MD	MAD/ MD %	*	MAD	MD	MAD/ MD %
A.I	(.56)	.68	.66	105	(6.7)	8.4	11.0	77
B.I	(.71)	.74	.57	131	(7.0)	7.5	8.3	99
C.I	(.92)	.81	.84	96	(7.5)	8.9	10.2	88
A.II		.75	.63	120		6.8	9.2	66
B.II		1.06	.74	152		4.6	7.4	63
C.II		.76	.58	135		6.5	8.4	77
Ave		.80	.67	123		7.1	9.1	78
Ave (SC)		.84	.78	110		4.5	6.4	72

Notes:
* Figures in brackets are MAD values that exclude the Miscellaneous category.

11.4. SOLE BUYERS.

11.4.1. Regularities.

The main SC-level regularities in this area are threefold.

F. The proportion of sole buyers (bs/b) is "low".

G. The average purchase frequency of a store's sole buyers (ws) is slightly higher than that of all the store's buyers.

H. Both measures (bs/b and ws) fall in value with decreasing market share.

Regularity F can be seen to apply to the present SCwB context in Table 11.8 where, in most cases, a minority of a store's buyers for the brand are 100%-loyal to the store for that brand. Put another way, a **majority** typically buy the brand at other stores at least once over the period. Results from other markets support this overall picture, and in average terms are very similar to each other - bs/b always being about 45% - as shown in Table 11.9. The Table also indicates that the proportion of store sole buyers for a brand is over twice that when **product** buyers are considered: in a multibrand buying situation, the purchasing rates of individual brands is necessarily lower than that of the product class as a whole, providing less opportunity for store "disloyalty".

Regularity G is **not** obvious in the SCwB context: whereas at the SC level ws was typically 20% higher than w, in the present situation it is (in overall terms) close to - and slightly **lower** than - w in all the six markets studied (see Table 11.10). Thus people who shop at only one store for a given brand are as individuals no more valuable to the store (regarding that brand's sales at the store) than the average buyer of the brand-store combination in question.

Regularity H is clearly apparent in Table 11.8 for both sole buying measures: the bs/b proportions consistently fall with decreasing share (either Other Multiples or Store Y for Brand A1 being the only exception to this trend), as do the ws values (excepting Store Z for Brand A1). This trend for ws is also reasonably apparent within other submarkets, as shown by the averaged values for each store rank in Table 11.11. However, in many submarkets ws retains its "erratic" behaviour (presumably due to the particularly small samples associated with this measure) noted originally at the whole-market level.

TABLE 11.8

Proportion of Sole Buyers (bs/b) and Average Purchase Frequency of Sole Buyers (ws): Store Choice for Brands A1, A2 and A3. Automatic Washing Powder, Region I.

	MS (%)	bs/b (%) O	bs/b (%) D	ws O	ws D
Brand A1					
Store X	42	50	49	4.6	3.8
O Mltps	24	34	40	3.1	3.4
Store Y	17	43	37	2.5	3.2
Misclns	9	25	33	2.0	3.0
Store Z	7	24	32	2.9	3.0
Average	20	35	38	3.0	3.3
Brand A2					
Store X	35	51	48	3.6	3.5
Store Y	26	44	43	3.3	3.3
O Mltps	20	40	41	2.7	3.2
Misclns	11	28	37	2.6	3.0
Store Z	9	24	36	2.4	2.9
Average	20	38	41	2.9	3.2
Brand A3					
Store X	36	60	57	3.5	3.4
O Mltps	26	50	53	3.0	3.2
Store Y	26	48	53	2.8	3.2
Store Z	7	43	45	2.2	2.9
Misclns	6	39	44	1.3	2.9
Average	20	48	50	2.6	3.1

Notes:
- E.g. of the buyers of Brand A1 at Store X, 50% buy the brand only at Store X (i.e. are 100% loyal to the store for that brand), and these sole buyers buy the brand at that store 4.6 times on average.

11.4.2. Dirichlet Fit

The agreement between observed and predicted figures in Table 11.8 is reasonably close, with a mean absolute difference of under 5 for bs/b and 0.5 for ws (including Miscellaneous where, as usual, the discrepancies are widest). Elsewhere the fit is poorer, as summarized by Table 11.12. The overall mean discrepancies of 6 and 0.8 for bs/b and ws respectively can not be deemed especially low when assessed against (i) the average values for the

TABLE 11.9

Proportion of Sole Buyers (bs/b)
and Average Purchase Frequency of Sole Buyers (ws).
Average Store for the Average Brand.

Product/Region	bs/b (%) O	bs/b (%) D	ws O	ws D
Automatc Rgn I	42	45	3.0	3.2
Tea Bags Rgn I	51	48	3.1	3.0
Inst Cof Rgn I	42	47	3.5	3.6
Automatc Rgn II	45	44	3.5	3.3
Tea Bags Rgn II	43	44	4.1	4.0
Inst Cof Rgn II	46	45	3.6	3.5
Average	45	46	3.5	3.4
Average (SC)	19	21	7.3	6.3

Notes:
- E.g. in the case of Automatc Rgn I, on average 42% of the buyers of a brand at a store are 100%-loyal to the store for that brand, and these sole buyers buy the brand at that store 3.0 times on average.

TABLE 11.10

Average Purchase Frequency of Sole Buyers (ws)
Compared with
Average Purchase Frequency of All Buyers.
Average Store for the Average Brand.

Product/Region	ws	w	ws/w (%)
Automatc Rgn I	3.0	3.4	88
Tea Bags Rgn I	3.1	3.2	97
Inst Cof Rgn I	3.5	3.7	95
Automatc Rgn I	3.5	3.8	92
Tea Bags Rgn I	4.1	4.2	98
Inst Cof Rgn I	3.6	3.9	92
Average	3.5	3.7	94
Average (SC)	7.3	6.2	118

TABLE 11.11

Average Purchase Frequency of Sole Buyers (ws): Values Average Across Brands for Each Store Rank.

Store Rank	AI	BI	CI	AII	BII	CII	Ave
	Product/Region						
1	3.8	3.4	3.9	4.8	5.5	4.7	4.4
2	3.1	4.0	4.1	3.5	4.1	3.5	3.7
3	2.7	3.0	4.0	3.4	4.1	3.9	3.5
4	2.1	2.8	2.9	2.5	3.5	3.3	2.9
5	3.0	2.4	2.5	3.2	3.5	2.6	2.9

Notes:
- E.g. Regarding Automatc Rgn I, on average buyers of a brand at the largest store (whichever that may be for each brand) who are 100%-loyal to that store for that brand make 3.8 purchases of the brand at the store.
- See Table 11.2 for further clarification.

TABLE 11.12

Dirichlet Fit in the SCwB Context: Proportion of Sole Buyers (bs/b) and Average Purchase Frequency of Sole Buyers (ws).

Prdct/ Rgn		----- bs/b -----				----- ws -----		
	*	MAD	MD	MAD/ MD %	*	MAD	MD	MAD/ MD %
A.I	(6.8)	6.6	9.2	70	(.70)	.76	.83	89
B.I	(5.2)	4.6	5.8	79	(.77)	.67	.63	136
C.I	(9.3)	8.3	9.0	92	(.99)	1.06	1.06	104
A.II		6.4	4.8	149		.72	.81	93
B.II		6.4	6.0	110		.91	.92	102
C.II		4.3	4.2	141		.91	.95	113
Ave		6.1	6.5	107		.84	.87	106
Ave (SC)		4.0	4.3	110		1.57	1.26	123

Notes:
* Figures in brackets are MAD values that exclude the Miscellaneous category.

two measures (45% and 3.5) and (ii) the mean deviation associated with each measure (7 and 0.9). Overall, the Dirichlet has not quite improved on the average value as predictor (as indicated by the MAD/MD figures in Table 11.12).

A point of interest is that the consistent underprediction of ws in the BC, SC and BCwS contexts does not apply to the SCwB situation, as implied by the average values in Table 11.9.

11.5. PURCHASE FREQUENCY DISTRIBUTION.

11.5.1. Regularities.

The main SC-level regularity in this area is noted below.

I. The distribution of product purchasing rates at a store across consumers is reversed-J-shaped, implying a large proportion of light buyers at the store.

On this measure of buying behaviour, the observed data in the present SCwB context are necessarily identical to those in the BCwS situation. Thus again the distribution is highly skewed, with on average about half the buyers of a given brand at a store buying that brand-store combination only once over the 48-week period (Table 11.14).

TABLE 11.13.

Purchase Frequency Distribution: Store Choice for Brand A1. Automatic Washing Powder, Region I.

Buyers of Brand A1 at:		% buying A1 there X times: 1	2	3	4	5	6	7	8+
Store X	O	33	19	8	8	6	5	2	21
	D	37	18	11	7	5	4	3	15
O Mltps	O	43	15	11	8	4	2	4	13
	D	40	18	11	7	5	4	3	12
Store Y	O	44	24	9	4	4	2	2	11
	D	42	18	11	7	5	4	2	12
Misclns	O	49	26	11	5	2	4	0	3
	D	44	18	10	7	4	3	3	12
Store X	O	44	20	9	11	2	2	6	7
	D	44	18	11	7	5	4	2	10
Average	O	43	21	10	7	4	3	3	11
	D	41	18	10	7	5	4	3	12

Notes:
- E.g. of the buyers of Brand A1 at Store X, 33% buy the brand at the store once, 19% do so twice, etc.

11.5.2. Dirichlet Fit.

The Dirichlet predictions however are not the same, deriving from the SCwB submarkets (which involve different calibrations of the Dirichlet from the BCwS situation). However, the fit remains very good, as illustrated for an individual brand in Table 11.13 and for the average brand-store combination in each market in Table 11.14. The now-familiar underprediction of once-only buyers is also apparent from these figures.

TABLE 11.14

Purchase Frequency Distribution: Average Store for the Average Brand. Region I.

Buyers of average brand-store combination:		% buying the brand at the store X times: 1	2	3	4	5	6	7	8+
Automatc	O	49	17	8	6	5	3	3	10
	D	43	18	10	7	5	4	3	11
Tea Bags	O	55	15	9	5	3	2	2	10
	D	45	18	10	6	4	3	2	10
Inst Cof	O	47	16	7	6	4	3	2	14
	D	40	17	10	7	5	3	3	15
Average	O	50	16	8	6	4	3	2	11
	D	43	18	10	7	5	3	3	12
Ave (SC)	O	31	14	9	7	5	5	4	24
	D	29	15	10	7	6	4	4	25

Notes:
- E.g. regarding Automatc, of the buyers of the average brand at the average store, 49% buy that brand-store combination once, 17% buy it twice, etc.

11.6. DUPLICATION.

11.6.1. Regularities.

The Duplcation of Purchase Law is recalled here as SC-level regularity "J".

J. The percentage of product buyers at a store also buying the product at any other given store is proportional to this latter store's penetration.

As in Chapter 7, duplication is here related to **relative** penetration, which in the present SCwB context refers to the store's penetration among buyers of the brand.

The present results corroborate those of Kau (1981) and Kau and Ehrenberg (1984) who found the Law to apply to store choice for both whole product fields and individual brands. The store duplication patterns for Brands A2 and B2 in Tables 11.15 and 11.16 are illustrative in this respect: the predicted duplications (respectively 0.7 and 0.8 times relative penetration) being accurate to within a few percentage points of the average duplications. A

TABLE 11.15

Store Duplication for Brand A2.
Automatic Washing Powder, Region I.

Buyers of Brand A2 at:	**% also buying Brand A2 at:**				
	X	**Y**	**OM**	**Ms**	**Z**
Store X	--	17	22	14	9
Store Y	22	--	22	22	12
O Mltps	25	19	--	23	12
Misclns	25	30	36	--	16
Store Z	24	24	28	24	--
Average	24	23	27	21	12
D x rltv b	29	23	26	17	11
D = 0.71					
Relative b *	41	32	37	24	16

Notes:
* Relative b (or rltv b) = relative penetration, i.e. the store's penetration among buyers of Brand A2. Note that D is calculated using relative penetration.
- E.g. 22% of the buyers of Brand A2 at Store Y also buy Brand A2 at Store X.

similar level of agreement applies to other SCwB submarkets, as shown in Table 11.17 for Region I, with a typical discrepancy of about 3 percentage points.

TABLE 11.16

Store Duplication for Brand B2. Tea Bags, Region I.

Buyers of Brand B2 at:	**% also buying Brand B2 at:**				
	OM	**X**	**Y**	**Ms**	**Z**
O Mltps	--	24	26	25	10
Store X	29	--	24	21	4
Store Y	31	24	--	24	10
Misclns	34	24	28	--	12
Store Z	37	13	32	32	--
Average	33	21	28	26	9
D x Rltv b	32	26	27	22	9
D = 0.77					
Relative b	41	34	35	29	11

The usual scatter occurs within each column of the full duplication tables shown here and in Appendix 6 (variation which can largely be attributed to sampling error), and the agreement between the predictions and **individual** duplications (see Table 11.18) is correspondingly poorer than for the averages. Nevertheless, individual duplications do typically show that slight increase with falling market share (i.e. down the columns) that is well-established at the whole-market level.

A further similarity with the SC level concerns the overprediction of duplication with Store X (Table 11.17), the only exception concerning Other Brands in the Region I tea bags market. This appears to be a characterization of Store X itself rather than a reflection of some "store leader" effect (analogous to the brand leader effect widely noted in Chapter 6): the overprediction applies to Store X even when it is not the store leader (see the unemboldened figures for this store in Table 11.17), and such a discrepancy does not consistently apply to the store leader (usually Store V) in Region II (see Appendix 6).

The 30 duplication coefficients in the SCwB context are all less than one, indicating that buying a brand at a store inhibits buying the brand elsewhere. For instance, in Region I, the average buyer of Brand A1 at a store is

TABLE 11.17
Store Duplication for Individual Brands:
Average Values for Each Store. Region I.

Buyers at ave store of stated brand:		% also buying stated brand at:				
Automatc Rgn I		X	OM	Y	Ms	Z
Brand A1	O	**32**	36	23	23	13
	T	**38**	32	26	19	11
Brand A2	O	**24**	27	23	21	12
	T	**29**	26	23	17	11
Brand A3	O	**28**	24	25	13	9
	T	**33**	24	24	9	9
Brand A4	O	**19**	30	18	24	11
	T	**28**	24	21	19	9
Brand A5	O	**27**	25	15	14	10
	T	**28**	24	16	15	9
Tea Bags Rgn I						
Brand B1	O	**32**	19	16	19	17
	T	**40**	16	12	17	17
Brand B2	O	21	**33**	28	26	9
	T	26	**32**	27	22	9
O Brands	O	24	**21**	16	25	3
	T	21	**24**	15	25	4
Brand B3	O	14	**28**	15	20	7
	T	17	**23**	17	19	8
Brand B4	O	7	**15**	12	16	3
	T	10	**15**	10	13	4
Inst Cof Rgn I						
Brand C1	O	**31**	27	18	17	16
	T	**43**	22	15	15	14
Brand C2	O	**30**	42	32	25	13
	T	**39**	35	32	26	10
Brand C3	O	20	**34**	26	17	13
	T	28	**27**	24	19	12
O Brands	O	15	24	9	**26**	4
	T	17	22	10	**25**	4
Brand C4	O	28	**41**	21	16	7
	T	32	**35**	24	17	5
Average	O	**23**	28	20	20	10
	T	**29**	25	20	18	9

Notes to Table 11.17 on previous page:
- Emboldened figures refer to the store leader for each brand.
- O = Observed average duplication with the store.
- T = Theoretical value predicted from the Duplication of Purchase Law.
- E.g. regarding Automatc, on average 32% of the buyers of Brand A1 at a (non-X) store also buy Brand A1 at Store X.

TABLE 11.18

Mean Absolute Difference Between Observed and Theoretical Duplication. *
(Individual, not Averaged, Duplications.) **

Brand	Automatc Rgn I	Automatc Rgn II	Brand	Tea Bags Rgn I	Tea Bags Rgn II	Brand	Inst Cof Rgn I	Inst Cof Rgn II
A1	5.3	3.6	**B1**	4.5	5.6	**C1**	6.5	4.7
A2	4.4	2.8	**B2**	3.5	4.9	**C2**	6.5	1.5
A3	4.6	2.9	**OB**	2.3	2.4	**C3**	5.7	2.3
A4	7.5	3.6	**B3**	4.9	2.7	**OB**	7.0	3.5
A5	4.9	6.2	**B4**	3.7	3.3	**C4**	5.9	6.7
Ave	5.3	3.8		3.8	3.8		6.3	3.7

Notes:
* Theoretical values from Duplication of Purchase Law.
** I.e. these MAD values concern the discrepancies between the Duplication Law predictions and each (corresponding) duplication figure within the body of the duplication table.

about 0.8 as likely as the average buyer of Brand A1 **anywhere** to buy that brand at any other given store. (D values are generally greater than 1 if related to buyers of the product class; thus the average buyer Brand A1 at a store is 1.4 times as likely as the average buyer of the product class to buy A1 at any other particular store.)

As in the BCwS case, the D coefficients are quite stable across submarkets within each product field (though not quite as constant as in the BCwS context), as shown by Table 11.19. A further factor is the marked similarity in the coefficients across **regions** for brands of washing powder and tea bags: excluding the unusual cases of Brand A3 (available at only 3 stores in Region II) and Brand B4 (where the sample is particularly small), the average discrepancy between regions for these two products is just

0.04. However, such evidence is insufficient to conclude that D is a constant for each brand (i.e. regardless of region) in the SCwB context.

TABLE 11.19

Store Duplication Coefficients for Individual Brands.

Brand	Automatc Rgn I	Automatc Rgn II	Brand	Tea Bags Rgn I	Tea Bags Rgn II	Brand	Inst Cof Rgn I	Inst Cof Rgn II
A1	.81	.77	B1	.72	.69 *	C1	.76	.57*
A2	.71	.61	B2	.77	.74	C2	.92	.84
A3	.71	.39 *	OB	.64	.71	C3	.72	.49*
A4	.73	.72	B3	.62	.60	OB	.60	.61
A5	.64	.68	B4	.44	.64	C4	.77	.59
Ave	.72	.63		.64	.68		.75	.62
MD	.04	.11		.09	.04		.08	.09

Notes:

* In Region II, Brand A3 is available at only three store groups, and Brands B1, C1 and C3 are available at only four store groups.

\- MD = mean deviation.

11.7. DIRICHLET FIT: SUMMARY.

11.7.1. Overall Fit.

The MAD figures in Table 11.20 do not point to an especially close agreement between observed and predicted behaviour in the SCwB context. The average MAD values for the six measures considered are between 10% and 20% of the average value for these measures (given in Table 11.21). And only in the case of penetration has the Dirichlet substantially improved on the average value (within each submarket) "as predictor". Although the composite store categories exert a distorting influence (loyalty to these groups being consistently lower than predicted, as indicated in the next section), they can not be held responsible for the overall level of **discrepancy** in

TABLE 11.20

Summary of Dirichlet Fit in the SCwB Context For Six Measures of Buyer Behaviour.

Measure of fit:	**Measure of buyer behaviour:**					
MAD	**b**	**w**	**wp**	**w/wp**	**bs/b**	**ws**
Automatc Rgn I	1.4	.59	.68	8.4	6.6	.76
Tea Bags Rgn I	1.0	.52	.74	7.5	4.6	.67
Inst Cof Rgn I	1.2	.66	.81	8.9	8.3	1.06
Automatc Rgn II	1.5	.72	.75	6.8	6.4	.72
Tea Bags Rgn II	1.7	.77	1.06	4.6	6.4	.91
Inst Cof Rgn II	1.7	.65	.76	6.5	4.3	.91
Average	1.4	.65	.80	7.1	6.1	.84
Oth measures of fit, ave values, 6 mkts: *						
MD	3.0	.77	.67	9.1	6.5	.87
MAD/MD (%)	58	83	123	78	107	106
MAD (SC) **	3.3	.67	.84	4.5	4.0	1.57
MAD/MD (%) (SC) **	49	81	110	72	110	123

Notes:
* Other measures of fit, averaged across all brand submarkets and all six markets.
** Corresponding values from the whole-market store choice context.

question. (This can be seen for Miscellaneous from the MAD figures that exclude this category in Tables 11.3, 11.7 and 11.12.)

However, it is clear that the Dirichlet's predictions are very good for values averaged across stores for each brand submarket (see Appendix 6) or, in still more summary form, for the values averaged across all submarkets (see Table 11.21). Thus the Dirichlet has far from misrepresented the fundamental features of store choice behaviour for individual brands, concerning the general extent to which consumers buy a brand at "other" stores, the incidence of 100% store-loyal buyers, and so on. Further, the main trends with market share assumed by the model have been seen to hold in the present context. The difficulty appears therefore to derive from the level of disaggregation: given the small samples involved, it is to be expected that the precise figures for individual brand-store combinations should differ somewhat from the Dirichlet's predictions.

TABLE 11.21

Six Buyer Behaviour Measures in the SCwB Context: Average Value for Each Market.

Prdct/ Rgn	MS (%)	b (%) O	b (%) D	w O	w D	wp O	wp D
A.I	20	9	9	3.4	3.6	6.8	6.6
B.I	20	9	10	3.2	3.3	5.9	6.0
C.I	20	10	9	3.7	4.0	7.6	7.1
A.II	20	8	8	3.8	3.8	7.2	7.3
B.II	18	10	10	4.2	4.4	7.9	8.1
C.II	19	10	10	3.9	3.8	7.2	7.1
Ave	20	9	9	3.7	3.8	7.1	7.0

	w/wp (%)		bs/b (%)		ws	
A.I	51	54	42	45	3.0	3.2
B.I	54	58	51	48	3.1	3.0
C.I	50	56	42	47	3.5	3.6
A.II	54	54	45	44	3.5	3.3
B.II	52	54	43	44	4.1	4.0
C.II	55	55	46	45	3.6	3.5
Ave	53	55	45	46	3.5	3.4

Table 11.20 also shows the degree of fit, as measured by mean absolute difference as a proportion of mean deviation (MAD/MD) to be similar in the SC and current SCwB contexts. This correspondence in terms of the relative fit between measures (e.g. the MAD/MD figure being "low" for b but "high" for wp) supports the view that store choice behaviour for individual brands is fundamentally the same as that for the product class as a whole.

There is little evidence from Table 11.20 that, in terms of mean discrepancy, the **overall** fit (i.e. across all six measures) differs markedly across products or regions. Again this reflects the SC-level pattern.

11.7.2. Bias.

The average observed and predicted figures in Table 11.21 show little sign of a consistent underprediction or overprediction on any of the six buyer behaviour measures listed. A tendency to overestimate within-brand store loyalty in terms of w/wp and bs/b in Region I does emerge, but this is largely attributable to the composite store categories, and in particular Miscellaneous which is included only in Region I. (The atypical behaviour for these two store groups is summarized below.) Inevitably instances of predictive bias can be found for individual brands; for instance, observed bs/b is significantly underpredicted and overpredicted in the Brand B3 and Brand C3 submarkets respectively (in Region I). But such cases are rare, and even in these two submarkets the underprediction does not apply to every store.

The most surprising feature of Table 11.21 concerns ws, the purchase frequency of sole buyers. In the present SCwB context, this measure shows no sign of the consistent underprediction which occurred in the BC, BCwS and - to a lesser extent - SC situations.

Two clear - and familiar - manifestations of predictive bias remain, however.

Variance Discrepancy.

This aspect of predictive bias - an underestimation of loyalty variation across brands - is detectable in the present SCwB context, though it was not manifest at the SC level. It is illustrated via loyalty indices for the Region I automatic washing powder market in Table 11.22, the corresponding results from other markets being listed in Tables A6.62-A6.66.

TABLE 11.22

Loyalty Indices
Averaged Across Brands for Each Store Rank.
Automatic Washing Powder, Region I.

Store Rank	Measure: s	w	w/wp	bs/b	ws	8+	dpl ****	Ave excl s
1	228	113	110	107	109	126	122	115
2	135	103	99	103	96	94	100	99
3	64	89	92	97	87	101	98	94
4	56	82	76	79	70	60***	87	76
5	42*	89	85	78	68**	42	87	75

Notes:

* Exludes Brand A4 at Store Z where index is 488.

** Exludes Brand A4 at Store Z where index is 219.

*** Exludes Brand A5 at Store Z where index is 300.

**** Predicted duplication from Duplication of Purchase Law. E.g. the predicted proportion of the buyers of a brand at a store who also buy the brand at the largest store is 22% higher than the average observed proportion.

- Loyalty index = observed value as percentage of predicted value, but vice versa for duplication (see example above).
- Index for s = (S parameter / s) x 100. (Not included in averages in right-hand column.)
- E.g. the largest store (whichever that might be) for a brand typically has an observed w/wp value 10% higher than the predicted value.

Composite Categories.

As at the SC level, the Other Multiples and Miscellaneous groupings receive consistently lower loyalty than predicted. Exceptions do occur (most notably for tea bags, Region I, where the observed bs/b values for Miscellaneous are higher-than-predicted in four out of five submarkets), but overall the loyalty deficiency is a clear one, as shown by Table 11.23.

11.7.3. Dirichlet Fit for Different Brands.

This section examines whether the degree of fit diverges substantially between different SCwB submarkets.

The approach taken is similar to that used in Chapter 10:

TABLE 11.23

The Loyalty Discrepancy for Miscellaneous and Other Multiples in the SCwB Context: Observed - Predicted Values, Averaged for Each Market.

Miscellaneous.	w	w/wp (%)	bs/b (%)
Automatc Rgn I	- 1.0	- 15	- 5
Tea Bags Rgn I	- 0.4	- 9	+ 2
Inst Cof Rgn I	- 1.1	- 13	+ 1
Other Multiples.			
Automatc Rgn I	- 0.3	- 6	- 2
Tea Bags Rgn I	- 0.2	- 3	0
Inst Cof Rgn I	- 0.3	- 7	- 11
Automatc Rgn II	- 0.4	- 4	- 5
Tea Bags Rgn II	- 0.1	0	- 2
Inst Cof Rgn II	- 0.6	- 7	+ 1

for each of six aspects of buyer behaviour, the fit within each submarket is measured through mean absolute difference as a percentage of mean deviation (to take account of across-submarket differences in the absolute value and in the variation of the buyer behaviour variables). Table 11.24 reports data for all 15 Region I submarkets (the corresponding Region II data being provided in Tables A6.58-A6.60): the lower the MAD/MD index, the better the fit. Two observations are made.

First, as in the BCwS context, the degree of fit measured in this way does not differ substantially from brand to brand - at least when all measures are considered together. On any specific measure, the level of fit often varies strongly across submarkets, as in the case of Brands B2 and B3 regarding penetration. But such instances of particularly good or poor fit are not generally reflected by the other behavioural measures, or indeed by the **same** measure for that brand in the other region (see Tables A6.58-A6.60).

Second, as with the BCwS situation, the degree of fit obtained for store choice for a given brand appears unrelated to the fit achieved for that **brand** in the whole-market context: while Brand B4 and the Other Brands group in the two drinks markets (Region I) exhibited the largest discrepancies at the BC level, as store choice submarkets these brand categories do not stand out in terms of overall fit. The question of the **relationship** between whole-market and submarket behaviour is considered more fully in Chapter 12.

TABLE 11.24

Summary of Dirichlet Fit in Each SCwB Submarket: Mean Absolute Difference as a Percentage of Mean Deviation. Region I.

	b	w	wp	w/wp	bs/b	ws
Automatc						
Brand A1	54	89	99	64	65	88
Brand A2	67	82	91	71	56	71
Brand A3	17	68	137	86	59	91
Brand A4	55	98	92	92	85	98
Brand A5	61	90	108	70	83	98
Average	51	85	105	77	70	89
Tea Bags						
Brand B1	46	78	131	60	55	79
Brand B2	20	73	142	53	76	182
Brand OB	19	76	120	71	45	77
Brand B3	89	85	115	89	151	111
Brand B4	0	92	145	222	66	232
Average	35	81	131	99	79	136
Inst Cof						
Brand C1	54	93	78	86	103	92
Brand C2	34	67	138	104	96	158
Brand C3	43	71	105	92	113	84
Brand OB	11	111	73	90	69	85
Brand C4	21	77	85	68	80	102
Average	33	84	96	88	92	104

11.8. DIFFERENCES BETWEEN BRANDS.

That the Dirichlet model applies to every brand submarket implies that each of these submarkets is subject to the same regularities and broad behavioural patterns in store choice behaviour. However, the actual numerical values involved may differ, which raises two main questions. First, does submarket "structure" - as measured by the overall degree of store loyalty - vary from brand to brand? And second, does the patronage pattern for an **individual store** vary from brand to brand? The answer to this latter question is clearly yes, in so far as (i) submarket structure does vary across brands and (ii) a store's share varies across brands (loyalty depending crucially on market share). But the issue addressed in Section 11.8.2 is whether a store's buying pattern varies from brand to brand once account has been taken of both submarket structure and the store's share of the brand submarket in question: this buying pattern is assessed relative to the norms provided by the Dirichlet for that store in each brand submarket.

TABLE 11.25

Dirichlet Parameters for SCwB Submarkets.

	Region I			Region II		
	M	**K**	**S**	**M**	**K**	**S**
Automatc						
Brand A1	2.71	.27	.68	2.78	.21	.64
Brand A2	1.89	.17	.64	1.37	.14	.62
Brand A3	1.32	.14	.50	.99	.10	.23
Brand A4	1.25	.11	.48	1.67	.11	.84
Brand A5	.87	.08	.64	1.36	.11	.51
Tea Bags						
Brand B1	3.83	.28	.49	3.61	.22	.28
Brand B2	2.03	.20	.75	3.54	.23	.66
Brand OB	1.90	.25	.54	2.81	.27	.50
Brand B3	.83	.11	.76	1.75	.14	.44
Brand B4	.44	.11	.33	1.74	.15	.58
Inst Cof						
Brand C1	3.63	.29	.34	2.35	.21	.40
Brand C2	2.76	.22	.53	4.29	.31	.82
Brand C3	1.47	.14	.54	1.21	.12	.46
Brand OB	1.36	.17	.45	2.56	.27	.54
Brand C4	.82	.06	.67	.36	.04	.43

11.8.1. Submarket Structure.

An appropriate initial means of comparing the structures of different SCwB submarkets is via the Dirichlet parameters M, K and S, for which values are listed in Table 11.25. (See Sections 2.4.3 and 2.4.5 for explanations of these parameters.) As in the BCwS context, there is little evidence of any stability in S from submarket to submarket. But again there is a suggestion of K parameter constancy. In the BCwS context, K was quite constant for each store across product fields; in the present context K is fairly constant (though less so than in the BCwS case) for each brand across regions, the average across-region difference being just 0.04. However, given the variation in both K and S across brand submarkets (i.e. within a given region), there is no clear evidence from Table 11.25 that the structure of store choice behaviour is essentially the same for different brands.

The appropriate next step is to compare brand submarkets in terms of the simpler issue of store loyalty, and using more direct measures of behaviour than the Dirichlet parameters. Taking this approach, Table 11.26 suggests that loyalty to the average store (in terms of four "proportional" measures of loyalty) is in fact much the same for different brands. As usual exceptions can be found; but the most marked of these, concerning Brands A3, B1, C1 and C3 in Region II (for which store loyalty is particularly high) are cases of limited distribution (i.e. where the brand is unavailable at either one or two of the store groups studied). The general stability of loyalty to the average store extends across both products and regions, reflecting the SC-level pattern.

In sum, the propensity to "also buy" a given brand at another store (as measured, in a related manner, by 1-bs/b, b/B and D), and the average proportion of total purchases of that brand devoted to "other" stores (1-w/wp), varies little according to the brand in question. Values of w/wp, bs/b and D of 50, 45 and 0.7 respectively would in most cases represent a good estimate of loyalty to the average store, whatever the brand in question, and indeed whatever the product or region involved.

11.8.2. The Patronage Pattern of a Store for Different Brands.

This section examines the degree of constancy in a store's patronage pattern across brands once account has been taken, via the Dirichlet, of submarket structure and the store's share of the submarket. Specifically, it examines

TABLE 11.26

Buyer Behaviour Measures
Regarding the Average Store for Each Brand,
and D Coefficients for Each SCwB Submarket.

Measure:	w/wp (%)		bs/b (%)		b/B (%)*		D **	
Region:	I	II	I	II	I	II	I	II
Brand A1	46	47	35	36	31	27	.81	.77
Brand A2	50	53	38	52	30	24	.71	.61
Brand A3 (3)	50	77	48	68	28	37	.71	.39
Brand A4	57	48	48	35	28	29	.73	.72
Brand A5	51	52	40	43	29	26	.64	.68
Average	51	54	42	45	29	29	.72	.63
Brand B1 (4)	57	62	44	47	28	29	.72	.69
Brand B2	49	50	42	32	30	28	.77	.74
Brand OB	53	53	48	41	28	24	.64	.71
Brand B3	53	50	53	48	27	23	.62	.60
Brand B4	60	48	71	49	24	24	.44	.64
Average	54	52	51	43	27	26	.64	.68
Brand C1 (4)	51	64	42	54	29	28	.76	.57
Brand C2	41	42	37	28	31	30	.92	.84
Brand C3 (4)	50	56	38	55	31	30	.72	.49
Brand OB	59	58	52	41	26	22	.60	.61
Brand C4	51	58	41	56	29	24	.77	.59
Average	50	56	42	46	29	27	.75	.62
Ovrl Ave	52	54	45	45	28	27	.70	.64

Notes:
* b/B = relative penetration, i.e. penetration of the store among buyers of the brand.
** All D coefficients are calculated using relative penetration.
- Figures in brackets refer to brands with limited distribution **in Region II**, and specify the number of store groups where the brand is available (e.g. Brand A3 is available at only 3 store groups in Region II).

the across-brand consistency of divergences from the Dirichlet norms. For instance, if a store receives higher-than-predicted loyalty for one brand, will this discrepancy be reflected for other brands?

TABLE 11.27

Store Loyalty Indices * for Individual Brands.
Figures Grouped by Store.
Tea Bags, Region I.

	MS ** (%)	w	w/wp	bs/b	dpl
Store X					
Brand B1	47	109	114	115	125
Brand B2	27	119	116	122	124
O Brands	24	100	100	98	88
Brand B3	26	129	100	125	121
Brand B4	18	96	76	109	143
O Mltps					
Brand B1	10	67	85	94	84
Brand B2	30	105	102	102	97
O Brands	27	97	91	108	114
Brand B3	30	114	105	92	82
Brand B4	33	109	88	101	100
Misclns					
Brand B1	12	78	96	114	89
Brand B2	19	103	94	103	85
O Brands	27	94	96	104	100
Brand B3	17	81	68	105	95
Brand B4	24	91	71	97	81
Store Y					
Brand B1	11	102	107	89	75
Brand B2	19	88	92	122	96
O Brands	20	115	106	91	94
Brand B3	19	100	106	138	113
Brand B4	22	109	91	96	83
Store Z					
Brand B1	21	131	124	112	100
Brand B2	5	74	90	103	100
O Brands	2	53	62	100	133
Brand B3	7	76	115	130	114
Brand B4	3	50	80	98	133

Notes:

* Loyalty index = observed value as percentage of predicted value, but vice versa for duplication.

** Market share of store for brand, e.g. Store X's share for Brand B1 is 47% and for Brand B2 it is 27%.

\- E.g. in the Brand B1 submarket, Store X's observed w value is 9% greater than the predicted value; in the B2 submarket, it is 19% greater than predicted.

\- For clarification of duplication figures see Table 11.22.

The loyalty indices provided in Table 11.27 and in Tables A6.61-A6.66 suggest that inconsistency is more prevalent than consistency (Store X being the most marked case of the latter), even when a single measure of buyer behaviour is considered. For instance, in Table 11.27 Store Y's w value for Other Brands is about 10% higher than predicted, yet the reverse holds for that store in the case of Brand B2. Such cases might reflect genuine brand-store interaction. However, it seems likely that two other factors are more important. First, most of the discrepancies expressed by the loyalty indices are small, and the associated across-brand variation in the loyalty pattern could be expected on the basis of sampling error alone. Second, the "variance discrepancy", in so far as it applies to the SCwB context, is necessarily relevant to the present issue: where a store enjoys a large share of a brand submarket, it will typically receive a loyalty "excess" (i.e. relative to the Dirichlet norms); where it has a small share, the reverse usually holds. Store Z in Table 11.27, of which the submarket share is large for Brand B1, but small for the Other Brands category, is illustrative in this respect (on the w and w/wp measures).

11.9. CONCLUSIONS.

This chapter has examined patterns of store choice for individual brands, and in particular has assessed the fit of the Dirichlet model in this submarket choice context. Four main conclusions can be drawn from the results.

1. Store choice patterns for individual brands follow the same trends and regularities as have long been associated with store choice behaviour at the whole-market level.

First, the usual association between market share and buyer behaviour measures is again apparent: for instance, the buyers of a given brand at a small store are (in relative terms) infrequent buyers of the brand at the store, make more purchases of the brand at other stores, and are less likely to make all their purchases of the brand at the store. The main exceptions concern the buying frequencies of the average buyer (w) and of sole buyers (ws), which exhibit **relatively** little trend with market share (sampling error being especially relevant to the latter measure). Also, as in the BCwS context, the average purchasing rate of sole buyers (ws) tends to be slightly **lower** than the average purchasing rate of all buyers (w). (Although the reverse applied in both BC and SC contexts, this is not strictly an irregularity as the present balance between ws and w is well predicted by the Dirichlet.)

Second, multistore buying is still very much the norm. Loyalty to a store for a given brand seems quite low in so far as a **majority** of the buyers of a given brand at a store will also buy the brand elsewhere (1-bs/b), and overall about 50% of brand purchases are made at other stores (1-w/wp). Certainly there is little evidence that consumers are "tied" to a specific store for any given brand, switching stores only when switching brands. Nevertheless, loyalty does exist to the extent that making a purchase decreases the probability of buying the same brand at any other given store: the D coefficient is usually about 0.7 in the 30 submarkets studied. This coefficient (or level of switching) seems quite low when it is recalled that Kau (1981) and Kau and Ehrenberg (1984) reported numerically similar coefficients for a 24-week period (which is half the length of the current analysis period): D values generally **rise** with increasing length of time period (Ehrenberg and Goodhardt, 1970).

2. The Dirichlet successfully describes store choice patterns for individual brands.

As in the BCwS context, this finding represents a logical extension to the results of the Kau/Ehrenberg studies just mentioned, which demonstrated the validity of the NBD model and Duplication of Purchase Law - effectively two "special cases" of the Dirichlet - to the within-brand store choice context.

Conclusion 2 must be qualified however by referring back to observations made in Section 11.7. In terms of absolute difference the degree of fit is not especially good; the average discrepancy for the six main buyer behaviour measures is typically between 10% and 20% of the value of the mean. However, there is little evidence of **systematic** deviation from the Dirichlet's predictions, and agreement is close for the average values within each submarket. Such results point to small-sample problems as explanations for much of the inconsistent divergences from the model, and imply that the Dirichlet successfully represents the fundamental aspects of store choice behaviour for individual brands (concerning the overall extent to which multistore buying occurs on different measures of behaviour, the association between loyalty and market share, and so on).

The instances of predictive bias (i.e. systematic deviation) that **do** arise accord with those noted in previous chapters for other choice contexts. First, the across-store variation in loyalty is underestimated, leading to the now-familiar tendency to underpredict and overpredict the loyalty to large and small choice categories respectively. Second, the loyalty to composite categories - in this case Other Multiples and Miscellaneous - is consistently lower than predicted. However, that consistent underprediction of ws - the purchase frequency of sole buyers - in the BC, SC and BCwS contexts, is not apparent in the present SCwB situation.

The degree of fit for any specific measure of buyer behaviour typically varies from brand to brand submarket. However, in so far as an **overall** picture of fit (i.e. across all measures) can be attained, the Dirichlet's validity in the SCwB context is much the same from brand to brand.

3. The level of store loyalty differs little from brand to brand.

As in the BCwS situation, this conclusion applies to the "proportional" loyalty measures, notably w/wp, bs/b and the D coefficient, rather than the "frequency" measures such as w and ws which typically vary strongly with the overall size of the brand submarket. Loyalty to the average store on this basis is quite constant not only across brands, but also across product fields (where the choice set remains the same) and regions (where the choice set alters). The main exceptions to the across-brand stability in store loyalty concern brands which are only available in three or four of the store categories studied, loyalty to the average store in these cases being relatively high.

When loyalty to **individual** stores is considered, and in a **relative** sense (i.e. relative to the Dirichlet norms), then substantial variation does occur across brands. Thus it is quite common for a store to receive higher-than-predicted loyalty for one brand and lower-than-predicted loyalty for another. However, much of this instability is seemingly attributable to sampling error, and also to across-brand differences in a store's market share (since, according to the "variance discrepancy", the likelihood of overprediction or underprediction depends partly on the store's market share).

Chapter 12

A HIERARCHICAL MODEL OF CHOICE

Contents:

12.1. INTRODUCTION.

Previous chapters have shown the Dirichlet to successfully describe the pattern of buyer behaviour in four contexts, namely brand choice, store choice, brand choice within individual stores, and store choice for individual brands. The extension of the Dirichlet - a model initially developed for the brand choice situation - to these latter three contexts implies that two hierarchical models of choice have been established. One describes store choice and then brand choice within the chosen store, while the other first describes brand choice and then store choice for the chosen brand. These models provide two alternative "routes" to the buyers of any given brand-store combination, although the actual behaviour being described is different (except on the b and w measures, which are necessarily identical in both BCwS and SCwB contexts).

The availability of these hierarchical models raises three main questions, the first two of which are examined in Section 12.2:

1. Does one hierarchy lead to a better fit than the other? If so, the discrepancy could hold implications for the way in which brand and store alternatives are treated at the individual level (e.g. the independence assumption might hold good for only one hierarchy).

2. Is there a relationship between behaviour at the first and second stages of choice? For example, if a store enjoys a high level of loyalty (relative to the Dirichlet norms), will this impact on **brand** loyalty (relative to the Dirichlet norms) within the store?

Section 12.3 is concerned with the third issue:

3. Can the hierarchical model be simplified by using the Stage 1 output as Stage 2 input? This would involve using the **predicted** penetration (b) and purchase frequency (w) at the whole-market level as input to the model at the submarket level for the purpose of estimating the two Dirichlet parameters K and S (M remaining unchanged).

With regard to this latter question, it can be stated that any model should seek to describe the behaviour at hand with the minimum of input data (for any given level of accuracy). The proposed modification should be interpreted in the context of this objective. Whether the increase in parsimony is warranted must be assessed in the light of any loss in predictive validity.

To differentiate between the two approaches, this model - where Stage 1 output is used as Stage 2 input - is referred to as a "linked two-stage model". The former approach - whereby the Dirichlet is calibrated to each submarket using **observed** penetration (B) and purchase frequency (W) - is denoted a "discrete two-stage model". Also, "Stage 1" refers to the whole-market level of choice (i.e. brand choice or store choice) and "Stage 2" to the submarket level (i.e. BCwS or SCwB).

Data Details:

Before proceding, a few notes on data are required. The following apply to this and the following chapter.

* Only Region I is considered. (Region II data present the complication of certain brands not being stocked by certain stores.)

* Only the three largest non-composite brand and store categories within each product field are examined. This is to avoid (i) the most acute of the small-sample problems and (ii) the atypical buyer behaviour associated with the composite groupings (e.g. Other Brands and Miscellaneous stores).

* The Dirichlet has been recalibrated to these reduced-choice-set product fields so that the S parameters relate only to the three brands or stores in question. Consequently the model's predictions often differ marginally from those provided in earlier chapters.

* For consistency, in every market and submarket studied, the S parameter has been calculated as the weighted average of the individual s values of **all three** brands or stores in question (i.e. there are no exclusions when calculating the S parameter).

Finally, it should be noted that for presentational clarity, all data tables in this chapter are provided at the end of each section.

12.2. A DISCRETE TWO-STAGE MODEL.

For convenience, comparison of the fit provided by the two alternative versions of this hierarchical model can initially be made for each stage in turn.

12.2.1. A comparison of Fit in the BC and SC Contexts.

Table 12.1 displays the fit achieved for the reduced choice set of three brands and three stores in the automatic washing powder market, and Table 12.2 specifies the average values for all three product fields. The fit is manifestly very good, and as expected represents an improvement on that reported in Chapters 6 and 7 where composite and smaller brand and store categories were included. In these circumstances, it is clear that any difference in fit obtained in the BC and SC contexts will be a marginal one.

The main discrepancy concerns the purchase frequency of sole buyers (ws) which tends to be more severely underpredicted in the BC context than in the SC case (see Table 12.2). Turning to the mean absolute differences in Table 12.3, the tea bag data suggest a better fit obtains for store choice than for brand choice, although when account is taken of mean deviation (via MAD/MD) the disparity disappears. Overall, it seems reasonable to conclude that the fit in each context is much the same: certainly differences between contexts within each product field are no greater than differences between product fields within each context.

TABLE 12.1

Measures of Buyer Behaviour: Observed (O) and Dirichlet (D) Values for the Brand Choice and Store Choice Contexts. Automatic Washing Powder, Region I.

	MS (%)	b (%)		w		wp	
		O	D	O	D	O	D
Brand Choice							
Brand A1	31	48	47	5.7	5.8	12.2	13.3
Brand A2	22	34	37	5.5	5.2	13.7	13.8
Brand A3	15	28	28	4.7	4.8	14.1	14.2
Average	23	37	37	5.3	5.2	13.3	13.8
Store Choice							
Store X	36	43	44	7.2	7.1	12.2	12.7
Store Y	23	30	29	6.2	6.4	12.6	13.2
Store Z	21	14	13	5.5	5.8	12.7	13.7
Average	27	29	29	6.3	6.4	12.5	13.2

	w/wp (%)		bs/b (%)		ws	
	O	D	O	D	O	D
Brand Choice						
Brand A1	46	44	28	19	7.4	4.5
Brand A2	40	38	18	16	5.3	3.9
Brand A3	33	34	12	13	5.8	3.6
Average	40	38	19	16	6.2	4.0
Store Choice						
Store X	59	56	30	35	8.1	7.1
Store Y	49	48	21	28	5.6	6.4
Store Z	43	42	24	23	6.7	5.8
Average	51	49	25	29	6.8	6.4

TABLE 12.2

Measures of Buyer Behaviour:
Observed (O) and Dirichlet (D) Values
for the Brand Choice and Store Choice Contexts.
Average Values for Each Market, Region I.

Context/ Product	MS (%)	b (%)		w		wp	
		O	D	O	D	O	D
Brand Choice							
Automatc	23	37	37	5.3	5.2	13.3	13.8
Tea Bags	25	37	37	5.5	5.7	14.4	13.9
Inst Cof	25	42	41	6.1	6.2	13.3	13.5
Average	24	39	38	5.6	5.7	13.7	13.7
Store Choice							
Automatc	27	29	29	6.3	6.4	12.5	13.2
Tea Bags	21	28	28	6.4	6.3	13.5	13.6
Inst Cof	21	33	33	6.5	6.4	13.9	13.4
Average	23	30	30	6.4	6.4	13.3	13.4

	w/wp (%)		bs/b (%)		ws	
	O	D	O	D	O	D
Brand Choice						
Automatc	40	38	19	16	6.2	4.0
Tea Bags	40	42	17	19	5.6	4.8
Inst Cof	46	46	22	21	7.7	6.5
Average	42	42	19	19	6.5	5.1
Store Choice						
Automatc	51	49	25	29	6.8	6.4
Tea Bags	48	47	24	26	7.0	6.3
Inst Cof	48	48	22	24	7.5	7.2
Average	49	48	24	26	7.1	6.6

TABLE 12.3

Measures of Dirichlet Fit in the Brand Choice (BC) and Store Choice (SC) Contexts: (i) Mean Absolute Difference (MAD) and (ii) MAD as a Proportion of Mean Deviation (MAD/MD).

	Choice context	b	w	wp	w/wp	bs/b	ws	dpl *
(i) MAD								
Automatc	BC	1.2	.18	.43	1.9	4.5	2.17	2.2
	SC	.7	.18	.71	1.9	4.5	.93	2.3
Tea Bags	BC	2.8	.50	.78	5.2	4.2	1.89	7.4
	SC	1.2	.30	.48	3.2	6.3	.88	3.9
Inst Cof	BC	1.0	.18	.19	1.9	3.0	1.16	6.6
	SC	1.0	.26	.88	2.7	5.3	.86	3.7
Average	BC	1.7	.29	.47	3.0	3.9	1.74	5.4
	SC	1.0	.25	.69	2.6	5.4	.89	3.3
(ii) MAD/MD %								
Automatc	BC	17	45	57	43	77	262	26
	SC	7	29	385	33	136	105	22
Tea Bags	BC	27	43	52	43	46	85	66
	SC	12	59	53	44	65	110	54
Inst Cof	BC	11	28	53	32	52	209	97
	SC	9	51	69	36	60	100	40
Average	BC	18	39	54	39	58	185	63
	SC	9	46	169	38	87	105	39

Notes:

* The observed duplication measure on which the MAD and MAD/MD figures are based refers to the average proportion of the buyers of "another" brand (or store) also buying the brand (or store) in question. The duplication predictions derive from the Dirichlet (and not from the Duplication of Purchase Law as in previous chapters).

12.2.2. A Comparison of Fit in the BCwS and SCwB Contexts

The measures b and w provide an appropriate initial means of comparing the fit in these two contexts, since the observed values - for a given brand-store combination - are necessarily identical in the associated BCwS and SCwB submarkets. Before proceeding, two points should be made. First, despite this identity, it is quite possible for a given b-w pair to be deemed typical in one submarket and atypical in the other (on the basis of proximity to the Dirichlet norms). Second, although these measures are immune to predictive bias within a given market (since the S parameter specifically reflects the overall balance between the b and w values in question), the predictions for **individual** choice items may differ widely from the observed behaviour.

Table 12.4 lists, for each automatic washing powder brand-store combination, predictions of penetration derived from both BCwS and SCwB contexts. (Only penetrations are considered as the degree of discrepancy on this measure is necessarily - and positively - associated with the degree of discrepancy regarding average purchase frequency.) It is clear that, for any given brand-store pair, predictive accuracy often differs greatly between the BCwS and SCwB contexts. However, there is little evidence to suggest that, overall, one such context generates a better fit than the other. A similar conclusion could apply to the other two product fields, as indicated by the MAD values for b and w in Table 12.5.

In Table 12.5, the small differences that do exist (for b and w) between the average MAD values of the BCwS and SCwB contexts appear to reflect differences in the degree of market share variation within each context: for each product, the (BCwS-SCwB) balance between the average MAD figures corresponds to the (BCwS-SCwB) balance between the mean deviation of market share.

Comparison between the fit achieved in the BCwS and SCwB contexts on other measures presents a similar picture. From Table 12.5 it is apparent that there is no single measure on which a marked discrepancy in fit occurs. Indeed, the similarity in the overall averages for each context is striking. It is notable that the mean absolute difference for bs/b tends to be high relative to the average value of this measure (given in Table 12.6), but the poor fit in this area applies equally to the BCwS and SCwB contexts.

In terms of bias, there is again little difference between the two contexts. The averages in Table 12.6 suggest that the Dirichlet tends to underpredict bs/b and ws and overpredict wp in the BCwS situation, and vice versa in the SCwB case. However, such apparent biases are, within each context, rarely large or fully consistent across product fields.

In conclusion, the Dirichlet achieves a similar degree of fit within the BCwS and SCwB contexts. The crucial point is that the differences that **do** arise between these two contexts are no greater than those that arise between submarkets within the same (BCwS or SCwB) context. As a final remark, as there is little difference in the predictive accuracy of the Dirichlet between the BC and SC contexts, and between the BCwS and SCwB contexts, the order of choice adopted by the hierarchical model (i.e. whether store choice precedes brand choice, or vice versa) has little impact on the overall degree of fit achieved.

TABLE 12.4

Penetration of Brand-Store Combinations: Observed Values and Predicted (Dirichlet) Values from Both BCwS and SCwB Contexts. Automatic Washing Powder, Region I.

	O	BCwS D	SCwB D	Abs Difrnce* BCwS	Abs Difrnce* SCwB
Store X					
Brand A1	22.5	23.5	26.4	.93	3.90
Brand A2	14.2	15.0	15.0	.82	.81
Brand A3	13.2	11.3	13.1	1.93	.08
Store Y					
Brand A1	15.4	13.7	12.3	1.67	3.04
Brand A2	11.0	14.1	11.5	3.01	.48
Brand A3	9.4	10.7	10.0	1.24	.51
Store Z					
Brand A1	6.3	6.3	5.4	.01	.91
Brand A2	5.6	5.6	4.2	.01	1.37
Brand A3	3.4	3.4	3.0	.03	.46
Average	11.2	11.5	11.2	1.07	1.28

Notes:

* Absolute difference between observed and predicted values within the BCwS and SCwB submarkets.

\- E.g. 22.5% of the population buy Brand A1 at Store X. The brand-choice-within-Store-X Dirichlet predicts this proportion should be 23.5%. The store-choice-for-Brand-A1 Dirichlet predicts the proportion should be 26.4%.

TABLE 12.5
Fit of the Discrete Two-Stage Model:
Mean Absolute Difference (MAD)
for Buyer Behaviour Measures
in the BCwS and SCwB Contexts.
Region I.

	Str/ Brnd	MD of MS *	b	w	wp	w/wp	bs/b	ws
BCwS								
Aut-matc	X	8	1.2	.35	.61	2.4	3.1	.47
	Y	3	2.0	.58	.93	6.8	8.3	1.31
	Z	5	.0	.01	.52	2.8	20.2	1.23
	Ave	**6**	**1.1**	**.31**	**.69**	**4.0**	**10.5**	**1.01**
Tea Bags	X	20	1.3	.56	.73	9.0	10.2	.74
	Y	8	1.7	.59	.87	8.7	12.5	1.28
	Z	32	1.5	1.18	.47	12.7	5.3	.78
	Ave	**20**	**1.5**	**.78**	**.69**	**10.1**	**9.3**	**.93**
Inst Cof	X	14	1.7	.48	.84	4.0	5.0	1.09
	Y	8	.8	.27	.83	4.3	6.1	.74
	Z	20	1.7	1.17	1.43	6.6	4.8	1.15
	Ave	**14**	**1.4**	**.64**	**1.03**	**5.0**	**5.3**	**.99**
Ovrl	**Ave**	**13**	**1.3**	**.58**	**.80**	**6.4**	**8.4**	**.98**
SCwB								
Aut-matc	A1	13	2.6	.67	1.03	6.8	6.3	.66
	A2	10	.9	.47	.31	6.7	14.9	.84
	A3	11	.4	.21	.32	6.5	2.8	.38
	Ave	**11**	**1.3**	**.45**	**.55**	**6.7**	**8.0**	**.63**
Tea Bags	B1	14	1.0	.51	.53	4.0	14.5	1.60
	B2	8	1.7	.59	.67	4.6	8.9	1.16
	B3	7	.8	.51	1.10	2.1	10.1	.70
	Ave	**10**	**1.2**	**.54**	**.77**	**3.6**	**11.2**	**1.15**
Inst Cof	C1	15	2.3	1.07	1.09	7.8	11.4	1.42
	C2	10	.6	.35	1.86	10.1	10.5	1.01
	C3	7	.2	.07	.40	3.1	9.3	.30
	Ave	**11**	**1.0**	**.50**	**1.12**	**7.0**	**10.4**	**.91**
Ovrl	**Ave**	**11**	**1.2**	**.49**	**.81**	**5.7**	**9.9**	**.90**

Notes:
* Mean Deviation of Market Share within stated submarket.

TABLE 12.6

Measures of Buyer Behaviour:
Observed (O) and Dirichlet (D) Values
for the BCwS and SCwB Contexts.
Average Values for Each Product Field, Region I.

Context/ Product	MS (%)	b (%) O	b (%) D	w O	w D	wp O	wp D
BCwS							
Automatc	22	11	11	3.7	3.6	8.2	8.8
Tea Bags	27	11	11	3.9	4.1	8.6	8.4
Inst Cof	28	13	13	4.4	4.5	7.8	8.2
Average	26	12	12	4.0	4.1	8.2	8.5
SCwB							
Automatc	23	11	11	3.7	3.8	6.8	6.5
Tea Bags	20	11	11	3.9	3.9	6.7	6.8
Inst Cof	22	13	13	4.4	4.4	8.5	7.5
Average	22	12	12	4.0	4.0	7.3	6.9

	w/wp (%) O	w/wp (%) D	bs/b (%) O	bs/b (%) D	ws O	ws D
BCwS						
Automatc	45	41	38	27	3.3	2.5
Tea Bags	48	50	38	39	3.5	3.4
Inst Cof	56	56	47	45	4.2	4.0
Average	50	49	41	37	3.7	3.3
SCwB						
Automatc	55	59	43	49	3.1	3.6
Tea Bags	56	57	49	48	4.0	3.6
Inst Cof	53	59	42	49	4.0	4.1
Average	55	58	45	49	3.7	3.8

12.2.3. The Relationship Between Behavioural "Irregularity" at the Whole-Market and Submarket Levels.

Given the availability of theoretical norms at both whole-market and submarket levels, an appropriate question is whether behavioural "irregularities" at these levels are in any way related. Table 12.7 addresses the issue in terms of loyalty. Specifically, the first column lists for each store and brand category at the whole-market level the discrepancy between observed and predicted average purchase frequency; the second and third columns indicate the average discrepancy on the w/wp and bs/b measures for the choice items within each store and brand submarket. These figures point to a negative association between loyalty at the whole-market and submarket levels (on the measures specified), such a relationship applying to 27 of the 36 cases shown. To illustrate, if a store receives higher than expected loyalty (in terms of w), then brand loyalty within that store (in terms of w/wp and bs/b) will **tend** to be lower than predicted. And vice versa.

Such a negative relationship is in fact built into the discrete two-stage model in so far as the balance between the observed b and w at the whole-market level is used to establish the parameters (K and S) of the associated submarket, thereby influencing the predictions at this latter level. The example of two equally-sized stores, S and T, will illustrate this point: if, relative to Store S, Store T has a high w and low b (i.e. high loyalty), then at the submarket context Store T's K parameter will be relatively low and its S parameter relatively high (other things being equal), leading to less predicted brand loyalty within the store. (This feature of the model reflects the empirical tendency for loyalty to be low in markets where the **opportunity** for disloyalty is great, i.e. where for any given sales level the purchase frequency is high.) However, since Table 12.7 suggested that loyalty at the two levels **relative to the Dirichlet norms** is negatively related, the degree of association built into the discrete two-stage model is not apparently sufficient.

TABLE 12.7

The Relationship Between Loyalty at the Whole-Market and Submarket Levels, Using Difference from Dirichlet Predictions. Region I.

		Observed - Predicted:		
	Measure:	w	w/wp	bs/b
	Context:	SC	BCwS	BCwS
Automatc	Store X	.12	2.4	3.1
	Store Y	- .15	6.8	8.3
	Store Z	- .26	2.8	20.2
Tea Bags	Store X	.07	- 6.1	- 10.2
	Store Y	- .41	6.3	9.4
	Store Z	.42	- 8.8	- 3.0
Inst Cof	Store X	.09	2.2	- 4.4
	Store Y	- .29	1.3	5.1
	Store Z	.40	- 4.8	4.8
	Measure:	w	w/wp	bs/b
	Context:	BC	SCwB	SCwB
Automatc	Brand A1	- .12	- 4.8	- 5.2
	Brand A2	.31	- 5.3	- 14.9
	Brand A3	- .12	- 2.9	1.3
Tea Bags	Brand B1	.35	- 3.8	- 14.5
	Brand B2	- .22	2.0	8.9
	Brand B3	- .93	.1	10.1
Inst Cof	Brand C1	.15	- 6.7	- 11.4
	Brand C2	.04	- 10.1	- 5.7
	Brand C3	- .34	- .4	- 3.8

Notes:
- E.g. regarding Automatc, at the whole-market level, Store Y's observed purchase frequency (w) is 0.15 **lower** than predicted. But in the context of brand choice **within** Store Y, the average brand's observed w/wp and bs/b values are 6.8 and 8.3 **higher** than predicted respectively. This is one instance of a negative association between loyalty, assessed relative to the Dirichlet norms, at the two levels.

12.3. A LINKED TWO-STAGE MODEL.

This section examines the validity of combining the two stages of the previous hierarchical model. Specifically, the proposed modification involves employing the predicted penetration (b) and purchase frequency (w) of the first stage as input to the second stage (where these measures become the B and W of the relevant submarket). Calculation of the submarkets' K and S parameters follows the usual procedure, but using the revised B and W values.

Ideally such a linked model would be capable of estimating the submarket parameter S without using the observed b and w values of the individual choice items it contains. However, a procedure for achieving such parsimony has not yet been identified.

12.3.1. Fit of the Linked Model Within the BCwS and SCwB Contexts.

As the first stage of the current model is similar to that of the discrete model, the predictive accuracy at this whole-market level is not considered here.

The predictions of the linked model within the BCwS and SCwB contexts confirm the importance of considering the issue of fit on a submarket-by-submarket basis rather than within choice contexts (BCwS or SCwB) as a whole. There are cases of very good fit, such as the Store X submarket in Table 12.8, and cases of very poor agreement, such as the Brand B3 submarket shown in Table 12.9 where w/wp and bs/b are on average underpredicted by 16 and 29 percentage points respectively. Table 12.10, specifying all mean absolute differences, emphasizes the high variation in fit across measures within each submarket and across submarkets for each measure. As with the discrete model, there is little evidence, in **overall** terms, of a disparity in fit between the BCwS and SCwB contexts (except perhaps regarding the bs/b measure, where the fit tends to be somewhat poorer in the SCwB situation). As would be expected given the increased parsimony of the linked model, on no measure does this latter formulation improve on the predictions of the discrete model (see Table 12.12).

In accounting for the discrepancy between observed and predicted behaviour within a given submarket, two main considerations arise. The first is that, if even the **discrete** hierarchical model can not provide an accurate description of the buying pattern within the submarket, then the behaviour at hand can be deemed "irregular" and the poor fit need not be attributed to using the **linked** version of the hierarchical Dirichlet. The second consideration concerns what might be termed (if somewhat inelegantly) the "parametization" of the linked model.

TABLE 12.8

Fit of the Linked Model: Brand Choice Within Store X, Automatic Washing Powder, Region I.

	MS (%)	b (%) O	b (%) D	w O	w D	wp O	wp D
Brand A1	36	23	24	5.1	4.9	8.8	8.8
Brand A2	21	14	15	4.6	4.4	9.4	9.3
Brand A3	15	13	11	3.5	4.2	8.3	9.5
Average	24	17	17	4.4	4.5	8.8	9.2

	w/wp (%) O	w/wp (%) D	bs/b (%) O	bs/b (%) D	ws O	ws D
Brand A1	58	55	43	41	5.2	4.1
Brand A2	49	47	35	33	3.4	3.6
Brand A3	43	44	31	30	3.2	3.4
Average	50	49	36	35	3.9	3.7

TABLE 12.9

Fit of the Linked Model: Store Choice for Brand B3, Tea Bags, Region I.

	MS (%)	b (%) O	b (%) D	w O	w D	wp O	wp D
Store X	26	6	7	3.6	2.9	6.3	6.5
Store Y	19	6	6	2.7	2.8	4.7	6.7
Store Z	7	3	2	1.9	2.5	3.5	7.3
Average	17	5	5	2.7	2.7	4.8	6.8

	w/wp (%) O	w/wp (%) D	bs/b (%) O	bs/b (%) D	ws O	ws D
Store X	57	45	60	33	3.2	2.1
Store Y	57	41	62	30	1.9	2.0
Store Z	55	34	52	25	1.4	1.7
Average	56	40	58	30	2.1	1.9

TABLE 12.10
Fit of the Linked Two-Stage Model:
Mean Absolute Difference (MAD)
for Buyer Behaviour Measures
in the BCwS and SCwB Contexts.
Region I.

	Str/ Brnd	MD of MS *	b	w	wp	w/wp	bs/b	ws
BCwS								
Aut- matc	X	8	1.3	.36	.44	1.9	1.6	.52
	Y	3	2.0	.59	1.03	8.2	10.0	1.44
	Z	5	.0	.03	1.09	5.3	22.6	1.28
	Ave	**6**	**1.1**	**.32**	**.85**	**5.1**	**11.4**	**1.08**
Tea Bags	X	20	1.3	.59	.81	9.7	11.7	.74
	Y	8	1.6	.55	1.18	11.0	14.4	1.61
	Z	32	1.8	1.30	1.22	15.3	7.2	.89
	Ave	**20**	**1.6**	**.81**	**1.07**	**12.0**	**11.1**	**1.08**
Inst Cof	X	14	1.7	.50	.73	3.7	5.9	1.08
	Y	8	.7	.24	.86	5.5	9.7	.80
	Z	20	1.8	1.21	1.60	8.8	.7	1.27
	Ave	**14**	**1.4**	**.65**	**1.06**	**6.0**	**5.4**	**1.05**
Ovrl	**Ave**	**13**	**1.4**	**.60**	**1.00**	**7.7**	**9.3**	**1.07**
SCwB								
Aut- matc	A1	13	2.6	.65	.96	5.9	5.6	.61
	A2	10	1.0	.50	.92	11.6	23.0	.98
	A3	11	.4	.20	.24	5.7	4.4	.34
	Ave	**11**	**1.3**	**.45**	**.71**	**7.8**	**11.0**	**.64**
Tea Bags	B1	14	1.0	.53	1.07	10.1	23.3	1.59
	B2	8	1.7	.58	1.02	4.8	12.1	1.31
	B3	7	.7	.44	1.98	15.8	28.7	.49
	Ave	**10**	**1.1**	**.52**	**1.36**	**10.2**	**21.4**	**1.13**
Inst Cof	C1	15	2.4	1.07	1.28	8.8	14.9	1.45
	C2	10	.6	.36	1.88	10.4	10.8	1.04
	C3	7	.2	.06	.67	5.2	8.0	.54
	Ave	**11**	**1.0**	**.50**	**1.28**	**8.1**	**11.2**	**1.01**
Ovrl	**Ave**	**11**	**1.2**	**.49**	**1.11**	**8.7**	**14.5**	**.93**

Notes:
* Mean deviation of market share within stated submarket.

12.3.2. Submarket Parameters.

Within any market, the Dirichlet parameters K and S depend (in part in the latter case) on that market's penetration (B) and average purchase frequency (W). Thus, in the context of a linked two-stage Dirichlet, the parameters K and S of a brand or store submarket are dependent on the predicted penetration and purchase frequency of that brand or store at the first stage of the model. This is apparent in Table 12.11, which gives the observed and predicted B values of all submarkets (i.e. predicted at the first stage of the model), together with K and S values determined from the discrete model (where the parameters are calculated from **observed** B and W) and from the linked model (where **predicted** B and W values are used). (The W values are not tabulated because an overprediction regarding B is necessarily associated with an underprediction regarding W, and vice versa.)

It can be seen that the difference in B (and W) values used by the discrete and linked models leads to different estimates of the K and S parameters. For instance, where a store's penetration is overpredicted (and purchase frequency underpredicted), the K and S parameters of that store at the submarket level are, respectively, higher and lower under the linked model than would be the case under the discrete model. Such differences in parameters necessarily impact on the models' predictions: for any given market, the higher the K parameter and the lower the S parameter, the greater the degree of loyalty assumed by the Dirichlet to apply - on all measures - to the choice items within that market. Thus the "inappropriate" parametization of the Brand B3 submarket apparent from Table 12.11 leads to gross underprediction of store loyalty for that brand, as shown earlier in Table 12.9.

Differences between the discrete-model and linked-model parameters (at the submarket level) are in most cases quite small, and such differences as do exist tend not to translate into a wide discrepancy in terms of fit, as reflected by the mean absolute differences in Table 12.12. However, the main problem concerns the bias, regarding loyalty, introduced to the linked model through "incorrect" parametization.

In theory, such bias (i.e. a consistent underprediction or overprediction of loyalty within a submarket) is inevitable if the (correctly parametized) discrete model provides a perfect fit. In practice incorrect parametization tends to accentuate (rather than diminish) any bias already present in the discrete model. This is illustrated in Table 12.13 for the measures w/wp and bs/b: on each measure, the linked model, relative to the discrete version, is further from the observed behaviour (i.e. the discrete model's predictions come **between** the observed values and the linked model's predictions) in 14 of the 18 cases.

In establishing **why** the linked two-stage Dirichlet has this effect, three points should be made, the first two of which are recalled from Section 12.2.3.

* First, when assessed against the Dirichlet norms, loyalty at the whole-market and submarket levels tends to be negatively related.

* Second, the discrete model does pick up this tendency in so far as the degree of loyalty (in terms of w) at the first stage affects the parameters of the submarket in question and hence also the predicted loyalty within that submarket. However, the strength of the negative association remains underestimated.

* Third, the linked two-stage model does not allow for any negative association between loyalty (assessed relative to the Dirichlet norms) at the two stages because its submarket parameters (which determine within-submarket loyalty) are based on "normal" (i.e. predicted) whole-market loyalty. Stated alternatively, the excess or deficiency of loyalty at Stage 1 relative to the Dirichlet norms is not allowed to impact on the parameters (and hence predictions) at the submarket level.

In summary, since an inverse relationship tends to hold between Stage 1 and Stage 2 loyalty (relative to the Dirichlet norms), and since the discrete two-stage model partly picks up this tendency, the linked model - which allows for no such association - is condemned to be further from the observed degree of within-submarket loyalty than the discrete model.

TABLE 12.11

Submarket Parameters K and S
Calculated from Discrete and Linked Two-Stage Dirichlet;
and Submarket Penetration (B)
used by Discrete and Linked Dirichlet.
Region I.

		B		K		S	
		Dsc	Lnk	Dsc	Lnk	Dsc	Lnk
BCwS	**Store**	*					
Automatc	X	43.5	44.3	.20	.21	.79	.74
	Y	30.2	29.5	.13	.13	1.68	1.92
	Z	14.1	13.5	.06	.05	1.88	2.27
Tea Bags	X	43.3	43.9	.20	.21	.48	.45
	Y	25.7	24.0	.11	.10	1.60	2.43
	Z	16.0	17.2	.06	.07	.89	.73
Inst Cof	X	50.3	50.7	.26	.26	.56	.53
	Y	31.5	30.0	.14	.13	.66	.81
	Z	17.2	18.3	.07	.07	.48	.39
SCwB	**Brand**						
Automatc	A1	47.9	47.0	.27	.26	.55	.60
	A2	34.5	36.6	.17	.19	.37	.27
	A3	28.2	27.5	.14	.14	.54	.62
Tea Bags	B1	53.1	56.0	.28	.32	.24	.16
	B2	37.9	36.4	.20	.18	.88	1.02
	B3	21.4	17.3	.11	.08	.62	1.40
Inst Cof	C1	52.8	53.8	.29	.30	.29	.26
	C2	44.0	44.2	.22	.23	.51	.50
	C3	28.3	26.5	.14	.12	.57	.75

Notes:
* Observed penetration of the store or brand.
- Dsc = Discrete Two-Stage Dirichlet.
- Lnk = Linked Two-Stage Dirichlet.
- E.g., consider Store X within the Automatc market. In the SC context, this store has an observed penetration of 43.5% and a predicted penetration of 44.3%. The discrete model uses the **observed** penetration (and purchase frequency) of the store to calculate K and S, while the linked model uses the **predicted** penetration (and purchase frequency) for this purpose. This results in different K and S values, as shown by the table.

TABLE 12.12

Fit of Discrete and Linked Two-Stage Models: Mean Absolute Difference (MAD) for Buyer Behaviour Measures in the BCwS and SCwB Contexts, Averaged by Product Field. Region I.

	Model Type *	b	w	wp	w/wp	bs/b	ws
BCwS							
Automatc	Dsc	1.1	.31	.69	4.0	10.5	1.01
	Lnk	1.1	.32	.85	5.1	11.4	1.08
Tea Bags	Dsc	1.5	.78	.69	10.1	9.3	.93
	Lnk	1.6	.81	1.07	12.0	11.1	1.08
Inst Cof	Dsc	1.4	.64	1.03	5.0	5.3	.99
	Lnk	1.4	.65	1.06	6.0	5.4	1.05
Average	Dsc	1.3	.58	.80	6.4	8.4	.98
	Lnk	1.4	.60	1.00	7.7	9.3	1.07
SCwB							
Automatc	Dsc	1.3	.45	.55	6.7	8.0	.63
	Lnk	1.3	.45	.71	7.8	11.0	.64
Tea Bags	Dsc	1.2	.54	.77	3.6	11.2	1.15
	Lnk	1.1	.52	1.36	10.2	21.4	1.13
Inst Cof	Dsc	1.0	.50	1.12	7.0	10.4	.91
	Lnk	1.0	.50	1.28	8.1	11.2	1.01
Average	Dsc	1.2	.49	.81	5.7	9.9	.90
	Lnk	1.1	.49	1.11	8.7	14.5	.93

Notes:
* Dsc = Discrete Two-Stage Model.
Lnk = Linked Two-Stage Model.

TABLE 12.13

Share of Requirement (w/wp)
and Proportion of Sole Buyers (bs/b):
Predicted Values from Discrete & Linked Two-Stage Models,
Averaged for Each Submarket.
Region I.

		Ave w/wp (%)			Ave bs/b (%)		
		O	Dsc D	Lnk D	O	Dsc D	Lnk D
BCwS							
Automatc	Store X	50	47	49	36	33	35
	Store Y	45	38	37	33	24	23
	Store Z	39	36	34	45	25	22
Tea Bags	Store X	52	58	59	37	47	49
	Store Y	46	40	35	36	27	22
	Store Z	44	53	57	41	44	48
Inst Cof	Store X	57	55	56	38	42	43
	Store Y	54	53	49	47	42	37
	Store Z	55	60	64	57	52	57
SCwB							
Automatc	Brand A1	51	56	54	39	44	42
	Brand A2	58	63	69	40	55	63
	Brand A3	55	58	55	51	49	46
Tea Bags	Brand B1	66	70	76	47	62	71
	Brand B2	48	46	43	42	33	30
	Brand B3	56	56	40	58	48	30
Inst Cof	Brand C1	59	66	68	46	57	60
	Brand C2	45	55	55	38	43	44
	Brand C3	55	55	49	41	45	39

Notes:
- E.g. regarding Automatc, the buyers of the average brand at Store X devote 50% of their product purchases within Store X to that brand. The discrete model predicts that this proportion should be 47%, and the linked model predicts that it should be 49%.

12.4. CONCLUSIONS.

This chapter has brought together the two levels of choice examined separately in previous chapters, the aim being to address some issues associated with the hierarchical or two-stage Dirichlet model which has parenthetically been established. The following conclusions relate to the three questions posed at the beginning of the chapter.

1. There is no evidence to suggest that one hierarchical model provides a more accurate description of behaviour than the other.

In other words, using the Dirichlet to describe store choice and then brand choice within the chosen store is no more or less accurate than the alternative "brand-then-store" Dirichlet. The two hierarchical models are equally valid.

This conclusion derives from a direct comparison of the degree of fit in the BC and SC contexts, and in the BCwS and SCwB contexts. Although differences in fit often arise between a BC and a SC market, or between a BCwS and a SCwB submarket, these are typically no greater than the differences between markets (or submarkets) within the **same** choice context. The only measure which significantly differentiated between contexts in terms of fit was ws, the average purchase frequency of sole buyers. As noted earlier in Chapters 7 and 11, this measure is more seriously underpredicted in both the BC and BCwS contexts than in the SC and SCwB cases. (Indeed, the present SCwB context reveals no such predictive bias at all.)

2. There is some evidence of a relationship between behavioural "irregularity" at the first and second stages of choice.

Specifically, the data suggest that a negative relationship exists between loyalty at the two stages, i.e. **when loyalty is assessed relative to the Dirichlet norms**. For instance, if a store receives higher-than-predicted loyalty (in terms of w), then brand loyalty within that store (in terms of w/wp and bs/b) will **tend** to be lower than predicted.

This is a surprising result in that the Dirichlet (under the discrete two-stage model) is calibrated to each brand or store submarket using only **observed** data as input (i.e. in estimating parameters), which would lead to the expectation that predictive bias at the two levels of choice would be independent.

However, although the negative association between loyalty at the two stages is fairly consistent in the present analysis, it is not emphatic, and is shown here using only one measure (w) at the whole-market level and two measures (w/wp and bs/b) at the submarket level. The above conclusion remains tentative therefore, and is at present best interpreted as a potentially relevant consideration when attempting to account for a predictive bias within any given submarket.

3. Simplifying the hierarchical Dirichlet model by using the Stage 1 output as Stage 2 input has a deleterious effect on fit and is not recommended.

In fact the loss of accuracy, in terms of mean absolute difference between observed and predicted figures, is not large. The main difficulty concerns the **bias** introduced by the linked model at this second (i.e. submarket) stage.

First, for rather involved reasons suggested in Section 12.3.2, the linked model tends to **accentuate** (rather than diminish) any predictive bias already present in the discrete model.

Second, where the buying pattern for a store or brand is poorly described at the first stage of the linked model, the parameters at the second stage for the store or brand in question are inevitably wrongly estimated,.leading in some cases to very marked predictive bias. This leads to the conclusion that "the linked model is only appropriate where choice behaviour is well described at the first stage of the model", in which case the linked model only distinguishes itself from the discrete version in terms of low generalizability.

Chapter 13

THE INTERACTION OF BRAND CHOICE AND STORE CHOICE

Contents:

13.1. INTRODUCTION.

The previous four chapters have examined choice behaviour within submarkets (represented by either a store or a brand), each of which have been considered separately. For instance, choice behaviour was assessed for **all** the buyers at Store X, and for **all** the buyers at Store Y, regardless of how much overlap existed between the buyers at each store. No attempt was made to measure the behaviour of the **same** group of consumers in different submarkets. This chapter aims to fill this gap: it "follows" the buyers of Brand B at Store S as they move from store to store, and from brand to brand, and measures how their brand and store choice patterns adjust accordingly.

Such questions as the following are addressed.

* Do the buyers of Brand B at Store S tend to buy other brands when at other stores or do they exhibit loyalty to Brand B across stores?

* Do these buyers tend to shop elsewhere when they "switch" brands or do they remain loyal to Store S across brands?

* Are they more likely to buy other brands at Store S or Brand B at other stores? (An issue of particular relevance when a store delists a brand.)

* How do the patterns vary for different brand-store combinations?

The results in this area of Wrigley and Dunn (1984c) and Kau and Ehrenberg (1984) indicated that buyers of a brand-store combination typically buy other brands and/or at other stores extensively, although the precise pattern varied according to the brand-store pair in question. The present study differs in providing theoretical (Dirichlet) norms to help with interpretation.

Analysis begins, in Section 13.2, by illustrating some of the possible patterns for individual households. Subsequently aggregated results are reported for the buyers of various brand-store combinations. Section 13.3 examines the **number** of buyers who "also buy" other brands and/or at other stores, and Section 13.4 focuses on the **amount bought** (e.g. how many purchases of Brand B are made at other stores). In Section 13.5, the crucial (and pervasive) influence of market share on the observed patterns of interaction is illustrated. Sections 13.6 and

13.7 use the same data as the previous sections, but the issues they deal with are treated separately in the interests of clarity. Specifically, Section 13.6 introduces the distinction between loyalty **within** and **across** submarkets, and Section 13.7 examines the balance between within-store brand loyalty and within-brand store loyalty.

As in the previous chapter,

* the results relate to Region I alone;

* only the three largest non-composite brand and store categories are considered;

* the Dirichlet has been recalibrated to these reduced-choice-set product fields;

* and in each case the S parameter is determined using **all** the brands or stores in question (i.e. no exclusions are made).

The reasons for this approach were specified in Section 12.1.

Before proceeding, two points of clarification are required. First, many of the data studied in this chapter have already been used earlier in the thesis. The originality of the current analysis is that it **brings together** the BCwS and SCwB contexts for a given set of consumers (i.e. the buyers of a particular brand at a particular store). Their purchasing behaviour on two dimensions is thereby considered simultaneously. A third choice dimension, entitled the "across-brand/across-store" (aBaS) context, is also studied. This refers to the situation where the buyers of a given brand at a given store buy **a different brand at a different store.** Between them, these three choice contexts cover the whole range of brand and store choice alternatives available to the buyers of any particular brand-store combination.

The second point concerns an analytical approach used extensively in this chapter. Specifically, analysis of multibrand and multistore buying is often simplified by grouping all "other" purchases into a single brand or store category. For the buyers of Brand B at Store S, this involves dividing their total product purchases into what are henceforth referred to as four **"purchase options"**. These are specified overleaf together with their abbreviations.

	Purchase Option	Abbreviation
(i)	Brand B at Store S	B/S
(ii)	Other Brands at Store S	OB/S
(iii)	Brand B at Other Stores	B/OS
(iv)	Other Brands at Other Stores	OB/OS

13.2. INDIVIDUAL-LEVEL PATTERNS.

Figure 13.1 overleaf illustrates some contrasting ways in which the buyers of Brand A1 at Store X may distribute 15 product class purchases between other brands and stores. The examples are hypothetical, although individual-level results presented by Wrigley and Dunn (1984c) indicate that the patterns shown are realistic. The following observations can be made.

* Buyer I exhibits complete loyalty to Brand A1 and to Store X.
* Buyer II exhibits disloyalty to Brand A1 within Store X, but complete loyalty to Store X.
* Buyer III exhibits complete loyalty to Brand A1, but disloyalty to Store X for that brand.
* Buyer IV exhibits disloyalty to both Brand A1 and Store X. This buyer switches brand when switching stores.
* Buyer V exhibits a more complex pattern of behaviour, containing evidence of both brand loyalty (within OM), store loyalty (for Brand A2), brand disloyalty (within Store X), and store disloyalty (for Brand A4).

The point of such examples is to illustrate the wide range and potential complexity of brand-store choice patterns at the individual level. However, it is now well established that consumer heterogeneity and behavioural complexity at this level does not in general preclude the emergence of predictable regularities at the aggregate level (as implied by the fit of the NBD and Dirichlet models).

FIGURE 13.1

Some Individual-Level Patterns of Brand and Store Choice for Five Hypothetical Buyers of Brand A1 at Store X: the Number of Purchases Made of Various Brand-Store Pairs.

(15 Product-Class Purchases per Buyer Assumed.)

Buyer I

Store	A1	A2	A3	A4	A5
X	15	-	-	-	-
OM	-	-	-	-	-
Y	-	-	-	-	-
Msc	-	-	-	-	-
Z	-	-	-	-	-

Buyer II

Store	A1	A2	A3	A4	A5
X	7	1	2	4	1
OM	-	-	-	-	-
Y	-	-	-	-	-
Msc	-	-	-	-	-
Z	-	-	-	-	-

Buyer III

Store	A1	A2	A3	A4	A5
X	5	-	-	-	-
OM	2	-	-	-	-
Y	5	-	-	-	-
Msc	1	-	-	-	-
Z	2	-	-	-	-

Buyer IV

Store	A1	A2	A3	A4	A5
X	4	-	-	-	-
OM	-	-	-	5	-
Y	-	-	3	-	-
Msc	-	-	-	-	1
Z	-	2	-	-	-

Buyer V

Store	A1	A2	A3	A4	A5
X	2	-	1	1	-
OM	3	-	-	-	-
Y	-	-	-	3	-
Msc	-	2	-	3	-
Z	-	-	-	-	-

13.3. DUPLICATION: NUMBER OF BUYERS.

13.3.1. Duplication with Individual Brands and Stores.

A useful initial means of examining, simultaneously, the incidence of multibrand and multistore buying is through standard duplication tables. Table 13.1 exhibits the pattern for nine brand-store pairings within the Automatic Washing Powder market. To illustrate, 41% of the buyers of Brand A2 at Store X also buy Brand A1 at Store X; 28% of those who buy Brand A1 at Store Y also buy Brand A1 at Store X; and 13% of those who buy Brand A2 at Store Y also buy Brand A1 at Store X.

TABLE 13.1

Duplication with Other Brands and/or at Other Stores. Automatic Washing Powder, Region I.

Buyers of:		% who also buy:								
		Store X			Store Y			Store Z		
Store	Brand	A1	A2	A3	A1	A2	A3	A1	A2	A3
	A1	--	26	21	19	6	4	10	4	2
X	A2	41	--	19	11	17	7	3	9	0
	A3	37	20	--	16	8	20	6	5	6
	A1	28	10	14	--	29	29	9	5	2
Y	A2	13	22	10	41	--	31	3	12	1
	A3	9	12	28	48	37	--	7	3	7
	A1	36	9	14	23	5	10	--	29	21
Z	A2	16	24	12	14	24	6	32	--	12
	A3	13	0	23	13	3	19	39	19	--
Rltv b *		28	18	16	19	14	12	8	7	4

Notes:
* Rltv b = relative penetration, i.e. penetration of the brand-store pair among buyers of the product field.

The Duplication of Purchase Law specifies that duplication should be proportional to penetration, which accounts for the stability in the figures within each column of "standard" duplication tables. Clearly, the Law does not hold in the present instance where brand and store choices are considered simultaneously. Responsibility lies with two main features in the data. The first can be described as a "brand effect" (which emerges from the diagonals within six of the subtables): for instance, buyers of Brand A1 at Store Y are about two times more likely to buy Brand A1 at Store X than are the buyers of Brand A2 at Store Y. The second is a corresponding "store effect" (which emerges from the three within-store subtables): buyers of Brand A2 at Store X are about three times more likely to buy Brand A1 at Store X than are the buyers of Brand A2 at Store Y. Stated alternatively, buyers of any given brand-store combination exhibit a tendency to buy other brands at the same store rather than elswhere, and to buy the same brand rather than alternatives when at other stores. This pattern represents a two-way segmentation of the market: by store for brand choice and by brand for store choice.

TABLE 13.2

Average D Coefficients in the BCwS, SCwB, and Across-Brand/Across-Store Contexts. (D Calculated Relative to Buyers of the Product Class.)

	Store			Brand			
	X	Y	Z	1	2	3	Ave
Automatc							
BCwS	1.32	2.41	4.02				2.11
SCwB				1.14	1.41	1.59	1.34
aBaS	.53	.58	.55	.57	.46	.64	.55
Tea Bags							
BCwS	1.59	2.76	4.21				2.47
SCwB				.93	1.44	1.48	1.17
aBaS	.47	.75	.65	.60	.56	.61	.59
Inst Cof							
BCwS	1.44	2.19	2.93				1.92
SCwB				1.16	1.65	2.09	1.53
aBaS	.42	.70	.57	.44	.60	.62	.53

Notes:
- aBaS = across-brand/across-store context. (The context where the buyers of Brand B at Store S buy a different brand at a different store.)
- E.g., regarding Automatc, the aBaS D value for Store X is calculated as follows: average aBaS duplication = (13+9+16+13+10+12+9+0+14+10+14+12)/12 = 11.0; average penetration of Store-X brands among buyers of the product class = 20.7; therefore D = 11.0/20.7 = 0.53.

An alternative expression of this dual-loyalty pattern is provided in Table 13.2, where D coefficients, for all three product fields, have been calculated for the BCwS, SCwB, and across-brand/across-store contexts. (This latter context refers to the situation where the buyers of a brand-store combination buy a different brand at a different store.) These coefficients, determined separately for each store and brand submarket, relate to buyers of the product field. Thus, regarding the washing powder market, buyers of any given brand at Store X are 1.32 times as likely as the average buyer of the product class to buy any other given brand at that store; buyers of Brand A1 at any given store are 1.14 times as likely as the average product buyer to buy Brand A1 at any other given store; and buyers of any given brand at Store X are 0.53 as likely as the average product buyer to buy a different brand at a different store. (The D coefficients increase as the size of the brand or store falls because fewer people buy smaller brands or at smaller stores at all; if the coefficients were calculated using penetration among brand buyers or store patrons, they would be much the same from submarket to submarket, as indicated in Chapters 10 and 11.) The average figures (in the right-hand column of Table 13.2) present a similar picture in each product field: in every case, regarding the average product buyer, buying Brand B at Store S substantially **increases** the probability of buying another brand at Store S or Brand B at another store, but substantially **decreases** the probability of buying another brand at another store.

Modelling the Patterns.

As shown in Table 13.3, duplication within each BCwS and SCwB submarket can be successfully predicted by multiplying the relative penetration (i.e. penetration among product class buyers) of each brand-store combination by the D coefficients in Table 13.2. (This capability was demonstrated in Chapters 10 and 11 using D coefficients determined using penetration among buyers **at the store** or **of the brand**; so long as D is specific to the submarket in question, whether or not **relative** penetration is used in its calculation has no effect on the actual predictions.)

But can across-brand/across-store duplication be modelled? The reasonable stability of the (unemboldened) figures in this context within each column of Table 13.1 holds promise in this respect. It in fact transpires that the Duplication of Purchase Law applies to this context also. Indeed, since the associated D coefficients shown in Table 13.2 do not differ markedly from submarket to submarket (especially in the case of automatic washing powder), the **same** D value can reasonably be applied to **all** the brand-store combinations within a given product field.

TABLE 13.3

Observed Average Duplication and Predicted Duplication in the BCwS, SCwB, and Across-Brand/Across-Store Contexts. Automatic Washing Powder, Region I.

	% also buying:								
	Store X			Store Y			Store Z		
	A1	A2	A3	A1	A2	A3	A1	A2	A3
BCwS									
Ave dpl	39	23	20	45	33	30	36	24	17
D x b/B *	37	23	22	46	33	28	31	28	9
SCwB									
Ave dpl	32	23	26	21	21	20	10	11	7
D x b/B *	38	24	22	26	18	16	10	9	6
aBaS									
Ave dpl	13	8	13	14	6	7	5	4	1
D x b/B **	15	10	9	11	8	7	4	4	2
D = 0.55									
b/B ***	28	18	16	19	14	12	8	7	4

Notes:

* These predictions are obtained via a D coefficient specific to each BCwS and SCwB submarket (see Table 13.2).

** In this aBas context D is calculated from average duplication as a proportion of average b/B using all 9 brand-store pairs simultaneously.

*** b/B = penetration of the brand-store combination among buyers of the product field.

The resultant predictions are tabulated in Table 13.3. The fit is quite good, especially in view of the small samples involved. (On average only 5.4% of a brand-store combination's buyers also purchase any other given brand at any other given store.) Corresponding results from the two other product fields, reported in Table 13.4, indicate a similar level of agreement. The overprediction of duplication with the largest brand-store combination in each product class reflects the pattern at the BC level (see Section 6.6).

From Table 13.4 it is also notable that the average D coefficients in this across-brand/across-store context are almost the same for each product field. Thus a further simplification to the model can be made: the **same** D value could well have been used in Table 13.4 for all the brand-store combinations in all three product classes. In summary, the following rule holds quite well for the data analysed here: buyers of Brand B at Store S are about 0.55 as likely as the average product buyer to purchase any other given brand at any other given store, regardless of the Brand B, Store S, or product field in question.

TABLE 13.4

Observed Average Duplication and Predicted Duplication in the Across-Brand/Across-Store Context.

	% also buying:								
	Store X			**Store Y**			**Store Z**		
Automatc	**A1**	**A2**	**A3**	**A1**	**A2**	**A3**	**A1**	**A2**	**A3**
Ave dpl	13	8	13	14	6	7	5	4	1
D x b/B	15	10	9	11	8	7	4	4	2
D = .55									
b/B	28	18	16	19	14	12	8	7	4
Tea Bags	**B1**	**B2**	**B3**	**B1**	**B2**	**B3**	**B1**	**B2**	**B3**
Ave dpl	19	7	3	8	12	6	11	3	2
D x b/B	21	9	4	7	10	4	9	3	2
D = .59									
b/B	36	16	7	11	16	7	16	5	4
Inst Cof	**C1**	**C2**	**C3**	**C1**	**C2**	**C3**	**C1**	**C2**	**C3**
Ave dpl	11	10	6	7	12	9	6	4	3
D x b/B	17	11	6	6	9	6	6	3	3
D = .53									
b/B	33	21	12	12	17	10	11	6	5

Notes:
- E.g., regarding Automatc, on average 13% of the buyers of a brand-store combination (that includes neither Brand A1 nor Store X) also buy Brand A1 at Store X.
- b/B = penetration of brand-store combination among buyers of the product field.
- In each market, D is calculated from average duplication as a proportion of average b/B using all 9 brand-store pairs simultaneously.

13.3.2. Duplication with "Other Brands" and "Other Stores".

Analysis of duplication across brands and stores can be simplified by following the "purchase option" approach described in Section 13.1. This perspective is adopted in Table 13.5 regarding automatic washing powder in Region I (except that the B/S option, where values are necessarily 100%, is excluded). To illustrate, of those consumers who bought Brand A1 at Store X, 57% bought other brands at Store X, 50% bought Brand A1 elsewhere, and 41% bought other brands at other stores.

TABLE 13.5

Duplication with Other Brands and Other Stores. Predicted Values from "Non-Interaction" Dirichlet. Automatic Washing Powder, Region I.

Buyers of:	% also buying: OB/S O	OB/S D	B/OS O	B/OS D	OB/OS O	OB/OS D
Store X						
Brand A1	57	51	50	43	41	73
Brand A2	65	59	49	37	54	76
Brand A3	69	62	40	27	63	79
Store Y						
Brand A1	58	41	57	56	56	78
Brand A2	67	40	56	41	59	83
Brand A3	77	43	52	31	66	85
Store Z						
Brand A1	49	20	76	60	65	83
Brand A2	53	21	76	47	73	86
Brand A3	63	23	57	37	86	88
Average	62	40	57	42	63	81

Notes:
- The term "non-interaction" Dirichlet is used to describe the model when it has been calibrated simultaneously to all brand-store combinations within the market as a whole. Such calibration does not take account of the known segmented structure of the market (i.e. by store for brand choice and by brand for store choice).

Also listed are predictions derived from what might be termed a "non-interaction" Dirichlet. This is a model calibrated to all brand-store combinations simultaneously in the whole-market context. (Specifically, the M and K parameters are identical to those determined for the BC and SC contexts, but the S parameter is estimated using the b and w values of all nine brand-store combinations.) The model thus expresses what could be expected if the product field were not segmented by store (for brand choice) or by brand (for store choice) - a hypothetical situation where the buyers of a given brand-store pair would show no special tendency to buy other brands at the same store rather than elsewhere, or to buy the same brand rather than other brands when shopping at other stores. Put another way, the model describes how these buyers would distribute their purchases between other brand-store pairs on the basis of market share alone (together with the product field parameters), i.e. regardless of whether the "same" brand or store was involved.

Four main observations can be made from Table 13.5.

First, for the buyers of every brand-store pair, the proportion buying other brands at the same store and the same brand at other store is without exception greater than the "non-interaction" values, and the proportion buying other brands at other stores is always lower than these theoretical figures. In most cases the discrepancy is substantial. This pattern reiterates that noted regarding Table 13.1: buyer behaviour is characterized by both brand loyalty across stores and store loyalty across brands.

Second, the buyers of a brand-store combination typically buy other brands and/or at other stores extensively, the proportions involved averaging at about 60% for each of the three purchase options. These figures are similar to those derived from the other two product fields (see the average values in Table 13.6), and also accord broadly with the results reported by Kau and Ehrenberg (1984) and Wrigley and Dunn (1984c). The average proportion buying other brands at other stores (implying simultaneous brand and store disloyalty) may at first sight seem quite high at 63%, but comparison with the non-interaction estimates reveals this percentage to be considerably **lower** than would be expected on the basis of market share alone (i.e. there **is** resistance to making such purchases).

Third, the precise pattern tends to vary across brand-store combinations: buyers of Brand A1 at Store Y appear to have the same propensity to "also buy" in each of the three purchase options (OB/S, B/OS, and OB/OS); buyers of Brand A3 at Store X seem more prone to buy other brands at X rather than A3 at other stores; this latter balance is reversed for buyers of Brand A1 at Store Z; and the buyers of Brand A3 at Store Z have a particularly high probability of buying other brands at other stores.

TABLE 13.6

Duplication with Other Brands and Other Stores: Average Values from Each Product Field, Region I.

Product Field	% also buying: OB/S	B/OS	OB/OS
Automatc	62	57	63
Tea Bags	62	51	68
Inst cof	53	58	59
Average	59	55	63

Fourth, this variation is clearly in part attributable to market share differences. For instance, buyers of Brand A3 (the smallest brand) at each store exhibit a particularly high propensity to buy other brands within the same store. And buyers of a brand at Store Z (the smallest store) show a relatively marked tendency to also buy that brand at other stores. The relevance of the market share factor is considered in more detail in Section 13.5.

Modelling the Patterns.

The validity of the Dirichlet in the BCwS and SCwB contexts (demonstrated in Chapters 10 and 11) means it is possible to generate predictions for duplication with the OB/S and B/OS purchase options. This is illustrated in Table 13.7 overleaf, where six **separately-calibrated** Dirichlet models have been juxtaposed. (For instance, in the case of Brand A1 at Store X, the predicted duplication with OB/S derives from the brand-choice-within-Store-X Dirichlet, while the predicted duplication with B/OS derives from the store-choice-for-Brand-A1 Dirichlet.) The fit is not especially close (undoubtedly due in part to the small samples involved). But it is of interest that in this and other markets (see Tables A8.5 and A8.6) a **tendency** emerges for a high (or low) duplication with OB/S to be associated with a low (or high) duplication with B/OS (i.e. where the duplication level is assessed relative to the Dirichlet norms). In effect, if duplication is low on one dimension, it will be "compensated" by high duplication on the other.

TABLE 13.7

Duplication with Other Brands and Other Stores.
Predicted Values from Dirichlet Calibrated Separately
to Each BCwS and SCwB Submarket.
Automatic Washing Powder, Region I.

Buyers of:	% also buying:			
	OB/S		B/OS	
	O	D	O	D
Store X				
Brand A1	57	61	50	46
Brand A2	65	68	49	40
Brand A3	69	71	40	45
Store Y				
Brand A1	58	75	57	59
Brand A2	67	74	56	44
Brand A3	77	78	52	50
Store Z				
Brand A1	49	73	76	63
Brand A2	53	75	76	51
Brand A3	63	78	57	58
Average	62	73	57	51

Notes:
- Note that the above predictions derive from six separately-calibrated Dirichlet models.

13.4. DUPLICATION: AMOUNT BOUGHT.

The results of the preceding section indicated that a large proportion of the buyers of a given brand at a given store would, over a 48-week period, also buy other brands at the store, the same brand at other stores, and other brands at other stores. However, the possibility remains that these "other" purchases are only occasional, arising perhaps from isolated promotions or temporary stockouts. This section examines the extent of the disloyalty at issue in terms of buying frequency.

Here, as in Section 13.3.2, analysis is simplified by grouping "other" purchases into single brand or store categories. Following this approach, Table 13.8 presents data from the usual automatic washing powder market. The purchase frequencies shown are the averages for **all** the buyers of the brand-store pair in question. For example, buyers of Brand A1 at Store X make on average 3.7

TABLE 13.8

Buyers of Brand B at Store S:
Amount Bought of Other Brands and/or at Other Stores.
Predicted Values from "Non-Interaction" Dirichlet.
Automatic Washing Powder, Region I.

Buyers of:	Purchase Frequency of: B/S O	B/S D	OB/S O	OB/S D	B/OS O	B/OS D	OB/OS O	OB/OS D	any B/any S O	any B/any S D
X										
A1	5.1	4.3	3.7	2.7	2.4	2.1	1.7	5.5	13	15
A2	4.6	3.9	4.8	3.4	2.0	1.7	2.5	6.1	14	15
A3	3.5	3.8	4.8	3.7	2.6	1.1	3.8	6.7	15	15
Y										
A1	3.0	3.8	3.7	1.9	3.1	3.1	3.0	6.5	13	15
A2	4.4	3.8	4.7	1.8	2.7	1.9	3.2	7.8	15	15
A3	3.6	3.7	5.0	2.0	2.0	1.3	4.7	8.4	15	15
Z										
A1	3.1	3.6	4.0	0.8	5.6	3.5	5.2	7.7	18	16
A2	3.0	3.6	4.2	0.8	4.1	2.3	5.2	8.9	17	16
A3	2.7	3.6	5.7	0.9	3.7	1.6	6.5	9.6	19	16
Av	3.7	3.8	4.5	2.0	3.1	2.1	4.0	7.5	15	15

Notes:
- For definition of "non-interaction" Dirichlet, see Table 13.5

purchases of other brands at that store; if only those A1-X buyers who **do** make purchases of other brands at Store X are counted, their average purchase rate in the OB/S option would be higher at 6.5 (i.e. 3.7/0.57, since 57% of A1-X buyers also buy other brands at Store X).

Also shown in the table are predictions from the same "non-interaction" Dirichlet used in Table 13.5. Against these norms, the buyers of any given brand-store pair exhibit a marked tendency to concentrate other-brand purchases within the same store and other-store purchases within the same brand, together with a marked resistance to switch both brands and stores simultaneously. This pattern - which holds for every brand-store combination for all three categories of "other" purchases - accords with that noted earlier regarding the **number** of buyers involved, and again reflects the market's segmentation by both store (for brand choice) and brand (for store choice). The corresponding data from the two other product fields present much the same picture, as summarized in Table 13.9 using the share-of-requirement approach.

TABLE 13.9

Share of Requirement:
Buyers of the Average Brand at the Average Store.
Predicted Values from "Non-Interaction" Dirichlet.

Product Field	Share of requirement (%) represented by:							
	B/S		OB/S		B/OS		OB/OS	
	O	D	O	D	O	D	O	D
Automatc	25	25	30	13	20	13	25	49
Tea Bags	26	28	30	11	18	14	26	47
Inst Cof	29	31	23	11	27	13	21	44
Average	27	28	28	12	22	13	24	47

Notes:
- E.g., regarding Automatc, buyers of the average brand at the average store devote 25% of their total product purchases to that brand-store pair, 30% to other brands at the store, etc.
- For definition of "non-interaction" Dirichlet, see Table 13.5.

The observed figures in Table 13.8 make plain that "other" purchases are not just occasional - rather, they consistently account for the **majority** of total purchases.

For example, buyers of Brand A2 at Store Y make 15 purchases of the product class, yet only 4.4 of these - about 29% - were devoted to that brand at that store. As where the **number** of duplicating buyers was considered (in Section 13.3), the precise way in which total purchases are distributed between the four purchase options can be seen to vary according to the brand-store pair in question. Again the market share factor seems relevant, as described more fully in Section 13.5. Overall, consumers in this and other product fields divide their product purchases fairly equally between the four purchase options, as illustrated by the average observed share-of-requirement values in Table 13.9.

Modelling the Patterns.

The analysis of how consumers distribute their product requirements between the four purchase options (B/S, OB/S, B/OS, and OB/OS) would be facilitated by the provision of theoretical norms in each of these categories. In view of the segmented nature of the market, it is clear that to this end the Dirichlet must be calibrated separately to each brand or store submarket. It has already been shown in Chapters 10 and 11 that the Dirichlet is capable of describing behaviour with regard to the first three options (B/S, OB/S, and B/OS) within each segment. Or more specifically, the predictions for the number of purchases made within the B/S and OB/S options can be drawn from the BCwS Dirichlet, and predictions for the B/S (again) and B/OS options are available from the SCwB Dirichlet. This is illustrated using the present data in Table 13.10, which (like Table 13.7) juxtaposes the predictions of six separately-calibrated Dirichlet models. Beyond a slight tendency to overpredict the purchase frequency within the OB/S option, the fit is reasonably good, and a similar conclusion applies to the tea bag and instant coffee markets (Tables A8.14 and A8.15).

In sum, the Dirichlet succesfully describes the distribution of purchases in the within-store brand choice and within-brand store choice contexts. But so long as the model is confined to this submarket level, the share of consumers' requirements represented by **other brands at other stores** (OB/OS) remains unpredicted. If a means could be found of estimating the product purchasing rate (i.e. the any-B/any-S category) of the buyers of a brand-store combination, it would be possible to solve for the buying rate within the OB/OS option and generate predictions of purchase frequencies within all four purchase options.

One means of predicting this product-buying rate is via the non-interaction Dirichlet, which (as described in

TABLE 13.10

Buyers of Brand B at Store S:
Amount Bought Within Three Purchase Options.

Buyers of:	purchase frequency of:						
	----- B/S -----			OB/S		B/OS	
	O	D(1)	D(2)	O	D(1)	O	D(2)
Store X							
Brand A1	5.1	4.9	4.3	3.7	4.1	2.4	2.3
Brand A2	4.6	4.3	4.3	4.8	5.3	2.0	2.1
Brand A3	3.5	4.2	3.6	4.8	5.6	2.6	2.0
Store Y							
Brand A1	3.0	3.4	3.8	3.7	5.2	3.1	3.3
Brand A2	4.4	3.4	4.2	4.7	5.2	2.7	2.4
Brand A3	3.6	3.2	3.4	5.0	5.8	2.0	2.4
Store Z							
Brand A1	3.1	3.1	3.6	4.0	4.4	5.6	3.7
Brand A2	3.0	3.0	3.9	4.2	4.7	4.1	3.0
Brand A3	2.7	2.7	3.1	5.7	5.4	3.7	3.0
Average	3.7	3.6	3.8	4.5	5.1	3.1	2.7

Notes:
- D(1) = predictions from Dirichlet calibrated to the relevant BCwS context.
- D(2) = predictions from Dirichlet calibrated to the relevant SCwB context.

Section 13.3.2) is calibrated within the required whole-market context to all brand-store pairs simultaneously. While such application does not truly reflect the known market structure (as discussed later), the estimates are in practice reasonably close to the observed values (the main problem concerning a slight underestimation of the variation in product-buying rates across brand-store combinations), as shown by Table 13.11. This provides a workable means of predicting the OB/OS buying rate (i.e. by subtracting from the predicted any-B/any-S purchasing rate the predicted B/S, OB/S and B/OS rates).

A few notes on the associated calculation procedure are appropriate. As a prediction of the B/S buying frequency derives from both BCwS and SCwB contexts (see e.g. Table

TABLE 13.11

Average Purchase Frequency of the Product
(i.e. any brand at any store)
per Buyer of Brand B at Store S (wp).
Predictions from "Non-Interaction" Dirichlet.
Region I.

	Automatc wp		Tea Bags wp		Inst Cof wp	
	O	D	O	D	O	D
Store X						
Brand 1	12.8	14.6	11.9	14.2	12.8	14.0
Brand 2	13.9	15.1	14.3	15.2	13.8	14.5
Brand 3	14.6	15.3	16.2	15.5	12.5	14.7
Store Y						
Brand 1	12.9	15.3	16.3	15.3	14.2	14.7
Brand 2	15.0	15.3	14.3	15.3	14.9	14.5
Brand 3	15.4	15.4	17.7	15.5	15.2	14.7
Store Z						
Brand 1	17.8	15.6	14.8	15.0	16.6	14.6
Brand 2	16.5	15.6	18.5	15.6	18.4	14.8
Brand 3	18.6	15.7	16.3	15.6	17.9	14.8
Average	15.3	15.3	15.6	15.2	15.1	14.6

Notes:
- For definition of "non-interaction" Dirichlet, see Table 13.5

13.10), the approach adopted is to take the average of these two values. This "revised" w figure is then subtracted from the wp predictions in both BCwS and SCwB contexts to give the purchasing rate within the OB/S and B/OS options. The resultant predictions within the B/S, OB/S and B/OS options are, finally, subtracted from the predicted any-B/any-S purchasing rate to give the OB/OS value.

Tables 13.12 and 13.13 specify the predictions derived in this way, but express these predictions in share of requirement terms (the underlying purchase frequencies being provided in Tables A8.16-A8.18). The fit in each case is quite good, though marked discrepancies - emboldened - do arise. The overall agreement represents a marked improvement on that achieved via the "non-interaction" model, as indicated by the average values at the base of each table. The predictions are slightly less accurate in the tea bag market (see Table

TABLE 13.12

Share of Requirement of all Four "Purchase Options". Predictions Derived from the Dirichlet Calibrated to Each Submarket. * Automatic Washing Powder, Region I.

Buyers of:	% of total purchases devoted to:							
	B/S		OB/S		B/OS		OB/OS	
	O	D	O	D	O	D	O	D
Store X								
Brand A1	39	31	29	28	18	16	13	25
Brand A2	33	29	35	35	14	14	18	23
Brand A3	24	25	33	37	17	13	26	24
Store Y								
Brand A1	24	24	29	34	24	22	24	20
Brand A2	29	25	31	34	18	16	21	26
Brand A3	23	21	33	38	13	15	31	25
Store Z								
Brand A1	17	21	22	30	32	24	29	25
Brand A2	18	22	26	32	25	19	32	27
Brand A3	15	18	31	37	20	19	35	25
Average	25	24	30	34	20	18	25	24
Ave frm Non-Intrctn Drchlt **		25		13		13		49

Notes:
* Note that the non-interaction Dirichlet is used to predict total product purchases per buyer of each brand-store combination, and this value is then used to solve for the OB/OS purchasing rate (as detailed in the text).
** Average predictions from the non-interaction Dirichlet.

A8.20), as is generally the case.

Four points should be made regarding the methodology employed.

First, the approach has the drawback of losing the simple three-parameter definition of market structure offered by the Dirichlet. In the present case, the model is calibrated to seven different "markets": three BCwS submarkets, three SCwB submarkets, and the whole-market

TABLE 13.13

Share of Requirement of all Four "Purchase Options". Predictions Derived from the Dirichlet Calibrated to Each Submarket. Instant Coffee, Region I.

Buyers of:	% of total purchases devoted to:							
	B/S		OB/S		B/OS		OB/OS	
	O	D	O	D	O	D	O	D
Store X								
Brand C1	46	40	20	21	14	14	20	25
Brand C2	33	32	24	30	26	21	17	16
Brand C3	29	28	37	35	18	18	15	19
Store Y								
Brand C1	25	30	19	26	**37**	**22**	19	21
Brand C2	31	30	20	20	29	23	20	27
Brand C3	25	26	30	27	20	19	25	28
Store Z								
Brand C1	40	36	11	12	25	21	**23**	**32**
Brand C2	**17**	**27**	**17**	**26**	**49**	**29**	17	18
Brand C3	19	26	31	26	21	23	29	25
Average	29	31	23	25	27	21	21	23
Ave from Non-Intrctn Drchlt		31		11		13		44

Notes:
- See Table 13.12 for clarification.

situation (to predict the any-B/any-S purchasing rate). Thus the share of requirement predictions for Brand A1 at Store X depend on the structures of the brand-choice-within-Store-X submarket, the store-choice-within-Brand-A1 submarket, and the (assumed unsegmented) product field as a whole, together with the share of A1-X within each market. It seems unlikely that such modelling complexity can be avoided in a situation (such as the present one) where a two-way segmentation characterizes the product field.

Second, there are many possible alternative calculation procedures for determining the share of requirement predictions. For instance, the purchasing rate in the OB/S option could be determined using the BCwS-context prediction of purchase frequency (w) alone (i.e. rather than the average of the two w predictions from the BCwS and SCwB contexts), from applying the predicted w/wp proportion to the observed value of w, and so on. The above-described procedure was chosen because it provides a reasonably good fit, uses only market share as brand-specific or store-specific input to the model (once market parameters have been defined), and involves minimal "manipulation" of the Dirichlet's initial predictions.

Third, calibrating the Dirichlet to all nine brand-store combinations for the purpose of estimating wp (i.e. the any-B/any-S purchasing rate) is not strictly valid as such a model does not represent the known segmented structure of the market. However, wp tends to be fairly stable across different choice categories (as noted in Chapters 10 and 11), and the Dirichlet calibrated in this way remains a workable approximation. An alternative is to use **observed** product purchasing rates in calculating the share of requirement predictions. Such a procedure also gives rise to a good fit - though not obviously a better one - as indicated by Tables A8.22-A8.24.

Fourth, in view of the multitude of alternative calculation procedures for determining the share of requirement predictions (point 2 above) and the erroneous unsegmented assumption in predicting wp (point 3), the theoretical values presented in Tables 13.12 and 13.13 are appropriately interpreted as rough estimates for the purpose of identifying the more marked irregularities. One such instance might concern the buyers of Brand C2 at Store Z: from the norms provided, these consumers seem to devote a relatively small proportion of their product purchases to Store Z, and appear particularly prone to buy Brand C2 elsewhere - a discrepant pattern which might reflect an aggressive promotion of that brand at another store, or to stocking problems at Store Z.

13.5. THE RELEVANCE OF MARKET SHARE.

It has been noted in the two previous sections that the precise way in which the buyers of a brand at a store divide their purchases between the four basic "purchase options" (B/S, OB/S, B/OS and OB/OS) varies according to the brand-store combination in question. The purpose of this section is to briefly demonstrate the relevance of market share to this variation.

It is well established at the whole-market level that a positive relationship exists between brand (or store) loyalty and market share. Chapters 10 and 11 demonstrated that a similar association applies to the submarket level of analysis. This basic result is illustrated for the current measures of loyalty (or rather disloyalty) in Table 13.14.

In Part 1 of the table, it can be seen that a brand with a relatively small market share within a store suffers from a type of "double jeopardy" pattern:

* more of its buyers also buy other brands within the store;

* and those buyers who do make these "other" purchases do so more frequently.

Together, these two trends imply that, regarding **all** the buyers of a brand at a store, the smaller the brand at that store the higher is the average purchase frequency of other brands within the store.

Part 2 of the table illustrates a corresponding trend with regard to the B/OS option: the smaller a store's share of a brand submarket, the greater the propensity (on all three measures) to buy the brand in question elsewhere. Similarly, in Part 3, it is clear that the smaller a brand-store combination's share of the market as a whole, the greater the propensity to buy other brands at other stores.

Note however that the buying rate of duplicating buyers (i.e. the buyers that do in fact make purchases within the specified "other" category) is less closely related to market share than the **proportion** of duplicating buyers. This follows the established pattern at the whole-market level.

The crucial point of these results is that the propensity to "also buy" within the OB/S, B/OS and OB/OS options can only meaningfully be assessed with reference to market share. The market shares of the brand, of the store, and

TABLE 13.14
The Influence of Market Share on the Propensity to Buy Other Brands and/or at Other Stores.
Automatic Washing Powder, Region I.

	MS(%) *	% of duplicating buyers(%) **	buying rate of duplicating buyers ***	buying rate of all buyers ****
1. Buying OB/S				
Store X				
Brand A1	36	57	6.5	3.7
Brand A2	21	65	7.5	4.8
Brand A3	15	69	7.0	4.8
Store Y				
Brand A2	26	67	7.0	4.7
Brand A1	25	58	6.5	3.7
Brand A3	18	77	6.6	5.0
Store Z				
Brand A1	25	49	8.1	4.0
Brand A2	21	53	7.9	4.2
Brand A3	12	63	9.1	5.7
2. Buying B/OS				
Brand A1				
Store X	42	50	4.7	2.4
Store Y	17	57	5.4	3.1
Store Z	7	76	7.4	5.6
Brand A2				
Store X	35	49	4.2	2.0
Store Y	26	56	5.0	2.7
Store Z	9	76	5.5	4.1
Brand A3				
Store X	36	40	6.5	2.6
Store Y	26	52	3.9	2.0
Store Z	7	57	6.7	3.7
3. Buying OB/OS				
Stor Brnd				
X A1	13.1	41	1.7	4.1
X A2	7.5	54	2.5	4.6
Y A2	5.6	59	3.2	5.4
X A3	5.4	63	3.8	6.0
Y A1	5.4	56	3.0	5.4
Y A3	3.9	66	4.7	7.1
Z A1	2.2	65	5.2	8.0
Z A2	1.9	73	5.2	7.1
Z A3	1.1	86	6.5	7.6

Notes to Table 13.14 on previous page:

* Market share of the brand-store combination (1) within the state store, (2) for the stated brand, or (3) within the market as a whole.

** The proportion of the buyers of the brand-store combination who also buy within the stated purchase option.

*** The average buying rate of these duplicating buyers within the stated purchase option.

**** The average buying rate of all the buyers of the brand-store combination within the stated purchase option.

of the brand-store combination within the store or brand and within the market as a whole all juxtapose and influence the distribution of purchases between the four purchase options. For instance, buyers of a small brand at a large store (e.g. Brand A3 at Store X) will tend to be relatively prone to buy other brands at that store rather than that brand at other stores; for a large brand at a small store the reverse will typically hold; and buyers of a small brand-store combination within the market as a whole will usually be relatively prone to buy other brands at other stores.

13.6. LOYALTY WITHIN AND ACROSS SUBMARKETS.

The notions of brand loyalty and store loyalty, when applied to the buyers of Brand B at Store S, can each be divided into two types. Specifically, these buyers' loyalty to Brand B can be assessed (i) within Store S and (ii) at other stores. Correspondingly, their loyalty to Store S can be assessed (i) for Brand B and (ii) for other brands. This section re-expresses the share of requirement data provided earlier to provide a basis for analysis along these lines.

Abbreviations and definitions of each loyalty type are noted below.

Buyers of Brand B at Store S: Loyalty Types.

Abbre-viation	**Definition (and measurement)**
BLwS:	**Brand Loyalty within a Store.** (Brand B's share of requirement within Store S.)
BLaS:	**Brand Loyalty across Stores.** (Brand B's share of requirement at other stores.)
SLwB:	**Store Loyalty within a Brand.** (Store S's share of requirement for Brand B.)
SLaB:	**Store Loyalty across Brands.** (Store S's share of requirement for other brands.)

(Note that other measures of BLwS and SLwB are used in Section 13.7.)

Table 13.15 presents figures for these measures regarding automatic washing powder. To illustrate, buyers of Brand A1 at Store Y devote 45% of their product purchases at Store Y to Brand A1, 50% of their product purchases elsewhere to Brand A1, 49% of their total purchases of Brand A1 to Store Y, and 55% of their purchases of other brands to Store Y.

Analysis initially focuses on the two types of **brand** loyalty (referred to by the two left-hand data columns in the table).

13.6.1. Brand Loyalty Within and Across Stores.

A striking feature of Table 13.15 is the similarity between the two brand loyalty types. The average discrepancy is just 5 percentage points, with no obvious bias. Thus buyers of a given brand within a store devote a similar proportion of product purchases to that brand when at other stores as they do within the store in question. They show no marked tendency to switch brands when switching stores, or indeed to increase their concentration on the brand in question when shopping elsewhere. To summarize, in this product field brand loyalty within a store is much the same as brand loyalty across stores (when measured by share of requirement).

TABLE 13.15

Brand Loyalty Within and Across Stores, and Store Loyalty Within and Across Brands, Measured via Share of Requirement. Automatic Washing Powder, Region I.

	Brand Loyalty		Store Loyalty	
	BLwS (%)	**BLaS** (%)	**SLwB** (%)	**SLaB** (%)
Store X				
Brand A1	58	58	68	68
Brand A2	49	44	70	66
Brand A3	43	40	58	56
Store Y				
Brand A1	45	50	49	55
Brand A2	48	46	62	60
Brand A3	42	30	64	52
Store Z				
Brand A1	44	52	35	43
Brand A2	41	44	42	45
Brand A3	32	36	42	47
Average	45	44	54	55

The results from the two other product fields are supportive in overall terms: there is no consistent tendency for BLwS to exceed BLaS, or the reverse, as reflected by the average values in Table 13.16. However, the individual figures (presented in Tables A8.26 and A8.27) often show substantial differences between the two brand loyalty measures, especially within the tea bag market. The most marked case concerns Brand B1 at Store Z where a strong positive relationship between brand and store emerges: buyers of this combination devote 90% of their product purchases within the store to Brand B1, but only 40% of their purchases at other stores to this brand. In contrast buyers of Brand B2 at Store Z concentrate many more product purchases in the brand when shopping elsewhere.

TABLE 13.16

Brand Loyalty Within and Across Stores, and Store Loyalty Within and Across Brands, Measured via Share of Requirement. Average Brand-Store Combination for Each Product Field, Region I.

	Brand Loyalty		Store Loyalty	
	BLwS (%)	**BLaS** (%)	**SLwB** (%)	**SLaB** (%)
Automatc	45	44	54	55
Tea Bags *	43	42	55	55
Inst Cof	56	55	53	52
Average	48	47	54	54

Notes:
* Excludes Brand B1 at Store Z.

Modelling the Patterns.

To summarize, brand loyalty within and across stores are overall very similar in degree, although imbalances do occur for certain brand-store combinations, especially within the tea bag market.

A theoretical justification for these patterns is not straightforward. Although the Dirichlet makes clear that, within an unsegmented market, the way in which purchases are divided between "other" brands depends on the market share of these brands, a difficulty arises in the present instance because the BLaS measure relates (in part) to the buying pattern within the OB/OS option - a category where behaviour can not be directly predicted by either a whole-market or submarket Dirichlet. However, the procedure - outlined in Section 13.4 - for circumventing this problem leads to predictions which assume overall equality between BLwS and BLaS, as can be seen from the averages in Table 13.17 for two different product fields.

TABLE 13.17

Brand Loyalty Within and Across Stores
Measured via Share of Requirement,
and Brand Share Within Store S and at Other Stores.
Automatic Washing Powder
and Tea Bags, Region I.

	BLwS % O	BLwS % D	MS at Store % *	BLaS % O	BLaS % D	MS at Oth S * %
Automatc						
Store X						
Brand A1	58	53	36	58	39	29
Brand A2	49	45	21	44	38	23
Brand A3	43	41	15	40	36	15
Store Y						
Brand A1	45	41	25	50	51	33
Brand A2	48	43	26	46	38	21
Brand A3	42	36	18	30	38	14
Store Z						
Brand A1	44	42	25	52	50	32
Brand A2	41	41	21	44	41	22
Brand A3	32	33	12	36	43	15
Average	45	42	22	44	42	23
Tea Bags						
Store X						
Brand B1	78	74	58	44	30	34
Brand B2	48	49	18	53	50	25
Brand B3	32	43	7	56	28	10
Store Y						
Brand B1	59	51	29	50	46	45
Brand B2	50	43	27	45	50	22
Brand B3	30	33	11	24	30	9
Store Z						
Brand B1	90	84	80	40	33	38
Brand B2	23	37	10	43	67	24
Brand B3	20	34	5	23	36	10
Average	48	50	27	42	41	24
Ave excl B1-Z **	43	46	21	42	42	22

Notes to Table 13.17 on previous page:

* MS at Store = market share of Brand B at Store S.
MS at Oth S = market share of Brand B at other stores.

** Average excluding Brand B1 at Store Z.

\- The BLwS predictions derive from the Dirichlet calibrated separately to each BCwS submarket. The BLaS predictions derive from the procedure for generating predictions for all four purchase options described earlier in relation to Tables 13.12 and 13.13.

The influence of market share - on both the observed and predicted pattern - is also apparent from the table. Where Brand B's share within Store S is similar to its share within all other stores (as a group), as generally occurs within the automatic washing powder market, BLwS and BLaS tend to be similar. Where Brand B's share within Store S is much larger than its share within all other stores, as occurs in the case of B1-Z, BLwS typically exceeds BLaS; and where Brand B's share within Store S is smaller than its share elsewhere, as for B2-Z, the reverse tends to apply. Thus the relatively high imbalance between BLwS and BLaS for several brand-store pairs in the tea bag market can be seen to reflect the high degree of brand share variation from store to store.

13.6.2. Store Loyalty Within and Across Brands.

The pattern of behaviour on the two store loyalty measures simply re-expresses that noted regarding BLwS and BLaS. To illustrate this point, let the **amounts bought** within each purchase option be denoted as follows:

Amount bought within purchase option:	B/S	OB/S	B/OS	OB/OS
Abbreviation:	a	b	c	d

The calculation of each loyalty type can then be expressed in the following way:

$$\text{BLwS} = a/(a+b)$$
$$\text{BLaS} = c/(c+d)$$

$$\text{SLwB} = a/(a+c)$$
$$\text{SLaB} = b/(b+d)$$

Simple algebra reveals:

(i) if $b > c$

then $\text{SLwB} > \text{BLwS}$
$\text{SLaB} > \text{BLaS}$

(ii)	if	ad	>	bc
	then	BLwS	>	BLaS
		SLwB	>	SLaB

Consequently the conclusions regarding brands apply also to stores: first, in the case of automatic washing powder (see Table 13.15), buyers of Brand B at Store S are just as loyal to that store when they buy other brands as when they buy Brand B; second, the other two markets reveal larger discrepancies between SLwB and SLaB, but with no obvious bias (as summarized by Table 13.16).

13.6.3. Loyalty Within and Across Submarkets: Conclusion.

The analysis of loyalty within and across markets could usefully be extended to cover the individual brands purchased when shopping elsewhere (rather than grouping them into a single "other brand" category) and the individual stores involved. However, the initial results in this area presented above suggest at least the following. Buyers at Store S behave similarly in terms of the brands they choose when shopping at other stores if the share of these brands within these other stores is similar to their share within Store S. Where this latter condition does not hold, consumers appear to be influenced by whatever factors have contributed to a "different" set of brand shares within other stores, rather than rigidly adhere to the pattern of behaviour they established within Store S.

13.7. A COMPARISON OF BRAND LOYALTY WITHIN A STORE AND STORE LOYALTY FOR A BRAND.

Reference has been made in earlier sections to a "store effect" and "brand effect" in consumer buying, these terms relating to the apparent proclivity on the part of the buyers of any given brand-store combination to purchase other brands at the same store rather than elsewhere, and when at other stores to buy the same brand rather than alternative offerings. This section examines which "effect" is stronger. In other words, are consumers more brand loyal within a store than they are store loyal for a brand?

The issue is especially relevant to circumstances where a brand is delisted by a store, or is temporarily out of stock. If consumers search elsewhere for the brand then that brand sale, along with any associated purchases, is lost; in contrast, if they are happy to choose an alternative, the importance of stocking the brand is lower. As argued in Chapter 1, an answer to this dilemma would help establish what the "balance of power" is (or should be) between retailer and manufacturer regarding such issues as merchandising and supply terms.

Note that in comparing BLwS (Brand Loyalty within a Store) with SLwB (Store Loyalty within a brand), this section uses a wider range of measures for these two aspects of loyalty than the previous section (which focused on the share of requirement index alone).

13.7.1. The Influence of Market Share.

Reference has already been made to the influence of market share on the distribution of purchases between brands and stores (Section 13.5). This factor warrants further cosideration by virtue of its importance to the present issue.

It has been seen that the larger the brand or store within a given submarket, the higher the degree of loyalty received by that choice item (within the submarket). Since this applies to both BCwS and SCwB contexts, using a brand and store of different sizes (i.e. in the market as a whole) when comparing BLwS and SLwB would "distort" the balance between the two loyalties. For instance, if Brand B were very large, and Store S very small, buyers of B at S would (relative to buyers of other brand-store combinations) typically make many purchases of B at other stores and few of other brands at S.

The strength of the market share factor is expressed by the correlation coefficients in Table 13.18. These measure the association between (i) the brand-share/store-share ratio and (ii) the BLwS/SLwB ratio. Note that, unlike Section 13.6, two measures of BLwS and SLwB are used, concerning (a) duplication and (b) buying rates (as detailed in the table footnote). The level of correlation shown emphasizes the importance of taking account of brand and store size when comparing BLwS and SLwB. It also indicates that, within a given product field, O'Reilly's "test" for brand character (see Section 1.6) does little more than reflect the balance between brand and store size.

However, such correlation says nothing of the actual **balance** between the two loyalties, even when due consideration **has** been given to market share. This question of absolute balance is addressed in the next two sections.

TABLE 13.18

The Relationship Between (Brand Market Share)/(Store Market Share) and BLwS/SLwB for Nine Brand-Store Combinations Within Each Product Field: Correlation Coefficients. Region I.

		BLwS/SLwB Measure	
		d(B/OS)/ d(OB/S) *	**w(B/OS)/ w(OB/S)** **
Automatc	r =	.958	.953
Tea Bags	r =	.937	.860
Inst Cof	r =	.955	.864

Notes:
* d(OB/S) = the proportion of the buyers of Brand B at Store S also buying other brands at Store S; and d(B/OS) = the proportion also buying Brand B at other stores.
** w(OB/S) = the average number of purchases made by the buyers of Brand B at Store S of other brands at Store S; and w(B/OS) = the average number of purchases made by the buyers of Brand B at Store S of Brand B at other stores.
\- Note that the measures described above (* and **) are **inverse** measures of loyalty (i.e. they concern the propensity for **dis**loyalty), but this does not effect the correlations in question.

13.7.2. Duplication: Number of Buyers.

At first sight, the duplication figures in Table 13.1 at the beginning of this chapter suggest that brand loyalty within a store is lower than store loyalty for a brand: within-store brand duplication was on average 60% higher than within-brand store duplication. However, the brands tended to be larger than the stores (the average penetrations being 37% and 29% respectively), and from the previous section it is clear such disparity strongly effects the balance between the propensity to (i) buy other brands at the store and (ii) the same brand at other stores.

A simple way of taking account of this brand and store size discrepancy is to translate the duplication figures into D coefficients. This involves exressing a brand's duplication figures as a proportion of the brand's

TABLE 13.19

D Coefficients Within BCwS and SCwB Submarkets. Automatic Washing Powder, Region I.

Buyers of:		**% who also buy:**								
		Store X			**Store Y**			**Store Z**		
Store	**Brand**	**A1**	**A2**	**A3**	**A1**	**A2**	**A3**	**A1**	**A2**	**A3**
	A1	--	.80	.69	.60			.77		
X	**A2**	.80	--	.63		.53			.57	
	A3	.69	.63	--			.60			.50
	A1	.60			--	.80	.94	.71		
Y	**A2**		.53		.80	--	1.00		.75	
	A3			.60	.94	1.00	--			.58
	A1	.77			.71			--	.73	.88
Z	**A2**		.57			.75		.73	--	.49
	A3			.50			.58	.88	.49	--
BCwS Ave		.75	.72	.66	.87	.90	.97	.81	.61	.69
SCwB Ave		.69	.55	.55	.66	.64	.59	.74	.66	.54

Overall BCwS Average = .78
Overall SCwB Average = .61

Notes:
- These D coefficients were calculated using **relative** penetrations, i.e. brand penetration among product buyers at the store, and store penetration among brand buyers.

penetration among store buyers; and expressing a store's duplication figures as a proportion of its penetration among brand buyers.

The resultant coefficients are shown in Table 13.19. (The "boxed" figures relate to BCwS contexts while the figures in "diagonals" relate to the SCwB contexts.) To illustrate, buyers of Brand A1 at Store X are 0.80 as likely as the average buyer (of the product class) at Store X to also buy Brand A2 at Store X, and 0.60 as likely as the average buyer of Brand A1 (anywhere) to also buy Brand A1 at Store Y. Despite the contrasts when individual brand-store combinations are considered, these D coefficients indicate that, in overall terms, making a purchase within this product field typically inhibits buying the same brand at another store more than it inhibits buying another brand at the same store. The disparity is quite small in this case, somewhat larger in the tea bag market, and virtually non-existant for instant coffee, as summarized in Table 13.20 by the average coefficient from each BCwS and SCwB context.

TABLE 13.20

D Coefficients Within the BCwS and SCwB Contexts: Average Values for Each Product Field, Region I.

	Automatc	Tea Bags	Inst Cof
BCwS	.78	.93	.74
SCwB	.61	.58	.76

Notes:
- See Table 13.19.

An alternative means of comparing BLwS and SLwB is via the "purchase option" approach used in earlier sections. Thus the D coefficients in Table 13.21 were calculated by dividing the proportion of B/S buyers also buying OB/S (or B/OS) by the penetration of the OB category among buyers at S (or of the OS category among buyers of B). Also listed, in column three, is an expression of the "advantage" held by SLwB over BLwS: for instance, buying Brand A1 at Store X decreases the probability of buying Brand A1 elsewhere (among buyers of A1) 10% more than it decreases the probability of buying other brands at Store X (among product buyers at Store X).

The basic message is the same as before. (It would only be different if each submarket were heavily segmented.) Again the balance between the measures of BLwS and SLwB varies slightly across brand-store combinations (despite

TABLE 13.21

Buying OB/S and B/OS:
Duplication Coefficients.
Automatic Washing Powder, Region I.

Duplication Coefficients:

	OB/S		B/OS		1-(r/q)	
	O (q)	D	O (r)	D	O (%)	D
Store X						
Brand A1	.73	.77	.66	.66	10	14
Brand A2	.73	.77	.61	.54	16	30
Brand A3	.75	.77	.54	.60	28	22
Store Y						
Brand A1	.73	.84	.66	.66	10	21
Brand A2	.76	.84	.64	.54	16	36
Brand A3	.83	.84	.61	.60	27	29
Store Z						
Brand A1	.64	.83	.79	.66	-23	20
Brand A2	.65	.83	.78	.54	-20	35
Brand A3	.69	.83	.59	.60	14	28
Average	.72	.81	.65	.60	9	26
MD *	.04		.06			

Notes:
* Mean Deviation.
- E.g. buyers of Brand A1 at Store X are .73 as likely as the average product buyer at Store X to buy other brands there, and .66 as likely as the average buyer of Brand A1 to buy that brand at other stores.
- Note that the Dirichlet predictions (D) derive from six separately-calibrated Dirichlet models.

the fact that account has now been taken of the market share, or more specifically penetration, factor). And again the overall balance favours SLwB rather than BLwS, although the difference between the two is not great (as summarized by the average values for each product field in Table 13.22). The main relevance of these figures emerges on a modelling perspective.

Modelling the Patterns.

The Dirichlet's predictions of the various D values are shown in Table 13.21 to illustrate an important theoretical pattern. It is clear that **within** each of the

TABLE 13.22

Buying OB/S and B/OS:
D Coefficients.
Average Values for Each Product Field, Region I.

	Automatc	Tea Bags	Inst Cof
OB/S	.72	.74	.64
B/OS	.65	.58	.67

Notes:
- E.g., regarding Automatc, the buyers of Brand B at Store S are .72 as likely as the average product buyer at Store S to buy other brands at that store, and .65 as likely as the average buyer of Brand B to buy that brand at other stores (in overall average terms).

six brand and store submarkets to which the model has been applied, the predicted D coefficients are constant. (To be precise, they increase very slightly as brand or store share of the submarket falls.) Thus the D value within the Store X submarket is 0.77 for every brand, and within the Brand A1 submarket is 0.66 for each of the three stores. The predicted D coefficient can be considered therefore as a theoretical market parameter, and allows the balance between BLwS and SLwB to be conceptualized as deriving from the conjunction of **submarkets**, and not from the specific brand-store combinations involved. This is expressed diagramatically in Figure 13.2. Each BCwS and SCwB submarket is represented by a rectangular box, to which the relevant (theoretical) D coefficient is attached.

To illustrate, the buyers of Brand A1 at Store X have a certain propensity to (i) buy other brands at Store X and (ii) buy Brand A1 at other stores: within the framework of Figure 13.2, it becomes clear that the balance between these two propensities derives simply from the pattern of behaviour **generally** prevailing within the Store X and Brand A1 submarkets; it does **not** derive from some entirely unique feature of that particular brand-store combination (the brand loyalty pattern being the same for other brands at Store X, and the store loyalty pattern being the same for other stores regarding Brand A1).

The validity of this simple framework depends on the constancy of observed D values within each submarket. In Table 13.21 such constancy is strong, with the notable exception of Brands A1 and A2 at Store Z. Regarding the B/OS option, this conclusion does not hold so well for the other two product fields, where the variation **within** each submarket appears equal to that **between** submarkets (see

FIGURE 13.2

The Intersection of BCwS and SCwB Submarkets, and Dirichlet D Coefficients Within Each Submarket. Automatic Washing Powder, Region I.

	Brand A1	Brand A2	Brand A3	D
Store X	*	*	*	.77
Store Y	*	*	*	.84
Store Z	*	*	*	.83
D	.66	.54	.60	

Notes:
- The D coefficients, predicted by the Dirichlet, are based on **relative** penetration, i.e. brand penetration among product buyers at the store, and store penetration among buyers of the brand.

Tables A8.32 and A8.33). However, results from "standard" duplication tables suggest that the overall D coefficient can act as a valid submarket parameter (see Chapters 10 and 11; Kau, 1981; Kau and Ehrenberg, 1984; Wrigley and Dunn, 1984c). To the extent that this is so, the framework described above represents an appropriate "base-line" for assessing the balance between BLwS and SLwB. It would help assess whether an unusual BLwS/SLwB discrepancy derives from irregular within-store brand loyalty or irregular within-brand store loyalty.

13.7.3. Duplication: Amount Bought.

Comparing BLwS and SLwB in terms of the amount bought is more complicated than when duplication is considered in that there exists no straightforward means of taking account of the crucial market share factor. One possible solution is to confine attention to brands and stores of similar market sizes, such as Brand A2 and Store Y for automatic washing powder or Brand C1 and Store X for instant coffee. As indicated in Table 13.23, regarding each pair, buyers of the brand at the store (i.e. A2 at Y and C1 at X) buy more within the OB/S option than within the B/OS category, which points to higher SLwB than BLwS. However, such cases are clearly too few to permit generalization.

TABLE 13.23

Average Number of Purchases Made by Buyers of Brand B at Store S Where Market Shares of B and S are (Approximately) Equal. Region I.

Buyers of:	Average number of purchases made of: OB/S	B/OS
Brand A2 at Store Y	4.7	2.7
Brand C1 at Store X	2.5	1.8

Market share of A2 = 21.8%
Market share of Y = 21.5%
Market share of C1 = 34.9%
Market share of X = 35.2%

Table 13.24 therefore presents data for all brand-store combinations within the automatic washing powder market. The figures in the right-hand column indicate that buyers of a given brand at a given store typically make more purchases of other brands within the store than of the same brand at other stores. Indeed, the imbalance applies in three of the four cases where within-store brand share exceeds within-brand store share (a situation favouring BLwS rather than SLwB). The figures in the two middle columns show that this (BLwS-SLwB) discrepancy arises because of both the **number** of duplicating buyers and the buying **rate** of these duplicating buyers within the relevant "other" purchase option. In other words, buyers of Brand B at Store S, relative to their purchasing of B at other stores, are more likely to buy other brands at S, and those who make such purchases do so at a higher rate.

The **average** values in Table 13.25 are useful indices of the balance between the two loyalties as the associated within-submarket brand and store shares, having evened out, are roughly equal and therefore do not strongly bias the results towards either BLwS or SLwB. (In fact one brand-store combination has been excluded from each of the two drinks markets to achieve this equality in brand and store shares.) From these figures it appears that the BLwS/SLwB discrepancy is wider for tea bags than that noted above for automatic washing powder (mainly due to a

TABLE 13.24

Buying OB/S and B/OS. Automatic Washing Powder, Region I.

	Market share *		% of duplicating buyers **		Buying rate of duplicating buyers ***		Buying rate of all buyers****	
	BCwS	SCwB	OB/S	B/OS	OB/S	B/OS	OB/S	B/OS
Str X								
A1	36	42	57	50	6.5	4.7	3.7	2.4
A2	21	35	65	49	7.5	4.2	4.8	2.0
A3	15	36	69	40	7.0	6.5	4.8	2.6
Str Y								
A1	25	17	58	57	6.5	5.4	3.7	3.1
A2	26	26	67	56	7.0	5.0	4.7	2.7
A3	18	26	77	52	6.6	3.9	5.0	2.0
Str Z								
A1	25	7	49	76	8.1	7.4	4.0	5.6
A2	21	9	53	76	7.9	5.5	4.2	4.1
A3	12	7	63	57	9.1	6.7	5.7	3.7
Ave	22	23	62	57	7.3	5.5	4.5	3.1

Notes:

* Market share of brand or store within the stated (BCwS or SCwB) submarket.

** The proportion of the buyers of the brand-store combination who also buy OB/S or B/OS.

*** The average purchase frequency of these duplicating buyers within the OB/S or B/OS options.

**** The average purchase frequency of all the buyers of the brand-store combination within the OB/S or B/OS options.

wider discrepancy in the **number** of duplicating buyers between the two options OB/S and B/OS, rather than in the purchasing rates of these duplicating buyers). In the case of instant coffee, the loyalty disparity disappears. Buyers of the average brand-store pair within this product field divide their purchases equally between other brands at the store and the same brand at other stores, this similarity emerging from both the number and buying rate of duplicating buyers. (Full figures for the tea bag and instant coffee markets are provided in Tables A8.35 and A8.36.)

TABLE 13.25

Buying OB/S and B/OS: Average Values per Product Field. Region I.

Prdct Fld	Market share		% of duplicating buyers		Buying rate of duplicating buyers		Buying rate of all buyers	
	BCwS	SCwB	OB/S	B/OS	OB/S	B/OS	OB/S	B/OS
A.I	22	23	62	57	7.3	5.5	4.5	3.1
B.I *	21	20	65	50	7.8	5.6	5.3	2.8
C.I *	24	23	56	58	6.7	6.9	3.7	4.1

Notes:
* Averages for tea bags and instant coffee exclude the brand-store combinations B1-Z and C1-Z respectively.
- For clarification of loyalty measures, see Table 13.24.

13.7.4. Implications for a Brand Delisting.

The above results do not specifically answer O'Reilly's question (posed in Section 1.6), namely whether consumers will, when finding their intended brand to be unavailable at a store, go elsewhere for the brand rather than choose an alternative within the store. First, the data relate to a choice environment in which all the (stated) alternatives are constantly available. Second, they relate to behaviour over an extended time period (48 weeks), rendering suspect any inference as to the response of consumers to a temporary stock-out.

Nevertheless, the following represent reasonable hypotheses on the basis of the present findings. (These conjectures concern the manner in which the buyers of Brand B at Store S redistribute their purchases when B is delisted by S, i.e. when the unavailability is permanent.)

1. Both responses would occur. I.e., in the aggragate, buyers of B at S would buy both other brands at S and B at other stores.

2. The overall balance between the two response alternatives (i.e. OB/S and B/OS) would depend on the product field.

3. The precise balance for each brand-store combination would depend largely on the relative market share of the brand and store in question.

4. The search for a means of quantitatively predicting the redistribution of purchases following the deslisting of B at S could appropriately begin with the following assumptions:

   (i) The number of purchases of the product class made by buyers of B at S remains unchanged. (Justification: in the aggregate, consumers exhibit a marked willingness to buy other brands and/or at other stores; it seems unlikely therefore that the unavailablity of Brand B at Store S would override the product-purchase intention rather than lead to the purchase of an alternative brand-store combination.)

   (ii) The number of purchases of OB/OS by buyers of B at S remains unchanged. (Justification: if consumers, finding their intended brand-store combination unavailable, have the option of obtaining one of the two elements in that combination, it seems unlikely that they would "switch" on both accounts.)

   (iii) The **balance** between the number of purchases made within the OB/S and B/OS options remains unchanged, i.e. the **ratio** between the two remains constant. (Justification: given the scope of the data studied above, current expression of relative preference towards these two purchase options seems the only possible "null hypothesis" for future relative preference.)

On the basis of these assumptions, if the buyers of Brand B at Store S make 9, 10 and 5 purchases within the B/S, OB/S and B/OS options respectively, following the delisting of B by S these buyers would make 16 purchases of OB/S and 8 of B/OS. In practice the situation is complicated by a replacement brand usually being introduced. However, a means of predicting the redistribution of purchases in the simple situation described above would be useful in specifying the "compensation" required to maintain the pre-delisting sales level for the product class in question.

13.8. CONCLUSIONS.

This chapter has investigated the extent to which the buyers of Brand B at Store S buy other brands at Store S, Brand B at other stores, and other brands at other stores. There are six main findings.

1. The markets are segmented by brand and by store.

When brand choice and store choice are considered simultaneously, it transpires that brand choice is segmented by store, and store choice is segmented by brand. This picture emerges (in this study) in two ways.

(i) Duplication is greater within than across submarkets. E.g. the buyers of Brand B at Store S are more likely to buy Brand C at Store S than Brand C at Store T (even where the penetrations of the C/S and C/T combinations are the same). Indeed, the D coefficients indicate that, relative to the average buyer of the product class, buying Brand B at Store S consistently **increases** the probability of buying another brand at Store S or Brand B at another store, but **decreases** the probability of buying a different brand at a different store.

(ii) The propensity to buy other brands at Store S and Brand B at other stores is consistently greater than would be expected on the basis of the market shares (rather than identities) of all brand-store combinations involved. This "basis" can be derived from applying the Dirichlet (which assumes an unsegmented market structure) to all brand-store combinations simultaneously.

In sum, these results can be taken to express the existence of both brand loyalty across stores and store loyalty across brands.

2. The propensity to buy other brands and/or at other stores is "high", but varies across brand-store combinations.

This propensity is deemed high in terms of both the number of buyers and the purchasing rates involved (i.e. "other" purchases are not just occasional). On average, total product purchases are divided fairly equally between the four basic "purchase options" B/S, OB/S, B/OS and OB/OS. Thus the buyers of a brand at a store typically give the **majority** of their total product purchases to other brands and/or stores.

However, the precise pattern varies according to the brand-store combination in question: the buyers of some brand-store pairs are relatively prone to buy other brands at the store, but reluctant to buy the same brand at other stores; for other combinations the pattern is reversed. The main factors accounting for such variation are specified in Conclusion 5 below.

3. Brand loyalty within and across stores is similar in degree.

In overall terms, buyers of a brand at a store show no marked tendency either to switch brands when switching stores or to increase their concentration on the brand when shopping elsewhere. For instance, if the buyers of Brand B at Store S devote 40% of their product purchases at that store to Brand B, when at other stores they will also tend to devote 40% of their product purchases to that brand.

This pattern holds in an overall sense (i.e. for the average brand-store combination) for all three product fields. It applies also to almost all **individual** brand-store combinations in the automatic washing powder market, but not in the two instant drinks markets. This difference between product fields seems linked to the level of across-store variation in brand shares.

4. Store loyalty "within" a brand (SLwB) usually exceeds brand loyalty within a store (BLwS), but in one market the two loyalties are equal.

In the automatic washing powder and tea bag markets, the buyers of Brand B at Store S typically show a higher propensity to buy other brands at Store S than to buy Brand B elsewhere. This loyalty disparity derives from both the number of buyers (i.e. duplicating buyers) and the rates of purchase involved. The imbalance is not emphatic, however, and disappears altogether (in average terms) for instant coffee. The bargaining strength of manufacturers relative to that of retailers therefore seems especially strong in this latter market.

Again the pattern varies markedly across brand-store combinations.

5. Four main "components of interaction" can be identified.

These factors regard the balance between BLwS and SLwB for any given brand-store combination, and hence account also for the **variation** in the balance across brand-store combinations. To recap, these two loyalties regard consumers' propensities to (1) buy other brands at the same store and (2) buy the same brand at other stores, as measured in the present instance by both the number of duplicating buyers and the purchasing rates involved.

(i) The product field.

The **overall** balance between the two loyalties varies by product field (as noted in Conclusion 4 above), and therefore tends to effect the pattern for any particular brand-store pair.

(ii) Market share.

Within a given product field, the balance between BLwS and SLwB for each brand-store combination depends critically on the market share of the brand or store in question. For instance, buyers of a small brand at a large store will tend to make relatively many purchases of other brands at that store, and relatively few purchases of that brand at other stores.

(iii) The overall level of switching (or loyalty) within each submarket.

The level of switching within a submarket varies according to the particular brand or store submarket in question, even once account has been taken of the market size represented by that store or brand. The point is best illustrated by the D coefficient. For instance, on this measure, the propensity to buy "other" automatic washing powder brands (i.e. the level of brand switching) is higher within Store X than within Store Z. For any given brand, BLwS is therefore more likely to exceed SLwB in the case of Store Z than in the case of Store X (even if the two stores were of equal sizes).

Taken together, points (ii) and (iii) restate an argument of Chapter 8, namely that loyalty is a characterization of the market (or in this case submarket) as a whole, rather than of each specific choice alternative within it. The point is eloquently summarized by the good fit of the Dirichlet for within-store brand choice and within-brand store choice. In this light, it becomes logical to interpret the balance between BLwS and SLwB as deriving essentially from the conjunction of two distinct submarket "structures", and not from some fundamentally unique pattern of behaviour towards the brand-store combination in question.

This perspective on the issue of relative BLwS and SLwB was illustrated in Figure 13.2 using D coefficients (which measure just the switching aspect of "submarket structure"), although clearly the Dirichlet model (via its three parameters) represents a more comprehensive specification of the structure of each submarket.

(iv) Deviations from the "loyalty structure" of the submarket.

Despite point (iii) above, deviations from the overall loyalty level within a submarket do arise, emphasizing that the "intersection of submarkets" approach acts only as a base-line explanation for the balance between BLwS and SLwB.

Of these last three factors, it is clear that **market share** plays by far the most important role. The balance between BLwS and SLwB is found to be highly correlated with the balance between brand and store market share: correlation coefficients of about 0.95 applied to all three product fields where duplication was the (inverse) loyalty measure used.

It transpires therefore that the relative extent to which the buyers of Brand B at Store S (i) buy other brands at Store S and (ii) buy Brand B at other stores is not so much a test of brand image, as suggested by O'Reilly (see Section 1.6), as a simple reflection of brand and store market share.

6. The propensity to buy other brands at other stores can be modelled.

The extent to which the buyers of Brand B at Store S buy other brands at Store S or Brand B at other stores has been shown in previous chapters to be predictable by the Dirichlet model. This chapter demonstrates that their propensities to buy other brands at other stores is also susceptible to prediction. This possibility arises in two main ways.

First, it is found that duplication within the across-brand/across-store context accords broadly with the Duplication of Purchase Law. In other words, the proportion of the buyers of Brand B at Store S who buy a **different** brand at a **different** store varies with this latter brand-store combination's penetration. It also emerges that the D coefficients in this context - usually between 0.5 and 0.6 (regarding penetration among product buyers) - show no marked variation across product classes.

Second, through linking together three separately-calibrated Dirichlet models, a reasonably good prediction of the number of purchases made within the OB/OS option can be obtained. This involves calibrating the Dirichlet to all brand-store combinations simultaneously to generate an estimate of the product-buying rate (wp) for the buyers of each combination. From the predictions of w and wp-w in the relevant BCwS and SCwB contexts, it is then possible to solve for the buying rate within the OB/OS category. However, the approach is not fully satisfactory in so far as applying the Dirichlet to all brand-store combinations simultaneously does not take account of the known segmented structure of the market. A more theoretically sound alternative is to use the **observed** wp value, which leads to an equally good fit.

PART V

SUMMARY AND DISCUSSION

Chapter 14

SUMMARY AND DISCUSSION

Contents:

This thesis has examined patterns of brand choice and store choice in consumers' purchasing of packaged groceries. In particular, it has investigated how these two aspects of consumer choice compare and interact, and the extent to which they can be described by the Dirichlet model of buyer behaviour. The purpose of this concluding chapter is to draw together the main findings, and to discuss their theoretical and practical implications.

The chapter begins, in Section 14.1, by briefly specifying the main ways in which the research has contributed to existing knowledge of consumer behaviour. In Sections 14.2 to 14.7, the main summary and discussion is organized around six basic issues studied. Section 14.8 outlines some areas where further research is needed. Finally, in Section 14.9, a brief conclusion is offered.

14.1. CONTRIBUTION TO EXISTING KNOWLEDGE.

The present research has extended knowledge of consumer behaviour in six main ways.

1. It has generalized the Dirichlet - a model previously applied only to the whole-market level - to the submarket contexts of within-store brand choice and within-brand store choice.

2. It has also generalized the Dirichlet to two new product fields, namely automatic washing powder and tea bags.

3. It has highlighted three types of systematic deviation from the model.

4. It has demonstrated that the similarity between brand choice and store choice patterns applies not only to the regularities in each context (as noted in previous studies) but to the actual numerical values involved.

5. In so doing, the thesis has outlined a new methodology for comparing the loyalty structure of different choice contexts within a given product field.

6. It has identified some new patterns in the way brand choice and store choice interact, and new approaches to modelling this aspect of consumer behaviour.

14.2. PATTERNS OF CHOICE: THE WHOLE-MARKET LEVEL.

14.2.1. Regularities.

The basic theme running through this thesis is that there exist precise and generalizable regularities in brand choice and store choice behaviour. This underlying result may be deemed surprising in two respects. First, it is far from obvious that such patterns should exist at all, given the plethora of potential influences on individual choices (although it is arguably this very complexity which allows behaviour, via the "as if random" assumption, to be modelled so successfully in the aggregate). Second, it is equally remarkable that the **same** regularities should apply to both brand choice and store choice, given the fundamental differences that exist between the two contexts (as described in Section 14.5 below).

The regularities in question essentially concern relationships between different measures of buyer behaviour, and trends with market share in particular. For instance, it is found that a small store, relative to its more dominant competitors, attracts fewer customers, **and** these buy there less frequently; these customers are less likely to be 100%-loyal to the store; they are heavier buyers at other stores; and so on. While some measures such as penetration and duplication vary markedly with market share, others such as average purchase frequency show more subtle differences across brands or stores. Indeed, in these cases the stability of values is arguably more striking than the variation.

The existence of such regularities has been well documented by previous studies based on the Dirichlet or related models. Even in the case of store choice, which has been relatively neglected in the past, a good basis for generalization has already built up. Part of the present research has therefore served to reinforce existing knowledge in this area.

The consistency of "law-like" regularities in behaviour is not just a point of theoretical interest. Such patterns impose constraints on the capacity of marketing activity to impact on the loyalty strucuture of a brand or store's customer base. Put another way, they define what can and can not be achieved in practice. For instance, the known facts of behaviour indicate that a strategy aimed at generating complete loyalty among all a brand or store's buyers would be aiming at something altogether unusual. And an objective of markedly increasing sales through existing buyers' rate of purchase rather than through the number of buyers attracted would appear similarly unrealistic, given the relative stability of the former measure in practice.

The argument should be qualified by the observation that some brands and stores **do** attract atypical buying patterns (defined as deviation from the Dirichlet's theoretical norms) over and above what can reasonably be attributed to sampling error. Even a small discrepancy (e.g. increasing yearly average purchase frequency from 5.0 to 5.2) could represent a highly significant change in sales, especially if occurring at a national level. However, as emphasized in Chapter 1, this thesis is concerned with generalizable patterns of behaviour in a broad sense rather than with exceptional individual cases in the first instance. Indeed, describing the overall patterns should logically precede the identification of irregularities.

14.2.2. Loyalty.

That the same basic **patterns** of choice hold for a variety of markets does not imply that the overall level of loyalty must in each case be the same. However, overall loyalty - in so far as it can be measured, given differences in the sizes of markets - is found in the present study to be much the same for different product fields and regions. Such constancy is most marked in the case of stores, where for instance duplication coefficients vary only from 0.87 to 0.93.

The level of **brand** loyalty is somewhat less stable from product to product (if not from region to region). This finding can be reasonably explained in terms of the choice set, which (in this study) differs across product fields for brands but not for stores. The argument is supported by the observation that where the brand set remains **constant** (i.e. across regions for each product), D coefficients are remarkably stable. Brand loyalty is in fact found to be strongest for instant coffee and weakest for tea bags in each region, which may reflect a higher level of brand differentiation in the former case (although it is worth recalling that whether substitutability should increase or decrease switching is still a matter of controversy). Nevertheless, the variation at issue is far from emphatic. D coefficients, for example, range only from 0.92 to 1.07 in the brand choice context.

The finding that the overall level of brand loyalty differs more across product classes than store loyalty may be generalizable. Focusing again on D coefficients, while brand values are found to vary significantly from product to product in Ehrenberg and Goodhardt's (1970) study, Kau and Ehrenberg (1984) report store values that remain much the same for each product studied.

14.3. PATTERNS OF CHOICE: THE SUBMARKET LEVEL.

14.3.1. Regularities.

The analysis of choice behaviour within sixty different brand or store submarkets indicates that the well-established regularities in choice at the whole-market level apply also to the submarket level. Thus the basic regularities in brand choice behaviour within an individual store are, in form, similar to those within the market as a whole. And, correspondingly, the regularities in store choice behaviour for an individual brand are essentially the same as for the product class as a whole.

The patterns in question are certainly less clear at the submarket level, as would be expected given the far smaller samples involved. For instance, the divergence of the two basic purchase frequency measures w and wp as market share falls is not as smooth, and in duplication tables within-column stability is less apparent. However, the crucial association between measures of buyer behaviour and market share is on occasion **more** obvious at the submarket level because of the very large deviation in brand shares within certain stores, and in store shares for certain brands.

Kau (1981) was the first to note that patterns of choice within submarkets display the same trends and regularities as within the market as a whole. The present results serve to reinforce those of Kau in this area, while extending the basic finding to a longer time period (48 rather than 24 weeks) and to two new product fields (automatic washing powder and tea bags).

A good basis for generalization in this area is now building up. It certainly seems reasonable to conclude that the "law-like" framework which defines the boundaries of marketing influence at the whole-market level applies also at the submarket level - a point which will be of particular relevance to stores wishing to promote private-label products within their stores.

14.3.2. Loyalty.

While the same basic regularities hold at the two levels of analysis, loyalty (on all "standard" measures) is found to be stronger at the submarket level. In other words a brand typically receives more loyalty within an individual store than within the market as a whole, and correspondingly stores enjoy a higher level of loyalty for each brand than for the whole product class. This disparity simply reflects the smaller number of purchases made within any given submarket (a corrolary of multibrand or multistore buying at the whole-market level), which reduces the **opportunity** for disloyalty. The negative association between loyalty and product purchasing rates has also been noted by Kau and Ehrenberg (1984, p. 402) and by Wrigley and Dunn (1984c, p. 1229), and in general would appear to account for much of the inter-product variation in overall loyalty levels noted elsewhere in the literature.

Despite being stronger at the submarket level, loyalty remains far from emphatic in this context. To illustrate, the buyers of Brand B at Store S (over a 48-week period) typically devote only about half of their product purchases at the store to Brand B; only about half of the buyers of B at S make more than one purchase of that brand-store combination; and only about a third of the buyers of B at S would be 100%-loyal to that brand within that store.

This represents an important finding. Although it is well established that multibrand buying is the norm at the whole-market level, the possibility remained that consumers would be loyal to a brand **within a particular store**, switching to other brands only when changing stores. The present results indicate that this is not so: buyers of a brand at a store buy other brands at that store extensively. (And, correspondingly, they make many purchases of the same brand at other stores, although the degree of switching does tend to be slightly lower in this SCwB context.)

14.4. THE DIRICHLET MODEL.

A major objective of the present research has been to assess the fit and generalizability of the Dirichlet model of buyer behaviour. Most previous support for the model has been indirect, deriving from the wide-ranging applicability of the NBD and the Duplication of Purchase Law, which are effectively "special cases" of the Dirichlet. The 72 markets (or submarkets) to which the Dirichlet has been applied in the course of this study provide a good basis on which to assess the robustness of the model.

14.4.1. Goodness of Fit.

At the whole-market level, the Dirichlet presents a remarkably accurate description of both brand choice and store choice behaviour. In chapters 6 and 7, when the model was applied to a brand or store choice set of five, the average difference (for all markets) between observed and predicted values was typically only about 10% of the value of the mean for the measures b, w, wp and w/wp, although this increased to about 20% in the case of the two "sole buying" measures bs/b and ws. The fit is closer still when the Dirichlet's calibration and predictions are restricted to the larger non-composite brand or store categories (the approach of Chapters 12 and 13), where small-sample effects are reduced and the distorting influence of miscellaneous groupings avoided. Importantly, the deviations from the model that do arise tend to average out: there are few predictive **biases** inherent in the model.

The fit of the Dirichlet at the submarket level is of particular interest, as the present research represents the first direct application of the model to this context. In overall terms, the fit is certainly poorer than at the whole-market level. For instance, the mean absolute discrepancy for w and wp tends to be larger in the BCwS and SCwB contexts, despite the lower absolute values on these two measures at the submarket level. And on all measures the improvement on the average "as predictor" is far from emphatic. A worsening of fit is of course to be expected, given the far smaller samples employed when brand choice is considered within individual stores, and store choice considered for individual brands.

The Dirichlet successfully describes the patterns of choice at the submarket level in two important respects. First, the basic regularities in buyer behaviour assumed by the model - the trends with market share, and the system of relationships between different measures of buyer behaviour - are still found to apply. Second, there is little evidence of systematic deviation from the model: certainly no predictive biases are introduced by the model other than those already present at the whole-market level.

All the evidence suggests that - in terms of predictive accuracy - the Dirichlet is performing in the BCwS and SCwB contexts in much the same way as it would perform in a small product field (i.e. with corresponding sample sizes) at the whole-market level.

As the Dirichlet is applicable to both brand and store choice, be it at the whole-market or submarket level, a relevant question is whether the model applies equally to each of these aspects of consumer choice. In terms of the **overall** level of fit (in so far as this can be measured, given the variety of buyer behaviour indices involved), there appears to be little difference between the brand and store choice contexts. Even when **specific** measures are considered, the differences that do arise between the two contexts (at either the whole-market or submarket level) are typically no greater than the differences that occur between **product fields** within the **same choice context.**

In terms of predictive **bias**, a small disparity arises with regard to sole buyers. Whereas in the BC and BCwS contexts, the proportion of sole buyers (bs/b) and in particular these buyers' purchase frequency (ws) tend to be underpredicted, in the SC and SCwB contexts bs/b tends to be **over**predicted and ws far less severely underpredicted. (Indeed in the SCwB case the underprediction of ws disappears altogether.) These results indicate that sole buying is a more prominent feature of behaviour in the case of brand choice than in the case of store choice.

Despite these points, the main message is that the patterns of brand choice and store choice are the same, not just in terms of the "broad trends and regularities" described in Sections 14.2 and 14.3, but in terms of the more exact patterns of behaviour encapsulated by the Dirichlet.

The model has, in this thesis, been applied to two product fields - automatic washing powder and tea bags - for the first time. That the model has successfully described the patterns of choice within these markets clearly reinforces its generalizability. There is little evidence of the overall level of fit varying markedly from one market to another (although on any single measure such variation can readily be found). The main exception concerns tea bags in the BC context, where discrepancies between observed and predicted figures tend to be relatively large in both regions studied. Possible factors include the seasonality in tea bag sales (the most marked of the three product fields), and in particular the relatively high across-brand variation on most measures within this product field. Indeed, when mean discrepancy is expressed as a proportion of mean deviation, tea bags no longer stands out as a relatively "poorly fitted" market.

The level of fit can also be compared across **submarkets**, and here also there is little evidence of marked variation. In the BCwS context for instance, the overall fit of the Dirichlet in one store is much the same as in any other (although again it must be emphasized that on any individual buyer behaviour measure, disparities are readily apparent). In other words the patterns of brand choice are essentially the same within every store. It is also notable that the overall degree of fit obtained for brand choice within a store is unrelated to the fit achieved for that store at the whole-market SC context. Thus if the patronage pattern for a store is poorly described at the whole-market level (i.e. the store is "atypical"), this does not undermine the Dirichlet's capacity to describe the patterns of brand choice **within** that store. A similar conclusion applies to the fit of the model in the BC and SCwB contexts.

14.4.2. Systematic Deviation.

Notwithstanding the overall validity of the Dirichlet, three main areas of systematic deviation from the model's theoretical norms have been identified.

(i) Sole Buyers.

The first of these concerns the purchase frequency of sole buyers (ws), which tends to be substantially underpredicted. This underestimation, which has been noted by other researchers (e.g. Ellis, 1989), represents the first serious fault of the model. It clearly requires further research, which is outside the scope of this study. When such work is undertaken, a relevant consideration is that the level of underprediction appears to vary by choice context. As noted in the previous section, it is considerably stronger for brand choice than for store choice at both the whole-market and submarket levels. If this result can be generalized, a re-specification of the model to the benefit of one context may not be appropriate to the other.

Even if the predictive bias in this area can be corrected, the scope for improvement in terms of absolute discrepancy is limited by the "erratic" behaviour of the ws measure.

This lack of any marked trend with market share has been noted elsewhere (e.g. Ehrenberg, 1988, p. 199), and largely reflects the particularly small samples used when focusing on 100%-loyal buyers.

The only other specific measure characterized by consistent predictive bias is the proportion of once-only buyers. A tendency to underpredict this proportion arises in all four choice contexts studied (although in the SC and SCwB situations the overall disparity is largely accounted for by the Miscellaneous store category). This discrepancy, which has been highlighted by other authors with regard to product-class purchasing (Wrigley and Dunn, 1984b, p. 761), may reflect non-stationarity in sales, with peak-season only buyers of a brand boosting the once-only proportion. Certainly the discrepancy is most marked for tea bags, which is the most seasonal of the three product fields.

(ii) Variance Discrepancy.

The aim of the Dirichlet is not to take account of every variable that may conceivably differentiate between brands but to "take out" the influence of market share. Consequently the model "explains" only a proportion of the observed variation across brands. This proportion is typically about 50% to 70% at the whole-market level for the measures w, wp, w/wp, and bs/b. In terms of loyalty this translates into a tendency for large brands (or stores) to receive higher-than-predicted loyalty and for small brands (or stores) to receive lower-than-predicted loyalty. There are many exceptions on individual measures, but the trend is clearly illustrated by comparing the largest and smallest choice categories within each market (or submarket). In terms of the average loyalty "index" (i.e. observed loyalty as a percentage of predicted loyalty), the largest (brand or store) choice category receives higher loyalty than the smallest category in 61 of the 72 markets (or submarkets) studied - see Appendices 1, 2, 5 and 6.

The effect is to some extent summarized by what appears to be a (slight) inverse relationship between individual s values and market share.

Researchers in the past have often noted a loyalty excess (i.e. relative to the Dirichlet norms) for large brands and described this as a "brand leader effect". The present results suggest that this discrepancy is part of a broader effect whereby the Dirichlet underestimates the degree of loyalty variation across brands, and that where such discrepancy occurs, it is appropriately interpreted at least in part as an effect of the model and not just as a characterization of the brand in question.

However, the deviation from the model in this area remains small, and is appropriately described as a "second order effect". Certainly the overall fit of the model, and its utility in providing interpretive norms to help understand the observed patterns, is not undermined.

(iii) Composite Categories.

The third area of systematic deviation concerns the miscellaneous brand and store groupings, namely "Other Brands", "Other Multiples", and "Miscellaneous". It transpires that loyalty to these categories, on all measures, is consistently lower than predicted in all four choice contexts.

The grouping of brands or stores into a composite grouping does not in itself cause theoretical problems because of the independence assumption of the Dirichlet distribution. But it may be desirable in future research to follow the approach taken in Chapters 12 and 13 and exclude composite categories altogether when testing the Dirichlet. An "atypical" pattern of behaviour for these groupings serves to obscure the picture for the individually named brands or stores, and it can be rationalized in terms of the composition of the groups. At the very least, where composite categories stand out, it seems appropriate to exclude them when **calibrating** the Dirichlet to avoid distorting the model's predictions.

The tendency for composite categories to receive lower-than-expected loyalty (in terms of w and duplication for instance) is detectable in the results of other studies (e.g. Kau and Ehrenberg, 1984; Uncles and Ehrenberg, 1988). This general pattern supports the view that minor brands and retailers are used for "occasional" or "filler" purchases rather than as the primary source of a product. However, it may in part be an effect of the model, or more specifically of the "variance discrepancy" described earlier. It has been seen that the Dirichlet tends to overestimate loyalty to small brands and stores. This overestimation is likely to be especially severe for the particularly small brands and stores of which the miscellaneous groupings are composed and would, in the absence of segmentation (i.e. relatively high switching between such brands or stores), inevitably tend to translate into a loyalty overprediction for each composite category as a whole.

14.4.3. Model Extensions.

Beyond generalizing the Dirichlet to the two submarket choice contexts and to two new product fields, the present research has extended the model's applicability in three main ways.

First, the successful application of the Dirichlet to the BCwS and SCwB contexts implies that two hierarchical models of choice have parenthetically been established. One describes store choice and then brand choice within the chosen store; the other first describes brand choice and then store choice for the chosen brand. As there exists little discrepancy in fit between the BC and SC contexts, and between the BCwS and SCwB situations, the two models represent equally valid "routes" to the buyers of each brand-store combination. The choice of which to use must rest on the behaviour at issue, as the models clearly differ in terms of the choice patterns described (excepting the penetration and purchase frequency of brand-store combinations, for which the observed values are necessarily identical in each case).

A possible simplification to the hierarchical model is to use the **output** of the first stage (b and w) as **input** to the second stage (B and W) for the purpose of determining the "diversity" parameters K and S. While increasing parsimony, the approach is not recommended as it tends to introduce a predictive bias (regarding loyalty) within brand or store submarkets that possess atypical buying patterns at the whole-market level.

The second extension of the Dirichlet concerns the model's capacity, via a methodology outlined in Chapter 13, to estimate the propensity to buy "other brands at other stores" (i.e. in purchase frequency terms). As a result it becomes possible to predict, using only market shares as brand-specific or store-specific input, how the buyers of Brand B at Store S divide their total product purchases between all four basic "purchase options", namely B at S, other brands at S, B at other stores, and other brands at other stores.

The associated methodology is not entirely satisfactory, as for each brand-store combination it involves interlacing three separately-calibrated Dirichlet models, one of which is set up in such a way that it ignores the known segmented structure of the market (i.e. a segmentation by store for brand choice, and by brand for store choice). As a result the elegance and "logic" of the Dirichlet is lost, and only tentative confidence can be placed in the predictions. To conclude, this "extension" of the Dirichlet is best described as a relevant theoretical exercise rather than a development which has significantly added to the model's practical utility.

The third extension strictly concerns a special case of the Dirichlet rather than the model itself, namely the

Duplication of Purchase Law. It is found that this Law applies not only to the BCwS and SCwB contexts (as noted previously by other researchers), but to the "across-Brand/across-Store" situation also. In other words the percentage of the buyers of Brand B at Store S who buy a **different** brand at a **different** store varies with this latter brand-store combination's penetration, and with sufficient regularity for this percentage to be predicted by an overall proportionality factor - the D coefficient. This coefficient is in fact quite stable across product fields: buying a brand at a store typically decreases the probability of buying any other given brand at any other given store by a factor of about 0.55 (in relation to the average buyer of the product class). As this conclusion rests on just three product fields, replicative analysis would be appropriate. Given the elegant simplicity of the Duplication Law, this should be a relatively straightforward exercise.

14.4.4. The Dirichlet Model: Concluding Remarks.

The present research has shown the Dirichlet to be a robust and generalizable model of buying behaviour. In particular, it has reinforced the conclusion of previous studies (Kau, 1981; Kau and Ehrenberg, 1984; Wrigley and Dunn, 1984b; Uncles and Ehrenberg, 1988) that the model, though initially formulated for the brand choice context, applies equally to the case of store choice. And more importantly it has generalized the Dirichlet to the submarket level, representing a logical extension to earlier work which demonstrated the applicability of two "special cases" of the Dirichlet - the NBD model and Duplication of Purchase Law - to this level of consumer choice (Kau, 1981; Kau and Ehrenberg, 1984; Wrigley and Dunn, 1984c).

The applicability of the Dirichlet to four quite different choice contexts (BC, SC, BCwS and SCwB) suggests that the model may encapsulate the "mechanisms of choice" at a somewhat deeper level than implied by its original application to brand choice. This leads to the question of which **other** choice contexts might be similarly susceptible to prediction. Some suggestions in this area are provided in Section 14.8.

The theoretical advance represented by the Dirichlet can be summarized by its **combination** of three "ideal properties" of any model: generalizability, comprehensiveness, and parsimony. The model contrasts markedly on these points (even when taken individually) with most previous formulations of choice, which have tended to lack systematic evidence of predictive validity, to focus on purchase incidence or brand choice rather than combining the two, and to involve considerable complexity in input requirements and parameter estimation procedures.

The parsimony of the Dirichlet is arguably the most "challenging" to previous work on consumer choice, or more specifically the deterministic school, as the model makes clear that patterns of choice can be successfully described without reference to the cognitive processing of consumers, their socioeconomic characteristics, the marketing support for specific brands, and so on. This is not to deny that such variables exert influence on behaviour. Rather, the model delineates the **way** in which they can impact on aggregated purchasing patterns.

The main utility of the Dirichlet - providing theoretical norms to help interpret the observed data - has been amply demonstrated throughout this thesis. The complexities of consumer behaviour become far more amenable to analysis when benchmarks are available against which the "typicality" of choice patterns can be assessed. Other potential uses, not illustrated in this thesis, concern the provision of base-lines for assessing the effects of promotional activity (or other market dynamics), specifying what must be achieved on various measures of behaviour for any given target sales level, and making explicit which aspects of behaviour are most susceptible to change. More generally the model makes explicit the framework or "laws" of behaviour within which marketing activity is constrained to operate.

The generalization of the Dirichlet to the submarket level implies that the utility of the model has been correspondingly extended. The model now offers retail chains a means to help asess the performance of their own-label products and of other brands within their outlets, and the performance of the store itself for individual brands (which could help identify which brands are contributing most to the store's loyalty rating for the product class as a whole). Additionally stores might use the model to provide benchmarks against which the impact of brand-specific promotions could be assessed. Manufacturers, for their part, could usefully employ the Dirichlet to identify unusual features in store patronage for their brand. "Irregularities" might highlight distribution or inventory problems, or previously unknown linkages between stores (i.e. market segmentation). And if such irregularities represented a store "underperformance" on certain measures for that brand, they might profitably be cited to bolster manufacturers' case for more within-store support for their brand.

Numerous other potential applications could be cited. The essential message is that the Dirichlet now represents a tool to help structure and interpret the observed patterns of behaviour at a more detailed level of analysis than before - a level that concerns the important interrelationships between brand and store choice.

14.5. BRAND CHOICE VERSUS STORE CHOICE.

The issues of brand choice and store choice differ in many ways. Brand alternatives are normally available side-by-side, whereas store alternatives tend to be geographically dispersed with all the "transaction costs" (time, effort, money, etc.) this may imply. Brand alternatives usually involve physical product-differences (if only in terms of packaging in some cases), whereas different stores do not usually impact materially on a manufacturer's brand. It is the brand, not the store, that is experienced during consumption. A brand decision normally relates to a single product, whereas a store decision typically relates to a multitude of different products (at least in the case of groceries). The list could be extended at length.

Yet despite such differences, it is found that the patterns of brand choice and store choice are similar in two basic respects. First, they both follow the same basic trends and regularities, and can as a result be described by the same models. This point was made earlier by several authors (Jephcott, 1972; Kau, 1981; Kau and Ehrenberg, 1984; Wrigley and Dunn, 1984b; Uncles and Ehrenberg, 1988). Second, it is found that the levels of loyalty in each case are broadly similar. In effect, this study has shown that the correspondence between the two choice contexts extends to the actual numerical values involved.

To be precise, in the present analysis store loyalty tends to exceed brand loyalty, although the disparity is not great and varies by product field. For instance, in the automatic washing powder and tea bag markets, the average brand accounts for about 40% of its buyers' total product purchases, and the average store about 50%: while discrepant, such figures are of the same order. And in the case of instant coffee in Region I, the two loyalty levels, on all measures used, are virtually the same. As noted in Section 14.2, brand loyalty varies more across product fields than does store loyalty, and it is therefore mainly variation in the BC context that accounts for differences in the **balance** between the two loyalties.

The tendency for store loyalty to be only slightly stronger than brand loyalty accords quite closely with previous results in this area, such as those presented by Cunningham (1961) and Seggev (1970) for two basic measures of loyalty (the proportion of total product expenditure devoted to a brand or store, and the number of brands or stores used). It is worth recalling however that neither author drew attention to this issue of loyalty comparison. In contrast Jephcott (1972) made explicit reference to the numerical similarity of the two choice patterns. The present study has built on Jephcott's findings by extending the comparison to a wider range of measures and, more importantly, by developing a methodolgy for taking account of the crucial market share factor on which loyalty is known to depend.

Why store loyalty should exceed brand loyalty, and only slightly, is open to some speculation. Intuitively the "cost" of switching stores would seem greater than that associated with switching among brand alternatives, which are after all specifically presented to consumers in such as way as to make obvious the options available. This point is reflected in the comments of several authors (see Section 5.3) which portray store choice as the "primary" decision in some sense. Another point is that the "catchment area" of store chains is inevitably smaller than that of widely distributed brands (i.e. even large chains are not practicably accessible to all consumers). In this light it seems logical that store penetration should be lower than brand penetration, and, accordingly, that purchasing rates (along with all other aspects of loyalty, given the strong relationships between these measures) for stores should exceed those for brands.

The broad **similarity** between the two loyalties is less easy to explain. The most obvious factor is that, in the product fields studied here, a wide range of both brands and stores are capable of satisfying the basic requirements for which a purchase is made. It is certainly not difficult to imagine circumstances where shoppers would wish to take advantage of the options available to them in either choice context, be it (for example) to satisfy diverse tastes at home in the case of brands, or to fit in with other shopping requirements in the case of stores.

The question of relative brand and store loyalty has in this thesis been studied not only at the whole-market level but at the submarket level, namely by comparing within-store brand loyalty and within-brand store loyalty. It is at this level that the practical relevance of making the comparison becomes most obvious: when an intended purchase is unavailable, are consumers more likely to buy an alternative brand at the same store or to look for the brand elsewhere? An answer would indicate to stores the importance of stocking particular brands, and to manufacturers their level of dependence on across-chain distribution. As argued in Section 1.6, it would accordingly help clarify what the balance of power is (or should be) between manufacturer and retailer.

The present results do not directly answer this question of response to unavailability. First, they concern choice behaviour over time where all alternatives within each store are (assumed to be) constantly available. Second, the way in which the loyalty balance should translate into the expected response to brand unavailability depends in part on whether disloyalty is taken to reflect indifference among alternatives or a positive need for variety - and as indicated in Section 5.3, there is no clear-cut answer to this issue. Third, brand unavailability could take the form of a permanent delisting or a temporary stock-out, and it is not at this stage clear how customers' "compensatory" behaviour would vary accordingly.

Nevertheless, the findings reported in Chapter 13 provide at least initial guidelines as to the likely response behaviour of consumers who find their intended brand to be unavailable. That within-brand store loyalty tends to exceed within-store brand loyalty (in terms of both the number of duplicating buyers and the purchasing rates involved) suggests that buying "another" brand within the "same" store would be the most likely option. However, it is worth recalling that the loyalty discrepancy is far from emphatic, and indeed disappears altogether in one product field. At the very least, manufacturers can be reassured that the level of store loyalty for a brand is in absolute terms quite low, implying that consumers' purchases of a brand are far from "tied" to their favourite store. Overall, the results suggest that the strength of retailers in their dealings with manufacturers is (or should be) less than is popularly imagined.

When opposing two dimensions of consumer choice, as here, an issue of theoretical (and possibly practical) relevance concerns the sequential ordering of decisions. Do consumers first decide on a store to visit and then on a brand to buy? Or does brand choice precede the store decision? This has been described as "the traditional question about consumers' store and brand choice" (Kau and Ehrenberg, 1984, p. 406). However, the matter has not been examined in this thesis. First, it is not clear how this aspect of individual information-processing should translate into overt behaviour, especially at the aggregate level considered here. Drawing a link between relative brand and store loyalty on the one hand, and the ordering of choice on the other, assumes that loyalty equates with decision "importance" rather than indifference among alternatives - as noted earlier this remains a subject of controversy. Second, it is far from clear how to measure the **instant** of brand or store choice, given the apparent reality of continuous rather than immediately pre-purchase evaluation of alternatives in the case of low-involvement products such as groceries. These points were discussed more fully in Section 5.3.

14.6. THE INTERACTION OF BRAND CHOICE AND STORE CHOICE.

The notion of "interaction" in this context covers a variety of issues relating brand buying to store patronage. The main findings in this broad subject area are summarized and discussed with reference to the five basic questions posed in Chapter 1.

14.6.1. Are brand choice and store choice interdependent?

In general, such interdependence emerges strongly: the probability of buying a brand - in terms of within-store market share or penetration - typically varies by store; correspondingly, the probability of buying at a particular store varies by brand. This is not a new finding. Such interaction is well-known in industry, where "source of trade" analyses are widely used to indicate the competitive performance of brands in different store submarkets. And in the marketing literature, a similar pattern of behaviour is reported by Wrigley and Dunn (1984c) and, to a lesser extent (i.e. the interdependence is weaker), by Kau (1981).

However, two previously undocumented points emerge from the present study. First, the choice probabilities of the brand leader and store leader tend to be positively correlated. Put another way, the customers of the dominant store for a given product class are especially prone to buy the dominant brand. The pattern probably reflects a positive promotional policy towards the brand leader on the part of the store leader, although the result may be more store-specific than general, given that within each region the dominant store was the same for each of the three product fields studied. Second, brand shares vary across stores in both absolute and relative terms: brand share ratios, or "relative preferences", are rarely constant even for specific pairs of brands. This implies that the causes of brand-store interdependence are liable to be complex: it is not a case of one brand's variation in popularity from store to store affecting other brands proportionately within each store.

The literature has cited a variety of within-store influences on brand choice (primarily relating to display and promotional activity), and it seems reasonable to assume that across-store differences in these variables - and in others such as the socioeconomic profile of consumers, brand range, and the presence of private labels - will to a large extent account for the interaction in question. The strength of such factors presumably varies from product to product: in the present study, interdependence is strongest for tea bags (where one brand's within-store share varies from 20% to 80%) and weakest for automatic washing powder in both regions.

14.6.2. Does the level of brand loyalty vary from store to store?

In terms of the **overall** level of loyalty (i.e. without focusing on any specific brand), such variation does not occur to any marked extent, at least for the "proportional" measures such as w/wp, bs/b and the duplication coefficient. (The purchase frequency measures such as w and ws inevitably vary strongly with the product buying rate at the store, which itself reflects the market share of that store.) Indeed, the stability of within-store brand loyalty extends across regions and, to a lesser extent, across product classes. For the three measures w/wp, bs/b and D, values of 45%, 35% and 0.85 respectively would in most cases represent a good estimate of loyalty to the average brand within a store, regardless of the product or region in question. (The most obvious exception concerns Store V in the Region II instant coffee market, where a restricted brand range leads to a particularly high level of within-store brand loyalty.)

In combination with the marked interdependence that arises between brand and store choice, this stability of brand loyalty delineates the scope of retailers' ability to impact on buyer behaviour within their outlets. It transpires that a store is capable of influencing its customers' (apparent) brand preferences, but not the overall extent to which these consumers switch between the brands available within that store.

The question posed above can be interpreted in a different way, namely as concerning loyalty to an individual brand. In this case brand loyalty inevitably differs from store to store in so far as brand shares and submarket "structure" also vary. But will a brand's loyalty be "high" in one store and "low" in another once account has been taken of these two factors via the Dirichlet model? In practice such variation does arise: it is common for a brand to receive higher-than-predicted loyalty in one store and lower-than-predicted loyalty in another. However, the divergences in question are mostly small, and much of the variation can reasonably be attributed to sampling error. In sum, there is little evidence of marked interaction in this respect: once account has been taken of within-store brand shares, and of overall submarket structure, brands receive much the same loyalty from store to store.

14.6.3. Does the level of within-brand store loyalty vary from brand to brand?

The same points made regarding question 2 above hold for the present issue. First, the overall level of store loyalty (on "proportional" measures) is much the same for each brand, whatever the product or region (the main exceptions concerning brands with limited distribution, for which store loyalty is relatively high). Second, the loyalty rating of individual stores (measured relative to the Dirichlet norms) often varies across brands, but not to any marked extent (i.e. over and above what could be expected from measurement error alone).

14.6.4. Do consumers tend to switch brands when switching stores, or do they remain loyal to a brand across stores?

This is a quite different issue from the subject of brand-store interdependence (see Section 14.6.1) which relates to the brand choice behaviour of **all** the buyers at a store, and store choice behaviour of **all** the buyers of a brand. The present question concerns the brand and store choice behaviour of the **same** group of consumers in different submarkets.

The issue has been addressed by examining the way in which the buyers of a given Brand B at a given Store S divide their purchases between the four basic "purchase options": B at S, other brands at S, B at other stores, and other brands at other stores.

When consumers' brand and store choices are considered simultaneously in this way, it transpires that the market is segmented by both store (for brand choice) and by brand (for store choice). In other words the buyers of Brand B at Store S, when at another store, are more likely to buy B than any other given brand (even when the market shares of the two alternatives are the same). And when they **do** buy another brand, it is more likely to be within Store S - the same store - than within any other given retail outlet. This points to the existence of both brand loyalty across stores and store loyalty across brands. The result may seem an obvious one, but the notion that shopping at a "different" store might induce the purchase of a "different" brand - perhaps due to promotional factors, or a wish to take advantage of the brand alternatives not available at the usual store - is not unreasonable. Certainly Rao (1969a) is unequivocal in his view that "store switching increases brand switching". Also, the scale of the segmentation in question may be surprising, as indicated by the contrast between the within-submarket duplication coefficients and the coefficients relating to simultaneous brand and store switching in Table 13.2.

A point of interest is that the "across-submarket" loyalty noted above is neither stronger nor weaker than the corresponding **within**-submarket loyalty. For instance, if the buyers of Brand B at Store S devote 40% of their product purchases at that store to Brand B, when at other stores they will tend also to devote 40% of their product purchases to Brand B. This is an average-value pattern for each product field: some cases of marked imbalance do arise for individual brand-store combinations, especially where the across-store variation in brand shares is strong. But the point is that there is no **overall** tendency for the buyers of a given brand to either decrease or increase their concentration on that brand as they move from store to store.

This result does not contradict the conclusion that brand choice behaviour is segmented by store: under conditions of independence (i.e. no segmentation), the number of purchases made of the "same" brand at "another" store would simply depend on the share of that brand-store combination in the market as a whole, which clearly does not hold in practice. But a certain paradox remains: simply by showing the **same** loyalty to a brand in each store, a condition of segmentation is produced.

In practical terms, this consistency in consumers' brand loyalty as they move from store to store questions the value of stocking a very "different" brand range as a means of drawing customers from competing stores. There is certainly no marked evidence at this stage of consumers taking advantage of the additional brand choices offered by "other" stores (although clearly a more detailed analysis, breaking down the four basic "purchase options" into their component brand-store combinations, may highlight a subtle pattern of interaction).

14.6.5. Are consumers more likely to buy other brands at the same store or the same brand at other stores?

This issue, in its overall sense, was discussed in Section 14.5 ("Brand Choice Versus Store Choice"). The present concern is with the interaction between these two aspects of loyalty, which essentially relates to differences in the pattern of behaviour across brand-store combinations.

It indeed transpires that the balance between within-store brand loyalty and within-brand store loyalty varies markedly according to the brand-store pair in question. In the case of Brand A3 at Store X, buyers are far more likely to buy other brands within the store than to buy Brand A3 at other stores. In the case of Brand A1 at

Store Z, the position is reversed.

However, as contended in Chapter 13, to conclude that brands and stores combine in such a way as to produce a fundamentally unique pattern of behaviour would be wrong. The basic argument is that, since the levels of brand loyalty within a store and of store loyalty for a brand are essentially characterizations of the whole submarket (i.e. within a submarket all choice alternatives receive approximately the same loyalty once account has been taken of their market shares), the balance between within-store brand loyalty and within-brand store loyalty can be taken to reflect the structure of each submarket as a whole rather than the specific brand-store combination in question. Put another way, the balance between these two loyalties reflects the **general** pattern of brand choice behaviour within Store S, and the **general** pattern of store choice for Brand B: there is nothing altogether unique about the Brand-B/Store-S combination in itself.

This idea can be simplified. Submarket "structure" is essentially defined by two variables: submarket size (the Dirichlet parameter M) and the level of switching within it (S and K). As noted in Sections 14.6.2 and 14.6.3, this latter variable - switching - is found to be roughly constant from submarket to submarket within each (BCwS and SCwB) choice context. Thus it is the **size** of the brand and store submarkets in question that largely determines the balance between the two loyalties. This is illustrated by the high (positive) correlation observed between (i) the ratio of within-store brand loyalty to within-brand store loyalty and (ii) the ratio of brand-submarket size to store-submarket size. Correlation coefficients of about 0.95 applied to all three product fields when the proportion of duplicating buyers was the (inverse) measure of loyalty used.

Such results indicate that, within a given product field, the balance between within-store brand loyalty and within-brand store loyalty is not so much a reflection of the brand's image or differentiation, as has been suggested by several authors (see Section 1.6), as a simple reflection of the brand and store's market shares. This is not to say that the former variables (image, etc.) are irrelevant to the loyalty balance; only that such factors are effectively subsumed by market share.

14.7. LOYALTY

As illustrated in Chapters 3 and 4, the notions of brand and store loyalty have been central concerns of research into consumer behaviour. "Loyalty" among buyers is widely perceived as an eminently feasible objective (in some cases even to the extent of converting fully-fledged loyalty from one to brand to another), and as an index of successful branding. A number of points made in this thesis may help interpret the phenomenon of loyalty in a more balanced manner.

14.7.1. A Characterization of the Product Class.

It has been seen that loyalty differences between brands and between stores - within a given product field - can usually be accounted for solely in terms of market share. Indeed, the point is implied by the generally good fit of the Dirichlet model (which employs only market share as brand-specific or store-specific input). Put another way, once account has been taken of market share, different brands of a product receive essentially the same level of loyalty (and a similar conclusion applies to different stores). It seems reasonable therefore to interpret the degree of loyalty shown to a brand or store as a characterization of the **product class**, not of the particular brand or store in question.

On a theoretical level, this result makes it possible to talk of "market structure", and to compare whole product fields rather than just individual brands or stores. It can sensibly be asked: "is instant coffee brand loyalty higher than tea bag brand loyalty?" (i.e. without referring to any specific brand or brands). In practical terms, the attribution of a brand's loyalty level to the product class severely delimits the ability of marketing variables to impact on the buying pattern for a brand over and above what is accounted for by its market share.

While intuitively appealing, the notion of "product field loyalty" poses problems in terms of measurement, at least when comparing different product classes. The difficulty is that more than one parameter is required to express the full structure of a market. At the very least there must be two: a measure of market size, and a measure of switching within that market. While the Dirichlet has almost reached such "ultimate parsimony" with just three input parameters, the relationships between these overall measures preclude meaningful inter-product comparison on any single parameter (excluding M, which expresses just market size).

However, as emphasized in Chapter 8, **within** a given product field only one Dirichlet parameter - S - varies between the brand and store choice contexts. Consequently this measure can on its own summarize the differences in the level of loyalty, on all measures, between the two contexts. The amount of information that need be compared is thereby greatly reduced. It is a telling comment on the regularity of consumer behaviour in the aggregate, and indeed on the extent to which such behaviour is understood, that comparison of the entire brand loyalty and store loyalty structures within a product field can be reduced to the comparison of just two figures.

Clearly, the use of S as a powerful summary measure of loyalty structure could extend to other choice contexts (such as flavour or pack-size choice) if these are found in the course of future research to accord with the Dirichlet.

14.7.2. Measures of Loyalty.

Loyalty is evidently a multi-faceted construct, and much debate in the literature has centred on the relative worth of different measures, and indeed on whether a particular index is in fact measuring loyalty at all. The present results suggest that such debate may be largely unnecessary, at least as regards measures of overt, aggregate loyalty behaviour. Different measures of this type are found in practice to be closely tied - a result which accords closely with the premise underlying the Dirichlet, and with previous findings in this area. Thus if a brand enjoys a high rate of purchase (i.e. relative to other brands within the product field), it will also receive strong loyalty in terms of share of requirement, duplication with other brands, and so on. This system of relationships between different measures of buyer behaviour (including market share) underlies the notion of loyalty as a product field characterization, and permits the parsimonious expression of this characterization through the three Dirichlet parameters.

A separate issue is whether different aspects of loyalty are strongly correlated when assessed **relative to the Dirichlet norms**. In other words, if a brand receives higher-than-predicted loyalty on one measure, will it enjoy a higher-than-predicted loyalty rating on other measures also? Section 6.8 showed some evidence of consistency in this regard, but - excepting the measures w and w/wp - the correlations involved were too low and the exceptions too numerous to posit that a brand's pattern of loyalty (i.e. relative to the Dirichlet norms) can be reliably summarized by any single measure. Indeed, a strong association of this type is effectively precluded by the generally good fit of the Dirichlet.

14.7.3. The Level of Loyalty.

Throughout this thesis, the phenomenon of loyalty has been more conspicuous through its absence than its presence. For instance, in the case of store choice for automatic washing powder - the whole-market context in which loyalty is **strongest** - the average buyer of the product at a store buys it there infrequently (about 6 times a year), these purchases account for a **minority** of total product purchases (i.e. at any store), and typically only a small proportion (about one fifth) of a store's buyers buy the product at only that store over the period. When considering a brand-store combination within the market as a whole, loyalty is lower still: typically, the buyers of a given brand at a given store will devote only about a **quarter** of their total product purchases to that specific brand-store pair.

Loyalty has been described similarly elsewhere - "extremely low" being one summary of its level (Wrigley and Dunn, 1984c, p. 1234). The consistency of this picture raises the question of whether "low" is still an appropriate description of such behaviour. There are no obvious benchmarks available: though well described by the Dirichlet, the extent of multibrand and multistore buying is an empirical regularity, not a theoretical one. However, the level of loyalty reported in this study may reasonably be deemed low in relation to consumers' perceptions of their own behaviour. In one survey, 82% of respondents agreed with the statement "I always buy the same brand if I can" (Stoessl, 1979, p. 588). The current data indicate that, on average, only 16% of a brand's buyers always buy that brand over a 48-week period.

The level of loyalty reported earlier may also seem low when assessed against the importance popularly attached to the concept in the marketing literature. Authors have tended to emphasize purchasing rates (or loyalty) rather than the number of buyers as the basis of a brand's success. In this regard, it is worth recalling from Chapter 8 that, since any given sales level can be broken down into the number of buyers and how often they buy, high loyalty in the sense of rate of purchase can only be obtained at the expense of what might be termed "popularity". The use of this term for (more formally) penetration may help counteract the overriding emphasis in marketing on the no less value-laden notion of loyalty. Indeed, had the phrase "inert buying" (Watkins, 1986, p. 23) been more widely coined to describe this latter behaviour, it may not have been such a focus of either managerial or academic concern.

14.8. FUTURE WORK.

In accordance with tradition, the present research has raised as many questions as it has answered. This section outlines the areas where further research is most needed.

Several aspects of the Dirichlet model deserve further investigation. In particular, the consistent underprediction of the purchase frequency of sole buyers (ws) calls for possible adjustment to the model's specification. That the discrepancy is less severe in the store choice context might hold clues as to its source. Investigation in this area must take account of the particularly small samples associated with sole buying (given the low proportion of 100%-loyal buyers).

Attention could profitably also turn to less regular deviations, but those that nevertheless generalize in some way. For instance, a store might attract particularly heavy buyers in several product fields; or a brand might attract a high degree of loyalty in different stores. The aim would be to relate such discrepancies to other variables, such as pricing or advertising. Most deviations from the Dirichlet are quite small, and may not seem worthy of attention (given sample sizes). But relevant to work in this area is Chatfield's (1982, p. 276) distinction between a "significant difference" and an "interesting difference".

Another issue concerns the "diversity" parameters K and S. The present analysis suggests that the Dirichlet is considerably more sensitive to S (especially for values lower than 1) than to K. Can the Dirichlet be described as an essentially one-parameter model (excluding M, which simply measures the size of the market)?

The Dirichlet has been shown to apply to the BC, SC, BCwS and SCwB contexts. However, a fifth basic choice context remains to be effectively described, namely the across-Brand/across-Store (aBaS) situation (where the buyers of Brand B at Store S buy a **different** brand at a **different** store). (Some progress was made in this area in Chapter 13, but only with regard to one measure of behaviour, namely purchasing rates, and via a theoretically questionable methodology.) Extension to this aspect of behaviour would - through linking the BCwS, SCwB and aBaS Dirichlets - enable predictions to be made of how consumers distribute their purchases between all possible brand-store combinations. Some results presented in Chapter 13 are encouraging, in that the Duplication of Purchase Law (an indirect test of the IIA assumption underlying the Dirichlet) was found to hold in the aBaS context. Indeed, an appropriate first step would be to replicate such application of the Duplication Law.

The applicability of the Dirichlet to two quite different choice situations - brand choice and store choice - raises questions as to which **other** situations might be similarly susceptible to prediction. The most promising cases concern those where the NBD, Duplication Law or related models are already known to apply, such as television viewing or the readership of print media (see Goodhardt et al., 1984, p. 639). Other possible situations concern "outlet" choice beyond the grocery field, involving for instance fast-food chains, bank (or cash machine) visits, and cinemas. If such extensions can be made, the knowledge of choice behaviour gained over many years could be directly transferred to these new contexts.

In particular, analysis could focus on dimensions of choice that could be linked in with the brand or store decision, such as flavour and pack-size (see also Ehrenberg, 1988, p. 238). Other possibilities include choice between market **segments**, such as the caffeinated-decaffeinated and granules-powder oppositions in the instant coffee market. A notable contrast with the present analysis is that, unlike stores (in most cases), each of these dimensions impacts physically on the product in question. Analysis of relative loyalty levels, along the lines followed in Chapter 13, could be valuable in determining stocking policies: for instance, whether consumers are more likely to buy another flavour of the same brand or buy another brand of the same flavour would help establish whether to devote shelf-space to brand or flavour variety. If the Dirichlet applies to such contexts, it will ultimately be possible to establish a three or four tier model of "total market structure", describing for instance choice of store, then brand, then pack-size, then flavour. Clearly large data sets would be required for such disaggregate analysis.

The final area where research is needed concerns a quite different matter from the topics suggested above. As noted in Section 14.5, there is a need to uncover whether disloyalty represents a passive or active commitment to different brands (or stores). Do consumers typically buy a variety of brands because they are indifferent to the alternatives, or because they deliberately seek variety in their purchasing and consumption? An answer in this area would help establish the extent to which consumers derive utility from, and expect, a wide brand range within a store.

14.9. CONCLUSION.

This thesis has demonstrated that there exists a range of highly regular patterns in the way in which consumers, in the aggregate, choose between brands and between stores. In so doing it has reinforced the results of previous studies which found the same patterns to hold in each choice context and, relatedly, the Dirichlet to apply in each case.

The main extensions to previous work fall into two areas. The first has consisted in bringing together the subjects of brand and store choice, either to make direct comparisons between the patterns in each context, or to examine the pattern of interaction between these two aspects of consumer behaviour. On the issue of comparison, it is now possible to say that the similarity between the patterns of brand and store choice extends from the broad trends and regularities at hand to the actual numerical values (or loyalty levels) involved. The only simple summary of the interaction question is that it is complex, if only because of the numerous possible manifestations of "interaction". Nevertheless, some basic findings at the whole-market level are found to apply to the two (BCwS and SCwB) submarket contexts, which brings a certain logic to the observed patterns. In particular, the strong relationship between market share and buyer behaviour measures still holds, accounting for many of the contrasts in the buying patterns associated with different brand-store combinations.

The second area of extension to previous work concerns the Dirichlet model, which has in the present study been shown to apply not only to the whole-market contexts of brand choice and store choice, but to the submarket contexts of within-store brand choice and within-brand store choice. This represents a logical extension to earlier work which illustrated the applicability of the NBD and Duplication Law - effectively two "special cases" of the Dirichlet - to the submarket level. Greater emphasis than before has also been given to **measuring** the fit of the model, and assessing its **robustness** across a wide range of choice situtations - again, a logical sequel to the initial, more exploratory analyses. Overall the Dirichlet emerges as a remarkably accurate formulation of consumer choice (especially in view of its comprehensiveness and, paradoxically, its parsimony), and the 72 markets (or submarkets) to which it has been applied attest to the model's generalizability. Three aspects of systematic deviation from the model have been identified, but (excepting the underprediction of sole buyers' rate of purchase) these are best described as "second order" effects, and certainly do not undermine the main utility of the Dirichlet, namely to provide theoretical norms to help interpret the observed behaviour.

What are the appropriate "next steps" in this area of research? With regard to the Dirichlet, the most obvious need for further work concerns the sole-buying discrepancy just mentioned. This underprediction of the ws measure is a consistent feature of the present results (especially in the brand choice context), and one which has been noted elsewhere. Given that the **overall** predictive validity of the model is now well-established, it seems appropriate to focus also on deviations that are systematic for specific brands or stores in an attempt to relate these "irregularities" to background variables such as demographics, pricing or advertising. Perhaps the most attractive avenue for further research concerns dimensions of choice which could be linked to the brand or store choice decision, such as flavour and pack-size choice, or choice between market **segments**. This raises the possibility of developing, via a hierarchical series of "nested" Dirichlets, a model of "total market structure".

These issues were described more fully in the previous section, where other topics in need of further work were also noted. Research in such areas would undoubtedly benefit, as the present study has done, from having as its starting point a body of knowledge which has developed systematically and coherently over the years, and which will undoubtedly continue to grow in the future.

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Appendix 1

Detailed Results for Chapter 6:

BRAND CHOICE.

TABLE A1.1

Context: Brand Choice.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Various.

Brand	s	MS (%)	b (%) O	b (%) D	w O	w D
A1	1.32	31	48	46	5.7	5.9
A2	0.98	22	34	36	5.5	5.3
A3	1.31	15	28	27	4.7	4.9
A4	0.88	14	24	26	5.3	4.8
A5	1.01	10	18	19	4.8	4.6
Ave	S= 1.14	18	30	31	5.2	5.1

Brand	wp O	wp D	w/wp (%) O	w/wp (%) D	bs/b (%) O	bs/b (%) D	ws O	ws D
A1	12.2	13.2	46	44	28	20	7.4	4.7
A2	13.7	13.7	40	38	18	16	5.3	4.1
A3	14.1	14.1	33	35	12	14	5.8	3.8
A4	14.6	14.1	36	34	13	14	7.3	3.7
A5	14.8	14.4	32	32	12	13	4.6	3.5
Ave	13.9	13.9	38	37	17	15	6.1	4.0

TABLE A1.2

Context: Brand Choice.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Purchase Frequency Distribution.

Buyers of:		% Making X Purchases of the Brand: 1	2	3	4	5	6	7	8+
Brand A1	O	27	16	11	7	5	5	4	25
	D	28	16	10	8	6	5	4	24
Brand A2	O	29	18	10	6	7	4	4	22
	D	32	16	11	8	6	4	3	20
Brand A3	O	36	15	12	7	7	3	3	18
	D	34	17	10	7	5	3	3	18
Brand A4	O	37	14	8	6	6	1	1	23
	D	35	17	10	7	5	3	3	18
Brand A5	O	39	18	7	6	5	4	4	16
	D	36	17	11	7	5	3	3	17
Average	O	34	16	10	6	6	3	3	21
	D	33	16	10	7	5	3	3	20

TABLE A1.3

Context: Brand Choice.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Duplication.

Buyers of:	% also buying:				
	A1	A2	A3	A4	A5
Brand A1	--	38	35	26	23
Brand A2	53	--	34	34	21
Brand A3	60	42	--	30	34
Brand A4	53	50	36	--	22
Brand A5	61	39	53	29	--
Average	57	42	40	30	25
D x rltv b	61	44	36	30	23
D = 1.02					
Relative b *	60	43	35	29	23

Notes:
* Relative b (rltv b) is the penetration of the brand among buyers of the product field.
- D is calculated using relative penetration.

TABLE A1.4

Context: Brand Choice.
Product/Region: Tea Bags, Region I.
Measure(s): Various.

Brand	s	MS (%)	b (%)		w	
			O	D	O	D
B1	0.76	42	53	58	7.2	6.6
B2	1.18	22	38	38	5.4	5.3
OB	1.97	21	41	36	4.6	5.2
B3	1.85	9	21	19	3.9	4.5
B4	4.17	5	17	10	2.7	4.2
Ave	S= 1.23 excl B4	20	34	32	4.8	5.2

Brand	wp		w/wp (%)		bs/b (%)		ws	
	O	D	O	D	O	D	O	D
B1	12.5	12.9	58	51	29	24	7.3	5.3
B2	13.9	14.0	39	38	19	15	7.3	4.0
OB	13.2	14.1	35	37	14	15	4.1	3.9
B3	16.6	14.9	23	30	4	11	2.3	3.3
B4	14.6	15.2	18	28	8	10	2.4	3.1
Ave	14.2	14.2	35	37	15	15	4.7	3.9

TABLE A1.5

Context: Brand Choice.
Product/Region: Tea Bags, Region I.
Measure(s): Purchase Frequency Distribution.

Buyers of:		% Making X Purchases of the Brand: 1	2	3	4	5	6	7	8+
Brand B1	O	21	15	7	8	5	4	4	35
	D	25	15	10	8	6	5	4	27
Brand B2	O	34	17	9	5	5	5	4	22
	D	32	16	10	8	6	4	3	20
O Brands	O	35	17	12	5	6	6	4	16
	D	32	16	11	7	5	4	4	20
Brand B3	O	47	14	9	7	3	4	3	12
	D	37	17	10	7	5	4	3	16
Brand B4	O	62	12	10	3	3	2	1	8
	D	39	17	10	7	5	4	3	15
Average	O	40	15	9	6	4	4	3	19
	D	33	16	10	7	5	4	3	20

TABLE A1.6

Context: Brand Choice.
Product/Region: Tea Bags, Region I.
Measure(s): Duplication.

Buyers of:	% also buying: B1	B2	OB	B3	B4
Brand B1	--	41	47	26	15
Brand B2	57	--	49	34	23
O Brands	61	45	--	33	27
Brand B3	64	60	64	--	32
Brand B4	49	53	68	42	--
Average	58	50	57	34	24
D x rltv b	69	50	54	28	21
D = 1.06					
Relative b *	65	47	51	26	20

Notes:
* Relative b (rltv b) is the penetration of the brand among buyers of the product field.
- D is calculated using relative penetration.

TABLE A1.7

Context: Brand Choice.
Product/Region: Instant Coffee, Region I.
Measure(s): Various.

Brand	s	MS (%)	b (%)		w	
			O	D	O	D
C1	0.73	35	53	55	6.9	6.6
C2	0.78	27	44	45	6.3	6.1
C3	0.96	14	28	27	5.2	5.3
OB	1.48	13	31	26	4.4	5.3
C4	0.67	8	15	16	5.6	5.0
Ave	S= 0.88	19	34	34	5.7	5.7

Brand	wp		w/wp (%)		bs/b (%)		ws	
	O	D	O	D	O	D	O	D
C1	12.9	13.2	53	50	29	23	8.4	6.7
C2	13.2	13.5	48	45	22	19	6.8	6.2
C3	13.8	14.1	38	38	13	14	7.8	5.5
OB	13.5	14.1	33	38	13	14	4.6	5.4
C4	13.8	14.3	41	35	16	13.	8.9	5.1
Ave	13.4	13.8	42	41	19	17	7.3	5.8

TABLE A1.8

Context: Brand Choice.
Product/Region: Instant Coffee, Region I.
Measure(s): Purchase Frequency Distribution.

Buyers of:		% Making X Purchases of the Brand: 1	2	3	4	5	6	7	8+
Brand C1	O	24	12	10	8	7	7	4	29
	D	24	14	10	8	6	5	4	29
Brand C2	O	32	13	7	7	6	4	5	27
	D	26	15	10	8	6	5	4	26
Brand C3	O	33	16	6	8	5	5	4	22
	D	31	16	11	8	6	4	4	21
O Brands	O	38	19	8	7	6	3	2	17
	D	31	16	10	7	6	5	3	21
Brand C4	O	38	15	7	2	4	3	4	28
	D	33	16	10	7	5	4	4	20
Average	O	33	15	8	6	6	4	4	25
	D	29	16	10	8	6	5	4	23

TABLE A1.9

Context: Brand Choice.
Product/Region: Instant Coffee, Region I.
Measure(s): Duplication.

Buyers of:	% also buying: C1	C2	C3	OB	C4
Brand C1	--	37	25	36	12
Brand C2	45	--	40	28	17
Brand C3	47	62	--	34	14
O Brands	62	40	31	--	12
Brand C4	43	53	28	26	--
Average	49	48	31	31	14
D x rltv b	53	45	29	29	15
D = 0.92					
Relative b *	58	49	31	34	16

Notes:
* Relative b (rltv b) is the penetration of the brand among buyers of the product field.
- D is calculated using relative penetration.

TABLE A1.10

Context: Brand Choice.
Product/Region: Automatic Washing Powder, Region II.
Measure(s): Various.

Brand	s	MS (%)	b (%) O	b (%) D	w O	w D
A1	1.08	30	43	43	6.4	6.4
A4	0.75	18	26	30	6.3	5.6
A2	1.49	15	28	26	4.9	5.4
A5	1.05	15	25	25	5.5	5.4
A3	1.35	11	21	19	4.8	5.1
Ave	S= 1.11	17	29	29	5.6	5.6

Brand	wp O	wp D	w/wp (%) O	w/wp (%) D	bs/b (%) O	bs/b (%) D	ws O	ws D
A1	14.3	14.9	45	43	24	19	7.0	4.8
A4	14.8	15.7	43	36	17	15	8.0	4.1
A2	14.9	15.9	33	34	14	14	6.1	3.9
A5	15.6	15.9	35	34	15	14	6.9	3.9
A3	15.2	16.2	31	32	9	13	3.5	3.7
Ave	15.0	15.7	37	36	16	15	6.3	4.1

TABLE A1.11

Context:	Brand Choice.
Product/Region:	Automatic Washing Powder, Region II.
Measure(s):	Duplication.

Buyers of:	% also buying:				
	A1	A4	A2	A5	A3
Brand A1	--	32	36	30	25
Brand A4	52	--	41	31	23
Brand A2	56	38	--	32	29
Brand A5	52	33	36	--	34
Brand A3	52	30	39	41	--
Average	53	33	38	34	28
D x rltv b	56	34	36	32	27
D = 1.00					
Relative b *	56	34	36	32	27

Notes:
* Relative b (rltv b) is the penetration of the brand among buyers of the product field.
- D is calculated using relative penetration.

TABLE A1.12

Context: Brand Choice.
Product/Region: Tea Bags, Region II.
Measure(s): Various.

Brand	s	MS (%)	b (%) O	b (%) D	w O	w D
B1	1.11	27	47	49	7.7	7.4
B2	1.17	26	47	48	7.5	7.3
OB	2.26	21	48	41	5.9	6.8
B3	1.56	13	31	29	5.7	6.1
B4	1.67	13	31	29	5.5	6.1
Ave	S= 1.29 excl OB	20	41	39	6.4	6.7

Brand	wp O	wp D	w/wp (%) O	w/wp (%) D	bs/b (%) O	bs/b (%) D	ws O	ws D
B1	17.3	19.4	44	38	17	13	7.9	5.1
B2	18.3	19.4	41	38	17	13	8.9	5.0
OB	19.0	19.9	31	34	10	11	7.5	4.6
B4	20.7	20.7	27	29	12	9	8.4	4.0
B5	22.0	20.7	25	29	4	9	14.1	4.0
Ave	19.4	20.0	34	34	12	11	9.3	4.5

TABLE A1.13

Context: Brand Choice.
Product/Region: Tea Bags, Region II.
Measure(s): Duplication.

Buyers of:	% also buying: B1	B2	OB	B3	B4
Brand B1	--	51	59	36	39
Brand B2	51	--	58	38	41
O Brands	58	56	--	40	45
Brand B3	56	58	62	--	47
Brand B4	59	62	69	46	--
Average	56	57	62	40	43
D x rltv b	59	59	61	39	40
D = 1.07					
Relative b *	56	56	57	36	37

Notes:
* Relative b (rltv b) is the penetration of the brand among buyers of the product field.
- D is calculated using relative penetration.

TABLE A1.14

Context: Brand Choice.
Product/Region: Instant Coffee, Region II.
Measure(s): Various.

Brand	s	MS (%)	b (%) O	b (%) D	w O	w D
C2	0.67	39	57	61	7.6	7.0
OB	1.32	23	47	43	5.4	5.9
C1	0.97	21	41	40	5.8	5.8
C3	1.12	11	25	23	4.9	5.2
C4	1.13	3	8	8	4.4	4.7
Ave	S= 0.96	20	35	35	5.6	5.7

Brand	wp O	wp D	w/wp (%) O	w/wp (%) D	bs/b (%) O	bs/b (%) D	ws O	ws D
C2	13.7	13.7	55	51	27	23	8.9	7.1
OB	13.2	14.4	41	41	18	16	6.6	6.0
C1	13.7	14.4	42	40	14	15	8.8	5.9
C3	15.7	14.9	31	35	11	12	7.9	5.2
C4	15.9	15.3	28	31	10	10	7.4	4.8
Ave	14.4	14.6	39	40	16	15	7.9	5.8

TABLE A1.15

Context: Brand Choice.
Product/Region: Instant Coffee, Region II.
Measure(s): Duplication.

Buyers of:	% also buying:				
	C2	OB	C1	C3	C4
Brand C2	--	43	37	29	10
O Brands	51	--	48	27	6
Brand C1	51	56	--	29	6
Brand C3	66	52	47	--	7
Brand C4	72	36	30	23	--
Average	60	47	41	27	7
D x rltv b	58	48	42	25	8
D = 0.94					
Relative b *	62	52	44	27	9

Notes:
* Relative b (rltv b) is the penetration of the brand among buyers of the product field.
- D is calculated using relative penetration.

TABLE A1.16

Context: Brand Choice.
Product/Region: Automatc, Tea Bags, Inst Cof; Rgns I & II
Measure(s): Loyalty Indices.

Brnd	s	w	w/wp	bs/b	ws	8+	dpl	Ave excl s & ws
Rgn I								
A1	86	97	105	140	158	104	107	111
A2	116	104	104	113	129	110	105	107
A3	87	96	96	84	153	100	90	93
A4	130	109	105	91	195	128	100	107
A5	112	104	102	95	129	94	92	97
B1	162	109	113	121	138	130	119	118
B2	105	102	103	127	183	110	100	108
OB	63	88	94	93	105	80	95	90
B3	67	87	78	36	70	75	82	72
B4	30	64	67	80	77	53	88	70
C1	121	105	107	126	125	100	108	109
C2	113	103	106	116	110	104	94	105
C3	92	98	100	93	142	105	94	98
OB	59	83	87	93	85	81	100	89
C4	131	112	116	123	175	140	107	120
Rgn II								
A1	103	101	105	122	145	--	106	109
A4	148	113	120	113	195	--	103	112
A2	74	91	97	156	156	--	95	110
A5	106	102	104	178	178	--	94	120
A3	82	93	100	96	96	--	96	96
B1	117	104	117	136	157	--	105	116
B2	111	103	109	134	178	--	104	113
OB	57	86	90	92	164	--	98	92
B3	83	94	93	133	210	--	98	105
B4	77	91	86	44	355	--	93	79
C2	142	108	108	118	126	--	97	108
OB	72	91	99	116	110	--	102	102
C1	99	100	105	94	149	--	102	100
C3	86	94	90	92	150	--	93	92
C4	85	93	90	107	155	--	114	101

Notes:
- Within each market, brands are ordered by market share.
- "Loyalty Indices" are here defined as observed value as a percentage of predicted value, but vice versa for duplication, and index for s = (S parameter / s)100.
- For clarification of duplication data, see Table 6.25.

TABLE A1.17

Context: Brand Choice.
Product/Region: Automatc, Tea Bags, Inst Cof; Rgns I & II
Measure(s): Loyalty Indices, Ranked by s Index.

Brnd/ Rgn	s	w	w/wp	bs/b	ws	8+	dpl	Ave excl s & ws
B1-I	162	109	113	121	138	130	119	118
A4-II	148	113	120	113	195	--	103	112
C2-II	142	108	108	118	126	--	97	108
C4-I	131	112	116	123	175	140	107	120
A4-I	130	109	105	91	195	128	100	107
C1-I	121	105	107	126	125	100	108	109
B1-II	117	104	117	136	157	--	105	116
A2-I	116	104	104	113	129	110	105	107
C2-I	113	103	106	116	110	104	94	105
A5-I	112	104	102	95	129	94	92	97
B2-II	111	103	109	134	178	--	104	113
A5-II	106	102	104	178	178	--	94	120
B2-I	105	102	103	127	183	110	100	108
A1-II	103	101	105	122	145	--	106	109
C1-II	99	100	105	94	149	--	102	100
C3-I	92	98	100	93	142	105	94	98
A3-I	87	96	96	84	153	100	90	93
A1-I	86	97	105	140	158	104	107	111
C3-II	86	94	90	92	150	--	. 93	92
C4-II	85	93	90	107	155	--	114	101
B3-II	83	94	93	133	210	--	98	105
A3-II	82	93	100	96	96	--	96	96
B4-II	77	91	86	44	355	--	93	79
A2-II	74	91	97	156	156	--	95	110
OB-CII	72	91	99	116	110	--	102	102
B3-I	67	87	78	36	70	75	82	72
OB-BI	63	88	94	93	105	80	95	90
OB-CI	59	83	87	93	85	81	100	89
OB-BII	57	86	90	92	164	--	98	92
B4-I	30	64	67	80	77	53	88	70

Notes:
- "Loyalty Indices" are defined as observed value as a percentage of predicted value, but vice versa for duplication, and index for s = (S parameter / s)100.
- Predicted duplication from Duplication of Purchase Law. For further clarification of duplication figures, see Table 6.25.
- In the case of the Other Brands category, BI refers to Tea Bags Region I, CI to Instant Coffee Region II, etc.
- The averages in the right-hand column exclude the indices for s and ws.

Appendix 2

Detailed Results for Chapter 7:

STORE CHOICE

TABLE A2.1

Context: Store Choice.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Various.

Store	s	MS (%)	b (%)		w	
			O	D	O	D
X	0.54	36	43	45	7.2	6.9
OM	1.16	23	38	32	5.3	6.2
Y	0.64	21	30	30	6.2	6.1
Ms	2.76	11	27	16	3.4	5.6
Z	0.67	9	14	14	5.5	5.5
Ave	S= 0.74 excl Ms	20	30	28	5.5	6.1

Store	wp		w/wp (%)		bs/b (%)		ws	
	O	D	O	D	O	D	O	D
X	12.2	12.7	59	54	30	33	8.1	6.8
OM	12.6	13.2	42	47	21	26	5.6	6.1
Y	12.7	13.3	49	46	24	26	6.7	6.0
Ms	13.7	13.7	25	41	14	21	2.7	5.4
Z	15.9	13.8	35	40	10	21	5.3	5.4
Ave	13.4	13.3	42	46	20	25	5.7	5.9

Notes:
- "excl Ms" = excluding Miscellaneous, i.e. the Miscellaneous store category has been excluded from the calculation of the S parameter.

TABLE A2.2

Context: Store Choice.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Purchase Frequency Distribution.

Buyers at:		% making X purchases at the store: 1	2	3	4	5	6	7	8+
Store X	O	25	10	10	7	7	4	5	33
	D	25	14	10	7	6	5	4	29
O Mltps	O	28	18	11	5	5	6	3	24
	D	29	15	10	7	6	4	4	25
Store Y	O	25	16	12	7	3	4	5	27
	D	29	15	10	7	6	5	4	25
Misclns	O	40	17	11	7	5	7	3	9
	D	32	16	10	7	5	4	4	21
Store Z	O	43	17	7	7	2	1	1	24
	D	33	16	10	7	6	4	4	21
Average	O	32	16	10	7	4	4	3	23
	D	30	15	10	7	6	4	4	24

TABLE A2.3

Context: Store Choice.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Duplication.

Buyers at:	% also buying at:				
	X	OM	Y	Ms	Z
Store X	--	38	31	28	15
O Mltps	44	--	31	34	19
Store Y	44	38	--	34	16
Misclns	45	48	39	--	22
Store Z	47	52	35	42	--
Average	45	44	34	35	18
D x rltv b	50	43	35	31	16
D = 0.93					
Relative b *	54	47	38	33	18

Notes:
* Relative b (rltv b) is the penetration of the store among buyers of the product field.
- D is calculated using relative penetration.

TABLE A2.4

Context: Store Choice.
Product/Region: Tea Bags, Region I.
Measure(s): Various.

Store	s	MS (%)	b (%)		w	
			O	D	O	D
X	0.59	34	43	46	7.1	6.8
OM	1.04	21	34	31	5.4	6.0
Ms	1.49	18	34	27	4.7	5.9
Y	0.77	16	26	25	5.7	5.8
Z	0.51	11	16	18	6.3	5.5
Ave	S= 0.73 excl Ms	20	31	29	5.8	6.0

Store	wp		w/wp (%)		bs/b (%)		ws	
	O	D	O	D	O	D	O	D
X	12.1	13.1	59	52	38	29	7.7	6.5
OM	13.3	13.7	41	44	20	23	5.8	5.7
Ms	14.2	13.8	33	43	16	21	6.6	5.6
Y	13.8	13.9	41	42	18	21	5.8	5.5
Z	14.4	14.1	44	39	15	19	7.5	5.2
Ave	13.6	13.7	43	44	21	23	6.7	5.7

TABLE A2.5

Context: Store Choice.
Product/Region: Tea Bags, Region I.
Measure(s): Purchase Frequency Distribution.

Buyers at:		% making X purchases at the store: 1	2	3	4	5	6	7	8+
Store X	O	23	13	10	6	4	5	5	34
	D	26	14	10	7	6	5	4	28
O Mltps	O	31	17	8	8	4	4	6	23
	D	29	15	10	7	5	5	4	24
Misclns	O	45	13	9	4	4	5	4	16
	D	30	15	10	7	6	4	4	24
Store Y	O	32	11	10	8	4	5	3	26
	D	31	15	10	7	6	4	4	23
Store Z	O	28	16	9	9	4	6	3	23
	D	32	16	10	7	6	4	3	21
Average	O	32	14	9	7	4	5	4	24
	D	30	15	10	7	6	4	4	24

TABLE A2.6

Context: Store Choice.
Product/Region: Tea Bags, Region I.
Measure(s): Duplication.

Buyers at:	% also buying at: X	OM	Ms	Y	Z
Store X	--	33	32	24	13
O Mltps	41	--	45	30	20
Misclns	41	46	--	36	25
Store Y	41	41	48	--	22
Store Z	35	44	53	35	--
Average	40	41	45	31	20
D x rltv b	49	39	39	30	19
D = 0.93					
Relative b *	53	42	42	32	20

Notes:

* Relative b (rltv b) is the penetration of the store among buyers of the product field.
- D is calculated using relative penetration.

TABLE A2.7

Context: Store Choice.
Product/Region: Instant Coffee, Region I.
Measure(s): Various.

Store	S	MS (%)	b (%)		w	
			O	D	O	D
X	0.59	35	50	52	7.3	7.1
OM	0.81	24	41	39	6.1	6.4
Y	0.71	18	32	31	6.0	6.1
Ms	2.23	12	33	22	3.8	5.8
Z	0.51	10	17	19	6.3	5.7
Ave	S= 0.66 excl Ms	20	35	33	5.9	6.2

Store	wp		w/wp (%)		bs/b (%)		ws	
	O	D	O	D	O	D	O	D
X	12.4	13.1	58	54	35	29	8.3	7.7
OM	13.9	13.4	44	48	16	23	7.1	7.1
Y	13.5	13.7	44	45	16	21	6.2	6.8
Ms	14.4	13.9	26	42	13	19	4.5	6.5
Z	15.8	13.9	40	41	15	18.	8.0	6.4
Ave	14.0	13.6	43	46	19	22	6.8	6.9

TABLE A2.8

Context: Store Choice.
Product/Region: Instant Coffee, Region I.
Measure(s): Purchase Frequency Distribution.

Buyers at:		% making X purchases at the store: 1	2	3	4	5	6	7	8+
Store X	O	20	11	8	9	8	6	4	36
	D	23	14	10	8	6	5	4	31
O Mltps	O	26	12	10	9	6	5	5	26
	D	26	15	10	8	6	5	4	27
Store Y	O	30	15	8	8	4	4	4	27
	D	27	15	10	7	6	5	4	26
Misclns	O	42	16	11	6	5	5	4	11
	D	29	15	10	7	6	5	4	24
Store Z	O	34	13	7	8	7	7	3	21
	D	30	15	10	7	6	5	4	23
Average	O	30	13	9	8	6	5	4	24
	D	27	15	10	8	6	5	4	26

TABLE A2.9

Context:	Store Choice.
Product/Region:	Instant Coffee, Region I.
Measure(s):	Duplication.

Buyers at:	% also buying at:				
	X	OM	Y	Ms	Z
Store X	--	36	29	28	12
O Mltps	44	--	34	43	21
Store Y	46	44	--	39	19
Misclns	43	54	37	--	20
Store Z	36	52	35	39	--
Average	42	47	34	37	18
D x rltv b	51	42	32	34	18
D = 0.92					
Relative b *	56	46	35	37	19

Notes:
* Relative b (rltv b) is the penetration of the store among buyers of the product field.
- D is calculated using relative penetration.

TABLE A2.10

Context: Store Choice.
Product/Region: Automatic Washing Powder, Region II.
Measure(s): Various.

Store	s	MS (%)	b (%)		w	
			O	D	O	D
V	0.26	33	33	43	9.1	7.2
OM	1.44	16	30	24	5.0	6.2
W	1.00	14	24	22	5.5	6.1
Z	1.09	14	24	22	5.4	6.1
Y	0.57	13	18	20	6.6	6.0
Ave	S= 0.76	18	26	26	6.3	6.3

Store	wp		w/wp (%)		bs/b (%)		ws	
	O	D	O	D	O	D	O	D
V	15.8	14.5	58	50	22	27	9.1	6.4
OM	13.9	15.4	36	40	19	20	4.8	5.4
W	14.3	15.5	39	39	24	19	6.5	5.3
Z	14.4	15.5	37	39	19	19	6.2	5.3
Y	15.6	15.6	42	38	19	19	9.9	5.2
Ave	14.8	15.3	42	41	21	21	7.3	5.5

TABLE A2.11

Context: Store Choice.
Product/Region: Automatic Washing Powder, Region II.
Measure(s): Duplication.

Buyers at:	% also buying at: V	OM	W	Z	Y
Store V	--	36	23	29	24
O Mltps	40	--	28	30	21
Store W	32	35	--	27	18
Store Z	40	37	27	--	17
Store Y	44	35	24	23	--
Average	39	36	26	27	20
D x rltv b	38	34	27	28	20
D = 0.88					
Relative b *	43	39	31	31	23

Notes:
* Relative b (rltv b) is the penetration of the store among buyers of the product field.
- D is calculated using relative penetration.

TABLE A2.12

Context: Store Choice.
Product/Region: Tea Bags, Region II.
Measure(s): Various.

Store	s	MS (%)	b (%) O	b (%) D	w O	w D
V	0.51	26	37	42	9.4	8.3
Z	0.86	20	35	35	7.6	7.7
OM	0.85	20	35	35	7.6	7.7
Y	0.73	12	21	22	7.4	7.1
W	1.63	9	23	18	5.2	6.9
Ave	S= 0.82	17	30	30	7.4	7.5

Store	wp O	wp D	w/wp (%) O	w/wp (%) D	bs/b (%) O	bs/b (%) D	ws O	ws D
V	19.5	19.1	48	43	15	19	11.3	7.4
Z	17.7	19.5	43	40	20	16	8.8	6.8
OM	18.1	19.5	42	40	17	16	9.9	6.8
Y	19.9	20.2	37	35	13	14	12.2	6.2
W	15.8	20.3	33	34	15	13	7.0	6.0
Ave	18.2	19.7	41	38	16	16	9.8	6.6

TABLE A2.13

Context: Store Choice.
Product/Region: Tea Bags, Region II.
Measure(s): Duplication.

Buyers at:	% also buying at: V	Z	OM	Y	W
Store V	--	37	38	28	23
Store Z	38	--	39	18	23
O Mltps	40	40	--	21	24
Store Y	49	31	35	--	30
Store W	37	34	36	27	--
Average	41	36	37	24	25
D x rltv b	40	38	37	22	25
D = 0.90					
Relative b *	44	42	41	25	28

Notes:
* Relative b (rltv b) is the penetration of the store among buyers of the product field.
- D is calculated using relative penetration.

TABLE A2.14

Context: Store Choice.
Product/Region: Instant Coffee, Region II.
Measure(s): Various.

Store	s	MS (%)	b (%)		w	
			O	D	O	D
V	0.50	24	37	40	7.2	6.7
OM	1.12	20	40	34	5.4	6.5
Z	0.77	20	35	33	6.1	6.5
W	0.68	13	24	24	6.0	6.1
Y	0.71	11	21	20	5.8	6.0
Ave	S= 0.65 excl OM	18	32	30	6.1	6.3

Store	wp		w/wp (%)		bs/b (%)		ws	
	O	D	O	D	O	D	O	D
V	13.9	14.1	52	48	19	23	6.1	7.5
OM	14.3	14.2	38	45	17	21	6.8	7.3
Z	14.3	14.2	43	45	15	21	8.0	7.3
W	13.7	14.5	44	42	19	19	8.4	6.9
Y	15.4	14.5	38	41	14	18	8.5	6.8
Ave	14.3	14.3	43	44	17	20	7.5	7.2

TABLE A2.15

Context: Store Choice.
Product/Region: Instant Coffee, Region II.
Measure(s): Duplication.

Buyers at:	% also buying at: V	OM	Z	W	Y
Store V	--	43	33	20	21
O Mltps	40	--	37	21	18
Store Z	34	42	--	23	17
Store W	30	34	34	--	25
Store Y	37	35	28	28	--
Average	35	39	33	23	20
D x rltv b	35	38	34	23	20
D = 0.87					
Relative b *	40	44	39	27	23

Notes:
* Relative b (rltv b) is the penetration of the store among buyers of the product field.
- D is calculated using relative penetration.

TABLE A2.16

Context: Store Choice.
Product/Region: Automatc, Tea Bags, Inst Cof; Rgns I & II
Measure(s): Loyalty Indices.

Store	s	w	w/wp	bs/b	ws	8+	dpl	Ave excl s & ws
Rgn I								
Automatc								
X	122	104	109	92	120	114	111	106
OM	57	86	90	81	92	96	98	90
Y	103	101	106	95	112	108	103	103
Ms	24	61	62	65	49	43	89	64
Z	98	99	86	47	98	114	89	87
Tea Bags								
X	123	104	113	131	118	121	123	118
OM	70	90	93	87	102	96	95	92
Ms	49	80	77	76	118	67	87	77
Y	94	98	99	86	105	113	97	99
Z	144	115	112	79	144	110	95	102
Inst Cof								
X	112	103	107	121	108	116	121	114
OM	81	95	92	70	100	96	89	88
Y	93	98	100	76	91	104	94	94
Ms	30	66	63	68	69	46	92	67
Z	129	111	97	83	125	91	100	96
Rgn II								
Automatc								
V	294	127	84	80	142	--	97	97
OM	53	82	67	95	89	--	94	85
W	76	91	58	127	122	--	104	95
Z	70	88	71	101	116	--	104	91
Y	134	111	89	104	190	--	100	101
Tea Bags								
V	160	114	112	81	153	--	98	101
Z	95	98	108	120	128	--	106	108
OM	96	99	106	107	145	--	100	103
Y	112	104	106	92	198	--	92	99
W	50	76	98	116	118	--	100	98
Inst Cof								
V	150	108	109	84	80	--	100	100
OM	67	84	84	79	93	--	97	86
Z	98	95	94	69	109	--	103	90
W	110	98	104	103	121	--	100	101
Y	106	97	91	77	125	--	100	91

Notes:
- Stores are ranked, within each market, by market share.
- "Loyalty Indices" are defined as observed value as a percentage of predicted value, but vice versa for duplication, and index for **s** = (S parameter / s)100.
- For clarification of duplication data, see Table 6.25.

Appendix 3

Detailed Results for Chapter 8:

A COMPARISON OF BRAND LOYALTY AND STORE LOYALTY

TABLE A3.1

Context: Brand Choice and Store Choice.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): b and w.

	MS (%)	b (%)		w	
		O	D	O	D
BRANDS					
Brand A1	31	48	46	5.7	5.9
Brand A2	22	34	36	5.5	5.3
Brand A3	15	28	27	4.7	4.9
Brand A4	14	24	26	5.3	4.8
Brand A5	10	18	19	4.8	4.6
Average	18	30	31	5.2	5.1
STORES					
Store X	36	43	44	7.2	7.1
Store Y	21	30	30	6.2	6.3
Store Z	9	14	13	5.5	5.7
Average	22	29	29	6.3	6.4

TABLE A3.2

Context: Brand Choice and Store Choice.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): b and w: Observed and Dirichlet for Real Brands/Stores and for Hypothetical Stores/Brands.

	MS (%)	b (%)		w	
		Brand O	Store D	Brand O	Store D
BRANDS					
Brand A1	31	48	40	5.7	6.8
Brand A2	22	34	30	5.5	6.3
Brand A3	15	28	22	4.7	6.0
Brand A4	14	24	21	5.3	6.0
Brand A5	10	18	15	4.8	5.8
Average	18	30	26	5.2	6.2
		Store O	Brand D	Store O	Brand D
STORES					
Store X	36	43	51	7.2	6.2
Store Y	21	30	36	6.2	5.3
Store Z	9	14	17	5.5	4.5
Average	22	29	35	6.3	5.3

Notes:
- E.g. Brand A1 has an observed penetration of 48% and an observed average purchase frequency of 5.7. The Dirichlet, calibrated to the store choice context, predicts that a store with the same market share (31%) would have a penetration of 40% and an average purchase frequency of 6.8.

TABLE A3.3

Context: Brand Choice and Store Choice.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): wp, w/wp, bs/b, and ws.

	wp		w/wp (%)		bs/b (%)		ws	
	O	D	O	D	O	D	O	D
BRANDS								
Brand A1	12.2	13.2	46	44	28	20	7.4	4.7
Brand A2	13.7	13.7	40	38	18	16	5.3	4.1
Brand A3	14.1	14.1	33	35	12	14	5.8	3.8
Brand A4	14.6	14.1	36	34	13	14	7.3	3.7
Brand A5	14.8	14.4	32	32	12	13	4.6	3.5
Average	13.9	13.9	38	37	17	15	6.1	4.0
STORES								
Store X	12.2	12.6	59	56	30	35	8.1	7.1
Store Y	12.7	13.2	49	48	24	28	6.7	6.3
Store Z	15.9	13.7	35	42	10	23	5.3	5.7
Average	13.6	13.2	48	49	21	29	6.7	6.4

TABLE A3.4

Context: Brand Choice and Store Choice.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): wp, w/wp, bs/b, and ws: Observed and Dirichlet for Real Brands/Stores and for Hypothetical Stores/Brands.

	wp		w/wp (%)		bs/b (%)		ws	
	Brd	Str	Brd	Str	Brd	Str	Brd	Str
BRANDS	O	D	O	D	O	D	O	D
Brand A1	12.2	12.8	46	53	28	33	7.4	6.8
Brand A2	13.7	13.1	40	48	18	28	5.3	6.4
Brand A3	14.1	13.4	33	45	12	25	5.8	6.0
Brand A4	14.6	13.4	36	45	13	25	7.3	6.0
Brand A5	14.8	13.6	32	43	12	23	4.6	5.8
Average	13.9	13.3	38	47	17	27	6.1	6.2
	Str	Brd	Str	Brd	Str	Brd	Str	Brd
STORES	O	D	O	D	O	D	O	D
Store X	12.2	13.0	59	48	30	23	8.1	5.0
Store Y	12.7	13.7	49	38	24	16	6.7	4.1
Store Z	15.9	14.5	35	31	10	12	5.3	3.5
Average	13.6	13.7	48	39	21	17	6.7	4.2

TABLE A3.5

Context: Brand Choice and Store Choice.
Product/Region: Tea Bags, Region I.
Measure(s): b and w.

	MS (%)	b (%)		w	
		O	D	O	D
BRANDS					
Brand B1	42	53	56	7.2	6.8
Brand B2	22	38	36	5.4	5.6
Brand B3	9	21	17	3.9	4.8
Average	24	37	36	5.5	5.7
STORES					
Store X	34	43	44	7.1	7.0
Store Y	16	26	24	5.7	6.1
Store Z	11	16	17	6.3	5.8
Average	20	28	28	6.4	6.3

TABLE A3.6

Context: Brand Choice and Store Choice.
Product/Region: Tea Bags, Region I.
Measure(s): b and w: Observed and Dirichlet for Real Brands/Stores and for Hypothetical Stores/Brands.

	MS (%)	b (%)		w	
		Brand O	Store D	Brand O	Store D
BRANDS					
Brand B1	42	53	51	7.2	7.5
Brand B2	22	38	32	5.4	6.4
Brand B3	9	21	14	3.9	5.7
Average	24	37	32	5.5	6.5
		Store O	Brand D	Store O	Brand D
STORES					
Store X	34	43	49	7.1	6.3
Store Y	16	26	28	5.7	5.2
Store Z	11	16	21	6.3	4.9
Average	20	28	33	6.4	5.5

TABLE A3.7

Context: Brand Choice and Store Choice.
Product/Region: Tea Bags, Region I.
Measure(s): wp, w/wp, bs/b, and ws.

	wp		w/wp (%)		bs/b (%)		ws	
	O	D	O	D	O	D	O	D
BRANDS								
Brand B1	12.5	12.9	58	53	29	27	7.3	5.9
Brand B2	13.9	13.9	39	40	19	18	7.3	4.6
Brand B3	16.6	14.7	23	33	4	13	2.3	3.9
Average	14.3	13.8	40	42	17	19	5.6	4.8
STORES								
Store X	12.1	13.0	59	54	38	32	7.7	7.0
Store Y	13.8	13.7	41	44	18	24	5.8	6.0
Store Z	14.4	13.9	44	42	15	22	7.5	5.8
Average	13.4	13.5	48	47	24	26	7.0	6.3

TABLE A3.8

Context: Brand Choice and Store Choice.
Product/Region: Tea Bags, Region I.
Measure(s): wp, w/wp, bs/b, and ws: Observed and Dirichlet for Real Brands/Stores and for Hypothetical Stores/Brands.

	wp		w/wp (%)		bs/b (%)		ws	
	Brd	Str	Brd	Str	Brd	Str	Brd	Str
BRANDS	O	D	O	D	O	D	O	D
Brand B1	12.5	12.7	58	59	29	37	7.3	7.4
Brand B2	13.9	13.5	39	47	19	27	7.3	6.4
Brand B3	16.6	14.0	23	41	4	21	2.3	5.7
Average	14.3	13.4	40	49	17	28	5.6	4.8
	Str	Brd	Str	Brd	Str	Brd	Str	Brd
STORES	O	D	O	D	O	D	O	D
Store X	12.1	13.3	59	47	38	23	7.7	5.4
Store Y	13.8	14.2	41	36	18	15	5.8	4.3
Store Z	14.4	14.5	44	34	15	14	7.5	4.0
Average	13.4	14.0	48	39	24	17	7.0	4.6

TABLE A3.9

Context: Brand Choice and Store Choice.
Product/Region: Instant Coffee, Region I.
Measure(s): b and w.

	MS (%)	b (%)		w	
		O	D	O	D
BRANDS					
Brand C1	35	53	54	6.9	6.8
Brand C2	27	44	44	6.3	6.3
Brand C3	14	28	26	5.2	5.6
Brand C4	8	15	16	5.6	5.2
Average	21	35	35	6.0	6.0
STORES					
Store X	35	50	51	7.3	7.2
Store Y	18	32	30	6.0	6.3
Store Z	10	17	18	6.3	5.9
Average	21	33	33	6.5	6.5

TABLE A3.10

Context: Brand Choice and Store Choice.
Product/Region: Instant Coffee, Region I.
Measure(s): b and w: Observed and Dirichlet for Real Brands/Stores and for Hypothetical Stores/Brands.

	MS (%)	b (%)		w	
		Brand O	Store D	Brand O	Store D
BRANDS					
Brand C1	35	53	51	6.9	7.2
Brand C2	27	44	41	6.3	6.7
Brand C3	14	28	24	5.2	6.1
Brand C4	8	15	14	5.6	5.8
Average	21	35	33	6.0	6.5
		Store O	Brand D	Store O	Brand D
STORES					
Store X	36	50	54	7.3	6.8
Store Y	21	32	33	6.0	5.8
Store Z	9	17	20	6.3	5.4
Average	22	33	36	6.5	6.0

TABLE A3.11

Context: Brand Choice and Store Choice.
Product/Region: Instant Coffee, Region I.
Measure(s): wp, w/wp, bs/b, and ws.

	wp		w/wp (%)		bs/b (%)		ws	
	O	D	O	D	O	D	O	D
BRANDS								
Brand C1	12.9	13.2	53	51	29	25	8.4	7.1
Brand C2	13.2	13.5	48	46	22	21	6.8	6.6
Brand C3	13.8	14.0	38	40	13	16	7.8	5.9
Brand C4	13.8	14.2	41	37	16	14	8.9	5.6
Average	13.4	13.7	45	44	20	19	8.0	6.3
STORES								
Store X	12.4	13.0	58	55	35	31	8.3	7.9
Store Y	13.5	13.6	44	46	16	23	6.2	7.1
Store Z	15.8	13.8	40	42	15	20	8.0	6.7
Average	13.9	13.5	47	48	22	25	7.5	7.2

TABLE A3.12

Context: Brand Choice and Store Choice.
Product/Region: Instant Coffee, Region I.
Measure(s): wp, w/wp, bs/b, and ws: Observed and Dirichlet for Real Brands/Stores and for Hypothetical Stores/Brands.

	wp		w/wp (%)		bs/b (%)		ws	
	Brd	Str	Brd	Str	Brd	Str	Brd	Str
BRANDS	O	D	O	D	O	D	O	D
Brand C1	12.9	13.1	53	55	29	31	8.4	7.9
Brand C2	13.2	13.3	48	50	22	26	6.8	7.5
Brand C3	13.8	13.7	38	44	13	21	7.8	6.9
Brand C4	13.8	13.9	41	41	16	19	8.9	6.6
Average	13.4	13.5	45	48	20	24	8.0	7.2
	Str	Brd	Str	Brd	Str	Brd	Str	Brd
STORES	O	D	O	D	O	D	O	D
Store X	12.4	13.2	58	52	35	25	8.3	7.1
Store Y	13.5	13.8	44	42	16	18	6.2	6.1
Store Z	15.8	14.1	40	38	15	15	8.0	5.7
Average	13.9	13.7	47	44	22	19	7.5	6.3

Appendix 4

Detailed Results for Chapter 9:

THE INTERDEPENDENCE OF BRAND CHOICE AND STORE CHOICE

TABLE A4.1

Context: Brand Choice Within Individual Stores.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Brand Share (%).

	Brand					
	A1	A2	A3	A4	A5	Ave
Store X	36	21	15	11	12	
O Mltps	33	19	17	13	10	
Store Y	25	26	18	16	7	
Misclns	27	23	8	21	9	
Store Z	25	21	12	20	11	
Average	29	22	14	16	10	18
MD	4.4	1.9	3.3	3.3	1.5	2.9
MD/Ave %	15.0	8.7	23.4	20.5	15.9	16.7

Notes:
- E.g. the brand share of Brand A1 within Store X is 36%; the brand share of that brand within O Mltps is 33%; etc.
- MD = mean (absolute) deviation (from the mean).

TABLE A4.2

Context: Brand Choice Within Individual Stores.
Product/Region: Tea Bags, Region I.
Measure(s): Brand Share (%).

	Brand					
	B1	B2	OB	B3	B4	Ave
Store X	58	18	15	7	3	
O Mltps	19	32	27	13	8	
Misclns	28	24	32	9	7	
Store Y	29	27	26	11	7	
Store Z	80	10	4	5	1	
Average	43	22	21	9	5	20
MD	21.0	6.6	9.0	2.4	2.6	8.3
MD/Ave %	49.0	29.5	43.5	26.7	49.2	39.6

TABLE A4.3

Context:	Brand Choice Within Individual Stores.
Product/Region:	Instant Coffee, Region I.
Measure(s):	Brand Share (%).

	Brand					
	C1	C2	C3	OB	C4	Ave
Store X	48	24	11	8	6	
O Mltps	25	29	16	14	10	
Store Y	20	38	19	10	11	
Misclns	18	23	11	34	9	
Store Z	60	15	15	8	1	
Average	34	26	14	15	7	19
MD	15.8	6.2	2.7	7.7	3.1	7.1
MD/Ave %	46.3	23.9	18.9	51.9	42.2	36.6

TABLE A4.4

Context:	Brand Choice Within Individual Stores.
Product/Region:	Automatic Washing Powder, Region II.
Measure(s):	Brand Share (%).

	Brand					
	A1	A4	A2	A5	A3	Ave
Store V	34	17	16	18	--	
O Mltps	27	16	12	14	21	
Store W	30	21	13	23	--	
Store Z	29	21	12	7	18	
Store Y	24	18	16	4	33	
Average	29	19	14	13	24	20
MD	2.7	2.0	1.9	6.3	5.7	3.7
MD/Ave %	9.4	10.7	13.8	47.2	23.6	20.9

TABLE A4.5

Context: Brand Choice Within Individual Stores.
Product/Region: Tea Bags, Region II.
Measure(s): Brand Share (%).

	Brand					
	B1	B2	OB	B3	B4	Ave
Store V	--	35	32	5	28	
Store Z	61	13	9	13	4	
O Mltps	29	23	22	17	10	
Store Y	31	39	12	12	7	
Store W	29	27	21	15	7	
Average	37	27	19	13	11	21
MD	11.8	7.7	7.0	3.0	6.7	7.3
MD/Ave %	31.8	28.1	36.6	24.3	60.5	36.3

TABLE A4.6

Context: Brand Choice Within Individual Stores.
Product/Region: Instant Coffee, Region II.
Measure(s): Brand Share (%).

	Brand					
	C2	OB	C1	C3	C4	Ave
Store V	56	40	--	--	4	
O Mltps	35	17	27	18	1	
Store Z	23	9	50	13	4	
Store W	39	21	18	15	2	
Store Y	42	16	19	14	7	
Average	39	20	28	15	4	21
MD	7.8	8.0	10.7	1.5	1.6	5.9
MD/Ave %	20.0	39.2	37.9	9.9	41.8	29.8

TABLE A4.7

Context: Store Choice for Individual Brands.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Store Share (%).

	Store					
	X	OM	Y	Ms	Z	Ave
Brand A1	42	24	17	9	7	
Brand A2	35	20	26	11	9	
Brand A3	36	26	26	6	7	
Brand A4	28	21	24	15	12	
Brand A5	44	23	14	9	10	
Average	37	23	21	10	9	20
MD	4.9	2.0	4.5	2.5	1.6	3.1
MD/Ave %	13.4	8.8	21.1	24.3	17.9	17.1

Notes:
- E.g. Store X's market share for Brand A1 is 42%; Store X's market share for Brand A2 is 35%; etc.

TABLE A4.8

Context: Store Choice for Individual Brands.
Product/Region: Tea Bags, Region I.
Measure(s): Store Share (%).

	Store					
	X	OM	Ms	Y	Z	Ave
Brand B1	47	10	12	11	21	
Brand B2	27	30	19	19	5	
O Brands	24	27	27	20	2	
Brand B3	26	30	17	19	7	
Brand B4	18	33	24	22	3	
Average	28	26	20	18	8	20
MD	7.4	6.4	4.6	2.9	5.4	5.3
MD/Ave %	26.2	24.6	23.0	15.8	70.5	32.0

TABLE A4.9

Context: Store Choice for Individual Brands.
Product/Region: Instant Coffee, Region I.
Measure(s): Store Share (%).

	Store					
	X	OM	Y	Ms	Z	Ave
Brand C1	48	18	10	6	18	
Brand C2	31	26	26	11	6	
Brand C3	27	28	24	10	11	
O Brands	22	26	13	32	6	
Brand C4	28	30	25	14	2	
Average	31	26	20	15	9	20
MD	6.6	2.8	6.4	7.2	4.8	5.6
MD/Ave %	21.3	10.8	32.0	48.0	53.3	33.1

TABLE A4.10

Context: Store Choice for Individual Brands.
Product/Region: Automatic Washing Powder, Region II.
Measure(s): Store Share (%).

	Store					
	V	OM	W	Z	Y	Ave
Brand A1	37	15	15	14	10	
Brand A4	31	15	17	16	12	
Brand A2	37	13	13	11	14	
Brand A5	41	16	23	7	3	
Brand A3	--	33	--	24	39	
Average	37	18	17	14	16	20
MD	2.7	5.8	3.1	4.6	9.3	5.1
MD/Ave %	7.4	32.1	18.5	31.8	59.7	29.9

TABLE A4.11

Context: Store Choice for Individual Brands.
Product/Region: Tea Bags, Region II.
Measure(s): Store Share (%).

	Store					
	V	Z	OM	Y	W	Ave
Brand B1	--	45	21	13	10	
Brand B2	35	10	17	17	9	
O Brands	40	9	21	6	9	
Brand B3	11	19	26	11	11	
Brand B4	56	6	15	6	5	
Average	35	18	20	11	9	19
MD	12.7	11.6	3.0	3.6	1.5	6.5
MD/Ave %	36.0	64.5	14.9	34.3	16.5	33.2

TABLE A4.12

Context: Store Choice for Individual Brands.
Product/Region: Instant Coffee, Region II.
Measure(s): Store Share (%).

	Store					
	V	OM	Z	W	Y	Ave
Brand C2	35	18	12	13	12	
O Brands	42	14	7	12	8	
Brand C1	--	25	45	11	10	
Brand C3	--	32	24	18	14	
Brand C4	28	7	23	10	25	
Average	35	19	22	13	14	21
MD	4.6	7.3	10.3	2.3	4.7	5.8
MD/Ave %	13.2	38.6	46.1	18.0	34.2	30.0

TABLE A4.13

Context:	Brand Choice Within Individual Stores.
Product/Region:	Automatic Washing Powder, Region I.
Measure(s):	Relative Penetration (i.e. penetration of the brand among product buyers at the store) (%).

	Brand					
	A1	A2	A3	A4	A5	Ave
Store X	52	33	30	21	18	
O Mltps	50	34	25	21	18	
Store Y	51	37	31	23	15	
Misclns	43	31	13	23	16	
Store Z	44	40	24	22	18	
Average	48	35	25	22	17	29
MD	3.6	2.8	4.9	0.8	1.2	2.7
MD/Ave (%)	7.5	8.0	19.8	3.6	7.1	9.2

Notes:
- E.g. 52% of automatic washing powder buyers at Store X buy Brand A1.

TABLE A4.14

Context:	Brand Choice Within Individual Stores.
Product/Region:	Tea Bags, Region I.
Measure(s):	Relative Penetration (i.e. penetration of the brand among product buyers at the store) (%).

	Brand					
	B1	B2	OB	B3	B4	Ave
Store X	68	30	32	14	9	
O Mltps	34	45	45	23	17	
Misclns	36	33	47	19	15	
Store Y	35	51	39	23	15	
Store Z	78	26	14	18	8	
Average	50	37	35	19	13	31
MD	18.2	8.8	9.9	2.9	3.4	8.7
MD/Ave (%)	36.3	23.8	28.0	14.8	26.9	26.0

TABLE A4.15

Context: Brand Choice Within Individual Stores.
Product/Region: Instant Coffee, Region I.
Measure(s): Relative Penetration (i.e. penetration of the brand among product buyers at the store) (%).

	Brand					
	C1	C2	C3	OB	C4	Ave
Store X	59	38	22	18	12	
O Mltps	37	41	26	27	16	
Store Y	34	49	30	16	14	
Misclns	31	37	22	38	10	
Store Z	56	29	28	11	6	
Average	43	39	26	22	12	28
MD	11.3	5.0	2.9	8.4	2.9	6.1
MD/Ave (%)	26.0	12.8	11.3	38.2	24.8	22.6

TABLE A4.16

Context: Brand Choice Within Individual Stores.
Product/Region: Automatic Washing Powder, Region II.
Measure(s): Relative Penetration (i.e. penetration of the brand among product buyers at the store) (%).

	Brand					
	A1	A4	A2	A5	A3	Ave
Store V	53	28	29	34	--	
O Mltps	39	26	20	25	26	
Store W	51	34	30	27	--	
Store Z	43	34	23	20	29	
Store Y	41	27	27	9	44	
Average	45	30	26	23	33	31
MD	5.3	3.4	3.4	6.8	7.3	5.2
MD/Ave (%)	11.6	11.3	13.3	29.6	22.2	17.6

TABLE A4.17

Context: Brand Choice Within Individual Stores.
Product/Region: Tea Bags, Region II.
Measure(s): Relative Penetration (i.e. penetration of the brand among product buyers at the store) (%).

	Brand					
	B1	B2	OB	B3	B4	Ave
Store V	--	54	54	20	45	
Store Z	72	28	23	20	14	
O Mltps	36	45	41	28	22	
Store Y	43	49	27	20	18	
Store W	31	42	39	26	17	
Average	46	44	37	23	23	34
MD	13.3	6.9	9.4	3.4	8.7	8.3
MD/Ave (%)	29.1	15.8	25.7	14.7	37.6	24.6

TABLE A4.18

Context: Brand Choice Within Individual Stores.
Product/Region: Instant Coffee, Region II.
Measure(s): Relative Penetration (i.e. penetration of the brand among product buyers at the store) (%).

	Brand					
	C2	OB	C1	C3	C4	Ave
Store V	66	52	--	--	6	
O Mltps	53	30	36	25	3	
Store Z	45	19	51	22	6	
Store W	49	37	24	25	7	
Store Y	53	25	35	25	11	
Average	53	33	37	24	7	31
MD	5.1	9.5	7.3	1.1	1.9	5.0
MD/Ave (%)	9.6	29.2	19.9	4.6	29.1	18.5

TABLE A4.19

Context:	Store Choice for Individual Brands.
Product/Region:	Automatic Washing Powder, Region I.
Measure(s):	Relative Penetration (i.e. penetration of the store among buyers of the brand) (%).

	Store					
	X	OM	Y	Ms	Z	Ave
Brand A1	47	40	32	24	13	
Brand A2	41	37	32	24	16	
Brand A3	47	33	33	13	12	
Brand A4	38	33	29	26	13	
Brand A5	44	38	24	23	14	
Average	43	36	30	22	14	29
MD	3.1	2.6	2.8	3.6	1.1	2.6
MD/Ave (%)	7.2	7.1	9.3	16.4	8.2	9.6

Notes:
- E.g. 47% of Brand A1 buyers buy that brand (at least once) at Store X; 41% of Brand A2 buyers buy that brand at Store X; etc.

TABLE A4.20

Context:	Store Choice for Individual Brands.
Product/Region:	Tea Bags, Region I.
Measure(s):	Relative Penetration (i.e. penetration of the store among buyers of the brand) (%).

	Store					
	X	OM	Ms	Y	Z	Ave
Brand B1	55	22	23	17	24	
Brand B2	34	41	29	35	11	
O Brands	33	37	39	24	6	
Brand B3	28	37	30	28	13	
Brand B4	23	35	30	23	8	
Average	35	34	30	25	12	27
MD	8.2	5.0	3.5	4.9	4.9	5.3
MD/Ave (%)	23.6	14.4	11.7	19.2	39.4	21.6

TABLE A4.21

Context:	Store Choice for Individual Brands.
Product/Region:	Instant Coffee, Region I.
Measure(s):	Relative Penetration (i.e. penetration of the store among buyers of the brand) (%).

	Store					
	X	OM	Y	Ms	Z	Ave
Brand C1	56	29	20	20	18	
Brand C2	43	38	35	28	11	
Brand C3	39	37	33	27	17	
O Brands	29	37	16	42	6	
Brand C4	41	46	31	22	7	
Average	42	37	27	28	12	29
MD	6.3	3.7	7.2	5.8	4.6	5.5
MD/Ave (%)	15.2	9.8	26.7	20.7	38.6	22.2

TABLE A4.22

Context:	Store Choice for Individual Brands.
Product/Region:	Automatic Washing Powder, Region II.
Measure(s):	Relative Penetration (i.e. penetration of the store among buyers of the brand) (%).

	Store					
	V	OM	W	Z	Y	Ave
Brand A1	41	27	28	24	17	
Brand A4	35	29	31	32	18	
Brand A2	34	22	26	20	17	
Brand A5	45	30	26	20	7	
Brand A3	--	38	--	34	38	
Average	39	29	28	26	19	28
MD	4.3	3.8	1.8	5.6	7.4	4.6
MD/Ave (%)	11.0	13.2	6.3	21.5	38.4	18.1

TABLE A4.23

Context:	Store Choice for Individual Brands.
Product/Region:	Tea Bags, Region II.
Measure(s):	Relative Penetration (i.e. penetration of the store among buyers of the brand) (%).

	Store					
	V	Z	OM	Y	W	Ave
Brand B1	--	54	27	19	15	
Brand B2	42	21	33	22	21	
O Brands	42	17	30	12	19	
Brand B3	24	23	32	14	20	
Brand B4	53	16	24	12	13	
Average	40	26	29	16	18	26
MD	8.1	11.1	3.0	3.8	2.9	5.8
MD/Ave (%)	20.2	42.4	10.1	23.8	16.4	22.6

TABLE A4.24

Context:	Store Choice for Individual Brands.
Product/Region:	Instant Coffee, Region II.
Measure(s):	Relative Penetration (i.e. penetration of the store among buyers of the brand) (%).

	Store					
	V	OM	Z	W	Y	Ave
Brand C2	43	37	28	21	20	
O Brands	41	26	14	19	11	
Brand C1	--	35	44	14	18	
Brand C3	--	40	32	25	21	
Brand C4	28	16	25	21	29	
Average	37	31	29	20	20	27
MD	6.2	7.8	7.5	2.8	4.2	5.7
MD/Ave (%)	16.7	25.5	26.3	14.0	21.4	20.8

TABLE A4.25

Context: Brand-Store Combinations.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Market Shares (%): Observed and Theoretical.

		Brand					
		A1	A2	A3	A4	A5	SC MS
Store X	O	13.1	7.5	5.4	4.0	4.4	36.7
	T	10.7	8.1	5.1	5.9	3.6	
O Mltps	O	7.6	4.4	4.0	3.0	2.3	22.9
	T	6.7	5.0	3.2	3.7	2.2	
Store Y	O	5.4	5.6	3.9	3.5	1.4	21.4
	T	6.3	4.7	3.0	3.4	2.1	
Misclns	O	2.9	2.4	0.8	2.2	0.9	10.1
	T	2.9	2.2	1.4	1.6	1.0	
Store Z	O	2.2	1.9	1.1	1.8	1.0	8.9
	T	2.6	2.0	1.3	1.4	0.9	
BC Mkt Shr		29.2	22.0	14.0	16.1	9.7	

Notes:
- BC Mkt Shr = brand share at whole-market level
- SC MS = store share at whole-market level
- The theoretical predictions are obtained by multiplying brand share (at the whole-market level) by store share (at the whole-market level).

TABLE A4.26

Context:	Brand-Store Combinations.
Product/Region:	Tea Bags, Region I.
Measure(s):	Market Shares (%): Observed and Theoretical.

		Brand					
		B1	B2	OB	B3	B4	SC MS
Store X	O	19.8	6.1	5.0	2.4	0.9	34.2
	T	14.5	7.7	7.2	3.1	1.7	
O Mltps	O	4.0	6.7	5.7	2.8	1.6	20.8
	T	8.8	4.7	4.4	1.9	1.0	
Misclns	O	5.0	4.3	5.6	1.6	1.2	7.7
	T	7.5	4.0	3.7	1.6	0.9	
Store Y	O	4.7	4.4	4.2	1.8	1.1	16.2
	T	6.9	3.6	3.4	1.5	0.8	
Store Z	O	8.9	1.1	0.4	0.6	0.2	11.1
	T	4.7	2.5	2.3	1.0	0.5	
BC Mkt Shr		42.5	22.5	21.0	9.2	4.9	

Notes:
- BC Mkt Shr = brand share at whole-market level
- SC MS = store share at whole-market level

TABLE A4.27

Context: Brand-Store Combinations.
Product/Region: Instant Coffee, Region I.
Measure(s): Market Shares (%): Observed and Theoretical.

		Brand					
		C1	C2	C3	OB	C4	SC MS
Store X	O	16.7	8.3	3.9	2.9	2.2	35.2
	T	12.3	9.3	5.0	4.6	2.8	
O Mltps	O	6.1	7.0	4.0	3.5	2.4	24.2
	T	8.4	6.4	3.4	3.2	1.9	
Store Y	O	3.6	6.9	3.4	1.7	2.0	18.1
	T	6.3	4.8	2.5	2.4	1.4	
Misclns	O	2.2	2.8	1.4	4.2	1.1	12.2
	T	4.3	3.2	1.7	1.6	1.0	
Store Z	O	6.2	1.5	1.5	0.8	0.2	10.4
	T	3.6	2.7	1.5	1.4	0.8	
BC Mkt Shr		34.9	26.5	14.1	13.1	7.9	

Notes:
- BC Mkt Shr = brand share at whole-market level
- SC MS = store share at whole-market level

TABLE A4.28

Context:	Brand-Store Combinations.
Product/Region:	Automatic Washing Powder, Region II.
Measure(s):	Market Shares (%): Observed and Theoretical.

		Brand A1	A4	A2	A5	A3	SC MS
Store V	O	11.0	5.6	5.4	6.0	---	32.6
	T	10.5	6.8	5.0	4.9	8.8	
O Mltps	O	4.4	2.6	1.9	2.3	3.5	16.1
	T	5.2	3.4	2.5	2.4	4.4	
Store W	O	4.3	3.0	1.9	3.3	---	14.2
	T	4.8	3.1	2.3	2.2	4.0	
Store Z	O	4.1	2.9	1.6	1.0	2.5	13.9
	T	4.2	2.7	2.0	1.9	3.5	
Store Y	O	3.0	2.2	2.0	0.5	4.1	12.7
	T	4.5	2.9	2.1	2.1	3.8	
BC Mkt Shr		29.7	17.9	14.7	14.5	10.6	

Notes:
- BC Mkt Shr = brand share at whole-market level
- SC MS = store share at whole-market level

TABLE A4.29

Context: Brand-Store Combinations.
Product/Region: Tea Bags, Region II.
Measure(s): Market Shares (%): Observed and Theoretical.

		Brand					
		B1	B2	OB	B3	B4	SC MS
Store V	O	---	9.1	8.3	1.4	7.3	35.3
	T	13.2	9.7	6.7	4.4	3.9	
Store Z	O	12.2	2.7	1.8	2.5	0.8	17.9
	T	6.7	4.9	3.4	2.2	2.0	
O Mltps	O	5.7	4.6	4.3	3.4	2.0	20.1
	T	7.5	5.5	3.8	2.5	2.2	
Store Y	O	3.5	4.5	1.3	1.4	0.8	10.6
	T	4.0	2.9	2.0	1.3	1.2	
Store W	O	2.6	2.4	1.9	1.4	0.7	8.8
	T	3.3	2.4	1.7	1.1	1.0	
BC Mkt Shr		37.3	27.5	19.1	12.5	11.1	

Notes:
- BC Mkt Shr = brand share at whole-market level
- SC MS = store share at whole-market level

TABLE A4.30

Context: Brand-Store Combinations.
Product/Region: Instant Coffee, Region II.
Measure(s): Market Shares (%): Observed and Theoretical.

		Brand C2	OB	C1	C3	C4	SC MS
Store V	O	13.6	9.8	---	---	0.9	35.0
	T	13.7	7.2	9.9	5.2	1.3	
O Mltps	O	6.9	3.2	5.2	3.5	0.2	18.9
	T	7.4	3.9	5.3	2.8	0.7	
Store Z	O	4.5	1.7	9.7	2.6	0.8	22.3
	T	8.7	4.6	6.3	3.3	0.8	
Store W	O	5.2	2.7	2.3	2.0	0.3	12.9
	T	5.0	2.6	3.6	1.9	0.5	
Store Y	O	4.6	1.8	2.1	1.5	0.8	13.7
	T	5.4	2.8	3.9	2.0	0.5	
BC Mkt Shr		39.1	20.4	28.2	14.9	3.7	

Notes:
- BC Mkt Shr = brand share at whole-market level
- SC MS = store share at whole-market level

TABLE A4.31

Context: Brand-Store Combinations.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Penetration (%): Observed and Theoretical.

		Brand					
		A1	**A2**	**A3**	**A4**	**A5**	SC b
Store X	O	22.5	14.2	13.2	9.0	8.0	43.5
	T	20.8	15.0	12.3	10.3	7.9	
O Mltps	O	19.0	12.7	9.3	7.9	6.9	37.7
	T	18.0	13.0	10.6	8.9	6.9	
Store Y	O	15.4	11.0	9.4	6.9	4.4	30.2
	T	14.4	10.4	8.5	7.1	5.5	
Misclns	O	11.4	8.2	3.5	6.3	4.2	26.7
	T	12.8	9.2	7.5	6.3	4.9	
Store Z	O	6.3	5.6	3.4	3.1	2.5	14.1
	T	6.8	4.9	4.0	3.3	2.6	
BC b		47.9	34.5	28.2	23.7	18.2	

Notes:
- BC b = brand penetration at whole-market level
- SC b = store penetration at whole-market level
- The theoretical predictions are obtained by multiplying brand penetration (at the whole-market level) by store penetration (at the whole-market level).

TABLE A4.32

Context: Brand-Store Combinations.
Product/Region: Tea Bags, Region I.
Measure(s): Penetration (%): Observed and Theoretical.

		Brand					
		B1	B2	OB	B3	B4	SC b
Store X	O	29.4	12.9	13.7	6.0	3.8	43.3
	T	23.0	16.4	17.9	9.3	7.2	
O Mltps	O	11.6	15.5	15.5	8.0	5.8	34.5
	T	18.3	13.1	14.2	7.4	5.7	
Misclns	O	12.3	11.2	15.9	6.5	5.0	33.9
	T	18.0	12.8	14.0	7.3	5.6	
Store Y	O	9.1	13.2	9.9	6.0	3.9	25.7
	T	13.7	9.7	10.6	5.5	4.2	
Store Z	O	12.5	4.2	2.3	2.8	1.3	16.0
	T	8.5	6.1	6.6	3.4	2.6	
BC b		53.1	37.9	41.3	21.4	16.5	

Notes:
- BC b = brand penetration at whole-market level
- SC b = store penetration at whole-market level

TABLE A4.33

Context:	Brand-Store Combinations.
Product/Region:	Instant Coffee, Region I.
Measure(s):	Penetration (%): Observed and Theoretical.

		Brand					
		C1	C2	C3	OB	C4	SC b
Store X	O	29.5	19.1	10.9	9.1	6.0	50.3
	T	26.5	22.1	14.2	15.6	7.4	
O Mltps	O	15.4	16.8	10.6	11.4	6.8	41.4
	T	21.9	18.2	11.7	12.8	6.1	
Store Y	O	10.7	15.5	9.3	5.0	4.6	31.5
	T	16.6	13.9	8.9	9.7	4.7	
Misclns	O	10.5	12.3	7.5	12.9	3.2	33.5
	T	17.7	14.7	9.5	10.3	4.9	
Store Z	O	9.7	5.0	4.8	1.9	1.0	17.2
	T	9.1	7.6	4.9	5.3	2.5	
BC b		52.8	44.0	28.3	30.9	14.8	

Notes:
- BC b = brand penetration at whole-market level
- SC b = store penetration at whole-market level

TABLE A4.34

Context: Brand-Store Combinations.
Product/Region: Automatic Washing Powder, Region II.
Measure(s): Penetration (%): Observed and Theoretical.

		Brand					
		A1	A4	A2	A5	A3	SC b
Store V	O	17.7	9.2	9.7	11.3	---	33.4
	T	14.4	8.8	9.4	8.3	6.9	
O Mltps	O	11.7	7.7	6.1	7.4	7.9	29.9
	T	12.9	7.9	8.4	7.5	6.2	
Store W	O	12.2	8.3	7.2	6.5	---	24.1
	T	10.4	6.4	6.8	6.0	5.0	
Store Z	O	10.4	8.4	5.5	4.9	7.0	24.3
	T	10.5	6.4	6.8	6.1	5.0	
Store Y	O	7.3	4.8	4.9	1.7	7.9	18.0
	T	7.7	4.8	5.1	4.5	3.7	
BC b		43.1	26.5	28.1	24.9	20.7	

Notes:
- BC b = brand penetration at whole-market level
- SC b = store penetration at whole-market level

TABLE A4.35

Context: Brand-Store Combinations.
Product/Region: Tea Bags, Region II.
Measure(s): Penetration (%): Observed and Theoretical.

		Brand					
		B1	B2	OB	B3	B4	SC b
Store V	O	---	19.9	20.1	7.4	16.8	37.1
	T	17.5	17.5	17.8	11.5	11.7	
Store Z	O	25.3	9.9	8.1	7.2	4.9	35.3
	T	16.6	16.6	17.0	10.9	11.1	
O Mltps	O	12.6	15.7	14.3	9.8	7.7	35.1
	T	16.5	16.5	16.9	10.8	11.0	
Store Y	O	9.1	10.4	5.6	4.3	3.7	21.1
	T	9.9	9.9	10.1	6.5	6.6	
Store W	O	7.2	9.7	9.2	6.1	4.0	23.4
	T	11.0	11.0	11.2	7.2	7.3	
BC b		47.1	47.1	48.0	30.9	31.4	

Notes:
- BC b = brand penetration at whole-market level
- SC b = store penetration at whole-market level

TABLE A4.~~37~~ 36

Context: Brand-Store Combinations.
Product/Region: Instant Coffee, Region II.
Measure(s): Penetration (%): Observed and Theoretical.

		Brand					
		C2	OB	C1	C3	C4	SC b
Store V	O	24.4	19.2	---	---	2.3	37.0
	T	21.0	17.5	15.0	9.2	3.0	
O Mltps	O	21.1	12.1	14.3	9.8	1.3	39.9
	T	22.6	18.9	16.2	9.9	3.2	
Store Z	O	15.8	6.7	18.0	7.9	2.0	35.3
	T	20.0	16.7	14.3	8.8	2.9	
Store W	O	12.0	9.0	5.9	6.1	1.7	24.4
	T	13.8	11.6	9.9	6.1	2.0	
Store Y	O	11.3	5.3	7.4	5.3	2.4	21.1
	T	11.9	10.0	8.6	5.2	1.7	
BC b		56.7	47.3	40.6	24.8	8.1	

Notes:
- BC b = brand penetration at whole-market level
- SC b = store penetration at whole-market level

Appendix 5

Detailed Results for Chapter 10:

BRAND CHOICE WITHIN INDIVIDUAL STORES.

TABLE A5.1
Context: Brand Choice Within Individual Stores.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Various.

Str/Brnd	s	MS (%)	b (%) O	b (%) D	w O	w D
Store X						
A1	0.64	36	23	23	5.1	4.9
A2	0.63	21	14	15	4.6	4.4
A3	1.39	15	13	11	3.5	4.2
A5	0.44	12	8	9	4.8	4.1
A4	0.91	11	9	9	3.9	4.1
Ave	0.76	19	13	13	4.4	4.3
O Mltps						
A1	1.06	33	19	19	3.5	3.5
A2	1.31	19	13	12	3.0	3.2
A3	0.51	17	9	11	3.7	3.2
A4	0.74	13	8	8	3.3	3.1
A5	1.09	10	7	7	2.9	3.0
Ave	0.97	18	11	11	3.3	3.2
Store Y						
A2	0.53	26	11	14	4.4	3.5
A1	3.47	25	15	13	3.0	3.5
A3	1.02	18	9	10	3.6	3.3
A4	0.45	16	7	9	4.3	3.2
A5	1.69	7	4	4	2.8	2.9
Ave	1.50	18	9	10	3.6	3.3
Misclns						
A1	1.97	27	11	10	2.2	2.4
A2	0.62	23	8	9	2.6	2.3
A4	0.21	21	6	8	3.0	2.3
A5	1.67	9	4	4	2.0	2.1
A3	1.26	8	4	3	2.1	2.1
Ave	1.11	17	7	7	2.4	2.2
Store Z						
A1	1.86	25	6	6	3.1	3.3
A2	1.86	21	6	5	3.0	3.2
A4	0.14	20	3	5	5.0	3.1
A3	1.79	12	3	3	2.7	2.9
A5	0.78	11	3	3	3.3	2.9
Ave	1.33	18	4	4	3.4	3.1
Ovrl Ave	1.12	18	9	9	3.4	3.2

TABLE A5.2

Context: Brand Choice Within Individual Stores.

Product/Region: Automatic Washing Powder, Region I.

Measure(s): Various.

Str/Brnd	wp		w/wp (%)		bs/b (%)		ws	
	O	D	O	D	O	D	O	D
Store X								
A1	8.8	8.9	58	55	43	40	5.2	4.1
A2	9.4	9.4	49	46	35	32	3.4	3.6
A3	8.3	9.6	43	43	31	30	3.2	3.4
A5	9.9	9.8	48	42	26	29	3.9	3.3
A4	10.5	9.8	37	42	25	28	5.0	3.3
Ave	9.4	9.5	47	46	32	32	4.1	3.5
O Mltpls								
A1	6.0	6.7	58	53	47	39	3.4	2.9
A2	7.1	7.1	42	45	33	32	2.5	2.6
A3	8.0	7.2	46	44	27	31	3.8	2.5
A4	7.3	7.3	45	42	25	30	2.8	2.4
A5	8.5	7.4	34	41	26	29	1.7	2.4
Ave	7.4	7.1	45	45	32	32	2.8	2.6
Store Y								
A2	9.1	8.5	48	41	33	27	4.0	2.3
A1	6.7	8.6	45	41	42	27	.3.5	2.2
A3	8.6	8.9	42	37	23	24	2.6	2.1
A4	10.3	9.1	42	35	26	23	4.5	2.0
A5	8.3	9.7	34	30	26	20	2.0	1.8
Ave	8.6	9.0	42	37	30	24	3.3	2.1
Misclns								
A1	3.8	4.4	58	54	59	44	2.0	2.0
A2	4.7	4.5	54	51	49	42	2.5	2.0
A4	5.4	4.6	56	50	38	41	3.5	1.9
A5	4.4	4.8	45	44	41	36	2.4	1.8
A3	5.6	4.8	37	44	45	36	2.1	1.8
Ave	4.8	4.6	50	49	46	40	2.5	1.9
Store Z								
A1	7.0	7.5	44	43	51	31	2.4	2.2
A2	7.2	7.7	41	41	47	29	1.2	2.1
A4	11.3	7.7	44	40	22	29	1.7	2.1
A3	8.4	8.1	32	36	37	25	4.2	1.9
A5	8.4	8.2	40	35	27	25	1.0	1.9
Ave	8.4	7.8	40	39	37	28	2.1	2.1
Ovrl Ave	7.7	7.6	45	43	35	31	3.0	2.4

TABLE A5.3

Context: Brand Choice within Store X.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Purchase Frequency Distribution.

Buyers of:		% Making X Purchases of the Brand: 1	2	3	4	5	6	7	8+
Brand A1	O	33	19	8	8	6	5	2	21
	D	35	17	10	7	5	4	3	19
Brand A2	O	40	19	7	3	6	2	2	19
	D	39	17	10	7	5	3	3	17
Brand A3	O	35	20	16	6	8	3	1	12
	D	40	17	10	6	4	4	3	16
Brand A5	O	44	14	3	11	3	6	3	16
	D	41	17	10	6	4	3	3	15
Brand A4	O	41	18	9	6	3	5	3	17
	D	41	18	9	7	5	4	2	14
Average	O	39	18	9	7	5	4	2	17
	D	39	17	10	7	5	4	3	16

TABLE A5.4

Context: Brand Choice within Other Multiples.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Purchase Frequency Distribution.

Buyers of:		% Making X Purchases of the Brand:							
		1	2	3	4	5	6	7	8+
Brand A1	O	43	15	11	8	4	2	4	13
	D	42	18	11	7	5	4	3	11
Brand A2	O	54	16	7	7	3	1	4	9
	D	45	19	10	7	4	3	3	9
Brand A3	O	48	17	9	5	5	2	4	11
	D	46	18	10	6	5	3	3	9
Brand A4	O	49	13	6	4	9	7	1	10
	D	48	18	10	6	5	4	2	8
Brand A5	O	53	16	7	10	5	5	0	5
	D	48	18	10	6	4	3	1	9
Average	O	49	15	8	7	5	3	3	10
	D	46	18	10	6	5	3	2	9

TABLE A5.5

Context: Brand Choice within Store Y.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Purchase Frequency Distribution.

Buyers of:		% Making X Purchases of the Brand:							
		1	2	3	4	5	6	7	8+
Brand A2	O	32	21	14	7	5	5	3	12
	D	44	18	10	7	4	4	2	11
Brand A1	O	44	24	9	4	4	2	2	11
	D	44	18	10	7	4	3	2	11
Brand A3	O	47	18	7	6	1	2	4	15
	D	46	18	10	6	4	3	2	11
Brand A4	O	39	16	10	8	2	8	3	13
	D	47	18	10	6	4	3	2	9
Brand A5	O	67	10	0	3	3	5	3	10
	D	51	19	9	5	5	2	2	7
Average	O	46	18	8	6	3	4	3	12
	D	47	18	10	6	4	3	2	10

TABLE A5.6

Context: Brand Choice within Miscellaneous.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Purchase Frequency Distribution.

Buyers of:		% Making X Purchases of the Brand:							
		1	2	3	4	5	6	7	8+
Brand A1	O	49	26	11	5	2	4	0	3
	D	54	19	10	6	4	2	1	5
Brand A2	O	51	18	8	4	8	1	4	4
	D	54	20	10	6	3	2	1	4
Brand A4	O	58	13	7	7	4	2	2	7
	D	55	19	10	5	4	2	1	4
Brand A5	O	60	16	11	3	5	5	0	0
	D	57	18	8	5	3	3	0	6
Brand A3	O	55	13	16	3	13	0	0	0
	D	58	17	9	6	3	3	0	4
Average	O	55	17	11	4	6	2	1	3
	D	56	19	9	5	3	2	1	5

TABLE A5.7

Context: Brand Choice within Store Z.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Purchase Frequency Distribution.

Buyers of:		% Making X Purchases of the Brand:							
		1	2	3	4	5	6	7	8+
Brand A1	O	44	20	9	11	2	2	6	7
	D	46	19	10	7	5	3	2	8
Brand A2	O	59	18	2	2	2	0	10	6
	D	48	17	10	6	4	4	2	10
Brand A4	O	41	15	7	7	11	0	7	11
	D	47	18	10	6	4	2	2	10
Brand A3	O	70	10	0	3	3	0	0	13
	D	50	19	9	6	3	3	3	5
Brand A5	O	73	18	0	0	0	0	0	9
	D	52	17	10	7	3	3	3	3
Average	O	57	16	4	5	4	0	5	9
	D	49	18	10	6	4	3	2	7

TABLE A5.8

Context: Brand Choice within Store X.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Duplication.

Buyers of:	% also buying:				
	A1	A2	A3	A5	A4
Brand A1	--	26	21	15	16
Brand A2	41	--	19	14	17
Brand A3	37	20	--	20	19
Brand A5	42	25	34	--	17
Brand A4	40	27	29	15	--
Average	40	25	26	16	17
D x rltv b	42	26	24	15	17
D = 0.80					
Relative b *	52	33	30	18	21

Notes:
* Relative b (rltv b) is the penetration of the brand among buyers of the product field at the store.
- D is calculated using relative penetration.

TABLE A5.9

Context: Brand Choice within Other Multiples.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Duplication.

Buyers of:	% also buying:				
	A1	A2	A3	A4	A5
Brand A1	--	22	19	14	16
Brand A2	33	--	25	19	13
Brand A3	40	34	--	15	21
Brand A4	36	31	18	--	20
Brand A5	44	24	29	22	--
Average	38	28	23	18	18
D x rltv b	42	28	21	17	15
D = 0.83					
Relative b *	50	34	25	21	18

Notes:
* Relative b (rltv b) is the penetration of the brand among buyers of the product field at the store.
- D is calculated using relative penetration.

TABLE A5.10

Context: Brand Choice within Store Y.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Duplication.

Buyers of:	% also buying:				
	A2	**A1**	**A3**	**A4**	**A5**
Brand A2	--	41	31	23	13
Brand A1	29	--	29	16	14
Brand A3	37	48	--	24	20
Brand A4	37	36	32	--	11
Brand A5	33	48	43	17	--
Average	34	43	34	20	15
D x rltv b	34	47	29	21	14
D = 0.93					
Relative b *	37	51	31	23	15

Notes:
* Relative b (rltv b) is the penetration of the brand among buyers of the product field at the store.
- D is calculated using relative penetration.

TABLE A5.11

Context: Brand Choice within Miscellaneous.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Duplication.

Buyers of:	% also buying:				
	A1	**A2**	**A4**	**A5**	**A3**
Brand A1	--	18	16	10	8
Brand A2	26	--	22	11	13
Brand A4	30	29	--	12	10
Brand A5	29	21	18	--	13
Brand A3	29	32	19	16	--
Average	29	25	19	12	11
D x rltv b	32	23	18	12	10
D = 0.76					
Relative b *	43	31	23	16	13

Notes:
* Relative b (rltv b) is the penetration of the brand among buyers of the product field at the store.
- D is calculated using relative penetration.

TABLE A5.12

Context: Brand Choice within Store Z.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Duplication.

Buyers of:	% also buying:				
	A1	A2	A4	A3	A5
Brand A1	--	29	19	21	14
Brand A2	32	--	26	12	12
Brand A4	40	48	--	22	14
Brand A3	39	19	19	--	29
Brand A5	36	27	18	40	--
Average	37	31	21	24	17
D x rltv b	39	35	19	21	16
D = 0.87					
Relative b *	44	40	22	24	18

Notes:
* Relative b (rltv b) is the penetration of the brand among buyers of the product field at the store.
- D is calculated using relative penetration.

TABLE A5.13
Context: Brand Choice Within Individual Stores.
Product/Region: Tea Bags, Region I.
Measure(s): Various.

Str/Brnd	s	MS (%)	b (%) O	b (%) D	w O	w D
Store X						
B1	0.34	58	29	32	6.1	5.7
B2	0.75	18	13	12	4.3	4.4
OB	1.74	15	14	11	3.3	4.3
B3	1.01	7	6	5	3.6	4.1
B4	4.00	3	4	2	2.2	4.0
Ave	S= 0.67 excl B4	20	13	12	3.9	4.5
O Mltpls						
B2	0.64	32	15	17	3.9	3.6
OB	1.23	27	15	15	3.3	3.5
B1	1.17	19	12	11	3.1	3.3
B3	0.93	13	8	8	3.2	3.1
B4	1.86	8	6	5	2.5	3.0
Ave	S= 0.97 excl B4	20	11	11	3.2	3.3
Misclns						
OB	1.11	32	16	15	3.1	3.3
B1	0.44	28	12	14	3.6	3.2
B2	0.53	24	11	12	3.4	3.1
B3	2.15	9	6	5	2.2	2.8
B4	2.28	7	5	4	2.1	2.8
Ave	S= 0.84 excl B4	20	10	10	2.9	3.0
Store Y						
B1	0.25	29	9	12	4.7	3.4
B2	2.90	27	13	12	3.0	3.4
OB	0.71	26	10	11	3.8	3.3
B3	1.93	11	6	6	2.7	2.9
B4	1.92	7	4	4	2.5	2.8
Ave	S= 1.38	20	8	9	3.3	3.2
Store Z						
B1	0.40	80	13	15	6.4	5.5
B2	4.99	10	4	3	2.3	2.9
B3	7.21	5	3	2	1.9	2.8
OB	15.51	4	2	1	1.6	2.7
B4	54.10	1	1	1	1.1	2.6
Ave	S= 1.75 excl B4	20	5	4	2.7	3.3
Ovrl Ave	4.40	20	9	9	3.2	3.5

TABLE A5.14
Context: Brand Choice Within Individual Stores.
Product/Region: Tea Bags, Region I.
Measure(s): Various.

Str/Brnd	wp		w/wp (%)		bs/b (%)		ws	
	O	D	O	D	O	D	O	D
Store X								
B1	7.8	8.1	78	70	59	57	6.1	5.1
B2	9.0	9.4	48	47	36	34	4.6	3.7
OB	8.6	9.5	38	45	27	32	2.2	3.6
B3	11.4	9.8	32	42	17	29	2.7	3.4
B4	10.2	9.9	22	40	15	28	1.0	3.2
Ave	9.4	9.3	44	49	31	36	3.3	3.8
O Mltps								
B2	6.7	6.9	58	52	42	39	4.9	2.9
OB	6.6	7.0	50	50	39	36	3.2	2.8
B1	6.1	7.3	51	45	40	32	2.5	2.6
B3	7.7	7.5	42	41	23	30	3.0	2.4
B4	8.2	7.7	30	39	16	28	1.8	2.3
Ave	7.1	7.3	46	46	32	33	3.1	2.6
Misclns								
OB	6.2	5.9	50	56	49	44	1.8	2.8
B1	6.6	6.0	55	53	56	42	3.3	2.7
B2	7.4	6.1	46	51	38	40	1.6	2.6
B3	7.3	6.5	30	43	28	34	1.1	2.4
B4	8.3	6.6	25	42	27	33	1.8	2.3
Ave	7.2	6.2	41	49	40	39	1.9	2.6
Store Y								
B1	8.0	7.6	59	45	40	31	5.3	2.4
B2	6.0	7.7	50	44	51	30	2.8	2.3
OB	7.8	7.7	49	43	30	30	2.7	2.3
B3	9.1	8.4	30	35	17	24	1.8	1.9
B4	8.6	8.6	29	33	29	22	1.3	1.9
Ave	7.9	8.0	43	40	33	27	2.8	2.2
Store Z								
B1	7.1	6.7	90	82	66	68	4.6	4.5
B2	9.8	10.1	23	29	32	20	1.7	1.7
B3	9.4	10.4	20	27	24	18	1.5	1.6
OB	7.7	10.6	21	25	30	18	1.7	1.6
B4	12.2	10.8	9	24	0	17	0.0	1.6
Ave	9.2	9.7	33	37	30	28	1.9	2.2
Ovrl Ave	8.2	8.1	41	44	33	33	2.6	2.7

TABLE A5.15

Context: Brand Choice within Store X.
Product/Region: Tea Bags, Region I.
Measure(s): Purchase Frequency Distribution.

Buyers of:		% Making X Purchases of the Brand: 1	2	3	4	5	6	7	8+
Brand B1	O	29	15	9	6	5	3	4	29
	D	31	16	10	7	5	4	3	22
Brand B2	O	44	12	12	4	4	4	1	19
	D	39	17	10	6	5	4	3	15
O Brands	O	49	15	15	3	2	3	2	12
	D	40	17	10	7	5	4	3	14
Brand B3	O	43	25	6	0	11	4	0	11
	D	42	17	9	6	4	4	2	17
Brand B4	O	70	12	6	3	0	0	0	9
	D	44	20	10	5	5	5	5	7
Average	O	47	16	10	3	4	3	1	16
	D	39	17	10	6	5	4	3	15

TABLE A5.16

Context: Brand Choice within Other Multiples.
Product/Region: Tea Bags, Region I.
Measure(s): Purchase Frequency Distribution.

Buyers of:		% Making X Purchases of the Brand:							
		1	2	3	4	5	6	7	8+
Brand B2	O	46	16	9	7	3	4	4	12
	D	42	18	10	7	5	4	2	13
O Brands	O	45	16	9	6	5	5	4	10
	D	43	18	10	7	5	3	3	11
Brand B1	O	48	20	9	7	3	2	4	8
	D	45	18	10	6	5	4	3	10
Brand B3	O	57	13	11	3	4	1	1	9
	D	47	19	10	6	4	2	2	9
Brand B4	O	57	16	10	6	4	0	0	6
	D	48	19	10	6	4	2	2	9
Average	O	51	16	10	6	4	2	3	9
	D	45	18	10	6	4	3	2	10

TABLE A5.17

Context: Brand Choice within Miscellaneous.
Product/Region: Tea Bags, Region I.
Measure(s): Purchase Frequency Distribution.

Buyers of:		% Making X Purchases of the Brand:							
		1	2	3	4	5	6	7	8+
O Brands	O	56	16	9	5	3	1	1	9
	D	44	19	10	6	5	3	3	10
Brand B1	O	51	14	7	7	5	2	3	13
	D	45	18	11	6	4	4	2	10
Brand B2	O	54	15	6	8	2	1	4	9
	D	46	19	10	6	5	3	2	8
Brand B3	O	53	23	14	0	0	4	2	5
	D	50	19	10	6	4	2	2	7
Brand B4	O	68	18	2	2	0	2	2	5
	D	51	18	10	5	5	3	3	5
Average	O	56	17	8	4	2	2	2	8
	D	47	19	10	6	5	3	2	8

TABLE A5.18

Context: Brand Choice within Store Y.
Product/Region: Tea Bags, Region I.
Measure(s): Purchase Frequency Distribution.

Buyers of:		% Making X Purchases of the Brand: 1	2	3	4	5	6	7	8+
Brand B1	O	39	14	8	8	3	4	5	22
	D	44	18	10	6	5	3	2	11
Brand B2	O	51	16	10	4	3	4	3	9
	D	44	18	10	7	4	3	3	10
O Brands	O	51	8	7	7	7	3	2	15
	D	45	19	10	6	4	4	3	10
Brand B3	O	62	15	2	8	4	0	0	10
	D	51	18	9	5	4	4	2	8
Brand B4	O	65	6	18	3	6	0	0	3
	D	51	17	9	6	3	3	3	9
Average	O	54	12	9	6	5	2	2	12
	D	47	18	10	6	4	3	2	9

TABLE A5.19

Context: Brand Choice within Store Z.
Product/Region: Tea Bags, Region I.
Measure(s): Purchase Frequency Distribution.

Buyers of:		% Making X Purchases of the Brand: 1	2	3	4	5	6	7	8+
Brand B1	O	26	17	9	11	6	4	3	24
	D	32	16	10	7	5	4	3	22
Brand B2	O	73	14	0	5	0	5	0	3
	D	52	18	9	6	3	3	3	5
Brand B3	O	68	8	12	4	4	0	0	4
	D	51	20	10	5	5	0	0	9
O Brands	O	70	10	15	5	0	0	0	0
	D	54	15	8	8	0	0	0	15
Brand B4	O	91	9	0	0	0	0	0	0
	D	58	19	0	0	0	0	0	23
Average	O	66	12	7	5	2	2	1	6
	D	49	18	7	5	3	1	1	15

TABLE A5.20

Context: Brand Choice within Store X.
Product/Region: Tea Bags, Region I.
Measure(s): Duplication.

Buyers of:	% also buying:				
	B1	B2	OB	B3	B4
Brand B1	--	18	22	12	4
Brand B2	43	--	31	18	9
O Brands	48	29	--	14	16
Brand B3	58	39	33	--	11
Brand B4	33	33	60	18	--
Average	46	30	37	16	10
D x rltv b	61	27	29	13	8
D = 0.90					
Relative b *	68	30	32	14	9

Notes:
* Relative b (rltv b) is the penetration of the brand among buyers of the product field at the store.
- D is calculated using relative penetration.

TABLE A5.21

Context: Brand Choice within Other Multiples.
Product/Region: Tea Bags, Region I.
Measure(s): Duplication.

Buyers of:	% also buying:				
	B2	OB	B1	B3	B4
Brand B2	--	30	27	22	15
O Brands	30	--	25	26	18
Brand B1	37	33	--	15	14
Brand B3	42	51	22	--	25
Brand B4	41	49	29	35	--
Average	38	41	26	25	18
D x rltv b	40	40	30	21	15
D = 0.89					
Relative b *	45	45	34	23	17

Notes:
* Relative b (rltv b) is the penetration of the brand among buyers of the product field at the store.
- D is calculated using relative penetration.

TABLE A5.22

Context: Brand Choice within Miscellaneous.
Product/Region: Tea Bags, Region I.
Measure(s): Duplication.

Buyers of:	% also buying:				
	OB	B1	B2	B3	B4
O Brands	--	23	28	14	14
Brand B1	30	--	18	13	8
Brand B2	40	20	--	24	20
Brand B3	36	26	42	--	19
Brand B4	47	20	45	25	--
Average	38	22	33	19	15
D x rltv b	40	31	28	16	13
D = 0.85					
Relative b *	47	36	33	19	15

Notes:
* Relative b (rltv b) is the penetration of the brand among buyers of the product field at the store.
- D is calculated using relative penetration.

TABLE A5.23

Context: Brand Choice within Store Y.
Product/Region: Tea Bags, Region I.
Measure(s): Duplication.

Buyers of:	% also buying:				
	B1	B2	OB	B3	B4
Brand B1	--	33	37	27	9
Brand B2	23	--	30	21	10
O Brands	34	40	--	25	18
Brand B3	41	47	41	--	30
Brand B4	23	35	47	47	--
Average	30	39	39	30	17
D x rltv b	33	48	37	22	14
D = 0.95					
Relative b *	35	51	39	23	15

Notes:
* Relative b (rltv b) is the penetration of the brand among buyers of the product field at the store.
- D is calculated using relative penetration.

TABLE A5.24

Context: Brand Choice within Store Z.
Product/Region: Tea Bags, Region I.
Measure(s): Duplication.

Buyers of:	% also buying:				
	B1	B2	B3	OB	B4
Brand B1	--	19	12	9	7
Brand B2	59	--	24	16	13
Brand B3	55	35	--	19	23
O Brands	54	29	25	--	25
Brand B4	72	45	54	45	--
Average	60	32	29	22	17
D x rltv b	87	29	20	16	9
D = 1.11					
Relative b *	78	26	18	14	8

Notes:
* Relative b (rltv b) is the penetration of the brand among buyers of the product field at the store.
- D is calculated using relative penetration.

TABLE A5.25
Context: Brand Choice Within Individual Stores.
Product/Region: Instant Coffee, Region I.
Measure(s): Various.

Str/Brnd	s	MS (%)	b (%) O	b (%) D	w O	w D
Store X						
C1	0.35	48	29	32	5.9	5.4
C2	0.73	24	19	19	4.5	4.7
C3	1.07	11	11	9	3.7	4.3
OB	1.34	8	9	7	3.3	4.2
C4	0.80	6	6	6	3.9	4.2
Ave	S= 0.64	19	15	15	4.3	4.6
O Mltps						
C2	0.54	29	17	18	4.3	4.1
C1	0.61	25	15	16	4.1	4.0
C3	0.63	16	11	11	3.9	3.8
OB	1.31	14	11	10	3.2	3.7
C4	0.70	10	7	7	3.6	3.6
Ave	S= 0.71	19	12	12	3.8	3.8
Store Y						
C2	0.43	38	15	16	4.7	4.4
C1	1.03	20	11	10	3.5	4.0
C3	0.75	19	9	9	3.7	3.9
C4	0.28	11	5	6	4.6	3.7
OB	0.70	10	5	5	3.6	3.7
Ave	S= 0.62	20	9	9	4.0	3.9
Misclns						
OB	0.21	34	13	16	3.4	2.7
C2	1.47	23	12	12	2.4	2.5
C1	1.69	18	10	10	2.2	2.4
C3	2.77	11	8	6	1.9	2.3
C4	0.10	9	3	5	3.7	2.3
Ave	S= 1.08	19	9	10	2.7	2.4
Store Z						
C1	0.38	60	10	13	6.7	5.1
C3	1.29	15	5	4	3.3	3.9
C2	1.62	15	5	4	3.1	3.9
OB	0.35	8	2	2	4.5	3.7
C4	10.23	1	1	0	1.6	3.6
Ave	S= 0.70 excl C4	20	5	5	3.8	4.0
Ovrl Ave	1.26	19	10	10	3.7	3.8

TABLE A5.26

Context: Brand Choice Within Individual Stores.

Product/Region: Instant Coffee, Region I.

Measure(s): Various.

Str/Brnd	wp O	wp D	w/wp (%) O	w/wp (%) D	bs/b (%) O	bs/b (%) D	ws O	ws D
Store X								
C1	8.4	8.5	70	64	54	50	7.3	4.9
C2	7.9	9.2	57	51	36	36	4.8	4.1
C3	8.3	9.6	45	45	23	31	3.3	3.7
OB	7.8	9.7	42	43	29	30	2.7	3.6
C4	8.8	9.8	44	43	28	29	4.9	3.6
Ave	8.2	9.4	52	49	34	35	4.6	4.0
O Mltps								
C2	7.7	7.7	56	53	43	41	4.3	3.5
C1	7.6	7.8	54	51	40	39	4.8	3.4
C3	7.2	8.0	54	48	35	35	3.7	3.2
OB	6.6	8.1	48	46	35	34	2.8	3.1
C4	7.4	8.2	49	44	45	32	3.9	3.0
Ave	7.3	8.0	52	48	40	36	3.9	3.2
Store Y								
C2	7.6	7.2	62	61	49	49	4.6	3.9
C1	6.1	7.7	57	52	54	40	2.9	3.4
C3	8.3	7.8	45	50	37	39	4.2	3.4
C4	7.3	8.0	63	46	50	36	4.5	3.2
OB	9.8	8.0	37	46	32	36	5.6	3.1
Ave	7.8	7.7	53	51	44	40	4.4	3.4
Misclns								
OB	5.2	4.7	65	57	51	45	3.8	2.3
C2	4.7	5.0	51	50	44	40	1.9	2.1
C1	4.3	5.1	51	47	49	37	1.7	2.0
C3	4.9	5.2	39	44	35	34	1.4	1.9
C4	5.8	5.3	64	43	54	34	2.4	1.9
Ave	5.0	5.1	54	48	47	38	2.2	2.0
Store Z								
C1	8.6	7.1	78	72	71	61	5.9	4.5
C3	8.9	8.6	37	45	50	36	3.1	3.1
C2	6.2	8.6	50	45	50	36	1.8	3.0
OB	12.8	8.8	35	42	29	33	1.2	2.9
C4	4.9	9.1	33	40	44	30	1.5	2.7
Ave	8.3	8.4	47	49	49	39	2.7	3.2
Ovrl Ave	7.3	7.7	51	49	43	38	3.6	3.2

TABLE A5.27

Context: Brand Choice within Store X.
Product/Region: Instant Coffee, Region I.
Measure(s): Purchase Frequency Distribution.

Buyers of:		% Making X Purchases of the Brand:							
		1	2	3	4	5	6	7	8+
Brand C1	O	26	15	8	8	8	4	4	27
	D	32	16	10	7	6	4	3	21
Brand C2	O	35	15	8	11	8	7	1	17
	D	37	17	10	7	5	4	3	17
Brand C3	O	49	15	3	9	5	4	3	11
	D	40	17	10	6	5	3	3	16
O Brands	O	46	15	13	3	5	3	3	14
	D	40	17	10	7	4	4	3	15
Brand C4	O	53	11	6	9	4	0	4	13
	D	41	18	11	7	5	4	4	11
Average	O	42	14	8	8	6	4	3	16
	D	38	17	10	7	5	4	3	16

TABLE A5.28

Context: Brand Choice within Other Multiples.
Product/Region: Instant Coffee, Region I.
Measure(s): Purchase Frequency Distribution.

Buyers of:		% Making X Purchases of the Brand:							
		1	2	3	4	5	6	7	8+
Brand C2	O	39	15	9	7	7	5	1	18
	D	39	17	11	7	5	4	3	14
Brand C1	O	43	13	11	7	5	2	3	16
	D	40	18	11	7	5	4	3	13
Brand C3	O	43	17	9	5	4	5	2	14
	D	42	17	10	6	5	4	3	13
O Brands	O	45	21	8	5	6	2	3	10
	D	42	18	10	6	5	3	3	12
Brand C4	O	47	15	8	2	5	2	3	18
	D	44	18	10	6	4	3	3	12
Average	O	43	16	9	5	5	3	2	15
	D	42	18	10	6	5	3	3	13

TABLE A5.29

Context: Brand Choice within Store Y.
Product/Region: Instant Coffee, Region I.
Measure(s): Purchase Frequency Distribution.

Buyers of:		% Making X Purchases of the Brand:							
		1	2	3	4	5	6	7	8+
Brand C2	O	36	18	11	4	2	6	1	21
	D	38	17	10	7	5	4	3	17
Brand C1	O	47	19	9	6	5	3	1	10
	D	41	18	11	6	4	3	3	14
Brand C3	O	44	13	6	6	6	4	9	12
	D	41	18	10	7	4	3	2	14
Brand C4	O	43	13	8	5	5	3	0	25
	D	43	18	9	7	5	4	2	11
O Brands	O	50	18	2	9	0	5	0	16
	D	43	16	10	6	4	4	2	13
Average	O	44	16	7	6	4	4	2	17
	D	41	17	10	7	5	4	2	14

TABLE A5.30

Context: Brand Choice within Miscellaneous.
Product/Region: Instant Coffee, Region I.
Measure(s): Purchase Frequency Distribution.

Buyers of:		% Making X Purchases of the Brand:							
		1	2	3	4	5	6	7	8+
O Brands	O	50	19	7	6	4	3	4	9
	D	49	20	10	6	4	3	2	6
Brand C2	O	63	12	6	6	2	3	1	7
	D	52	20	10	6	3	3	2	5
Brand C1	O	60	16	8	5	3	3	0	4
	D	53	20	9	5	3	2	2	5
Brand C3	O	56	26	12	2	2	0	2	2
	D	55	20	10	5	3	2	2	4
Brand C4	O	61	18	0	4	4	0	4	11
	D	57	19	10	6	4	2	2	1
Average	O	58	18	7	5	3	2	2	7
	D	53	20	10	6	4	2	2	4

TABLE A5.31

Context: Brand Choice within Store Z.
Product/Region: Instant Coffee, Region I.
Measure(s): Purchase Frequency Distribution.

Buyers of:		% Making X Purchases of the Brand:							
		1	2	3	4	5	6	7	8+
Brand C1	O	31	11	9	9	6	7	2	25
	D	36	16	10	7	5	4	3	19
Brand C3	O	50	14	7	7	2	5	5	10
	D	44	16	9	7	5	2	2	14
Brand C2	O	50	11	16	11	5	0	0	7
	D	45	17	9	7	5	2	2	13
O Brands	O	47	18	0	0	6	6	0	24
	D	45	16	8	4	4	4	4	14
Brand C4	O	67	22	0	11	0	0	0	0
	D	43	21	0	0	0	0	0	36
Average	O	49	15	6	8	4	4	1	13
	D	42	17	7	5	4	3	2	19

TABLE A5.32

Context: Brand Choice within Store X.
Product/Region: Instant Coffee, Region I.
Measure(s): Duplication.

Buyers of:	% also buying:				
	C1	C2	C3	OB	C4
Brand C1	--	23	15	12	8
Brand C2	35	--	27	14	11
Brand C3	41	48	--	19	7
O Brands	39	29	23	--	6
Brand C4	43	35	13	9	--
Average	40	34	20	14	8
D x rltv b	46	30	17	14	9
D = 0.78					
Relative b *	59	38	22	18	12

Notes:
* Relative b (rltv b) is the penetration of the brand among buyers of the product field at the store.
- D is calculated using relative penetration.

TABLE A5.33

Context: Brand Choice within Other Multiples.
Product/Region: Instant Coffee, Region I.
Measure(s): Duplication.

Buyers of:	% also buying:				
	C2	C1	C3	OB	C4
Brand C2	--	22	24	17	13
Brand C1	25	--	19	28	10
Brand C3	38	29	--	20	6
O Brands	25	38	18	--	8
Brand C4	33	23	9	14	--
Average	30	28	18	20	9
D x rltv b	29	26	19	19	11
D = 0.71					
Relative b *	41	37	26	27	16

Notes:
* Relative b (rltv b) is the penetration of the brand among buyers of the product field at the store.
- D is calculated using relative penetration.

TABLE A5.34

Context: Brand Choice within Store Y.
Product/Region: Instant Coffee, Region I.
Measure(s): Duplication.

Buyers of:	% also buying:				
	C2	C1	C3	C4	OB
Brand C2	--	17	30	11	11
Brand C1	25	--	23	5	14
Brand C3	51	26	--	8	14
Brand C4	37	12	17	--	9
O Brands	36	31	27	9	--
Average	37	22	24	8	12
D x rltv b	35	24	22	10	12
D = 0.72					
Relative b *	49	34	30	14	16

Notes:
* Relative b (rltv b) is the penetration of the brand among buyers of the product field at the store.
- D is calculated using relative penetration.

TABLE A5.35

Context: Brand Choice within Miscellaneous.
Product/Region: Instant Coffee, Region I.
Measure(s): Duplication.

Buyers of:	% also buying:				
	OB	C2	C1	C3	C4
O Brands	--	21	28	14	4
Brand C2	22	--	14	25	6
Brand C1	34	17	--	14	3
Brand C3	24	42	19	--	9
Brand C4	17	25	10	21	--
Average	24	26	18	19	6
D x rltv b	26	25	21	15	7
D = 0.67					
Relative b *	38	37	31	22	10

Notes:
* Relative b (rltv b) is the penetration of the brand among buyers of the product field at the store.
- D is calculated using relative penetration.

TABLE A5.36

Context: Brand Choice within Store Z.
Product/Region: Instant Coffee, Region I.
Measure(s): Duplication.

Buyers of:	**% also buying:**				
	C1	**C3**	**C2**	**OB**	**C4**
Brand C1	--	12	16	10	0
Brand C3	26	--	21	16	7
Brand C2	31	20	--	6	6
O Brands	52	41	17	--	0
Brand C4	0	33	33	0	--
Average	27	27	22	8	3
D x rltv b	37	19	19	7	4
D = 0.67					
Relative b *	56	28	29	11	6

Notes:
* Relative b (rltv b) is the penetration of the brand among buyers of the product field at the store.
- D is calculated using relative penetration.

TABLE A5.37
Context: Brand Choice Within Individual Stores.
Product/Region: Automatic Washing Powder, Region II.
Measure(s): Various.

Str/Brnd	s	MS (%)	b (%) O	b (%) D	w O	w D
Store V						
A1	0.86	34	18	17	5.8	5.9
A5	0.94	18	11	11	5.0	5.2
A4	0.58	17	9	10	5.7	5.2
A2	0.78	16	10	10	5.2	5.1
A3	----	--	--	--	---	---
Ave	S= 0.80	21	12	12	5.4	5.3
O Mltps						
A1	0.69	27	12	12	3.5	3.5
A3	0.26	21	8	10	4.1	3.4
A4	0.78	16	8	8	3.2	3.3
A5	1.17	14	7	7	2.9	3.2
A2	1.00	12	6	6	2.9	3.2
Ave	S= 0.72	18	8	8	3.3	3.3
Store W						
A1	1.69	30	12	12	3.3	3.4
A5	0.17	23	6	10	4.8	3.2
A4	0.95	21	8	9	3.4	3.2
A2	3.09	13	7	6	2.4	3.0
A3	----	--	--	--	---	---
Ave	S= 1.32	22	9	9	3.5	3.2
Store Z						
A1	0.77	29	10	11	3.7	3.5
A4	1.03	21	8	8	3.3	3.3
A3	0.78	18	7	7	3.4	3.2
A2	1.52	12	6	5	2.7	3.1
A5	4.99	7	5	3	2.0	3.0
Ave	S= 1.00 excl A5	17	7	7	3.0	3.2
Store Y						
A3	0.49	33	8	9	4.9	4.4
A1	1.18	24	7	7	3.9	4.2
A4	0.58	18	5	5	4.4	4.0
A2	0.94	16	5	5	3.8	3.9
A5	2.47	4	2	1	2.5	3.6
Ave	S= 0.83	19	5	5	3.9	4.0
Ovrl Ave	1.20	19	8	8	3.8	3.8

TABLE A5.38
Context: Brand Choice Within Individual Stores.
Product/Region: Automatic Washing Powder, Region II.
Measure(s): Various.

Str/Brnd	wp		w/wp (%)		bs/b (%)		ws	
	O	D	O	D	O	D	O	D
Store V								
A1	10.9	11.6	53	51	39	36	6.4	4.4
A5	11.7	12.5	43	42	28	28	4.7	3.7
A4	11.6	12.6	49	41	31	28	4.5	3.7
A2	13.2	12.6	39	41	21	27	6.4	3.6
A3	----	----	--	--	--	--	---	---
Ave	11.8	12.3	46	44	30	30	5.5	3.8
O Mltps								
A1	6.0	6.4	58	55	46	44	2.5	3.0
A3	7.1	6.5	58	52	35	41	1.9	2.9
A4	5.5	6.6	58	49	50	39	3.9	2.8
A5	8.4	6.7	34	48	35	38	1.7	2.7
A2	6.5	6.7	45	47	33	37	4.3	2.7
Ave	6.7	6.6	51	50	40	39	2.8	2.8
Store W								
A1	6.7	7.3	49	47	43	33	3.1	2.4
A5	8.8	7.6	54	42	35	30	6.3	2.2
A4	6.7	7.7	51	41	30	29	3.0	2.2
A2	7.0	8.1	35	37	28	25	1.6	2.0
A3	---	---	--	--	--	--	---	---
Ave	7.3	7.7	47	42	34	29	3.5	2.2
Store Z								
A1	6.5	7.0	56	50	40	38	3.6	2.7
A4	7.2	7.3	45	45	31	34	4.4	2.5
A3	7.9	7.4	43	44	26	33	2.5	2.4
A2	6.3	7.6	44	40	30	30	3.3	2.3
A5	6.0	7.8	33	38	27	28	1.5	2.2
Ave	6.8	7.4	44	43	31	32	3.0	2.4
Store Y								
A3	8.5	8.5	57	52	41	40	2.0	3.4
A1	8.9	8.9	43	47	31	35	4.1	3.1
A4	9.0	9.1	48	44	43	33	5.7	2.9
A2	9.1	9.2	42	43	34	32	1.9	2.9
A5	12.1	9.8	21	37	14	27	1.0	2.6
Ave	9.5	9.1	42	44	33	33	2.9	3.0
Ovrl Ave	8.3	8.5	46	45	34	33	3.5	2.8

TABLE A5.39

Context:	Brand Choice within Store V.
Product/Region:	Automatic Washing Powder, Region II.
Measure(s):	Duplication.

Buyers of:	% also buying:				
	A1	A5	A4	A2	A3
Brand A1	--	26	25	31	--
Brand A5	41	--	26	31	--
Brand A4	49	32	--	27	--
Brand A2	58	37	25	--	--
Brand A3	--	--	--	--	--
Average	49	32	25	30	--
D x rltv b	50	32	26	28	--
D = 0.95					
Relative b *	53	34	28	29	--

Notes:
* Relative b (rltv b) is the penetration of the brand among buyers of the product field at the store.
- D is calculated using relative penetration.

TABLE A5.40

Context: Brand Choice within Other Multiples.
Product/Region: Automatic Washing Powder, Region II.
Measure(s): Duplication.

Buyers of:	% also buying:				
	A1	A3	A4	A5	A2
Brand A1	--	20	16	20	15
Brand A3	30	--	10	28	16
Brand A4	25	10	--	10	15
Brand A5	32	30	11	--	12
Brand A2	29	21	19	15	--
Average	29	20	14	18	15
D x rltv b	28	19	18	17	14
D = 0.70					
Relative b *	39	26	26	25	20

Notes:
* Relative b (rltv b) is the penetration of the brand among buyers of the product field at the store.
- D is calculated using relative penetration.

TABLE A5.41

Context: Brand Choice within Store W.
Product/Region: Automatic Washing Powder, Region II.
Measure(s): Duplication.

Buyers of:	% also buying:				
	A1	A5	A4	A2	A3
Brand A1	--	18	27	25	--
Brand A5	35	--	33	24	--
Brand A4	40	26	--	36	--
Brand A2	43	21	41	--	--
Brand A3	--	--	--	--	--
Average	39	22	34	28	--
D x rltv b	44	23	30	26	--
D = 0.87					
Relative b *	51	27	34	30	--

Notes:
* Relative b (rltv b) is the penetration of the brand among buyers of the product field at the store.
- D is calculated using relative penetration.

TABLE A5.42

Context: Brand Choice within Store Z.
Product/Region: Automatic Washing Powder, Region II.
Measure(s): Duplication.

Buyers of:	% also buying:				
	A1	A4	A3	A2	A5
Brand A1	--	25	26	13	12
Brand A4	31	--	24	25	12
Brand A3	39	29	--	18	24
Brand A2	26	39	23	--	13
Brand A5	26	21	34	14	--
Average	31	29	27	18	15
D x rltv b	34	27	23	18	16
D = 0.80					
Relative b *	43	34	29	23	20

Notes:
* Relative b (rltv b) is the penetration of the brand among buyers of the product field at the store.
- D is calculated using relative penetration.

TABLE A5.43

Context: Brand Choice within Store Y.
Product/Region: Automatic Washing Powder, Region II.
Measure(s): Duplication.

Buyers of:	% also buying:				
	A3	A1	A4	A2	A5
Brand A3	--	36	13	24	10
Brand A1	39	--	21	24	11
Brand A4	22	32	--	27	12
Brand A2	39	36	26	--	9
Brand A5	50	50	35	28	--
Average	38	39	24	26	11
D x rltv b	40	37	25	25	9
D = 0.92					
Relative b *	44	41	27	27	9

Notes:
* Relative b (rltv b) is the penetration of the brand among buyers of the product field at the store.
- D is calculated using relative penetration.

TABLE A5.44
Context: Brand Choice Within Individual Stores.
Product/Region: Tea Bags, Region II.
Measure(s): Various.

Str/Brnd	s	MS (%)	b (%) O	b (%) D	w O	w D
Store V						
B2	0.76	35	20	21	6.2	6.0
OB	1.15	32	20	19	5.5	5.8
B4	0.76	28	17	17	5.8	5.6
B3	5.61	5	7	4	2.5	4.6
B1	----	--	--	--	---	---
Ave	S= 0.89 excl B3	25	16	15	5.0	5.5
Store Z						
B1	0.39	61	25	27	6.5	6.1
B2	1.50	13	10	8	3.6	4.4
B3	0.55	13	7	8	4.8	4.4
OB	2.29	9	8	6	3.0	4.3
B4	5.25	4	5	3	2.2	4.1
Ave	S= 0.74 excl B4	20	11	10	4.0	4.6
O Mltps						
B1	0.25	29	13	17	6.1	4.6
B2	1.67	23	16	14	3.9	4.4
OB	1.36	22	14	13	4.0	4.3
B3	0.69	17	10	11	4.6	4.2
B4	1.51	10	8	7	3.5	3.9
Ave	S= 1.01	20	12	12	4.4	4.3
Store Y						
B2	0.35	39	10	12	5.8	5.3
B1	0.54	31	9	10	5.2	5.0
B3	0.70	12	4	4	4.4	4.4
OB	2.09	12	6	4	3.2	4.4
B4	2.77	7	4	2	2.7	4.2
Ave	S= 0.67 excl B4	20	7	6	4.3	4.7
Store W						
B1	0.07	29	7	10	4.9	3.4
B2	0.98	27	10	10	3.4	3.3
OB	1.92	21	9	8	2.8	3.2
B3	1.01	15	6	6	3.1	3.1
B4	2.44	7	4	3	2.3	2.9
Ave	S= 1.03	20	7	8	3.3	3.2
Ovrl Ave	1.53	21	10	10	4.2	4.4

TABLE A5.45
Context: Brand Choice Within Individual Stores.
Product/Region: Tea Bags, Region II.
Measure(s): Various.

Str/Brnd	wp		w/wp (%)		bs/b (%)		ws	
	O	D	O	D	O	D	O	D
Store V								
B2	11.3	12.0	55	50	34	33	5.0	4.3
OB	11.7	12.1	47	48	33	32	4.6	4.1
B4	13.4	12.4	44	46	26	30	6.6	4.0
B3	15.7	13.9	16	33	19	21	1.2	3.0
B1	----	----	--	--	--	--	---	---
Ave	13.0	12.6	40	44	28	29	4.3	3.8
Store Z								
B1	8.6	8.6	75	71	55	57	5.5	5.3
B2	9.3	10.5	38	42	41	30	3.7	3.4
B3	12.0	10.5	40	42	18	29	7.6	3.4
OB	9.7	10.7	31	40	22	28	2.7	3.2
B4	10.8	10.9	20	37	20	26	1.9	3.1
Ave	10.1	10.2	41	46	31	34	4.3	3.7
O Mltps								
B1	10.2	10.1	60	46	32	31	6.7	3.3
B2	8.8	10.4	44	42	39	28	3.7	3.1
OB	9.9	10.4	41	41	29	27	3.6	3.0
B3	10.4	10.7	44	39	33	26	4.0	2.9
B4	11.4	11.1	30	35	17	23	3.2	2.6
Ave	10.1	10.5	44	41	30	27	4.2	3.0
Store Y								
B2	9.7	9.1	60	58	53	46	6.0	4.3
B1	9.1	9.4	57	53	50	41	5.4	4.0
B3	9.8	10.2	45	43	36	33	3.3	3.4
OB	10.1	10.2	31	43	23	33	2.0	3.4
B4	12.7	10.5	21	41	16	31	1.2	3.2
Ave	10.3	9.9	43	48	36	37	3.6	3.6
Store W								
B1	7.3	6.8	67	49	42	38	5.4	2.6
B2	6.3	6.9	53	48	38	37	2.5	2.6
OB	6.5	7.1	44	45	44	34	2.8	2.4
B3	6.3	7.3	49	42	43	31	2.6	2.3
B4	8.3	7.6	27	38	24	28	2.0	2.1
Ave	6.9	7.1	48	45	38	33	3.1	2.4
Ovrl Ave	10.0	10.0	43	45	33	32	3.9	3.3

TABLE A5.46

Context: Brand Choice within Store V.
Product/Region: Tea Bags, Region II.
Measure(s): Duplication.

Buyers of:	% also buying:				
	B2	OB	B4	B3	B1
Brand B2	--	43	40	22	--
O Brands	43	--	44	21	--
Brand B4	48	52	--	20	--
Brand B3	61	58	46	--	--
Brand B1	--	--	--	--	--
Average	51	51	43	21	--
D x rltv b	51	52	43	19	--
D = 0.96					
Relative b *	54	54	45	20	--

Notes:
* Relative b (rltv b) is the penetration of the brand among buyers of the product field at the store.
- D is calculated using relative penetration.

TABLE A5.47

Context:	Brand Choice within Store Z.
Product/Region:	Tea Bags, Region II.
Measure(s):	Duplication.

Buyers of:	% also buying:				
	B1	B2	B3	OB	B4
Brand B1	--	18	17	21	12
Brand B2	48	--	19	18	14
Brand B3	59	26	--	34	21
O Brands	66	22	30	--	20
Brand B4	65	29	31	34	--
Average	60	24	24	27	17
D x rltv b	69	27	20	22	13
D = 0.96					
Relative b *	72	28	20	23	14

Notes:

* Relative b (rltv b) is the penetration of the brand among buyers of the product field at the store.

\- D is calculated using relative penetration.

TABLE A5.48

Context: Brand Choice within Other Multiples.
Product/Region: Tea Bags, Region II.
Measure(s): Duplication.

Buyers of:	% also buying:				
	B1	B2	OB	B3	B4
Brand B1	--	35	41	19	19
Brand B2	28	--	34	19	22
O Brands	36	37	--	22	24
Brand B3	24	31	32	--	26
Brand B4	32	46	45	34	--
Average	30	37	38	24	23
D x rltv b	32	40	36	25	19
D = 0.89					
Relative b *	36	45	41	28	22

Notes:
* Relative b (rltv b) is the penetration of the brand among buyers of the product field at the store.
- D is calculated using relative penetration.

TABLE A5.49

Context: Brand Choice within Store Y.
Product/Region: Tea Bags, Region II.
Measure(s): Duplication.

Buyers of:	% also buying:				
	B2	B1	B3	OB	B4
Brand B2	--	27	14	24	19
Brand B1	31	--	14	27	17
Brand B3	36	30	--	30	25
O Brands	44	44	23	--	27
Brand B4	54	41	29	41	--
Average	41	36	20	31	22
D x rltv b	47	41	19	25	17
D = 0.95					
Relative b *	49	43	20	27	18

Notes:
* Relative b (rltv b) is the penetration of the brand among buyers of the product field at the store.
- D is calculated using relative penetration.

TABLE A5.50

Context: Brand Choice within Store W.
Product/Region: Tea Bags, Region II.
Measure(s): Duplication.

Buyers of:	% also buying:				
	B1	B2	OB	B3	B4
Brand B1	--	29	36	11	9
Brand B2	22	--	32	22	22
O Brands	28	33	--	19	14
Brand B3	13	35	29	--	19
Brand B4	18	54	33	30	--
Average	20	38	33	21	16
D x rltv b	25	34	32	21	14
D = 0.82					
Relative b *	31	42	39	26	17

Notes:
* Relative b (rltv b) is the penetration of the brand among buyers of the product field at the store.
- D is calculated using relative penetration.

TABLE A5.51
Context: Brand Choice Within Individual Stores.
Product/Region: Instant Coffee, Region II.
Measure(s): Various.

Str/Brnd	s	MS (%)	b (%) O	b (%) D	w O	w D
Store V						
C2	0.34	56	24	25	6.2	6.1
OB	0.41	40	19	19	5.6	5.7
C4	0.52	4	2	2	4.4	4.9
C1	----	--	--	--	---	---
C3	----	--	--	--	---	---
Ave	S= 0.38	33	15	15	5.4	5.5
O Mltps						
C2	1.01	35	21	20	3.6	3.8
C1	0.43	27	14	16	4.0	3.6
C3	0.43	18	10	11	3.9	3.4
OB	1.32	17	12	11	3.0	3.4
C4	3.94	1	1	1	1.8	3.0
Ave	S= 0.80 excl C4	19	12	12	3.3	3.4
Store Z						
C1	0.19	50	18	23	6.0	4.6
C2	2.06	23	16	13	3.2	3.8
C3	0.80	13	8	8	3.6	3.5
OB	1.80	9	7	5	2.8	3.4
C4	0.40	4	2	3	4.1	3.3
Ave	S= 0.86	20	10	11	3.9	3.7
Store W						
C2	0.40	39	12	13	4.8	4.4
OB	1.33	21	9	8	3.4	3.9
C1	0.38	18	6	7	4.4	3.9
C3	0.83	15	6	6	3.6	3.8
C4	3.17	2	2	1	2.1	3.5
Ave	S= 0.67 excl C4	19	7	7	3.7	3.9
Store Y						
C2	0.49	42	11	12	4.5	4.2
C1	1.50	19	7	6	3.1	3.6
OB	0.64	16	5	6	3.8	3.5
C3	1.17	14	5	5	3.2	3.5
C4	0.50	7	2	3	3.8	3.3
Ave	S= 0.81	20	6	6	3.7	3.6
Ovrl Ave	0.70	21	10	10	3.9	3.9

TABLE A5.52
Context: Brand Choice Within Individual Stores.
Product/Region: Instant Coffee, Region II.
Measure(s): Various.

Str/Brnd	wp O	wp D	w/wp (%) O	w/wp (%) D	bs/b (%) O	bs/b (%) D	ws O	ws D
Store V								
C2	8.1	8.1	76	75	67	68	6.3	5.8
OB	8.0	8.5	70	67	63	59	5.7	5.4
C4	10.3	9.5	43	51	21	42	4.3	4.4
C1	---	---	--	--	--	--	---	---
C3	---	---	--	--	--	--	---	---
Ave	8.8	8.7	63	64	50	56	5.4	5.2
O Mltps								
C2	6.0	6.7	60	57	52	44	3.0	3.3
C1	7.7	6.9	53	52	40	39	4.1	3.1
C3	9.1	7.1	43	47	26	35	3.3	2.8
OB	7.0	7.2	42	47	36	34	2.6	2.8
C4	8.6	7.6	21	39	18	28	3.0	2.5
Ave	7.7	7.1	44	48	34	36	3.2	2.9
Store Z								
C1	7.6	7.2	78	63	61	49	5.9	3.9
C2	6.4	8.1	50	47	51	34	2.9	3.0
C3	9.1	8.4	40	42	30	30	3.0	2.8
OB	9.0	8.6	31	40	27	28	2.9	2.6
C4	9.5	8.8	43	38	35	26	4.3	2.5
Ave	8.3	8.2	48	46	41	34	3.8	3.0
Store W								
C2	7.4	7.4	65	59	49	49	4.1	3.7
OB	6.3	7.9	53	50	36	40	2.7	3.2
C1	7.2	8.0	61	48	39	38	4.2	3.1
C3	8.4	8.1	43	47	29	37	4.0	3.1
C4	10.2	8.6	21	41	21	32	1.0	2.8
Ave	7.9	8.0	49	49	35	39	3.2	3.2
Store Y								
C2	7.4	7.1	61	59	52	47	4.0	3.5
C1	6.6	7.7	47	47	44	35	2.7	2.9
OB	8.4	7.8	45	45	32	34	4.5	2.8
C3	8.5	7.9	37	44	25	33	3.8	2.7
C4	8.4	8.1	46	41	25	31	3.0	2.6
Ave	7.9	7.7	47	47	36	36	3.6	2.9
Ovrl Ave	8.0	7.9	49	50	38	39	3.7	3.3

TABLE A5.53

Context: Brand Choice within Store V.
Product/Region: Instant Coffee, Region II.
Measure(s): Duplication.

Buyers of:	% also buying:				
	C2	OB	C4	C1	C3
Brand C2	--	28	6	--	--
O Brands	36	--	4	--	--
Brand C4	73	36	--	--	--
Brand C1	--	--	--	--	--
Brand C3	--	--	--	--	--
Average	55	32	5	--	--
D x rltv b	49	38	5	--	--
D = 0.74					
Relative b *	66	52	6	--	--

Notes:
* Relative b (rltv b) is the penetration of the brand among buyers of the product field at the store.
- D is calculated using relative penetration.

TABLE A5.54

Context: Brand Choice within Other Multiples.
Product/Region: Instant Coffee, Region II.
Measure(s): Duplication.

Buyers of:	% also buying:				
	C2	C1	C3	OB	C4
Brand C2	--	22	22	21	2
Brand C1	33	--	25	27	3
Brand C3	47	36	--	28	3
O Brands	37	32	22	--	3
Brand C4	45	36	27	36	--
Average	41	32	24	28	3
D x rltv b	46	31	21	26	3
D = 0.86					
Relative b *	53	36	25	30	3

Notes:
* Relative b (rltv b) is the penetration of the brand among buyers of the product field at the store.
- D is calculated using relative penetration.

TABLE A5.55

Context: Brand Choice within Store Z.
Product/Region: Instant Coffee, Region II.
Measure(s): Duplication.

Buyers of:	% also buying:				
	C1	C2	C3	OB	C4
Brand C1	--	22	17	16	1
Brand C2	25	--	21	18	6
Brand C3	39	42	--	24	6
O Brands	44	42	28	--	10
Brand C4	11	47	23	35	--
Average	30	38	22	23	6
D x rltv b	42	37	19	16	5
D = 0.84					
Relative b *	51	45	22	19	6

Notes:
* Relative b (rltv b) is the penetration of the brand among buyers of the product field at the store.
- D is calculated using relative penetration.

TABLE A5.56

Context: Brand Choice within Store W.
Product/Region: Instant Coffee, Region II.
Measure(s): Duplication.

Buyers of:	% also buying:				
	C2	OB	C1	C3	C4
Brand C2	--	20	11	25	5
O Brands	27	--	23	19	5
Brand C1	24	36	--	20	2
Brand C3	50	29	19	--	0
Brand C4	42	28	7	0	--
Average	36	28	15	16	3
D x rltv b	34	25	17	17	5
D = 0.69					
Relative b *	49	37	24	25	7

Notes:
* Relative b (rltv b) is the penetration of the brand among buyers of the product field at the store.
- D is calculated using relative penetration.

TABLE A5.57

Context: Brand Choice within Store Y.
Product/Region: Instant Coffee, Region II.
Measure(s): Duplication.

Buyers of:	**% also buying:**				
	C2	**C1**	**OB**	**C3**	**C4**
Brand C2	--	24	19	22	7
Brand C1	37	--	22	24	8
O Brands	40	31	--	31	9
Brand C3	47	34	31	--	11
Brand C4	34	25	19	25	--
Average	40	29	23	26	9
D x rltv b	45	29	21	21	9
D = 0.83					
Relative b *	53	35	25	25	11

Notes:
* Relative b (rltv b) is the penetration of the brand among buyers of the product field at the store.
- D is calculated using relative penetration.

TABLE A5.58
Context: Brand Choice Within Individual Stores.
Product/Region: Automatc, Tea Bags, Inst Cof, Rgns I & II
Measure: Dirichlet Fit for b and w.

	b			w		
	MAD	MD	MAD/ MD %	MAD	MD	MAD/ MD %
Automatc Rgn I						
X	1.1	4.0	27	.38	.53	72
OM	.7	3.8	19	.22	.26	85
Y	1.6	3.0	55	.57	.58	98
Msc	.9	2.5	35	.28	.35	80
Z	.6	1.4	46	.59	.64	92
Ave	**1.0**	**2.9**	**36**	**.41**	**.47**	**85**
Tea Bags Rgn I						
X	2.0	6.6	30	.76	1.04	73
OM	.8	3.4	24	.26	.32	81
Msc	1.2	3.6	33	.44	.58	76
Y	1.0	2.7	37	.54	.73	74
Z	1.0	3.4	30	1.00	1.50	67
Ave	**1.2**	**3.9**	**31**	**.60**	**.83**	**74**
Inst Cof Rgn I						
X	1.4	7.4	19	.50	.75	67
OM	.6	3.0	20	.18	.34	53
Y	.6	3.2	19	.40	.50	80
Msc	1.4	3.0	47	.56	.66	85
Z	1.2	2.5	48	1.16	1.41	82
Ave	**1.0**	**3.8**	**31**	**.56**	**.73**	**73**
Automatc Rgn II						
V	.4	2.9	15	.21	.33	64
OM	.7	1.4	46	.29	.39	74
W	1.4	1.8	74	.61	.64	95
Z	.7	1.7	38	.34	.53	64
Y	.5	1.8	27	.47	.59	80
Ave	**.7**	**1.9**	**40**	**.38**	**.49**	**75**
Tea Bags Rgn II						
V	1.4	4.3	33	.70	1.26	56
Z	1.8	5.7	31	.95	1.30	73
OM	1.7	2.6	66	.63	.75	84
Y	.9	2.5	36	.72	1.05	69
W	1.1	1.8	59	.51	.67	76
Ave	**1.4**	**3.4**	**45**	**.70**	**1.01**	**72**
Inst Cof Rgn II						
V	.2	8.7	3	.19	.65	29
OM	1.2	4.9	25	.54	.71	76
Z	2.0	5.4	37	.72	.89	81
W	.8	2.8	29	.61	.74	82
Y	.6	2.4	25	.36	.42	86
Ave	**1.0**	**4.9**	**24**	**.51**	**.68**	**71**
Ovrl Ave	**1.1**	**3.5**	**35**	**.53**	**.70**	**75**

TABLE A5.59

Context: Brand Choice Within Individual Stores.
Product/Region: Automatc, Tea Bags, Inst Cof, Rgns I & II
Measure: Dirichlet Fit for wp and w/wp.

	wp			w/wp		
	MAD	MD	MAD/ MD %	MAD	MD	MAD/ MD %
Automatc Rgn I						
X	.46	.67	69	3.4	5.8	59
OM	.54	.69	78	4.0	5.7	70
Y	1.05	.87	121	5.4	3.7	146
Msc	.58	.57	102	4.0	7.3	55
Z	1.02	1.14	89	2.5	3.5	72
Ave	**.73**	**.79**	**92**	**3.9**	**5.2**	**80**
Tea Bags Rgn I						
X	.70	1.12	63	9.0	15.6	57
OM	.50	.71	70	4.1	8.2	50
Msc	.94	.61	154	8.4	10.8	78
Y	.58	.80	73	6.8	11.1	61
Z	1.20	1.47	82	8.0	23.0	35
Ave	**.78**	**.94**	**88**	**7.2**	**13.7**	**56**
Inst Cof Rgn I						
X	1.12	.31	361	3.1	9.5	32
OM	.66	.32	206	3.9	2.9	134
Y	1.00	.98	102	7.6	9.6	79
Msc	.48	.42	114	7.8	8.4	92
Z	2.48	2.18	114	6.6	13.9	47
Ave	**1.15**	**.84**	**179**	**5.8**	**8.9**	**77**
Automatc Rgn II						
V	.77	.67	115	3.3	5.0	65
OM	.80	.83	96	6.9	8.9	78
W	.97	.74	131	6.5	6.3	103
Z	.87	.62	140	3.4	5.4	63
Y	.52	1.02	51	6.0	8.7	69
Ave	**.78**	**.78**	**107**	**5.2**	**6.9**	**76**
Tea Bags Rgn II						
V	.96	1.50	64	6.1	12.2	49
Z	.73	1.04	74	7.4	13.8	53
OM	.55	.61	90	5.4	6.7	81
Y	.73	.97	75	7.8	13.3	58
W	.67	.69	97	8.2	9.9	82
Ave	**.72**	**.96**	**80**	**7.0**	**11.2**	**65**
Inst Cof Rgn II						
V	.47	1.02	46	4.3	13.5	32
OM	.90	.92	98	6.3	10.1	62
Z	.77	1.05	73	6.9	12.5	55
W	.87	1.12	78	9.1	13.2	69
Y	.57	.68	84	2.9	5.7	51
Ave	**.74**	**.96**	**76**	**6.0**	**11.0**	**54**
Ovrl Ave	**.82**	**.88**	**104**	**5.9**	**9.5**	**68**

TABLE A5.60
Context: Brand Choice Within Individual Stores.
Product/Region: Automatc, Tea Bags, Inst Cof, Rgns I & II
Measure: Dirichlet Fit for bs/b and ws.

	----- bs/b -----			------- ws ------		
	MAD	MD	MAD/ MD %	MAD	MD	MAD/ MD %
Automatc Rgn I						
X	2.5	5.6	45	.77	.79	97
OM	4.2	6.9	61	.57	.59	97
Y	6.3	6.1	103	1.24	.80	155
Msc	7.7	6.0	128	.62	.41	151
Z	11.5	9.7	118	.95	.96	99
Ave	**6.4**	**6.9**	**91**	**.83**	**.71**	**120**
Tea Bags Rgn I						
X	6.8	13.4	51	1.24	1.62	77
OM	6.6	10.0	66	.72	.78	92
Msc	6.6	10.3	64	.88	.55	160
Y	8.8	9.7	91	.90	1.02	88
Z	9.8	14.9	66	.38	1.08	35
Ave	**7.7**	**11.7**	**68**	**.82**	**1.01**	**90**
Inst Cof Rgn I						
X	2.8	8.8	32	1.14	1.28	89
OM	3.4	3.7	92	.78	.52	150
Y	6.8	7.9	86	1.16	.65	178
Msc	8.6	5.7	151	.60	.69	87
Z	11.2	9.8	114	1.10	1.44	76
Ave	**6.6**	**7.2**	**95**	**.96**	**.92**	**116**
Automatc Rgn II						
V	3.5	5.4	65	1.66	.93	178
OM	5.0	6.4	78	1.04	.99	105
W	4.9	4.9	101	1.50	1.39	108
Z	2.7	3.9	68	.92	.87	106
Y	6.1	7.9	77	1.53	1.56	98
Ave	**4.5**	**5.7**	**78**	**1.31**	**1.15**	**119**
Tea Bags Rgn II						
V	1.8	5.5	33	1.40	1.58	89
Z	7.5	13.3	56	1.30	1.83	71
OM	5.5	5.5	99	1.27	.99	128
Y	8.5	12.8	66	1.32	1.71	77
W	6.4	5.6	113	.73	.93	78
Ave	**6.1**	**8.5**	**73**	**1.20**	**1.41**	**89**
Inst Cof Rgn II						
V	8.5	19.5	44	.32	.77	42
OM	6.1	10.0	61	.52	.41	127
Z	7.8	12.1	65	.91	1.05	87
W	4.5	7.6	59	.95	1.10	86
Y	5.8	9.9	59	.78	.60	130
Ave	**6.4**	**11.8**	**58**	**.73**	**.79**	**94**
Ovrl Ave	**6.3**	**8.6**	**77**	**.98**	**1.00**	**105**

TABLE A5.61
Context: Brand Choice within Individual Stores.
Product/Region: Automatic Washing Powder, Region I.
Measure: Loyalty Indices.

Store/ Brand	s	w	w/wp	bs/b	ws	8+	dpl	Ave excl s & ws
Store X								
A1	119	103	105	107	127	111	105	106
A2	120	105	105	109	95	112	104	107
A3	55	84	98	104	93	75	92	91
A5	172	116	115	90	118	107	94	104
A4	83	95	88	90	153	121	100	99
O Mltps								
A1	91	99	110	121	115	118	111	112
A2	74	93	93	102	99	100	100	98
A3	190	116	104	85	151	122	91	104
A4	131	107	107	83	117	125	94	103
A5	89	97	84	92	71	56	83	82
Store Y								
A2	282	124	117	121	177	109	100	114
A1	43	87	111	158	155	100	109	113
A3	147	110	114	96	128	136	85	108
A4	336	135	119	114	223	144	105	124
A5	89	97	112	131	110	143	93	115
Misclns								
A1	56	92	108	134	99	60	110	101
A2	178	111	106	115	125	100	92	105
A4	537	132	112	93	182	175	95	121
A5	66	92	101	113	135	0	100	81
A3	88	97	84	127	121	0	91	80
Store Z								
A1	72	94	101	164	109	88	105	110
A2	72	93	100	160	57	60	113	105
A4	972	160	110	77	79	110	90	109
A3	74	93	90	144	215	260	88	135
A5	170	115	113	109	52	300	94	146
Average *								
1	124	102	108	129	125	97	106	109
2	97	98	103	129	106	94	104	106
3	380	120	108	91	127	124	91	107
4	156	109	106	109	162	127	96	109
5	104	100	96	110	101	124	92	104

Notes:
- See Table A1.16 for definition of Loyalty Indices, and Table 6.25 for clarification of duplication figures.
- Within each store, brands are ordered by market share.
* Averages are for each brand rank.

TABLE A5.62

Context: Brand Choice within Individual Stores.
Product/Region: Tea Bags, Region I.
Measure: Loyalty Indices.

Store/ Brand	s	w	w/wp	bs/b	ws	8+	dpl	Ave excl s & ws
Store X								
B1	200	107	111	104	120	132	133	117
B2	89	98	102	106	124	127	90	104
OB	39	77	85	84	61	86	78	82
B3	67	88	75	59	79	65	81	74
B4	17	55	53	54	31	129	80	74
O Mltps								
B2	151	108	112	108	169	92	105	105
OB	79	94	100	108	114	91	98	98
B1	83	94	112	125	96	80	115	105
B3	104	103	101	77	125	100	84	93
B4	52	83	78	57	78	67	83	74
Misclns								
OB	76	94	89	111	64	90	105	98
B1	193	113	102	133	122	130	141	124
B2	158	110	90	95	62	113	85	98
B3	39	79	70	82	46	71	84	77
B4	37	75	60	82	78	100	87	81
Store Y								
B1	548	138	131	129	221	200	110	142
B2	48	88	113	170	122	90	123	117
OB	195	115	114	100	117	150	95	115
B3	71	93	86	71	95	125	73	90
B4	72	89	89	132	68	33	82	85
Store Z								
B1	441	116	110	97	102	109	145	115
B2	35	79	82	160	100	60	91	94
B3	24	68	75	133	94	44	69	78
OB	11	59	82	167	106	0	73	76
B4	3	42	37	0	0	0	53	27
Average *								
1	283	113	111	110	135	125	120	115
2	89	94	100	135	116	100	109	107
3	100	93	95	107	86	95	88	96
4	58	84	83	91	90	72	79	82
5	36	69	63	65	51	66	77	68

Notes:
- See Table A5.61 for clarification.
* Averages are for each brand rank.

TABLE A5.63

Context: Brand Choice Within Individual Stores.
Product/Region: Instant Coffee, Region I.
Measure: Loyalty Indices.

Store/ Brand	S	W	W/WP	BS/B	WS	8+	dpl	Ave excl S & WS
Store X								
C1	183	109	111	108	149	129	113	114
C2	88	96	112	100	117	100	85	99
C3	60	86	100	74	89	69	85	83
OB	48	79	98	97	75	93	100	93
C4	80	93	103	97	136	118	113	105
O Mltps								
C2	131	105	105	105	123	129	97	108
C1	116	103	105	103	141	123	93	105
C3	113	103	114	100	116	108	100	105
OB	54	86	106	103	90	83	100	96
C4	101	100	111	141	130	150	133	127
Store Y								
C2	144	107	101	100	118	124	95	105
C1	60	88	110	135	85	71	114	104
C3	83	95	89	95	124	86	88	90
C4	221	124	136	139	141	227	125	150
OB	89	97	79	89	181	123	92	96
Misclns								
OB	514	126	114	113	165	150	108	122
C2	73	96	102	110	90	140	92	108
C1	64	92	109	132	85	80	117	106
C3	39	83	88	103	74	50	79	80
C4	1080	161	147	159	126	1100	100	333
Store Z								
C1	184	131	108	116	131	132	111	120
C3	54	85	82	139	100	71	83	92
C2	43	79	110	139	60	54	117	100
OB	200	122	84	88	41	171	73	107
C4	7	44	83	147	56	0	133	81
Average *								
1	231	116	108	108	137	133	105	114
2	78	94	102	117	107	101	93	102
3	73	91	104	108	95	79	101	97
4	112	99	102	106	84	125	95	105
5	271	99	105	127	126	298	114	148

Notes:
- See Table A5.61 for clarification.
* Averages are for each brand rank.

TABLE A5.64

Context: Brand Choice within Individual Stores.
Product/Region: Automatic Washing Powder, Region II.
Measure: Loyalty Indices.

Store/ Brand	s	w	w/wp	bs/b	ws	8+	dpl	Ave excl s & ws
Store V								
A1	94	99	105	110	146	--	102	104
A5	86	96	103	99	127	--	100	100
A4	139	110	119	113	122	--	104	112
A2	103	101	96	77	177	--	93	92
A3	--	--	--	--	--	--	--	--
O Mltps								
A1	104	101	107	105	83	--	97	103
A3	281	122	112	85	67	--	95	104
A4	93	98	118	130	140	--	129	119
A5	61	89	70	94	62	--	94	87
A2	72	92	96	91	161	--	93	93
Store W								
A1	78	96	105	130	129	--	113	111
A5	789	147	128	118	281	--	105	125
A4	139	108	124	105	138	--	88	106
A2	43	82	95	111	79	--	93	95
A3	--	--	--	--	--	--	--	--
Store Z								
A1	129	105	113	106	133	--	110	109
A4	97	99	101	93	177	--	93	97
A3	127	106	99	80	101	--	85	93
A2	66	90	109	102	143	--	100	100
A5	20	66	86	96	66	--	107	89
Store Y								
A3	171	110	110	103	60	--	105	107
A1	71	93	92	88	131	--	95	92
A4	144	110	111	130	195	--	104	114
A2	89	97	99	107	64	--	96	100
A5	34	70	57	53	39	--	82	66
Average *								
1	115	102	108	111	110	--	105	107
2	265	111	107	97	157	--	98	103
3	121	105	109	113	145	--	106	108
4	99	99	104	104	106	--	96	101
5	54	82	86	86	104	--	94	87

Notes:
- See Table A5.61 for clarification.
* Averages are for each brand rank. Where no rank 5, brand in rank 3/4 is assumed to be in rank 4/5.

TABLE A5.65
Context: Brand Choice within Individual Stores.
Product/Region: Tea Bags, Region II.
Measure: Loyalty Indices.

Store/ Brand	s	w	w/wp	bs/b	ws	8+	dpl	Ave excl s & ws
Store V								
B2	117	103	109	103	117	--	100	104
OB	77	95	99	103	111	--	102	100
B4	117	104	96	86	166	--	100	97
B3	16	54	48	94	39	--	90	72
B1	--	--	--	--	--	--	--	--
Store Z								
B1	192	107	107	95	104	--	115	106
B2	50	82	92	138	109	--	113	106
B3	134	109	95	62	228	--	83	87
OB	33	71	78	79	84	--	81	77
B4	14	53	53	75	61	--	76	64
O Mltps								
B1	410	133	131	105	206	--	107	119
B2	61	89	105	138	121	--	108	110
OB	75	93	98	107	121	--	95	98
B3	147	111	114	129	139	--	104	115
B4	67	88	86	76	121	--	83	83
Store Y								
B2	230	111	104	115	140	--	115	111
B1	150	104	108	121	136	--	114	112
B3	116	99	103	110	98	--	95	102
OB	39	72	73	72	60	--	81	74
B4	29	64	53	53	37	--	77	62
Store W								
B1	1437	144	135	111	208	--	125	129
B2	105	101	110	105	100	--	89	101
OB	54	88	97	130	117	--	97	103
B3	102	100	116	138	113	--	100	114
B4	42	79	72	86	94	--	88	81
Average *								
1	477	120	117	106	155	--	112	114
2	89	94	103	121	115	--	105	106
3	95	97	98	102	141	--	93	98
4	88	92	95	101	112	--	93	95
5	34	68	62	77	70	--	83	72

Notes:
- See Table A5.61 for clarification.
* Averages are for each brand rank. Where no rank 5, brand in rank 3/4 is assumed to be in rank 4/5.

TABLE A5.66

Context: Brand Choice within Individual Stores.
Product/Region: Instant Coffee, Region II.
Measure: Loyalty Indices.

Store/ Brand	s	w	w/wp	bs/b	ws	8+	dpl	Ave excl s & ws
Store V								
C2	109	101	102	99	109	--	89	98
OB	92	99	105	107	105	--	119	107
C4	73	91	83	50	96	--	100	81
C1	--	--	--	--	--	--	--	--
C3	--	--	--	--	--	--	--	--
O Mltps								
C2	79	96	106	120	91	--	112	109
C1	184	113	101	103	136	--	97	104
C3	187	115	91	73	115	--	88	92
OB	60	88	90	104	92	--	93	94
C4	20	60	53	64	121	--	100	70
Store Z								
C1	451	130	124	124	154	--	140	130
C2	42	83	106	148	97	--	97	109
C3	108	102	95	101	109	--	86	96
OB	48	81	77	95	111	--	70	81
C4	216	125	115	134	172	--	83	114
Store W								
C2	170	109	109	100	112	--	94	103
OB	50	86	107	91	83	--	89	93
C1	176	114	127	102	134	--	113	114
C3	81	95	92	79	130	--	106	93
C4	21	61	51	67	36	--	167	86
Store Y								
C2	165	108	103	111	115	--	113	109
C1	54	87	102	123	95	--	100	103
OB	125	106	99	93	162	--	91	97
C3	69	91	85	76	140	--	81	83
C4	160	114	111	82	116	--	100	102
Average *								
1	195	109	109	111	116	--	110	110
2	83	92	104	116	103	--	96	102
3	138	107	103	95	125	--	99	101
4	65	89	86	89	118	--	88	88
5	98	90	83	79	108	--	110	91

Notes:
- See Table A5.61 for clarification.
* Averages are for each brand rank. Where no rank 4 or 5, brand ranked 2/3 is assumed to be ranked 3/5.

TABLE A5.67

Context: Brand Choice within Individual Stores.

Product/Region: Automatc, Tea Bags, Inst Cof; Rgns I & II

Measure: Mean Deviation of Brands' s Values Within Individual Stores.

	Auto-matc	Tea Bags	Inst Cof	Ave
Region I				
Store X	.28	1.04	.28	.53
O Mltps	.25	.30	.22	.26
Store Y	.92	.85	.23	.67
Misclns	.59	.73	.87	.73
Store Z	.66	(15.06)	(2.98)	.66
Average	.54	.73	.40	.57
Region II				
Store V	.11	1.77	.06	.65
O Mltps	.24	.50	1.01	.58
Store W	.91	.72	.83	.82
Store Z	1.27	1.42	.70	1.13
Store Y	.55	.91	.38	.61
Average	.62	1.06	.59	.76
Overall average	.58	.90	.50	.67

Notes:
- Figures in brackets are not included in averages.

Appendix 6

Detailed Results for Chapter 11:

STORE CHOICE FOR INDIVIDUAL BRANDS.

TABLE A6.1
Context: Store Choice for Individual Brands.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Various.

Brnd/Str	s	MS (%)	b (%) O	b (%) D	w O	w D
Brand A1						
X	0.20	42	23	27	5.1	4.2
OM	0.96	24	19	18	3.5	3.8
Y	1.35	17	15	13	3.0	3.6
Ms	3.57	9	11	7	2.2	3.4
Z	0.94	7	6	6	3.1	3.4
Ave	S= 0.68 excl Ms	20	15	14	3.4	3.7
Brand A2						
X	0.26	35	14	16	4.6	4.0
Y	0.29	26	11	13	4.4	3.8
OM	1.56	20	13	10	3.0	3.7
Ms	1.98	11	8	6	2.6	3.5
Z	1.08	9	6	5	3.0	3.4
Ave	S= 0.64 excl Ms	20	10	10	3.5	3.7
Brand A3						
X	0.58	36	13	13	3.5	3.6
OM	0.36	26	9	10	3.7	3.5
Y	0.41	26	9	10	3.6	3.5
Z	0.95	7	3	3	2.7	3.2
Ms	2.48	6	4	2	2.1	3.2
Ave	S= 0.50 excl Ms	20	8	8	3.1	3.4
Brand A4						
X	0.52	28	9	9	3.9	3.9
Y	0.25	24	7	8	4.3	3.8
OM	0.93	21	8	7	3.3	3.8
Ms	1.12	15	6	5	3.0	3.7
Z	0.10	12	3	4	5.0	3.6
Ave	S= 0.48 excl Ms	20	7	7	3.9	3.8
Brand A5						
X	0.18	44	8	10	4.8	3.7
OM	1.30	23	7	6	2.9	3.3
Y	1.12	14	4	4	2.8	3.2
Z	0.49	10	3	3	3.3	3.1
Ms	4.36	9	4	3	2.0	3.1
	S= 0.64 excl Ms	20	5	5	3.1	3.3
Ovrl Ave	1.09	20	9	9	3.4	3.6

TABLE A6.2
Context: Store Choice for Individual Brands.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Various.

Brnd/Str	wp		w/wp (%)		bs/b (%)		ws	
	O	D	O	D	O	D	O	D
Brand A1								
X	7.4	6.7	68	62	50	49	4.6	3.8
OM	7.1	7.1	49	53	34	40	3.1	3.4
Y	6.2	7.3	49	49	43	37	2.5	3.2
Ms	8.2	7.5	27	45	25	33	2.0	3.0
Z	8.7	7.6	35	45	24	32	2.9	3.0
Ave	7.5	7.2	46	51	35	38	3.0	3.3
Brand A2								
X	6.6	6.7	70	59	51	48	3.6	3.5
Y	7.1	6.9	62	54	44	43	3.3	3.3
OM	6.5	7.1	46	52	40	41	2.7	3.2
Ms	8.2	7.3	32	48	28	37	2.6	3.0
Z	7.1	7.4	42	46	24	36	2.4	2.9
Ave	7.1	7.1	50	52	38	41	2.9	3.2
Brand A3								
X	6.1	5.6	58	65	60	57	3.5	3.4
OM	6.6	5.7	56	61	50	53	3.0	3.2
Y	5.6	5.7	64	61	48	53	2.8	3.2
Z	6.4	6.1	42	53	43	45	2.2	2.9
Ms	7.4	6.1	28	52	39	44	1.3	2.9
Ave	6.4	5.8	50	58	48	50	2.6	3.1
Brand A4								
X	5.3	6.5	73	60	70	52	3.7	3.6
Y	6.7	6.5	65	59	59	51	4.5	3.5
OM	6.7	6.6	49	57	43	49	2.3	3.4
Ms	7.6	6.7	40	55	42	47	2.7	3.3
Z	8.7	6.8	57	54	26	45	7.1	3.3
Ave	7.0	6.6	57	57	48	49	4.1	3.4
Brand A5								
X	6.5	5.7	73	65	50	56	3.7	3.3
OM	6.2	6.1	47	55	52	46	1.8	2.9
Y	7.0	6.3	40	51	36	42	3.1	2.7
Z	6.6	6.4	50	48	23	40	1.2	2.7
Ms	4.3	6.4	45	48	41	40	1.1	2.6
Ave	6.1	6.2	51	53	40	45	2.2	2.8
Ovrl Ave	6.8	6.6	51	54	42	45	3.0	3.2

TABLE A6.3

Context: Store Choice for Brand A1.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Purchase Frequency Distribution.

Buyers at:		% making X purchases at the store:							
		1	2	3	4	5	6	7	8+
Store X	O	33	19	8	8	6	5	2	21
	D	37	18	11	7	5	4	3	15
O Mltps	O	43	15	11	8	4	2	4	13
	D	40	18	11	7	5	4	3	12
Store Y	O	44	24	9	4	4	2	2	11
	D	42	18	11	7	5	4	2	12
Misclns	O	49	26	11	5	2	4	0	3
	D	44	18	10	7	4	3	3	12
Store Z	O	44	20	9	11	2	2	6	7
	D	44	18	11	7	5	4	2	10
Average	O	43	21	10	7	4	3	3	11
	D	41	18	10	7	5	4	3	12

TABLE A6.4

Context: Store Choice for Brand A2.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Purchase Frequency Distribution.

Buyers at:		% making X purchases at the store:							
		1	2	3	4	5	6	7	8+
Store X	O	40	19	7	3	6	2	2	19
	D	39	18	10	7	5	4	3	14
Store Y	O	32	21	14	7	5	5	3	12
	D	41	18	10	7	5	4	2	13
O Mltps	O	54	16	7	7	3	1	4	9
	D	42	18	11	7	5	4	3	11
Misclns	O	51	18	8	4	8	1	4	4
	D	44	18	10	7	5	3	2	11
Store Z	O	59	18	2	2	2	0	10	6
	D	46	19	10	6	4	4	2	9
Average	O	47	18	8	5	5	2	5	10
	D	43	18	10	7	5	4	2	12

TABLE A6.5

Context: Store Choice for Brand A3.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Purchase Frequency Distribution.

Buyers at:		% making X purchases at the store:							
		1	2	3	4	5	6	7	8+
Store X	O	35	20	16	6	8	3	1	12
	D	42	18	11	7	5	4	3	11
O Mltps	O	48	17	9	5	5	2	4	11
	D	43	18	10	7	5	3	3	10
Store Y	O	47	18	7	6	1	2	4	15
	D	43	18	10	7	5	3	3	10
Store Z	O	70	10	0	3	3	0	0	13
	D	45	17	10	7	3	3	3	10
Misclns	O	55	13	16	3	13	0	0	0
	D	48	17	9	4	4	4	4	9
Average	O	51	16	10	5	6	1	2	10
	D	44	18	10	6	5	4	3	10

TABLE A6.6

Context: Store Choice for Brand A4.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Purchase Frequency Distribution.

Buyers at:		% making X purchases at the store:							
		1	2	3	4	5	6	7	8+
Store X	O	41	18	9	6	3	5	3	17
	D	41	17	10	7	5	3	2	15
Store Y	O	39	16	10	8	2	8	3	13
	D	42	18	10	6	5	4	3	12
O Mltps	O	49	13	6	4	9	7	1	10
	D	43	18	10	7	4	3	3	12
Misclns	O	58	13	7	7	4	2	2	7
	D	43	18	10	6	4	4	2	14
Store Z	O	41	15	7	7	11	0	7	11
	D	43	17	9	7	5	2	2	15
Average	O	46	15	8	6	6	4	3	12
	D	42	17	10	7	5	3	2	14

TABLE A6.7

Context: Store Choice for Brand A5.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Purchase Frequency Distribution.

Buyers at:		% making X purchases at the store:							
		1	2	3	4	5	6	7	8+
Store X	O	44	14	3	11	3	6	3	16
	D	41	18	11	7	5	4	3	12
O Mltps	O	53	16	7	10	5	5	0	5
	D	45	18	10	7	5	3	2	10
Store Y	O	67	10	0	3	3	5	3	10
	D	46	18	10	5	5	3	3	10
Store Z	O	73	18	0	0	0	0	0	9
	D	49	19	11	7	4	4	4	3
Misclns	O	60	16	11	3	5	5	0	0
	D	49	19	11	8	4	4	4	2
Average	O	59	15	4	5	3	4	1	8
	D	46	18	11	7	4	3	3	7

TABLE A6.8

Context: Store Choice for Brand A1.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Duplication.

Buyers at:	% also buying at:				
	X	OM	Y	Msc	Z
Store X	--	29	19	15	10
O Mltps	34	--	22	25	14
Store Y	28	27	--	19	9
Misclns	30	42	26	--	18
Store Z	36	45	23	34	--
Average	32	36	23	23	13
D x rltv b	38	32	26	19	11
D = 0.81					
Relative b *	47	40	32	24	13

Notes:
* Relative b (rltv b) is the penetration of the store among buyers of the brand.
- D is calculated using relative penetration.

TABLE A6.9

Context: Store Choice for Brand A2.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Duplication.

Buyers at:	% also buying at:				
	X	Y	OM	Msc	Z
Store X	--	17	22	14	9
Store Y	22	--	22	22	12
O Mltps	25	19	--	23	12
Misclns	25	30	36	--	16
Store Z	24	24	28	24	--
Average	24	23	27	21	12
D x rltv b	29	23	26	17	11
D = 0.71					
Relative b *	41	32	37	24	16

Notes:
* Relative b (rltv b) is the penetration of the store among buyers of the brand.
- D is calculated using relative penetration.

TABLE A6.10

Context: Store Choice for Brand A3.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Duplication.

Buyers at:	% also buying at:				
	X	OM	Y	Z	Msc
Store X	--	19	20	6	8
O Mltps	28	--	23	8	12
Store Y	28	22	--	7	14
Store Z	23	23	19	--	16
Misclns	32	32	38	16	--
Average	28	24	25	9	13
D x rltv b	33	24	24	9	9
D = 0.71					
Relative b *	47	33	33	12	13

Notes:
* Relative b (rltv b) is the penetration of the store among buyers of the brand.
- D is calculated using relative penetration.

TABLE A6.11

Context: Store Choice for Brand A4.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Duplication.

Buyers at:	% also buying at:				
	X	Y	OM	Msc	Z
Store X	--	10	18	15	7
Store Y	13	--	21	27	6
O Mltps	21	18	--	27	18
Misclns	21	30	34	--	12
Store Z	22	14	48	25	--
Average	19	18	30	24	11
D x rltv b	28	21	24	19	9
D = 0.73					
Relative b *	38	29	33	26	13

Notes:
* Relative b (rltv b) is the penetration of the store among buyers of the brand.
- D is calculated using relative penetration.

TABLE A6.12

Context: Store Choice for Brand A5.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Duplication.

Buyers at:	% also buying at:				
	X	OM	Y	Z	Msc
Store X	--	15	22	8	11
O Mltps	18	--	16	13	14
Store Y	41	25	--	7	10
Store Z	27	36	13	--	22
Misclns	21	24	10	13	--
Average	27	25	15	10	14
D x rltv b	28	24	16	9	15
D = 0.64					
Relative b *	44	38	24	14	23

Notes:
* Relative b (rltv b) is the penetration of the store among buyers of the brand.
- D is calculated using relative penetration.

TABLE A6.13
Context: Store Choice for Individual Brands.
Product/Region: Tea Bags, Region I.
Measure(s): Various.

Brnd/Str	s	MS (%)	b (%) O	b (%) D	w O	w D
Brand B1						
X	0.27	47	29	32	6.1	5.6
Z	0.14	21	13	17	6.4	4.9
Ms	1.14	12	12	10	3.6	4.6
Y	0.45	11	9	9	4.7	4.6
OM	1.66	10	12	8	3.1	4.6
Ave	S= 0.49	20	15	15	4.8	4.9
Brand B2						
OM	0.55	30	15	16	3.9	3.7
X	0.30	27	13	15	4.3	3.6
Y	1.37	19	13	13	3.0	3.4
Ms	0.70	19	11	11	3.5	3.4
Z	2.16	5	4	4	2.3	3.1
Ave	S= 0.75	20	11	12	3.4	3.4
O Brands						
Ms	0.73	27	16	15	3.2	3.4
OM	0.59	27	15	15	3.3	3.4
X	0.55	24	14	14	3.3	3.3
Y	0.23	20	10	12	3.8	3.3
Z	5.10	2	2	1	1.6	3.0
Ave	S= 0.54 excl Z	20	11	11	3.0	3.3
Brand B3						
OM	0.36	30	8	9	3.2	2.8
X	0.15	26	6	8	3.6	2.8
Y	0.78	19	6	6	2.7	2.7
Ms	1.79	17	6	5	2.2	2.7
Z	2.25	7	3	2	1.9	2.5
Ave	S= 0.76	20	6	6	2.7	2.7
Brand B4						
OM	0.19	33	6	6	2.5	2.3
Ms	0.57	24	5	5	2.1	2.3
Y	0.15	22	4	4	2.5	2.3
X	0.49	18	4	4	2.2	2.3
Z	24.50	3	1	1	1.1	2.2
Ave	S= 0.33 excl Z	20	4	4	2.1	2.3
Ovrl Ave	1.89	20	9	10	3.2	3.3

TABLE A6.14
Context: Store Choice for Individual Brands.
Product/Region: Tea Bags, Region I.
Measure(s): Various.

Brnd/Str	wp O	wp D	w/wp (%) O	w/wp (%) D	bs/b (%) O	bs/b (%) D	ws O	ws D
Brand B1								
X	7.9	8.3	77	67	63	55	6.7	5.3
Z	9.5	9.0	67	54	46	41	8.2	4.5
Ms	7.6	9.3	47	49	42	37	4.7	4.3
Y	8.9	9.3	53	49	33	37	3.7	4.2
OM	7.4	9.3	42	49	34	36	4.3	4.2
Ave	8.3	9.0	57	54	44	41	5.5	4.5
Brand B2								
OM	6.9	6.7	57	55	43	42	3.4	3.2
X	7.0	6.8	61	53	50	41	3.9	3.1
Y	6.7	7.0	45	49	45	37	3.5	2.9
Ms	7.7	7.0	45	49	38	37	2.9	2.9
Z	6.1	7.4	38	42	32	31	4.0	2.6
Ave	6.9	7.0	49	49	42	38	3.5	2.9
O Brands								
Ms	5.5	5.6	58	61	53	51	3.1	3.2
OM	6.0	5.6	55	61	54	50	3.0	3.2
X	5.7	5.7	58	58	48	49	3.4	3.1
Y	6.2	5.7	61	58	43	47	3.2	3.0
Z	5.2	6.0	31	50	40	40	1.4	2.8
Ave	5.7	5.7	53	57	48	47	2.8	3.1
Brand B3								
OM	5.2	4.8	62	58	46	50	2.0	2.5
X	6.3	4.9	57	57	60	48	3.2	2.4
Y	4.7	5.0	57	54	62	45	1.9	2.3
Ms	6.1	5.1	36	53	46	44	2.2	2.3
Z	3.5	5.3	54	47	52	40	1.4	2.1
Ave	5.2	5.0	53	54	53	45	2.1	2.3
Brand B4								
OM	3.7	3.0	68	77	75	74	1.9	2.3
Ms	4.0	3.1	53	74	70	72	1.6	2.3
Y	3.7	3.1	68	74	68	71	1.6	2.2
X	3.9	3.1	56	74	76	70	2.0	2.2
Z	2.0	3.2	55	69	64	65	1.1	2.1
Ave	3.5	3.1	60	74	71	70	1.6	2.2
Ovrl Ave	5.9	6.0	54	58	51	48	3.1	3.0

TABLE A6.15

Context: Store Choice for Brand B1.
Product/Region: Tea Bags, Region I.
Measure(s): Purchase Frequency Distribution.

Buyers at:		% making X purchases at the store:							
		1	2	3	4	5	6	7	8+
Store X	O	29	15	9	6	5	3	4	29
	D	31	16	10	7	6	4	3	22
Store Z	O	26	17	9	11	6	4	3	24
	D	36	17	10	7	5	4	3	18
Misclns	O	51	14	7	7	5	2	3	13
	D	37	17	10	7	5	4	3	16
Store Y	O	39	14	8	8	3	4	5	21
	D	38	17	10	6	5	4	3	16
O Mltps	O	48	20	9	7	3	2	4	8
	D	38	16	10	8	5	4	3	18
Average	O	39	16	8	8	4	3	4	19
	D	36	17	10	7	5	4	3	18

TABLE A6.16

Context: Store Choice for Brand B2.
Product/Region: Tea Bags, Region I.
Measure(s): Purchase Frequency Distribution.

Buyers at:		% making X purchases at the store:							
		1	2	3	4	5	6	7	8+
O Mltps	O	46	16	9	7	3	4	4	12
	D	41	18	10	7	5	4	2	12
Store X	O	44	12	12	4	4	4	1	19
	D	42	18	11	7	5	3	3	12
Store Y	O	51	16	10	4	3	4	3	9
	D	43	18	10	7	4	3	3	10
Misclns	O	54	14	6	8	2	1	4	10
	D	44	19	11	6	4	4	3	10
Store Z	O	73	14	0	5	0	5	0	3
	D	46	20	10	7	3	3	3	8
Average	O	54	14	7	6	2	4	2	11
	D	43	19	10	7	4	3	3	11

TABLE A6.17

Context: Store Choice for Other Brands.
Product/Region: Tea Bags, Region I.
Measure(s): Purchase Frequency Distribution.

Buyers at:		% making X purchases at the store: 1	2	3	4	5	6	7	8+
Misclns	O	56	17	9	5	3	1	1	9
	D	42	18	10	7	5	3	3	11
O Mltps	O	45	16	9	6	5	5	4	10
	D	43	18	10	7	5	3	3	11
Store X	O	49	15	15	3	2	3	2	12
	D	43	18	11	7	4	4	2	10
Store Y	O	51	8	7	7	7	3	2	15
	D	44	19	10	7	4	3	3	10
Store Z	O	70	5	20	5	0	0	0	0
	D	49	16	8	8	8	0	0	10
Average	O	54	12	12	5	3	2	2	9
	D	44	18	10	7	5	3	2	10

TABLE A6.18

Context: Store Choice for Brand B3.
Product/Region: Tea Bags, Region I.
Measure(s): Purchase Frequency Distribution.

Buyers at:		% making X purchases at the store:							
		1	2	3	4	5	6	7	8+
O Mltps	O	57	13	11	3	4	1	1	8
	D	48	19	10	7	4	3	2	6
Store X	O	43	25	6	0	11	4	0	11
	D	49	19	10	6	4	3	3	7
Store Y	O	62	15	2	8	4	0	0	10
	D	50	18	10	7	3	3	2	7
Misclns	O	53	23	14	0	0	4	2	5
	D	51	18	9	5	4	2	2	8
Store Z	O	68	8	12	4	4	0	0	4
	D	55	18	9	5	5	5	0	4
Average	O	57	17	9	3	5	2	1	8
	D	51	19	10	6	4	3	2	6

TABLE A6.19

Context: Store Choice for Brand B4.
Product/Region: Tea Bags, Region I.
Measure(s): Purchase Frequency Distribution.

Buyers at:		% making X purchases at the store: 1	2	3	4	5	6	7	8+
O Mltps	O	57	16	10	6	4	0	0	8
	D	52	19	10	6	3	2	2	6
Misclns	O	68	18	2	2	0	2	2	5
	D	54	19	11	6	4	2	2	1
Store Y	O	65	6	18	3	6	0	0	3
	D	54	19	9	7	5	2	2	2
Store X	O	70	12	6	3	0	0	0	9
	D	53	20	11	6	3	3	3	2
Store Z	O	91	9	0	0	0	0	0	0
	D	48	16	16	0	0	0	0	19
Average	O	70	12	7	3	2	0	0	5
	D	52	19	11	5	3	2	2	6

TABLE A6.20

Context: Store Choice for Brand B1.
Product/Region: Tea Bags, Region I.
Measure(s): Duplication.

Buyers at:	% also buying at:				
	X	Z	Msc	Y	OM
Store X	--	11	15	9	14
Store Z	26	--	17	17	16
Misclns	36	17	--	17	19
Store Y	31	23	23	--	25
O Mltps	36	17	20	19	--
Average	32	17	19	16	19
D x rltv b	40	17	17	12	16
D = 0.72					
Relative b *	55	24	23	17	22

Notes:
* Relative b (rltv b) is the penetration of the store among buyers of the brand.
- D is calculated using relative penetration.

TABLE A6.21

Context: Store Choice for Brand B2.
Product/Region: Tea Bags, Region I.
Measure(s): Duplication.

Buyers at:	**% also buying at:**				
	OM	**X**	**Y**	**Msc**	**Z**
O Mltps	--	24	26	25	10
Store X	29	--	24	21	4
Store Y	31	24	--	24	10
Misclns	34	24	28	--	12
Store Z	37	13	32	32	--
Average	33	21	28	26	9
D x rltv b	32	26	27	22	9
D = 0.77					
Relative b *	41	34	35	29	11

Notes:
* Relative b (rltv b) is the penetration of the store among buyers of the brand.
- D is calculated using relative penetration.

TABLE A6.22

Context: Store Choice for Other Brands.
Product/Region: Tea Bags, Region I.
Measure(s): Duplication.

Buyers at:	% also buying at:				
	Msc	OM	X	Y	Z
Misclns	--	23	20	16	3
O Mltps	25	--	19	16	2
Store X	24	22	--	17	5
Store Y	26	26	24	--	3
Store Z	25	14	34	14	--
Average	25	21	24	16	3
D x rltv b	25	24	21	15	4
D = 0.64					
Relative b *	39	37	33	24	6

Notes:
* Relative b (rltv b) is the penetration of the store among buyers of the brand.
- D is calculated using relative penetration.

TABLE A6.23

Context: Store Choice for Brand B3.
Product/Region: Tea Bags, Region I.
Measure(s): Duplication.

Buyers at:	% also buying at:				
	OM	X	Y	Msc	Z
O Mltps	--	21	14	29	11
Store X	28	--	11	16	3
Store Y	18	11	--	20	7
Misclns	36	15	19	--	7
Store Z	31	7	15	15	--
Average	28	14	15	20	7
D x rltv b	23	17	17	19	8
D = 0.62					
Relative b *	37	28	28	30	13

Notes:
* Relative b (rltv b) is the penetration of the store among buyers of the brand.
- D is calculated using relative penetration.

TABLE A6.24

Context: Store Choice for Brand B4.
Product/Region: Tea Bags, Region I.
Measure(s): Duplication.

Buyers at:	% also buying at:				
	OM	Msc	Y	X	Z
O Mltps	--	11	11	7	3
Misclns	13	--	13	6	6
Store Y	17	17	--	14	2
Store X	12	9	15	--	0
Store Z	18	27	9	0	--
Average	15	16	12	7	3
D x rltv b	15	13	10	10	4
D = 0.44					
Relative b *	35	30	23	23	8

Notes:
* Relative b (rltv b) is the penetration of the store among buyers of the brand.
- D is calculated using relative penetration.

TABLE A6.25

Context: Store Choice for Individual Brands.

Product/Region: Instant Coffee, Region I.

Measure(s): Various.

Brnd/Str	s	MS (%)	b (%) O	b (%) D	w O	w D
Brand C1						
X	0.25	48	29	31	5.9	5.6
Z	0.10	18	10	13	6.7	5.0
OM	0.72	18	15	13	4.1	5.0
Y	1.05	10	11	8	3.5	4.8
Ms	4.23	6	10	5	2.2	4.8
Ave	S= 0.34 excl Ms	20	15	14	4.5	5.0
Brand C2						
X	0.52	31	19	19	4.5	4.5
OM	0.57	26	17	17	4.3	4.4
Y	0.39	26	15	16	4.7	4.4
Ms	3.78	11	12	7	2.4	4.0
Z	1.10	6	5	4	3.1	3.9
Ave	S= 0.53 excl Ms	20	14	13	3.8	4.2
Brand C3						
OM	0.45	28	11	11	3.9	3.8
X	0.62	27	11	11	3.7	3.8
Y	0.51	24	9	9	3.7	3.7
Z	0.64	11	5	5	3.3	3.5
Ms	6.64	10	8	4	1.9	3.5
Ave	S= 0.54 excl Ms	20	9	8	3.3	3.7
O Brands						
Ms	0.50	32	13	13	3.4	3.4
OM	0.64	26	11	11	3.2	3.4
X	0.43	22	9	9	3.3	3.3
Y	0.24	13	5	6	3.6	3.2
Z	0.07	6	2	3	4.5	3.1
Ave	S= 0.45 excl Ms	20	8	8	3.6	3.3
Brand C4						
OM	1.01	30	7	6	3.6	3.9
X	0.68	28	6	6	3.9	3.9
Y	0.26	25	5	5	4.6	3.8
Ms	0.59	14	3	3	3.7	3.6
Z	8.81	2	1	0	1.6	3.3
Ave	S= 0.67 excl Ms & Z	20	4	4	3.5	3.7
Ovrl Ave	1.39	20	10	9	3.7	4.0

TABLE A6.26
Context: Store Choice for Individual Brands.
Product/Region: Instant Coffee, Region I.
Measure(s): Various.

Brnd/Str	wp O	wp D	w/wp (%) O	w/wp (%) D	bs/b (%) O	bs/b (%) D	ws O	ws D
Brand C1								
X	7.7	7.7	77	73	64	64	5.7	5.6
Z	10.9	8.3	61	60	39	50	7.6	4.9
OM	8.3	8.3	49	60	38	50	4.4	4.9
Y	8.8	8.4	40	57	34	47	3.2	4.8
Ms	8.1	8.5	27	56	36	45	1.9	4.7
Ave	8.8	8.2	51	61	42	51	4.6	5.0
Brand C2								
X	8.1	7.6	56	59	55	47	3.9	4.1
OM	9.4	7.8	46	56	32	45	2.4	4.0
Y	9.0	7.8	52	56	40	45	3.3	4.0
Ms	8.5	8.2	28	49	40	38	2.3	3.6
Z	12.1	8.3	26	47	18	36	1.6	3.5
Ave	9.4	7.9	41	54	37	42	2.7	3.8
Brand C3								
OM	7.5	6.4	52	59	27	50	3.9	3.4
X	5.9	6.4	63	59	56	50	3.8	3.4
Y	6.8	6.5	54	57	41	48	3.3	3.3
Z	7.2	6.8	46	51	26	42	3.4	3.1
Ms	5.8	6.8	33	51	41	42	1.6	3.1
Ave	6.6	6.6	50	56	38	46	3.2	3.3
O Brands								
Ms	5.0	5.2	68	65	64	58	2.8	3.3
OM	5.4	5.3	59	64	55	56	3.2	3.2
X	5.6	5.4	59	61	63	54	3.1	3.1
Y	5.8	5.5	62	58	45	50	2.2	3.0
Z	9.3	5.6	48	55	35	48	6.3	2.9
Ave	6.2	5.4	59	61	52	53	3.5	3.1
Brand C4								
OM	6.4	7.0	56	56	42	46	3.0	3.3
X	7.0	7.1	56	55	49	45	3.7	3.2
Y	6.6	7.2	70	53	48	43	5.8	3.2
Ms	7.4	7.5	50	48	43	38	3.6	2.9
Z	7.6	7.9	21	42	22	34	1.0	2.7
Ave	7.0	7.3	51	51	41	41	3.4	3.1
Ovrl Ave	7.6	7.1	50	56	42	47	3.5	3.6

TABLE A6.27

Context: Store Choice for Brand C1.
Product/Region: Instant Coffee, Region I.
Measure(s): Purchase Frequency Distribution.

Buyers at:		% making X purchases at the store: 1	2	3	4	5	6	7	8+
Store X	O	26	15	8	8	8	4	4	27
	D	30	16	10	7	6	5	4	23
Store Z	O	31	11	9	9	6	7	2	25
	D	34	16	10	7	5	4	3	21
O Mltps	O	43	13	11	7	5	2	3	16
	D	34	16	10	7	5	4	3	19
Store Y	O	47	19	9	6	5	3	1	10
	D	35	17	10	6	5	4	4	19
Misclns	O	60	16	8	5	3	3	0	4
	D	37	16	10	6	6	4	4	16
Average	O	41	15	9	7	5	4	2	16
	D	34	16	10	7	6	4	4	19

TABLE A6.28

Context: Store Choice for Brand C2.
Product/Region: Instant Coffee, Region I.
Measure(s): Purchase Frequency Distribution.

Buyers at:		% making X purchases at the store: 1	2	3	4	5	6	7	8+
Store X	O	35	15	8	11	8	7	1	17
	D	36	17	10	7	5	4	3	16
O Mltps	O	39	15	9	7	7	5	1	18
	D	37	17	10	7	5	4	3	16
Store Y	O	36	28	11	4	2	6	1	21
	D	38	17	10	7	5	4	3	16
Misclns	O	63	12	6	6	2	3	1	7
	D	40	18	10	7	4	4	3	14
Store Z	O	50	11	16	11	5	0	0	7
	D	42	17	10	7	5	2	2	13
Average	O	45	14	10	8	5	4	1	14
	D	39	17	10	7	5	4	3	15

TABLE A6.29

Context: Store Choice for Brand C3.
Product/Region: Instant Coffee, Region I.
Measure(s): Purchase Frequency Distribution.

Buyers at:		% making X purchases at the store:							
		1	2	3	4	5	6	7	8+
O Mltps	O	43	17	9	5	4	5	2	14
	D	41	17	10	6	5	4	3	14
Store X	O	49	15	3	9	5	4	3	11
	D	41	18	10	7	5	4	3	13
Store Y	O	44	13	6	6	6	4	9	12
	D	42	18	11	6	4	3	3	12
Store Z	O	50	14	7	7	2	5	5	10
	D	43	17	11	7	4	4	2	11
Misclns	O	56	26	12	2	2	0	2	2
	D	44	17	10	7	5	2	2	13
Average	O	48	17	7	6	4	4	4	10
	D	42	18	10	7	5	3	3	13

TABLE A6.30

Context: Store Choice for Other Brands.
Product/Region: Instant Coffee, Region I.
Measure(s): Purchase Frequency Distribution.

Buyers at:		% making X purchases at the store: 1	2	3	4	5	6	7	8+
Misclns	O	50	19	7	6	4	3	4	9
	D	42	18	10	7	5	4	2	11
O Mltps	O	45	21	8	5	6	2	3	10
	D	43	18	10	7	5	4	3	11
Store X	O	46	15	13	3	5	3	3	14
	D	44	19	10	7	4	3	2	11
Store Y	O	50	18	2	9	0	5	0	16
	D	44	18	11	7	5	4	2	9
Store Z	O	47	18	0	0	6	6	0	24
	D	47	18	11	7	4	4	4	6
Average	O	48	18	6	5	4	4	2	15
	D	44	18	10	7	5	4	3	10

TABLE A6.31

Context: Store Choice for Brand C4.
Product/Region: Instant Coffee, Region I.
Measure(s): Purchase Frequency Distribution.

Buyers at:		% making X purchases at the store:							
		1	2	3	4	5	6	7	8+
O Mltps	O	47	15	8	2	5	2	3	18
	D	43	17	9	6	5	3	3	13
Store X	O	53	11	6	9	4	0	4	13
	D	41	17	10	7	5	3	3	14
Store Y	O	43	13	8	5	5	3	0	25
	D	42	17	9	7	4	4	2	16
Misclns	O	61	18	0	4	4	0	4	11
	D	46	18	9	6	3	3	3	12
Store Z	O	67	22	0	11	0	0	0	0
	D	42	21	0	0	0	0	0	38
Average	O	54	16	4	6	4	1	2	13
	D	43	18	8	5	3	3	2	18

TABLE A6.32

Context: Store Choice for Brand C1.
Product/Region: Instant Coffee, Region I.
Measure(s): Duplication.

Buyers at:	% also buying at:				
	X	Z	OM	Y	Msc
Store X	--	8	16	12	11
Store Z	27	--	27	24	16
O Mltps	31	17	--	19	24
Store Y	35	22	28	--	17
Misclns	32	15	35	17	--
Average	31	16	27	18	17
D x rltv b	43	14	22	15	15
D = 0.76					
Relative b *	56	18	29	20	20

Notes:
* Relative b (rltv b) is the penetration of the store among buyers of the brand.
- D is calculated using relative penetration.

TABLE A6.33

Context: Store Choice for Brand C2.
Product/Region: Instant Coffee, Region I.
Measure(s): Duplication.

Buyers at:	% also buying at:				
	X	OM	Y	Msc	Z
Store X	--	27	22	18	8
O Mltps	31	--	33	27	20
Store Y	27	36	--	25	13
Misclns	28	37	31	--	12
Store Z	34	68	40	29	--
Average	30	42	32	25	13
D x rltv b	39	35	32	26	10
D = 0.92					
Relative b *	43	38	35	28	11

Notes:
* Relative b (rltv b) is the penetration of the store among buyers of the brand.
- D is calculated using relative penetration.

TABLE A6.34

Context: Store Choice for Brand C3.
Product/Region: Instant Coffee, Region I.
Measure(s): Duplication.

Buyers at:	% also buying at:				
	OM	X	Y	Z	Msc
O Mltps	--	25	26	19	26
Store X	25	--	22	7	9
Store Y	30	26	--	15	20
Store Z	42	16	30	--	14
Misclns	37	13	25	9	--
Average	34	20	26	13	17
D x rltv b	27	28	24	12	19
D = 0.72					
Relative b *	37	39	33	17	27

Notes:
* Relative b (rltv b) is the penetration of the store among buyers of the brand.
- D is calculated using relative penetration.

TABLE A6.35

Context: Store Choice for Other Brands.
Product/Region: Instant Coffee, Region I.
Measure(s): Duplication.

Buyers at:	% also buying at:				
	Msc	OM	X	Y	Z
Misclns	--	22	7	7	7
O Mltps	25	--	13	8	5
Store X	11	17	--	16	2
Store Y	20	20	29	--	2
Store Z	47	35	11	5	--
Average	26	24	15	9	4
D x rltv b	25	22	17	10	4
D = 0.60					
Relative b *	42	37	29	16	6

Notes:
* Relative b (rltv b) is the penetration of the store among buyers of the brand.
- D is calculated using relative penetration.

TABLE A6.36

Context: Store Choice for Brand C4.
Product/Region: Instant Coffee, Region I.
Measure(s): Duplication.

Buyers at:	% also buying at:				
	OM	X	Y	Msc	Z
O Mltps	--	33	19	19	8
Store X	37	--	16	7	7
Store Y	29	22	--	17	4
Misclns	42	14	25	--	7
Store Z	55	44	22	22	--
Average	41	28	21	16	7
D x rltv b	35	32	24	17	5
D = 0.77					
Relative b *	46	41	31	22	7

Notes:
* Relative b (rltv b) is the penetration of the store among buyers of the brand.
- D is calculated using relative penetration.

TABLE A6.37
Context: Store Choice for Individual Brands.
Product/Region: Automatic Washing Powder, Region II.
Measure(s): Various.

Brnd/Str	s	MS (%)	b (%) O	b (%) D	w O	w D
Brand A1						
V	0.12	37	18	22	5.8	4.6
OM	1.07	15	12	10	3.5	4.0
W	1.32	15	12	10	3.3	4.0
Z	0.88	14	10	10	3.7	4.0
Y	0.67	10	7	7	3.9	3.9
Ave	S= 0.64	18	12	12	4.0	4.1
Brand A4						
V	0.12	31	9	12	5.7	4.2
W	1.26	17	8	7	3.4	3.8
Z	1.49	16	8	7	3.3	3.8
OM	1.50	15	8	7	3.2	3.7
Y	0.43	12	5	6	4.4	3.7
Ave	S= 0.84	18	8	8	4.0	3.8
Brand A2						
V	0.00	37	10	14	5.2	3.6
Y	0.29	14	5	6	3.8	3.2
OM	0.94	13	6	6	2.9	3.2
W	2.01	13	7	5	2.4	3.2
Z	1.14	11	6	5	2.7	3.2
Ave	S= 0.62	17	7	7	3.4	3.3
Brand A5						
V	0.12	41	11	13	5.0	4.3
W	0.15	23	6	8	4.8	3.9
OM	1.62	16	7	6	2.9	3.8
Z	5.13	7	5	3	2.0	3.6
Y	1.61	3	2	1	2.5	3.5
Ave	S= 0.51 excl Z	18	6	6	3.4	3.8
Brand A3						
Y	0.00	39	8	9	4.9	4.2
OM	0.22	33	8	8	4.1	4.1
Z	0.59	24	7	6	3.4	4.0
V	----	--	-	-	---	---
W	----	--	-	-	---	---
Ave	S= 0.23	32	8	8	4.1	4.1
Ovrl Ave	0.99	20	8	8	3.8	3.8

TABLE A6.38
Context: Store Choice for Individual Brands.
Product/Region: Automatic Washing Powder, Region II.
Measure(s): Various.

Brnd/Str	wp		w/wp (%)		bs/b (%)		ws	
	O	D	O	D	O	D	O	D
Brand A1								
V	8.9	7.8	66	59	39	46	4.7	4.1
OM	8.8	8.4	40	48	27	35	3.4	3.5
W	8.2	8.4	40	47	43	35	3.8	3.4
Z	7.9	8.5	47	47	37	35	3.7	3.4
Y	8.6	8.6	45	45	36	33	3.9	3.3
Ave	8.5	8.3	47	49	36	37	3.9	3.5
Brand A4								
V	8.8	8.2	64	51	40	39	6.0	3.3
W	6.6	8.7	52	44	42	32	2.4	2.9
Z	7.3	8.7	45	43	41	32	2.9	2.9
OM	8.4	8.8	38	42	23	31	2.1	2.8
Y	10.7	8.9	41	41	30	30	1.8	2.8
Ave	8.3	8.6	48	44	35	33	3.0	2.9
Brand A2								
V	6.9	5.9	75	62	58	52	3.2	3.3
Y	7.3	6.4	52	51	44	41	2.5	2.8
OM	6.7	6.4	44	51	49	41	3.4	2.8
W	5.8	6.4	42	50	57	41	2.4	2.8
Z	5.3	6.4	51	50	52	40	3.1	2.8
Ave	6.4	6.3	53	53	52	43	2.9	2.9
Brand A5								
V	6.7	6.5	74	66	50	57	4.5	3.9
W	6.3	6.9	75	57	52	48	5.6	3.5
OM	5.8	7.1	49	53	37	45	2.9	3.4
Z	7.8	7.3	25	50	32	41	1.7	3.2
Y	6.9	7.4	36	48	43	40	4.0	3.1
Ave	6.7	7.0	52	55	43	46	3.7	3.4
Brand A3								
Y	6.0	5.3	81	78	70	74	5.8	4.1
OM	5.3	5.4	78	76	65	72	3.8	4.0
Z	4.7	5.5	73	73	69	69	3.4	3.9
V	---	---	--	--	--	--	---	---
W	---	---	--	--	--	--	---	---
Ave	5.3	5.4	77	76	68	72	4.3	4.0
Ovrl Ave	7.2	7.3	54	54	45	44	3.5	3.3

TABLE A6.39

Context: Store Choice for Brand A1.
Product/Region: Automatic Washing Powder, Region II.
Measure(s): Duplication.

Buyers at:	% also buying at:				
	V	OM	W	Z	Y
Store V	--	27	18	15	16
O Mltps	40	--	21	20	15
Store W	27	20	--	20	11
Store Z	26	22	24	--	8
Store Y	39	24	19	11	--
Average	33	23	21	17	13
D x rltv b	32	21	22	19	13
D = 0.77					
Relative b *	41	27	28	24	17

Notes:
* Relative b (rltv b) is the penetration of the store among buyers of the brand.
- D is calculated using relative penetration.

TABLE A6.40

Context: Store Choice for Brand A4.
Product/Region: Automatic Washing Powder, Region II.
Measure(s): Duplication.

Buyers at:	% also buying at:				
	V	W	Z	OM	Y
Store V	--	16	20	23	15
Store W	18	--	21	18	11
Store Z	22	21	--	27	12
O Mltps	28	20	29	--	18
Store Y	29	19	22	29	--
Average	24	19	23	24	14
D x rltv b	25	23	23	21	13
D = 0.72					
Relative b *	35	31	32	29	18

Notes:
* Relative b (rltv b) is the penetration of the store among buyers of the brand.
- D is calculated using relative penetration.

TABLE A6.41

Context: Store Choice for Brand A2.
Product/Region: Automatic Washing Powder, Region II.
Measure(s): Duplication.

Buyers at:	% also buying at:				
	V	Y	OM	W	Z
Store V	--	13	12	13	13
Store Y	26	--	17	21	9
O Mltps	19	13	--	15	13
Store W	18	14	13	--	6
Store Z	23	8	15	8	--
Average	22	12	14	14	10
D x rltv b	21	11	13	16	12
D = 0.61					
Relative b *	34	17	22	26	20

Notes:
* Relative b (rltv b) is the penetration of the store among buyers of the brand.
- D is calculated using relative penetration.

TABLE A6.42

Context: Store Choice for Brand A5.
Product/Region: Automatic Washing Powder, Region II.
Measure(s): Duplication.

Buyers at:	% also buying at:				
	V	W	OM	Z	Y
Store V	--	10	22	19	6
Store W	18	--	16	12	1
O Mltps	33	14	--	17	1
Store Z	43	17	26	--	9
Store Y	42	7	7	28	--
Average	34	12	18	19	4
D x rltv b	31	18	20	13	5
D = 0.68					
Relative b *	45	26	30	20	7

Notes:
* Relative b (rltv b) is the penetration of the store among buyers of the brand.
- D is calculated using relative penetration.

TABLE A6.43

Context: Store Choice for Brand A3.
Product/Region: Automatic Washing Powder, Region II.
Measure(s): Duplication.

Buyers at:	% also buying at:				
	Y	OM	Z	V	W
Store Y	--	19	9	--	--
O Mltps	19	--	13	--	--
Store Z	10	15	--	--	--
Store V	--	--	--	--	--
Store W	--	--	--	--	--
Average	15	17	11	--	--
D x rltv b	15	15	13	--	--
D = 0.39					
Relative b *	38	38	34	--	--

Notes:
* Relative b (rltv b) is the penetration of the store among buyers of the brand.
- D is calculated using relative penetration.

TABLE A6.44
Context: Store Choice for Individual Brands.
Product/Region: Tea Bags, Region II.
Measure(s): Various.

Brnd/Str	s	MS (%)	b (%) O	b (%) D	w O	w D
Brand B1						
Z	0.24	45	25	26	6.5	6.4
OM	0.22	21	13	13	6.1	5.8
Y	0.40	13	9	8	5.2	5.6
W	0.47	10	7	6	4.9	5.6
V	----	--	--	--	---	---
Ave	S= 0.28	22	14	13	5.7	5.8
Brand B2						
V	0.23	35	20	24	6.2	5.1
OM	1.18	17	16	13	3.9	4.6
Y	0.23	17	10	13	5.8	4.6
Z	1.23	10	10	8	3.6	4.4
W	1.46	9	10	8	3.4	4.3
Ave	S= 0.66	18	13	13	4.6	4.6
O Brands						
V	0.07	40	20	25	5.5	4.5
OM	0.50	21	14	14	4.0	4.1
W	1.45	9	9	7	2.8	3.8
Z	1.14	9	8	6	3.0	3.8
Y	0.90	6	6	5	3.2	3.8
Ave	S= 0.50	17	11	11	3.7	4.0
Brand B3						
OM	0.25	26	10	11	4.6	4.2
Z	0.19	19	7	8	4.8	4.1
W	1.09	11	6	5	3.1	3.9
Y	0.27	11	4	5	4.4	3.9
V	2.46	11	7	5	2.5	3.9
Ave	S= 0.44 excl V	15	7	7	3.9	4.0
Brand B4						
V	0.00	56	17	22	5.8	4.5
OM	0.75	15	8	7	3.5	3.7
Z	3.14	6	5	3	2.2	3.5
Y	1.37	6	4	3	2.7	3.5
W	2.44	5	4	3	2.3	3.5
Ave	S= 0.58	18	7	7	3.3	3.7
Ovrl Ave	0.90	18	10	10	4.2	4.4

TABLE A6.45
Context: Store Choice for Individual Brands.
Product/Region: Tea Bags, Region II.
Measure(s): Various.

Brnd/Str	wp		w/wp (%)		bs/b (%)		ws	
	O	D	O	D	O	D	O	D
Brand B1								
Z	9.0	8.6	72	74	64	66	7.6	6.3
OM	9.6	9.1	63	64	41	55	5.1	5.7
Y	8.6	9.3	60	61	49	52	6.5	5.5
W	9.2	9.3	53	60	33	50	6.5	5.5
V	---	---	--	--	--	--	---	---
Ave	9.1	9.1	62	65	47	56	6.4	5.7
Brand B2								
V	9.9	9.3	62	56	39	41	5.7	4.5
OM	8.3	9.9	47	46	34	33	5.9	3.9
Y	12.1	9.9	48	46	24	33	5.7	3.9
Z	8.4	10.2	43	43	29	30	2.9	3.6
W	6.8	10.2	49	42	35	29	2.9	3.6
Ave	9.1	9.9	50	47	32	33	4.6	3.9
O Brands								
V	7.8	6.8	70	65	46	54	5.3	4.2
OM	6.9	7.2	58	56	41	44	4.3	3.8
W	6.2	7.5	46	51	31	40	3.2	3.6
Z	7.0	7.5	43	51	43	39	3.2	3.6
Y	6.9	7.5	46	50	43	38	3.7	3.5
Ave	7.0	7.3	53	55	41	43	3.9	3.7
Brand B3								
OM	7.7	7.0	60	60	51	51	3.8	3.9
Z	8.8	7.1	54	57	38	49	2.2	3.8
W	6.8	7.3	45	54	51	45	2.9	3.6
Y	8.6	7.3	51	54	44	45	5.1	3.6
V	6.1	7.3	41	54	55	45	2.4	3.6
Ave	7.6	7.2	50	56	48	47	3.3	3.7
Brand B4								
V	7.7	6.3	76	72	54	63	5.1	4.2
OM	7.1	7.2	49	51	48	41	3.0	3.2
Z	6.9	7.5	31	47	41	37	2.2	3.0
Y	6.7	7.5	40	47	39	37	2.2	3.0
W	5.2	7.5	44	46	61	37	1.9	3.0
Ave	6.7	7.2	48	53	49	43	2.9	3.3
Ovrl Ave	7.9	8.1	52	54	43	44	4.1	4.0

TABLE A6.46

Context: Store Choice for Brand B1.
Product/Region: Tea Bags, Region II.
Measure(s): Duplication.

Buyers at:	% also buying at:				
	Z	OM	Y	W	V
Store Z	--	16	10	9	--
O Mltps	33	--	10	14	--
Store Y	28	14	--	21	--
Store W	31	25	26	--	--
Store V	--	--	--	--	--
Average	31	18	15	15	--
D x rltv b	37	18	13	10	--
D = 0.69					
Relative b *	54	27	19	15	--

Notes:
* Relative b (rltv b) is the penetration of the store among buyers of the brand.
- D is calculated using relative penetration.

TABLE A6.47

Context: Store Choice for Brand B2.
Product/Region: Tea Bags, Region II.
Measure(s): Duplication.

Buyers at:	% also buying at:				
	V	OM	Y	Z	W
Store V	--	22	22	15	8
O Mltps	28	--	14	19	18
Store Y	43	21	--	18	20
Store Z	30	30	19	--	8
Store W	17	29	22	8	--
Average	30	26	19	15	14
D x rltv b	31	25	16	16	15
D = 0.74					
Relative b *	42	33	22	21	21

Notes:
* Relative b (rltv b) is the penetration of the store among buyers of the brand.
- D is calculated using relative penetration.

TABLE A6.48

Context: Store Choice for Other Brands.
Product/Region: Tea Bags, Region II.
Measure(s): Duplication.

Buyers at:	% also buying at:				
	V	OM	W	Z	Y
Store V	--	17	14	13	8
O Mltps	24	--	15	13	8
Store W	31	23	--	12	12
Store Z	32	23	14	--	2
Store Y	31	21	21	4	--
Average	30	21	16	11	8
D x rltv b	30	21	14	12	8
D = 0.71					
Relative b *	42	30	19	17	12

Notes:
* Relative b (rltv b) is the penetration of the store among buyers of the brand.
- D is calculated using relative penetration.

TABLE A6.49

Context: Store Choice for Brand B3.
Product/Region: Tea Bags, Region II.
Measure(s): Duplication.

Buyers at:	% also buying at:				
	OM	**Z**	**W**	**Y**	**V**
O Mltps	--	15	10	9	10
Store Z	21	--	21	8	14
Store W	17	25	--	5	13
Store Y	22	13	8	--	13
Store V	14	14	11	8	--
Average	19	17	13	8	13
D x rltv b	19	14	12	8	14
D = 0.60					
Relative b *	32	23	20	14	24

Notes:
- * Relative b (rltv b) is the penetration of the store among buyers of the brand.
- \- D is calculated using relative penetration.

TABLE A6.50

Context: Store Choice for Brand B4.
Product/Region: Tea Bags, Region II.
Measure(s): Duplication.

Buyers at:	**% also buying at:**				
	V	**OM**	**Z**	**Y**	**W**
Store V	--	19	12	9	5
O Mltps	43	--	10	6	7
Store Z	41	17	--	9	4
Store Y	41	12	12	--	6
Store W	24	15	6	6	--
Average	37	16	10	8	6
D x rltv b	34	16	10	8	8
D = 0.64					
Relative b *	53	24	16	12	13

Notes: .
* Relative b (rltv b) is the penetration of the store among buyers of the brand.
- D is calculated using relative penetration.

TABLE A6.51

Context: Store Choice for Individual Brands.
Product/Region: Instant Coffee, Region II.
Measure(s): Various.

Brnd/Str	s	MS (%)	b (%) O	b (%) D	w O	w D
Brand C2						
V	0.26	35	24	30	6.2	4.9
OM	1.56	18	21	18	3.6	4.3
W	0.52	13	12	14	4.8	4.2
Y	0.61	12	11	12	4.5	4.1
Z	1.95	12	16	12	3.2	4.1
Ave	S= 0.82	18	17	17	4.4	4.3
O Brands						
V	0.19	42	19	26	5.6	4.2
OM	1.17	14	12	10	3.0	3.6
W	0.67	12	9	8	3.4	3.6
Y	0.41	8	5	6	3.8	3.5
Z	1.22	7	7	5	2.8	3.5
Ave	S= 0.54	17	10	11	3.7	3.7
Brand C1						
Z	0.21	45	18	23	6.0	4.7
OM	0.55	25	14	13	4.0	4.3
W	0.28	11	6	6	4.4	4.1
Y	1.03	10	7	6	3.1	4.0
V	----	--	--	--	---	---
Ave	S= 0.40	23	11	12	4.4	4.3
Brand C3						
OM	0.36	32	10	10	3.9	3.8
Z	0.47	24	8	8	3.6	3.6
W	0.42	18	6	6	3.6	3.6
Y	0.70	14	5	5	3.2	3.5
V	----	--	--	--	---	---
Ave	S= 0.46	22	7	7	3.6	3.6
Brand C4						
V	0.13	28	2	3	4.4	3.5
Y	0.22	25	2	3	3.8	3.4
Z	0.14	23	2	2	4.1	3.4
W	2.48	10	2	1	2.1	3.2
OM	4.33	7	1	1	1.8	3.2
Ave	S= 0.43 excl OM	19	2	2	3.3	3.3
Ovrl Ave	0.53	19	10	10	3.9	3.8

TABLE A6.52
Context: Store Choice for Individual Brands.
Product/Region: Instant Coffee, Region II.
Measure(s): Various.

Brnd/Str	wp O	wp D	w/wp (%) O	w/wp (%) D	bs/b (%) O	bs/b (%) D	ws O	ws D
Brand C2								
V	10.5	9.3	59	53	30	36	4.1	4.2
OM	10.3	10.0	36	43	27	28	3.6	3.5
W	10.7	10.2	45	41	26	26	5.2	3.4
Y	11.4	10.2	40	40	27	25	4.4	3.3
Z	9.6	10.2	33	40	28	25	3.2	3.3
Ave	10.5	10.0	42	43	28	28	4.1	3.5
O Brands								
V	7.1	6.3	79	66	59	55	5.1	4.0
OM	5.7	6.9	52	53	41	41	2.5	3.4
W	5.6	6.9	60	52	44	40	4.6	3.3
Y	6.9	7.0	54	50	36	39	2.6	3.3
Z	6.3	7.0	44	50	25	38	2.4	3.3
Ave	6.3	6.8	58	54	41	43	3.5	3.4
Brand C1								
Z	7.7	6.6	77	71	60	63	7.2	4.6
OM	6.5	7.0	62	62	56	52	3.7	4.1
W	8.0	7.2	55	56	43	47	4.0	3.9
Y	5.0	7.3	62	56	56	46	2.9	3.8
V	---	---	--	--	--	--	---	---
Ave	6.8	7.0	64	61	54	52	4.4	4.1
Brand C3								
OM	6.5	5.9	60	64	54	57	2.7	3.5
Z	7.1	6.0	51	60	48	53	2.5	3.3
W	5.8	6.1	62	58	59	51	3.4	3.3
Y	6.2	6.2	51	56	59	49	2.6	3.2
V	---	---	--	--	--	--	---	---
Ave	6.4	6.0	56	60	55	52	2.8	3.3
Brand C4								
V	6.0	5.4	74	64	58	59	4.3	3.2
Y	6.3	5.4	61	63	55	58	5.3	3.1
Z	5.7	5.4	72	62	53	57	1.9	3.1
W	4.6	5.7	46	57	57	52	1.9	2.9
OM	5.3	5.7	35	56	55	50	1.8	2.9
Ave	5.6	5.5	58	61	56	55	3.0	3.0
Ovrl Ave	7.2	7.1	55	55	46	45	3.6	3.5

TABLE A6.53

Context: Store Choice for Brand C2.
Product/Region: Instant Coffee, Region II.
Measure(s): Duplication.

Buyers at:	% also buying at:				
	V	OM	W	Y	Z
Store V	--	35	18	18	23
O Mltps	40	--	17	16	24
Store W	37	30	--	17	25
Store Y	39	30	19	--	17
Store Z	35	32	19	12	--
Average	38	32	18	16	22
D x rltv b	36	31	18	17	24
D = 0.84					
Relative b *	43	37	21	20	28

Notes:
* Relative b (rltv b) is the penetration of the store among buyers of the brand.
- D is calculated using relative penetration.

TABLE A6.54

Context: Store Choice for Other Brands.
Product/Region: Instant Coffee, Region II.
Measure(s): Duplication.

Buyers at:	% also buying at:				
	V	OM	W	Y	Z
Store V	--	11	8	5	7
O Mltps	18	--	15	8	11
Store W	17	21	--	9	9
Store Y	20	20	15	--	13
Store Z	21	21	12	10	--
Average	19	18	13	8	10
D x rltv b	25	16	12	7	9
D = 0.61					
Relative b *	41	26	19	11	14

Notes:
* Relative b (rltv b) is the penetration of the store among buyers of the brand.
- D is calculated using relative penetration.

TABLE A6.55

Context: Store Choice for Brand C1.
Product/Region: Instant Coffee, Region II.
Measure(s): Duplication.

Buyers at:	% also buying at:				
	Z	OM	W	Y	V
Store Z	--	21	8	7	--
O Mltps	26	--	10	5	--
Store W	26	26	--	20	--
Store Y	17	9	16	--	--
Store V	--	--	--	--	--
Average	23	19	11	11	--
D x rltv b	25	20	8	10	--
D = 0.57					
Relative b *	44	35	14	18	--

Notes:
* Relative b (rltv b) is the penetration of the store among buyers of the brand.
- D is calculated using relative penetration.

TABLE A6.56

Context: Store Choice for Brand C3.
Product/Region: Instant Coffee, Region II.
Measure(s): Duplication.

Buyers at:	% also buying at:				
	OM	**Z**	**W**	**Y**	**V**
O Mltps	--	21	10	8	--
Store Z	27	--	13	10	--
Store W	17	17	--	9	--
Store Y	15	15	11	--	--
Store V	--	--	--	--	--
Average	20	18	11	9	--
D x rltv b	19	16	12	10	--
D = 0.49					
Relative b *	40	32	25	21	--

Notes:
* Relative b (rltv b) is the penetration of the store among buyers of the brand.
- D is calculated using relative penetration.

TABLE A6.57

Context: Store Choice for Brand C4.
Product/Region: Instant Coffee, Region II.
Measure(s): Duplication.

Buyers at:	% also buying at:				
	V	Y	Z	W	OM
Store V	--	10	21	0	21
Store Y	9	--	14	19	4
Store Z	23	17	--	11	11
Store W	0	28	14	--	7
O Mltps	36	9	18	9	--
Average	17	16	17	10	11
D x rltv b	16	17	15	12	10
D = 0.59					
Relative b *	28	29	25	21	16

Notes:
* Relative b (rltv b) is the penetration of the store among buyers of the brand.
- D is calculated using relative penetration.

TABLE A6.58

Context: Store Choice for Individual Brands.

Product/Region: Automatc, Tea Bags, Inst Cof, Rgns I & II

Measure(s): Dirichlet Fit for b and w.

	b			w		
	MAD	MD	MAD/ MD %	MAD	MD	MAD/ MD %
Automatc Rgn I						
A1	2.7	4.9	54	.65	.73	89
A2	1.9	2.8	67	.65	.79	82
A3	.6	3.5	17	.40	.59	68
A4	.9	1.6	55	.61	.62	98
A5	1.1	1.8	61	.65	.72	90
Ave	**1.4**	**2.9**	**51**	**.59**	**.69**	**85**
Tea Bags Rgn I						
B1	2.6	5.6	46	.92	1.18	78
B2	.6	3.0	20	.44	.60	73
OB	.8	4.3	19	.44	.58	76
B3	1.0	1.1	89	.46	.54	85
B4	.0	1.2	0	.36	.39	92
Ave	**1.0**	**3.0**	**35**	**.52**	**.66**	**81**
Inst Cof Rgn I						
C1	3.0	5.6	54	1.36	1.46	93
C2	1.4	4.1	34	.56	.84	67
C3	.8	1.8	43	.40	.56	71
OB	.4	3.6	11	.40	.36	111
C4	.4	1.9	21	.58	.75	77
Ave	**1.2**	**3.4**	**33**	**.66**	**.79**	**84**
Automatc Rgn II						
A1	1.9	2.5	75	.56	.72	78
A4	1.4	1.2	123	.71	.82	87
A2	1.6	1.4	114	.73	.86	85
A5	1.6	2.4	65	1.04	1.17	89
A3	.8	.4	195	.44	.50	88
Ave	**1.5**	**1.6**	**114**	**.72**	**.82**	**85**
Tea Bags Rgn II						
B1	.7	5.9	12	.39	.63	62
B2	2.6	3.7	70	.93	1.14	82
B3	2.0	4.6	43	.69	.85	81
OB	1.3	1.4	95	.76	.86	88
B4	1.9	3.9	49	.97	1.09	89
Ave	**1.7**	**3.9**	**54**	**.77**	**.91**	**80**
Inst Cof Rgn II						
C2	3.2	4.7	67	.77	.83	93
OB	2.2	4.2	54	.66	.80	83
C1	2.0	4.7	41	.69	.79	87
C3	.3	1.6	16	.14	.21	67
C4	.5	.4	136	.91	1.02	89
Ave	**1.7**	**3.1**	**63**	**.65**	**.73**	**84**
Ovrl Ave	**1.4**	**3.0**	**58**	**.65**	**.77**	**83**

TABLE A6.59
Context: Store Choice for Individual Brands.
Product/Region: Automatc, Tea Bags, Inst Cof, Rgns I & II
Measure(s): Dirichlet Fit for wp and w/wp.

	------- wp -------			----- w/wp -----		
	MAD	MD	MAD/ MD %	MAD	MD	MAD/ MD %
Automatc Rgn I						
A1	.72	.73	99	7.6	11.8	64
A2	.41	.45	91	8.9	12.4	71
A3	.63	.46	137	10.0	11.7	86
A4	.85	.92	92	9.3	10.1	92
A5	.79	.73	108	6.3	8.9	70
Ave	**.68**	**.66**	**105**	**8.4**	**11.0**	**77**
Tea Bags Rgn I						
B1	.98	.75	131	7.1	12.0	60
B2	.54	.38	142	4.2	7.8	53
OB	.36	.30	120	6.2	8.7	71
B3	.98	.85	115	6.1	6.9	89
B4	.84	.58	145	13.8	6.2	222
Ave	**.74**	**.57**	**131**	**7.5**	**8.3**	**99**
Inst Cof Rgn I						
C1	.68	.87	78	12.5	14.5	86
C2	1.48	1.07	138	12.1	11.6	104
C3	.66	.63	105	7.5	8.2	92
OB	.90	1.23	73	4.1	4.6	90
C4	.34	.40	85	8.2	12.0	68
Ave	**.81**	**.84**	**96**	**8.9**	**10.2**	**88**
Automatc Rgn II						
A1	.47	.35	134	4.5	7.3	62
A4	1.30	1.15	113	5.6	8.2	68
A2	.78	.66	118	6.5	9.1	72
A5	.61	.50	122	13.7	18.2	75
A3	.52	.46	113	1.6	3.0	55
Ave	**.75**	**.63**	**120**	**6.8**	**9.2**	**66**
Tea Bags Rgn II						
B1	.42	.30	140	2.5	5.5	46
B2	1.90	1.51	126	3.2	4.9	66
B3	.74	.36	206	5.0	9.3	53
OB	1.07	.90	119	5.5	5.8	95
B4	1.03	.61	169	6.2	11.4	54
Ave	**1.06**	**.74**	**152**	**4.6**	**7.4**	**63**
Inst Cof Rgn II						
C2	.74	.45	164	5.0	7.5	67
OB	.80	.54	148	6.6	9.4	70
C1	1.14	1.05	109	3.5	6.5	54
C3	.50	.40	125	5.6	4.9	114
C4	.63	.49	129	10.9	13.8	79
Ave	**.76**	**.58**	**135**	**6.5**	**8.4**	**77**
Ovrl Ave	**.80**	**.67**	**123**	**7.1**	**9.1**	**78**

TABLE A6.60

Context: Store Choice for Individual Brands.
Product/Region: Automatc, Tea Bags, Inst Cof, Rgns I & II
Measure(s): Dirichlet Fit for bs/b and ws.

	bs/b			ws		
	MAD	MD	MAD/ MD %	MAD	MD	MAD/ MD %
Automatc Rgn I						
A1	5.9	9.1	65	.59	.67	88
A2	5.1	9.2	56	.32	.45	71
A3	3.3	5.7	59	.59	.65	91
A4	11.1	13.1	85	1.36	1.39	98
A5	7.3	8.8	83	.96	.98	98
Ave	**6.6**	**9.2**	**70**	**.76**	**.83**	**89**
Tea Bags Rgn I						
B1	4.8	8.7	55	1.22	1.54	79
B2	4.0	5.3	76	.60	.33	182
OB	2.2	4.9	45	.44	.57	77
B3	9.4	6.2	151	.50	.45	111
B4	2.6	3.9	66	.58	.25	232
Ave	**4.6**	**5.8**	**79**	**.67**	**.63**	**136**
Inst Cof Rgn I						
C1	9.0	8.7	103	1.54	1.67	92
C2	9.2	9.6	96	1.14	.72	158
C3	10.6	9.4	113	.54	.64	84
OB	6.8	9.9	69	.94	1.11	85
C4	6.0	7.5	80	1.16	1.14	102
Ave	**8.3**	**9.0**	**92**	**1.06**	**1.06**	**104**
Automatc Rgn II						
A1	5.9	3.9	150	.37	.33	112
A4	5.7	7.0	82	.99	1.17	85
A2	9.0	4.4	205	.35	.40	88
A5	6.3	6.6	95	1.11	1.16	96
A3	3.9	1.9	211	.81	.98	83
Ave	**6.4**	**4.8**	**149**	**.72**	**.81**	**93**
Tea Bags Rgn II						
B1	8.8	9.7	91	.95	.63	151
B2	3.7	4.6	80	1.31	1.37	96
B3	5.4	3.8	142	.50	.71	70
OB	5.4	5.3	103	1.01	.93	109
B4	9.2	6.8	135	.79	.95	83
Ave	**6.4**	**6.0**	**110**	**.91**	**.92**	**102**
Inst Cof Rgn II						
C2	2.2	1.2	173	.64	.57	112
OB	4.9	8.5	57	.95	1.12	85
C1	5.2	5.5	93	1.04	1.37	76
C3	6.5	3.9	165	.59	.30	197
C4	3.5	1.6	217	1.31	1.40	94
Ave	**4.3**	**4.2**	**141**	**.91**	**.95**	**113**
Ovrl Ave	**6.1**	**6.5**	**107**	**.84**	**.87**	**106**

TABLE A6.61

Context: Store Choice for Individual Brands.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Loyalty Indices.

Brand/ Store	s	w	w/wp	bs/b	ws	8+	dpl	Ave excl s & ws
Brand A1								
X	346	121	110	101	122	140	119	118
OM	71	93	93	86	91	108	89	94
Y	50	84	100	118	77	92	113	101
Ms	19	64	59	76	65	25	83	61
Z	72	91	79	73	99	70	85	80
Brand A2								
X	248	116	118	107	103	136	121	120
Y	221	116	113	102	101	92	100	105
OM	41	82	89	98	85	82	96	90
Ms	32	74	66	75	86	36	81	67
Z	60	87	90	68	82	67	92	81
Brand A3								
X	86	98	89	106	103	109	118	104
OM	140	106	92	95	95	110	100	101
Y	122	103	106	92	88	150	96	109
Z	52	85	80	97	74	130	100	98
Ms	20	65	54	88	46	0	. 69	55
Brand A4								
X	93	99	121	133	105	113	147	123
Y	195	113	111	117	129	108	117	113
OM	52	87	85	89	68	83	80	85
Ms	43	82	73	90	81	50	79	75
Z	488	137	107	57	219	73	82	91
Brand A5								
X	368	129	113	89	112	133	104	114
OM	50	87	85	115	63	50	96	87
Y	57	88	79	86	115	100	107	92
Z	132	107	103	57	45	300	90	132
Ms	15	63	94	102	43	0	107	73
Average *								
1	228	113	110	107	109	126	122	116
2	135	103	99	103	96	94	100	100
3	64	89	92	97	87	101	98	95
4	56	82	76	79	70	108	87	87
5	131	89	85	78	98	42	87	76

Notes:
- See Table A1.16 for definition of Loyalty Indices, and Table 6.25 for clarification of duplication figures.
- For each brand, stores are ordered by market share.
* Averages are for each store rank.

TABLE A6.62

Context: Store Choice for Individual Brands.
Product/Region: Tea Bags, Region I.
Measure(s): Loyalty Indices.

Brand/ Store	s	w	w/wp	bs/b	ws	8+	dpl	Ave excl s & ws
Brand B1								
X	186	109	114	115	126	132	125	119
Z	342	131	124	112	182	133	100	120
Ms	43	78	96	114	109	81	89	92
Y	109	102	107	89	88	131	75	101
OM	30	67	85	94	102	44	84	75
Brand B2								
OM	136	105	102	102	106	100	97	101
X	245	119	116	122	126	158	124	128
Y	55	88	92	122	121	90	96	98
Ms	107	103	94	103	100	100	85	97
Z	34	74	90	103	154	38	100	81
O Brands								
Ms	75	94	96	104	97	82	100	95
OM	92	97	91	108	94	91	114	100
X	99	100	100	98	110	120	88	101
Y	239	115	106	91	107	150	94	111
Z	11	53	62	100	50	0	133	70
Brand B3								
OM	212	114	105	92	80	133	82	105
X	503	129	100	125	133	157	121	126
Y	97	100	106	138	83	143	113	120
Ms	42	81	68	105	96	63	95	82
Z	34	76	115	130	67	100	114	107
Brand B4								
OM	177	109	88	101	83	133	100	106
Ms	58	91	71	97	70	500	81	168
Y	222	109	91	96	73	150	83	106
X	68	96	76	109	91	450	143	175
Z	1	50	80	98	52	0	133	72
Average *								
1	157	106	101	103	98	116	101	105
2	248	113	100	113	121	208	108	128
3	103	95	97	114	99	117	94	103
4	113	99	90	99	96	179	98	113
5	22	64	86	105	85	36	113	81

Notes:
- See Table A6.61 for clarification.
* Averages are for each store rank.

TABLE A6.63

Context: Store Choice for Individual Brands.
Product/Region: Instant Coffee, Region I.
Measure(s): Loyalty Indices.

Store/ Brand	S	W	W/WP	bs/b	ws	8+	dpl	Ave excl S & ws
Brand C1								
X	136	105	105	100	102	117	135	113
Z	340	134	102	78	155	119	88	104
OM	47	82	82	76	90	84	81	81
Y	32	73	70	72	67	53	83	70
Ms	8	46	48	80	40	25	88	57
Brand C2								
X	102	100	94	117	95	106	133	110
OM	93	98	81	71	60	113	83	89
Y	136	107	93	89	83	131	100	104
Ms	14	60	58	105	64	50	100	75
Z	48	79	55	50	46	54	77	63
Brand C3								
OM	120	103	88	54	115	100	79	85
X	87	97	106	112	112	85	140	108
Y	106	100	96	85	100	100	92	95
Z	84	94	89	62	110	91	92	86
Ms	8	54	64	98	52	15	112	69
O Brands								
Ms	90	100	104	110	85	82	96	98
OM	70	94	92	98	100	91	92	93
X	105	100	96	117	100	127	113	111
Y	188	113	107	90	73	178	111	120
Z	643	145	87	73	217	400	100	161
Brand C4								
OM	66	92	101	91	91	138	86	102
X	99	100	101	109	116	93	117	104
Y	258	121	132	112	181	156	105	125
Ms	114	103	104	113	124	92	100	102
Z	8	48	50	65	37	0	29	39
Average *								
1	103	100	98	94	98	109	106	102
2	138	105	96	94	109	100	104	100
3	130	102	100	96	111	120	98	103
4	86	89	86	88	88	93	97	91
5	143	74	61	73	78	99	81	78

Notes:
- See Table A6.61 for clarification.
* Averages are for each store rank.

TABLE A6.64
Context: Store Choice for Individual Brands.
Product/Region: Automatic Washing Powder, Region II.
Measure(s): Loyalty Indices.

Brand/ Store	s	w	w/wp	bs/b	ws	8+	dpl	Ave excl s & ws
Brand A1								
V	552	127	111	84	116	--	97	105
OM	60	87	84	76	99	--	91	85
W	49	83	85	124	110	--	105	99
Z	73	92	99	106	108	--	112	102
Y	96	99	99	109	117	--	100	102
Brand A4								
V	682	135	125	103	181	--	104	117
W	67	90	120	131	85	--	121	116
Z	56	86	104	130	102	--	100	105
OM	56	86	90	75	73	--	88	85
Y	193	119	98	99	63	--	93	102
Brand A2								
V	62490	142	122	112	99	--	95	118
Y	214	117	102	107	89	--	92	105
OM	67	90	86	120	121	--	93	97
W	31	75	83	139	84	--	114	103
Z	55	86	104	130	113	--	120	110
Brand A5								
V	409	117	113	88	116	--	91	102
W	341	122	133	108	160	--	150	128
OM	31	76	91	83	87	--	111	90
Z	10	54	50	77	53	--	68	62
Y	32	71	76	108	129	--	125	95
Brand A3								
Y	22520	118	104	94	143	--	100	104
OM	101	100	102	90	95	--	88	95
Z	38	85	99	100	87	--	118	101
V	--	--	--	--	--	--	--	--
W	--	--	--	--	--	--	--	--
Average *								
1	17331	128	115	96	131	--	97	109
2	171	104	110	106	108	--	114	108
3	61	87	94	109	103	--	99	97
4	43	77	81	99	80	--	96	88
5	83	92	95	109	102	--	111	102

Notes:
- See Table A6.61 for clarification.
* Averages are for each store rank. Where no rank 4 or 5, store in rank 2/3 is assumed to be in rank 3/5.

TABLE A6.65

Context: Store Choice for Individual Brands.
Product/Region: Tea Bags, Region II.
Measure(s): Loyalty Indices.

Brand/ Store	s	w	w/wp	bs/b	ws	8+	dpl	Ave excl s & ws
Brand B1								
Z	117	102	97	98	121	--	119	104
OM	131	105	99	75	90	--	100	95
Y	71	92	99	94	116	--	87	93
W	60	88	89	66	118	--	67	77
V	--	--	--	--	--	--	--	--
Brand B2								
V	282	120	112	95	128	--	103	107
OM	56	86	101	105	154	--	96	97
Y	285	128	104	74	148	--	84	97
Z	54	83	100	97	80	--	107	96
W	45	78	116	117	81	--	107	105
O Brands								
V	743	124	108	85	126	--	100	104
OM	99	100	104	93	114	--	100	99
W	34	74	89	79	89	--	88	82
Z	44	79	85	108	91	--	109	95
Y	56	84	92	111	104	--	100	97
Brand B3								
OM	175	110	100	100	97	--	100	103
Z	239	117	95	79	58	--	82	93
W	41	79	84	113	82	--	92	92
Y	165	112	94	99	143	--	100	101
V	18	63	76	122	68	--	108	92
Brand B4								
V	57500	129	105	85	121	--	92	103
OM	77	94	95	118	94	--	100	102
Z	18	61	67	111	71	--	100	85
Y	42	78	86	104	71	--	100	92
W	24	65	94	164	63	--	133	114
Average *								
1	11763	117	104	93	119	--	103	104
2	120	100	99	94	102	--	96	97
3	95	86	86	94	98	--	91	89
4	75	89	93	100	100	--	101	95
5	41	76	93	116	87	--	103	97

Notes:
- See Table A6.61 for clarification.
* Averages are for each brand rank. Where no rank 5, store in rank 3/4 is assumed to be in rank 4/5.

TABLE A6.66
Context: Store Choice for Individual Brands.
Product/Region: Instant Coffee, Region II.
Measure(s): Loyalty Indices.

Brand/ Store	s	w	w/wp	bs/b	ws	8+	dpl	Ave excl s & ws
Brand C2								
V	322	125	111	85	98	--	95	104
OM	53	84	82	99	103	--	97	91
W	159	114	109	102	155	--	100	106
Y	136	110	99	106	132	--	106	105
Z	42	77	82	112	96	--	109	95
O Brands								
V	277	135	120	108	128	--	132	124
OM	46	82	99	99	74	--	89	92
W	79	94	116	109	139	--	92	103
Y	131	107	109	94	80	--	88	99
Z	44	79	87	65	74	--	90	80
Brand C1								
Z	192	127	108	96	158	--	109	110
OM	73	94	100	108	90	--	105	102
W	141	108	98	92	104	--	73	93
Y	39	77	112	122	74	--	91	101
V	--	--	--	--	--	--	--	--
Brand C3								
OM	127	104	94	95	78	--	95	97
Z	97	99	84	92	76	--	89	91
W	109	102	106	116	105	--	109	108
Y	65	91	91	122	81	--	111	104
V	--	--	--	--	--	--	--	--
Brand C4								
V	338	128	116	98	135	--	94	109
Y	193	111	96	95	168	--	106	102
Z	311	121	116	93	61	--	88	105
W	17	66	81	111	64	--	120	94
OM	10	57	62	108	64	--	91	80
Average *								
1	251	124	110	96	119	--	105	109
2	92	94	92	99	102	--	97	96
3	183	110	114	101	118	--	93	105
4	107	99	99	104	97	--	99	100
5	40	76	87	106	78	--	98	92

Notes:
- See Table A6.61 for clarification.
* Averages are for each brand rank. Where no rank 5, store in rank 3/4 is assumed to be in rank 4/5.

Appendix 7

Detailed Results for Chapter 12:

A HIERARCHICAL MODEL OF CHOICE.

TABLE A7.1

Context: Brand Choice (BC) and Store Choice (SC).
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Various.

	s	MS (%)	b (%)		w	
			O	D	O	D
BC						
A1	1.32	31	48	47	5.7	5.8
A2	.98	22	34	37	5.5	5.2
A3	1.31	15	28	28	4.7	4.8
Ave	S= 1.21	23	37	37	5.3	5.2
SC						
X	.54	36	43	44	7.2	7.1
Y	.64	23	30	29	6.2	6.4
Z	.67	21	14	13	5.5	5.8
Ave	S= .59	27	29	29	6.3	6.4

	wp		w/wp (%)		bs/b (%)		ws	
	O	D	O	D	O	D	O	D
BC								
A1	12.2	13.3	46	44	28	19	7.4	4.5
A2	13.7	13.8	40	38	18	16	5.3	3.9
A3	14.1	14.2	33	34	12	13	5.8	3.6
Ave	13.3	13.8	40	38	19	16	6.2	4.0
SC								
X	12.2	12.7	59	56	30	35	8.1	7.1
Y	12.6	13.2	49	48	21	28	5.6	6.4
Z	12.7	13.7	43	42	24	23	6.7	5.8
Ave	12.5	13.2	51	49	25	29	6.8	6.4

TABLE A7.2

Context: Brand Choice (BC) and Store Choice (SC).
Product/Region: Tea Bags, Region I.
Measure: Various.

	s	MS (%)	b (%)		w	
			O	D	O	D
BC						
B1	.76	42	53	56	7.2	6.9
B2	1.18	22	38	36	5.4	5.6
B3	1.85	9	21	17	3.9	4.8
Ave	S= 1.02	25	37	37	5.5	5.7
SC						
X	.59	34	43	44	7.1	7.1
Y	.77	16	26	24	5.7	6.1
Z	.51	11	16	17	6.3	5.9
Ave	S= .62	21	28	28	6.4	6.3

	wp		w/wp (%)		bs/b (%)		ws	
	O	D	O	D	O	D	O	D
BC								
B1	12.5	13.0	58	53	29	27	7.3	5.9
B2	13.9	13.9	38	40	19	18	7.3	4.6
B3	16.6	14.7	23	33	4	13	2.3	3.9
Ave	14.4	13.9	40	42	17	19	5.6	4.8
SC								
X	12.1	13.1	59	54	38	33	7.7	7.0
Y	13.8	13.8	41	44	18	24	5.8	6.1
Z	14.4	14.0	43	42	15	22	7.5	5.8
Ave	13.5	13.6	48	47	24	26	7.0	6.3

TABLE A7.3

Context: Brand Choice (BC) and Store Choice (SC).
Product/Region: Instant Coffee, Region I.
Measure: Various.

		s	MS (%)	b (%)		w	
				O	D	O	D
BC							
C1		.73	35	53	54	6.9	6.7
C2		.78	27	44	44	6.3	6.2
C3		.96	14	28	26	5.2	5.5
Ave	S=	.79	25	42	41	6.1	6.2
SC							
X		.58	35	50	51	7.3	7.2
Y		.71	18	32	30	6.0	6.3
Z		.51	10	17	18	6.3	5.9
Ave	S=	.61	21	33	33	6.5	6.4

	wp		w/wp (%)		bs/b (%)		ws	
	O	D	O	D	O	D	O	D
BC								
C1	12.9	13.1	53	51	29	25	8.4	7.1
C2	13.2	13.4	47	46	22	21	6.8	6.6
C3	13.8	13.9	37	40	13	16	7.8	5.9
Ave	13.3	13.5	46	46	22	21	7.7	6.5
SC								
X	12.4	13.0	58	55	35	31	8.3	7.9
Y	13.5	13.5	44	46	16	23	6.2	7.1
Z	15.8	13.8	40	43	15	20	8.0	6.7
Ave	13.9	13.4	48	48	22	24	7.5	7.2

TABLE A7.4

Context: Brand Choice Within Individual Stores.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Various (Predictions from Discrete Model)

Str/Brnd		s	MS (%)	b (%)		w	
				O	D	O	D
Store X							
A1		.64	36	23	23	5.1	4.9
A2		.63	21	14	15	4.6	4.3
A3		1.41	15	13	11	3.5	4.2
Ave	S=	.79	24	17	17	4.4	4.5
Store Y							
A2		.52	26	11	14	4.4	3.4
A1		3.38	25	15	14	3.0	3.4
A3		1.00	18	9	11	3.6	3.2
Ave	S=	1.68	23	12	13	3.7	3.3
Store Z							
A1		1.90	25	6	6	3.1	3.1
A2		1.90	21	6	6	3.0	3.0
A3		1.82	12	3	3	2.7	2.7
Ave	S=	1.88	19	5	5	2.9	2.9
Ovrl Ave		1.45 *	22	11	11	3.7	3.6

Notes:
* Average of the three S parameters, not of the nine individual s values.

TABLE A7.5

Context: Brand Choice Within Individual Stores.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Various (Predictions from Discrete Model)

Str/Brnd	wp		w/wp (%)		bs/b (%)		ws	
	O	D	O	D	O	D	O	D
Store X								
A1	8.8	9.0	58	54	43	39	5.2	4.0
A2	9.4	9.6	49	45	35	32	3.4	3.5
A3	8.3	9.8	43	42	31	29	3.2	3.3
Ave	8.8	9.4	50	47	36	33	3.9	3.6
Store Y								
A2	9.1	8.6	48	40	33	26	4.0	2.1
A1	6.7	8.6	45	39	42	25	3.5	2.1
A3	8.6	9.0	42	35	23	22	2.6	1.9
Ave	8.1	8.8	45	38	33	24	3.4	2.1
Store Z								
A1	7.0	7.5	44	40	51	27	2.4	1.9
A2	7.2	7.7	41	37	47	25	1.2	1.8
A3	8.4	8.1	32	32	37	22	4.2	1.6
Ave	7.5	8.1	39	36	45	25	2.6	2.5
Ovrl Ave	8.2	8.8	45	41	38	27	3.3	2.5

TABLE A7.6

Context: Brand Choice Within Individual Stores.
Product/Region: Tea Bags, Region I.
Measure(s): Various (Predictions from Discrete Model)

Str/Brnd		s	MS (%)	b (%) O	b (%) D	w O	w D
Store X							
B1		.33	58	29	31	6.1	5.9
B2		.75	18	13	11	4.3	4.8
B3		1.01	7	6	5	3.6	4.5
Ave	S=	.48	28	16	16	4.7	5.1
Store Y							
B1		.24	29	9	13	4.7	3.4
B2		2.93	27	13	12	3.0	3.3
B3		1.95	11	6	6	2.7	2.8
Ave	S=	1.60	22	9	10	3.5	3.1
Store Z							
B1		.00	80	13	14	6.4	5.6
B2		4.83	10	4	3	2.3	3.5
B3		7.00	5	3	2	1.9	3.4
Ave	S=	.89	32	7	6	3.5	4.2
Ovrl Ave		.99 *	27	11	11	3.9	4.1

Notes:
* Average of the three S parameters, not of the nine individual s values.

TABLE A7.7

Context: Brand Choice Within Individual Stores.
Product/Region: Tea Bags, Region I.
Measure(s): Various (Predictions from Discrete Model)

Str/Brnd	wp O	wp D	w/wp (%) O	w/wp (%) D	bs/b (%) O	bs/b (%) D	ws O	ws D
Store X								
B1	7.8	8.0	78	73	59	64	6.1	5.6
B2	9.0	9.1	48	53	36	42	4.6	4.4
B3	11.4	9.4	32	48	17	37	2.7	4.1
Ave	9.4	8.8	52	58	37	47	4.5	4.7
Store Y								
B1	8.0	7.6	59	44	40	30	5.3	2.2
B2	6.0	7.7	50	42	51	28	2.8	2.1
B3	9.1	8.5	30	33	17	22	1.8	1.8
Ave	7.7	8.0	46	40	34	27	3.3	2.0
Store Z								
B1	7.1	6.7	90	84	66	75	4.6	5.1
B2	9.8	9.1	23	39	32	29	1.7	2.5
B3	9.4	9.3	20	37	24	27	1.5	2.4
Ave	9.2	9.7	44	53	41	44	2.6	3.4
Ovrl Ave	8.6	8.4	48	50	38	39	3.4	3.4

TABLE A7.8

Context: Brand Choice Within Individual Stores.
Product/Region: Instant Coffee, Region I.
Measure(s): Various (Predictions from Discrete Model)

Str/Brnd	s	MS (%)	b (%) O	b (%) D	w O	w D
Store X						
C1	.35	48	29	31	5.9	5.5
C2	.73	24	19	18	4.5	4.8
C3	1.07	11	11	9	3.7	4.5
Ave	S= 0.56	27	20	19	4.7	4.9
Store Y						
C2	.43	38	15	17	4.7	4.3
C1	1.03	20	11	10	3.5	3.9
C3	.76	19	9	9	3.7	3.9
Ave	S= 0.66	26	12	12	4.0	4.0
Store Z						
C1	.00	60	10	12	6.7	5.3
C3	1.30	15	5	4	3.3	4.3
C2	1.63	15	5	4	3.1	4.3
Ave	S= .48	30	6	7	4.4	4.6
Ovrl Ave	.57 *	28	13	13	4.4	4.5

Notes:
* Average of the three S parameters, not of the nine individual s values.

TABLE A7.9

Context: Brand Choice Within Individual Stores.
Product/Region: Instant Coffee, Region I.
Measure(s): Various (Predictions from Discrete Model)

Str/Brnd	wp		w/wp (%)		bs/b (%)		ws	
	O	D	O	D	O	D	O	D
Store X								
C1	8.4	8.5	70	65	54	53	7.3	5.2
C2	7.9	9.2	57	53	36	40	4.8	4.4
C3	8.3	9.6	45	47	23	34	3.3	4.0
Ave	8.2	9.1	57	55	38	42	5.1	4.5
Store Y								
C2	7.6	7.3	62	60	49	48	4.6	3.8
C1	6.1	7.8	57	50	54	39	2.9	3.3
C3	8.3	7.8	45	49	37	38	4.2	3.2
Ave	7.4	7.6	54	53	47	42	3.9	3.4
Store Z								
C1	8.6	7.0	78	76	71	68	5.9	4.9
C3	8.9	8.2	37	53	50	44	3.1	3.7
C2	6.2	8.2	50	53	50	44	1.8	3.7
Ave	7.9	7.8	56	60	57	52	3.6	4.1
Ovrl Ave	7.8	8.2	56	56	47	45	4.2	4.0

TABLE A7.10

Context: Store Choice for Individual Brands.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Various (Predictions from Discrete Model)

Brnd/Str		s	MS (%)	b (%)		w	
				O	D	O	D
Brand A1							
X		.15	42	23	26	5.1	4.3
Y		1.35	17	15	12	3.0	3.8
Z		.94	7	6	5	3.1	3.6
Ave	S=	.55	22	15	15	3.7	3.9
Brand A2							
X		.25	35	14	15	4.6	4.3
Y		.29	26	11	12	4.4	4.2
Z		1.08	9	6	4	3.0	3.9
Ave	S=	.37	23	10	10	4.0	4.2
Brand A3							
X		.57	36	13	13	3.5	3.6
Y		.40	26	9	10	3.6	3.4
Z		.94	7	3	3	2.7	3.1
Ave	S=	.54	23	9	9	3.3	3.4
Ovrl Ave		.49 *	23	11	11	3.7	3.8

Notes:
* Average of the three S parameters, not of the nine individual s values.

TABLE A7.11

Context: Store Choice for Individual Brands.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Various (Predictions from Discrete Model)

Brnd/Str	wp		w/wp (%)		bs/b (%)		ws	
	O	D	O	D	O	D	O	D
Brand A1								
X	7.4	6.6	68	65	50	54	4.6	4.1
Y	6.2	7.1	49	53	43	41	2.5	3.6
Z	8.7	7.3	35	49	24	37	2.9	3.3
Ave	7.4	7.0	51	56	39	44	3.3	3.6
Brand A2								
X	6.6	6.4	70	68	51	60	3.6	4.2
Y	7.1	6.6	62	64	44	56	3.3	4.0
Z	7.1	6.9	42	57	24	49	2.4	3.7
Ave	6.9	6.6	58	63	40	55	3.1	4.0
Brand A3								
X	6.1	5.6	58	63	60	55	3.5	3.3
Y	5.6	5.8	64	59	48	50	2.8	3.1
Z	6.4	6.1	42	51	43	42	2.2	2.8
Ave	6.0	5.9	55	58	51	49	2.8	3.1
Ovrl Ave	6.8	6.5	55	59	43	49	3.1	3.6

TABLE A7.12

Context: Store Choice for Individual Brands.
Product/Region: Tea Bags, Region I.
Measure(s): Various (Predictions from Discrete Model)

Brnd/Str		s	MS (%)	b (%) O	b (%) D	w O	w D
Brand B1							
X		.25	47	29	29	6.1	6.1
Z		.10	21	13	14	6.4	5.6
Y		.45	11	9	8	4.7	5.5
Ave	S=	.24	26	17	17	5.7	5.7
Brand B2							
X		.30	27	13	16	4.3	3.5
Y		1.37	19	13	12	3.0	3.3
Z		2.18	5	4	3	2.3	3.0
Ave	S=	.88	17	10	10	3.2	3.2
Brand B3							
X		.10	26	6	8	3.6	2.9
Y		.77	19	6	6	2.7	2.8
Z		2.23	7	3	2	1.9	2.6
Ave	S=	.62	17	5	5	2.7	2.7
Ovrl Ave		.58 *	20	11	11	3.9	3.9

Notes:
* Average of the three S parameters, not of the nine individual s values.

TABLE A7.13

Context: Store Choice for Individual Brands.
Product/Region: Tea Bags, Region I.
Measure(s): Various (Predictions from Discrete Model)

Brnd/Str	wp		w/wp (%)		bs/b (%)		ws	
	O	D	O	D	O	D	O	D
Brand B1								
X	7.9	7.9	77	77	63	70	6.7	6.2
Z	9.5	8.3	67	68	46	59	8.2	5.7
Y	8.9	8.5	53	64	33	56	3.7	5.5
Ave	8.8	8.3	66	70	47	62	6.2	5.8
Brand B2								
X	7.0	6.8	61	51	50	38	3.9	2.9
Y	6.7	7.1	45	47	45	34	3.5	2.7
Z	6.1	7.5	38	39	32	28	4.0	2.4
Ave	6.6	7.1	48	46	42	33	3.8	2.7
Brand B3								
X	6.3	4.8	57	60	60	52	3.2	2.6
Y	4.7	4.9	57	57	62	49	1.9	2.5
Z	3.5	5.1	54	51	52	44	1.4	2.3
Ave	4.8	4.9	56	56	58	48	2.1	2.5
Ovrl Ave	6.7	6.8	56	57	49	48	4.0	3.6

TABLE A7.14

Context: Store Choice for Individual Brands.
Product/Region: Instant Coffee, Region I.
Measure(s): Various (Predictions from Discrete Model)

Brnd/Str		s	MS (%)	b (%)		w	
				O	D	O	D
Brand C1							
X		.23	48	29	30	5.9	5.7
Z		.02	18	10	13	6.7	5.1
Y		1.05	10	11	8	3.5	5.0
Ave	S=	.29	25	17	17	5.4	5.3
Brand C2							
X		.51	31	19	19	4.5	4.5
Y		.39	26	15	16	4.7	4.4
Z		1.08	6	5	4	3.1	3.9
Ave	S=	.51	21	13	13	4.1	4.3
Brand C3							
X		.61	27	11	11	3.7	3.7
Y		.51	24	9	10	3.7	3.7
Z		.63	11	5	5	3.3	3.4
Ave	S=	.57	21	8	8	3.6	3.6
Ovrl Ave		.46 *	22	13	13	4.4	4.4

Notes:
* Average of the three S parameters, not of the nine individual s values.

TABLE A7.15

Context: Store Choice for Individual Brands.
Product/Region: Instant Coffee, Region I.
Measure(s): Various (Predictions from Discrete Model)

Brnd/Str	wp		w/wp (%)		bs/b (%)		ws	
	O	D	O	D	O	D	O	D
Brand C1								
X	7.7	7.7	77	75	64	67	5.7	5.7
Z	10.9	8.2	61	63	39	53	7.6	5.1
Y	8.8	8.3	40	60	34	50	3.2	5.0
Ave	9.1	8.0	59	66	46	57	5.5	5.3
Brand C2								
X	8.1	7.6	56	59	55	48	3.9	4.2
Y	9.0	7.8	52	57	40	46	3.3	4.1
Z	12.1	8.3	26	48	18	37	1.6	3.6
Ave	9.7	7.9	45	55	38	44	2.9	3.9
Brand C3								
X	5.9	6.4	63	58	56	48	3.8	3.3
Y	6.8	6.5	54	56	41	46	3.3	3.2
Z	7.2	6.8	46	50	26	41	3.4	3.0
Ave	6.6	6.5	55	55	41	45	3.5	3.2
Ovrl Ave	8.5	7.5	53	59	42	49	4.0	4.1

TABLE A7.16

Context: Brand Choice Within Individual Stores.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Various (Predictions from Linked Model).

Str/Brnd		s	MS (%)	b (%)		w	
				O	D	O	D
Store X							
A1		.58	36	23	24	5.1	4.9
A2		.60	21	14	15	4.6	4.4
A3		1.34	15	13	11	3.5	4.2
Ave	S=	.74	24	17	17	4.4	4.5
Store Y							
A2		.58	26	11	14	4.4	3.4
A1		3.90	25	15	14	3.0	3.4
A3		1.09	18	9	11	3.6	3.1
Ave	S=	1.92	23	12	13	3.7	3.3
Store Z							
A1		2.35	25	6	6	3.1	3.1
A2		2.29	21	6	6	3.0	3.0
A3		2.07	12	3	3	2.7	2.6
Ave	S=	2.27	19	5	5	2.9	2.9
Ovrl Ave		1.64 *	22	11	12	3.7	3.6

Notes:
* Average of the three S parameters, not of the nine individual s values.

TABLE A7.17

Context: Brand Choice Within Individual Stores.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Various (Predictions from Linked Model).

Str/Brnd	wp		w/wp (%)		bs/b (%)		ws	
	O	D	O	D	O	D	O	D
Store X								
A1	8.8	8.8	58	55	43	41	5.2	4.1
A2	9.4	9.3	49	47	35	33	3.4	3.6
A3	8.3	9.5	43	44	31	30	3.2	3.4
Ave	8.8	9.2	50	49	36	35	3.9	3.7
Store Y								
A2	9.1	8.9	48	39	33	24	4.0	2.0
A1	6.7	8.9	45	38	42	24	3.5	2.0
A3	8.6	9.3	42	34	23	21	2.6	1.8
Ave	8.1	9.0	45	37	33	23	3.4	1.9
Store Z								
A1	7.0	8.3	44	37	51	24	2.4	1.7
A2	7.2	8.5	41	35	47	23	1.2	1.7
A3	8.4	9.1	32	29	37	19	4.2	1.5
Ave	7.5	8.6	39	34	45	22	2.6	1.6
Ovrl Ave	8.2	8.9	45	40	38	27	3.3	2.4

TABLE A7.18

Context: Brand Choice Within Individual Stores.
Product/Region: Tea Bags, Region I.
Measure(s): Various (Predictions from Linked Model).

Str/Brnd		s	MS (%)	b (%)		w	
				O	D	O	D
Store X							
B1		.30	58	29	31	6.1	5.9
B2		.73	18	13	11	4.3	4.8
B3		.98	7	6	5	3.6	4.6
Ave	S=	.45	28	16	16	4.7	5.1
Store Y							
B1		.36	29	9	13	4.7	3.3
B2		4.69	27	13	12	3.0	3.3
B3		2.38	11	6	6	2.7	2.6
Ave	S=	2.43	22	9	10	3.5	3.1
Store Z							
B1		.00	80	13	15	6.4	5.3
B2		3.90	10	4	3	2.3	3.5
B3		5.82	5	3	2	1.9	3.4
Ave	S=	.73	32	7	6	3.5	4.1
Ovrl Ave		1.20 *	27	11	11	3.9	4.1

Notes:
* Average of the three S parameters, not of the nine individual s values.

TABLE A7.19

Context: Brand Choice Within Individual Stores.
Product/Region: Tea Bags, Region I.
Measure(s): Various (Predictions from Linked Model).

Str/Brnd	wp		w/wp (%)		bs/b (%)		ws	
	O	D	O	D	O	D	O	D
Store X								
B1	7.8	7.9	78	74	59	65	6.1	5.6
B2	9.0	8.9	48	54	36	43	4.6	4.5
B3	11.4	9.2	32	50	17	39	2.7	4.2
Ave	9.4	8.6	52	59	37	49	4.5	4.7
Store Y								
B1	8.0	8.4	59	40	40	24	5.3	1.8
B2	6.0	8.5	50	38	51	23	2.8	1.8
B3	9.1	9.7	30	27	17	17	1.8	1.5
Ave	7.7	8.9	46	35	34	22	3.3	1.7
Store Z								
B1	7.1	6.2	90	85	66	78	4.6	5.0
B2	9.8	8.2	23	43	32	34	1.7	2.8
B3	9.4	8.3	20	41	24	32	1.5	2.7
Ave	9.2	7.6	44	57	41	48	2.6	3.5
Ovrl Ave	8.6	8.4	48	50	38	40	3.4	3.3

TABLE A7.20

Context: Brand Choice Within Individual Stores.
Product/Region: Instant Coffee, Region I.
Measure(s): Various (Predictions from Linked Model).

Str/Brnd		s	MS (%)	b (%) O	b (%) D	w O	w D
Store X							
C1		.33	48	29	31	5.9	5.5
C2		.70	24	19	18	4.5	4.8
C3		1.04	11	11	9	3.7	4.5
Ave	S=	.53	27	20	19	4.7	4.9
Store Y							
C2		.56	38	15	16	4.7	4.4
C1		1.22	20	11	10	3.5	3.9
C3		.89	19	9	9	3.7	3.8
Ave	S=	.81	26	12	12	4.0	4.0
Store Z							
C1		.00	60	10	13	6.7	5.1
C3		1.06	15	5	4	3.3	4.2
C2		1.33	15	5	4	3.1	4.2
Ave	S=	.39	30	6	7	4.4	4.5
Ovrl Ave		.58 *	28	13	13	4.4	4.5

Notes:
* Average of the three S parameters, not of the nine individual s values.

TABLE A7.21

Context: Brand Choice Within Individual Stores.
Product/Region: Instant Coffee, Region I.
Measure(s): Various (Predictions from Linked Model).

Str/Brnd	wp		w/wp (%)		bs/b (%)		ws	
	O	D	O	D	O	D	O	D
Store X								
C1	8.4	8.3	70	66	54	54	7.3	5.2
C2	7.9	9.0	57	54	36	41	4.8	4.4
C3	8.3	9.3	45	48	23	35	3.3	4.1
Ave	8.2	8.9	57	56	38	43	5.1	4.6
Store Y								
C2	7.6	7.8	61	56	49	43	4.6	3.6
C1	6.1	8.4	57	46	54	34	2.9	3.0
C3	8.3	8.5	45	45	37	33	4.2	3.0
Ave	7.4	8.2	54	49	47	37	3.9	3.2
Store Z								
C1	8.6	6.5	78	78	71	72	5.9	4.8
C3	8.9	7.4	37	57	50	50	3.1	3.9
C2	6.2	7.4	51	57	50	50	1.8	3.9
Ave	7.9	7.1	55	64	57	57	3.6	4.2
Ovrl Ave	7.8	8.1	56	56	47	46	4.2	4.0

TABLE A7.22

Context: Store Choice for Individual Brands.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Various (Predictions from Linked Model).

Brnd/Str		s	MS (%)	b (%)		w	
				O	D	O	D
Brand A1							
X		.19	42	23	26	5.1	4.3
Y		1.44	17	15	12	3.0	3.8
Z		.99	7	6	5	3.1	3.6
Ave	S=	.60	22	15	15	3.7	3.9
Brand A2							
X		.16	35	14	15	4.6	4.3
Y		.20	26	11	12	4.4	4.2
Z		.92	9	6	4	3.0	4.0
Ave	S=	.27	23	10	10	4.0	4.2
Brand A3							
X		.65	36	13	13	3.5	3.6
Y		.46	26	9	10	3.6	3.4
Z		1.01	7	3	3	2.7	3.1
Ave	S=	.62	23	9	9	3.3	3.4
Ovrl Ave		.50 *	23	11	11	3.7	3.8

Notes:
* Average of the three S parameters, not of the nine individual s values.

TABLE A7.23

Context: Store Choice for Individual Brands.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Various (Predictions from Linked Model).

Brnd/Str	wp		w/wp (%)		bs/b (%)		ws	
	O	D	O	D	O	D	O	D
Brand A1								
X	7.4	6.8	68	64	50	52	4.6	4.0
Y	6.2	7.3	49	51	43	39	2.5	3.4
Z	8.7	7.6	35	47	24	35	2.9	3.2
Ave	7.4	7.2	51	54	39	42	3.3	3.5
Brand A2								
X	6.6	5.9	70	73	51	67	3.6	4.3
Y	7.1	6.0	62	70	44	64	3.3	4.1
Z	7.1	6.2	42	64	24	58	2.4	3.9
Ave	6.9	6.0	58	69	40	63	3.1	4.1
Brand A3								
X	6.1	5.8	58	61	60	52	3.5	3.2
Y	5.6	6.0	64	57	48	47	2.8	3.0
Z	6.4	6.4	42	48	43	39	2.2	2.7
Ave	6.0	6.1	55	55	51	46	2.8	3.0
Ovrl Ave	6.8	6.4	55	60	43	50	3.1	3.5

TABLE A7.24

Context: Store Choice for Individual Brands.
Product/Region: Tea Bags, Region I.
Measure(s): Various (Predictions from Linked Model).

Brnd/Str	s	MS (%)	b (%)		w	
			O	D	O	D
Brand B1						
X	.16	47	29	29	6.1	6.1
Z	.06	21	13	14	6.4	5.7
Y	.38	11	9	8	4.7	5.6
Ave	S= .16	26	17	17	5.7	5.8
Brand B2						
X	.37	27	13	16	4.3	3.5
Y	1.58	19	13	12	3.0	3.3
Z	2.38	5	4	3	2.3	2.9
Ave	S= 1.02	17	10	10	3.2	3.2
Brand B3						
X	.49	26	6	7	3.6	2.9
Y	1.76	19	6	6	2.7	2.8
Z	3.93	7	3	2	1.9	2.5
Ave	S= 1.40	17	5	5	2.7	2.7
Ovrl Ave	.86 *	20	11	11	3.9	3.9

Notes:
* Average of the three S parameters, not of the nine individual s values.

TABLE A7.25

Context: Store Choice for Individual Brands.
Product/Region: Tea Bags, Region I.
Measure(s): Various (Predictions from Linked Model).

Brnd/Str	wp		w/wp (%)		bs/b (%)		ws	
	O	D	O	D	O	D	O	D
Brand B1								
X	7.9	7.5	77	82	63	78	6.7	6.2
Z	9.5	7.7	67	74	46	69	8.2	5.9
Y	8.9	7.9	53	71	33	65	3.7	5.8
Ave	8.8	7.7	66	76	47	71	6.2	6.0
Brand B2								
X	7.0	7.3	61	48	50	35	3.9	2.7
Y	6.7	7.5	45	44	45	31	3.5	2.5
Z	6.1	8.1	38	36	32	25	4.0	2.2
Ave	6.6	7.6	48	43	42	30	3.8	2.5
Brand B3								
X	6.3	6.5	57	45	60	33	3.2	2.1
Y	4.7	6.7	57	41	62	30	1.9	2.0
Z	3.5	7.3	54	34	52	25	1.4	1.7
Ave	4.8	6.8	56	40	58	30	2.1	1.9
Ovrl Ave	6.7	7.4	56	53	49	43	4.0	3.5

TABLE A7.26

Context: Store Choice for Individual Brands.
Product/Region: Instant Coffee, Region I.
Measure(s): Various (Predictions from Linked Model).

Brnd/Str		s	MS (%)	b (%)		w	
				O	D	O	D
Brand C1							
X		.19	48	29	30	5.9	5.8
Z		.00	18	10	13	6.7	5.2
Y		.99	10	11	7	3.5	5.1
Ave	S=	.26	25	17	17	5.4	5.3
Brand C2							
X		.50	31	19	19	4.5	4.6
Y		.38	26	15	16	4.7	4.4
Z		1.07	6	5	4	3.1	4.0
Ave	S=	.50	21	13	13	4.1	4.3
Brand C3							
X		.81	27	11	11	3.7	3.7
Y		.66	24	9	10	3.7	3.7
Z		.77	11	5	5	3.3	3.4
Ave	S=	.75	21	8	8	3.6	3.6
Ovrl Ave		.50 *	22	13	13	4.4	4.4

Notes:
* Average of the three S parameters, not of the nine individual s values.

TABLE A7.27

Context: Store Choice for Individual Brands.
Product/Region: Instant Coffee, Region I.
Measure(s): Various (Predictions from Linked Model).

Brnd/Str	wp		w/wp (%)		bs/b (%)		ws	
	O	D	O	D	O	D	O	D
Brand C1								
X	7.7	7.5	77	77	64	70	5.7	5.8
Z	10.9	8.0	61	65	39	57	7.6	5.3
Y	8.8	8.1	40	63	34	54	3.2	5.1
Ave	9.1	7.8	59	68	46	60	5.5	5.4
Brand C2								
X	8.1	7.6	56	60	55	49	3.9	4.2
Y	9.0	7.7	52	57	40	46	3.3	4.1
Z	12.1	8.2	26	48	18	37	1.6	3.6
Ave	9.7	7.9	45	55	38	44	2.9	4.0
Brand C3								
X	5.9	7.1	63	53	56	42	3.8	3.1
Y	6.8	7.2	54	51	41	40	3.3	3.0
Z	7.2	7.6	46	44	26	34	3.4	2.7
Ave	6.6	7.3	55	49	41	39	3.5	2.9
Ovrl Ave	8.5	7.7	53	57	42	48	4.0	4.1

Appendix 8

Detailed Results for Chapter 13:

THE INTERACTION OF BRAND CHOICE AND STORE CHOICE.

TABLE A8.1

Context: Brand and Store Choice.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Duplication with Other Brands and/or at Other Stores.

Buyers of: % who also buy:

		Store X			Store Y			Store Z		
Store	Brand	A1	A2	A3	A1	A2	A3	A1	A2	A3
	A1	--	26	21	19	6	4	10	4	2
X	A2	41	--	19	11	17	7	3	9	0
	A3	37	20	--	16	8	20	6	5	6
	A1	28	10	14	--	29	29	9	5	2
Y	A2	13	22	10	41	--	31	3	12	1
	A3	9	12	28	48	37	--	7	3	7
	A1	36	9	14	23	5	10	--	29	21
Z	A2	16	24	12	14	24	6	32	--	12
	A3	13	0	23	13	3	19	39	19	--

Notes:
- See Table 13.1 for clarification.

TABLE A8.2

Context: Brand and Store Choice.
Product/Region: Tea Bags, Region I.
Measure(s): Duplication with Other Brands and/or at Other Stores.

Buyers of: % who also buy:

		Store X			Store Y			Store Z		
Store	Brand	B1	B2	B3	B1	B2	B3	B1	B2	B3
X	B1	--	18	12	9	7	5	11	2	1
	B2	43	--	18	7	24	4	7	4	0
	B3	58	39	--	5	9	11	7	1	3
Y	B1	31	9	3	--	33	27	23	4	3
	B2	17	24	4	23	--	21	14	10	3
	B3	26	9	11	41	47	--	16	5	7
Z	B1	26	8	3	17	15	8	--	19	12
	B2	16	13	2	10	32	8	59	--	24
	B3	15	0	7	11	15	15	55	35	--

TABLE A8.3

Context: Brand and Store Choice.
Product/Region: Instant Coffee, Region I.
Measure(s): Duplication with Other Brands and/or at Other Stores.

Buyers of: % who also buy:

		Store X			Store Y			Store Z		
Store	Brand	C1	C2	C3	C1	C2	C3	C1	C2	C3
	C1	--	23	15	12	8	3	8	2	1
X	C2	35	--	27	6	22	8	4	8	1
	C3	41	48	--	8	12	22	3	2	7
	C1	35	11	8	--	25	23	22	3	3
Y	C2	16	27	8	17	--	30	8	13	5
	C3	9	18	26	26	51	--	9	8	15
	C1	27	8	3	24	12	9	--	16	12
Z	C2	13	34	4	6	40	15	31	--	20
	C3	7	4	16	7	16	30	26	21	--

TABLE A8.4

Context:	**Brand and Store Choice.**
Product/Region:	**Automatic Washing Powder, Region I.**
Measure(s):	**Buying Other Brands and/or at Other Stores: Duplication.** Predictions from the Dirichlet Calibrated Separately to Each BCwS and SCwB Submarket.

Buyers of:	**% also buying:**				
	OB/S		**B/OS**		**OB/OS**
	O	**D**	**O**	**D**	**O**
Store X					
Brand A1	57	61	50	46	41
Brand A2	65	68	49	40	54
Brand A3	69	71	40	45	63
Store Y					
Brand A1	58	75	57	59	56
Brand A2	67	74	56	44	59
Brand A3	77	78	52	50	66
Store Z					
Brand A1	49	73	76	63	65
Brand A2	53	75	76	51	73
Brand A3	63	78	57	58	86
Average	62	73	57	51	63

Notes:
- For clarification, see text relating to Table 13.7.

TABLE A8.5

Context:	**Brand and Store Choice.**
Product/Region:	**Tea Bags, Region I.**
Measure(s):	**Buying Other Brands and/or at Other Stores: Duplication.** Predictions from the Dirichlet Calibrated Separately to Each BCwS and SCwB Submarket.

Buyers of:	**% also buying:**				
	OB/S		**B/OS**		**OB/OS**
	O	**D**	**O**	**D**	**O**
Store X					
Brand B1	41	36	37	30	45
Brand B2	64	58	50	62	55
Brand B3	83	63	40	48	56
Store Y					
Brand B1	60	70	67	44	68
Brand B2	49	72	55	66	67
Brand B3	83	78	38	51	86
Store Z					
Brand B1	34	25	54	41	71
Brand B2	68	71	68	72	72
Brand B3	76	73	48	56	95
Average	62	61	51	52	68

TABLE A8.6

Context:	**Brand and Store Choice.**
Product/Region:	**Instant Coffee, Region I.**
Measure(s):	**Buying Other Brands and/or at Other Stores: Duplication.** Predictions from the Dirichlet Calibrated Separately to Each BCwS and SCwB Submarket.

Buyers of: **% also buying:**

	OB/S		**B/OS**		**OB/OS**
	O	**D**	**O**	**D**	**O**
Store X					
Brand C1	46	47	36	33	43
Brand C2	64	60	45	52	48
Brand C3	77	66	44	52	43
Store Y					
Brand C1	46	61	66	50	62
Brand C2	51	52	60	54	62
Brand C3	63	62	59	54	63
Store Z					
Brand C1	29	32	61	47	65
Brand C2	50	56	82	63	72
Brand C3	50	56	74	59	76
Average	53	55	58	51	59

TABLE A8.7

Context: Brand and Store Choice.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Buying Other Brands and/or at Other Stores: Amount Bought.
Predictions from "Non-Interaction" Dirichlet.

Buyers of:	purchase frequency of:									
	B/S		OB/S		B/OS		OB/OS		any B/ any S	
	O	D	O	D	O	D	O	D	O	D
X										
A1	5.1	4.3	3.7	2.7	2.4	2.1	1.7	5.5	13	15
A2	4.6	3.9	4.8	3.4	2.0	1.7	2.5	6.1	14	15
A3	3.5	3.8	4.8	3.7	2.6	1.1	3.8	6.7	15	15
Y										
A1	3.0	3.8	3.7	1.9	3.1	3.1	3.0	6.5	13	15
A2	4.4	3.8	4.7	1.8	2.7	1.9	3.2	7.8	15	15
A3	3.6	3.7	5.0	2.0	2.0	1.3	4.7	8.4	15	15
Z										
A1	3.1	3.6	4.0	0.8	5.6	3.5	5.2	7.7	18	16
A2	3.0	3.6	4.2	0.8	4.1	2.3	5.2	8.9	17	16
A3	2.7	3.6	5.7	0.9	3.7	1.6	6.5	9.6	19	16
Av	3.7	3.8	4.5	2.0	3.1	2.1	4.0	7.5	15	15

Notes:
- For clarification, see text relating to Table 13.8.

TABLE A8.8

Context:	Brand and Store Choice.
Product/Region:	Tea Bags, Region I.
Measure(s):	Buying Other Brands and/or at Other Stores: Amount Bought. Predictions from "Non-Interaction" Dirichlet.

Buyers of:	B/S		OB/S		B/OS		OB/OS		any B/ any S	
	O	D	O	D	O	D	O	D	O	D
X										
B1	6.1	5.1	1.7	1.6	1.8	2.5	2.3	5.1	12	14
B2	4.3	4.3	4.8	3.1	2.8	1.8	2.5	6.0	14	15
B3	3.6	4.0	7.8	3.5	2.7	.8	2.1	7.1	16	15
Y										
B1	4.7	4.2	3.3	1.3	4.2	4.2	4.2	5.6	16	15
B2	3.0	4.2	3.0	1.3	3.7	2.0	4.5	7.8	14	15
B3	2.7	4.0	6.5	1.6	2.0	.8	6.6	9.0	18	16
Z										
B1	6.4	4.4	.7	.3	3.1	3.7	4.6	6.6	15	15
B2	2.3	4.0	7.5	1.2	3.8	2.4	5.0	8.1	19	16
B3	1.9	4.0	7.5	1.2	1.6	1.0	5.2	9.5	16	16
Av	3.9	4.2	4.8	1.7	2.9	2.1	4.1	7.2	16	15

TABLE A8.9

Context: Brand and Store Choice.
Product/Region: Instant Coffee, Region I.
Measure(s): Buying Other Brands and/or at Other Stores: Amount Bought.
Predictions from "Non-Interaction" Dirichlet.

Buyers of:	purchase frequency of:									
	B/S		OB/S		B/OS		OB/OS		any B/any S	
	O	D	O	D	O	D	O	D	O	D
X										
C1	5.9	5.2	2.5	1.9	1.8	1.9	2.5	5.0	13	14
C2	4.5	4.7	3.4	2.8	3.6	1.9	2.4	5.0	14	14
C3	3.7	4.4	4.7	3.3	2.2	1.1	1.9	5.9	12	15
Y										
C1	3.5	4.4	2.6	1.5	5.3	3.3	2.7	5.5	14	15
C2	4.6	4.6	3.0	1.2	4.4	2.1	2.9	6.7	15	15
C3	3.7	4.4	4.6	1.6	3.0	1.1	3.8	7.7	15	15
Z										
C1	6.7	4.6	1.9	.4	4.2	3.0	3.9	6.6	17	15
C2	3.1	4.3	3.0	.9	9.0	2.6	3.2	7.0	18	15
C3	3.3	4.3	5.6	.9	3.8	1.3	5.1	8.3	18	15
Av	4.4	4.5	3.5	1.6	4.1	2.0	3.2	6.4	15	15

TABLE A8.10

Context: Brand and Store Choice.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Buying Other Brands and/or at Other Stores: Share of Requirement.
Predictions from "Non-Interaction" Dirichlet.

Buyers of:	**% of total purchases devoted to:**							
	B/S		**OB/S**		**B/OS**		**OB/OS**	
	O	**D**	**O**	**D**	**O**	**D**	**O**	**D**
Store X								
Brand A1	39	29	29	18	18	15	13	38
Brand A2	33	26	35	23	14	11	18	41
Brand A3	24	25	33	24	17	7	26	44
Store Y								
Brand A1	24	25	29	12	24	20	24	43
Brand A2	29	25	31	12	18	12	21	51
Brand A3	23	24	33	13	13	8	31	54
Store Z								
Brand A1	17	23	22	5	32	22	29	49
Brand A2	18	23	26	5	25	15	32	57
Brand A3	15	23	31	6	20	10	35	61
Average	25	25	30	13	20	13	25	49

Notes:
- For clarification, see text relating to Table 13.9.

TABLE A8.11

Context: Brand and Store Choice.
Product/Region: Tea Bags, Region I.
Measure(s): Buying Other Brands and/or at Other Stores: Share of Requirement. Predictions from "Non-Interaction" Dirichlet.

Buyers of:	% of total purchases devoted to:							
	B/S		OB/S		B/OS		OB/OS	
	O	D	O	D	O	D	O	D
Store X								
Brand B1	51	36	15	11	15	17	19	36
Brand B2	30	28	33	21	19	12	17	39
Brand B3	22	26	48	23	17	5	13	46
Store Y								
Brand B1	29	27	20	8	26	28	26	37
Brand B2	21	27	21	9	26	13	32	51
Brand B3	15	26	37	10	11	5	37	58
Store Z								
Brand B1	43	29	5	2	21	25	31	44
Brand B2	12	25	41	7	20	15	27	52
Brand B3	12	25	46	8	10	6	32	61
Average	26	28	30	11	18	14	26	47

TABLE A8.12

Context: Brand and Store Choice.
Product/Region: Instant Coffee, Region I.
Measure(s): Buying Other Brands and/or at Other Stores: Share of Requirement. Predictions from "Non-Interaction" Dirichlet.

Buyers of:	% of total purchases devoted to:							
	B/S		OB/S		B/OS		OB/OS	
	O	D	O	D	O	D	O	D
Store X								
Brand C1	46	37	20	14	14	14	20	36
Brand C2	33	32	24	20	26	13	17	35
Brand C3	29	30	37	23	18	7	15	40
Store Y								
Brand C1	25	30	19	10	37	22	19	37
Brand C2	31	32	20	8	29	14	20	46
Brand C3	25	30	30	11	20	8	25	52
Store Z								
Brand C1	40	31	11	3	25	15	23	45
Brand C2	17	29	17	6	49	18	17	47
Brand C3	19	29	31	6	21	9	29	56
Average	29	31	23	11	27	13	21	44

TABLE A8.13

Context: Brand and Store Choice.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Buying Other Brands and/or at Other Stores: Amount Bought.
Predictions from Dirichlet Calibrated Separately to Each BCwS and SCwB Submarket.

Buyers of:	purchase frequency of:						
	----- B/S -----			OB/S		B/OS	
	O	D(1)	D(2)	O	D(1)	O	D(2)
Store X							
Brand A1	5.1	4.9	4.3	3.7	4.1	2.4	2.3
Brand A2	4.6	4.3	4.3	4.8	5.3	2.0	2.1
Brand A3	3.5	4.2	3.6	4.8	5.6	2.6	2.0
Store Y							
Brand A1	3.0	3.4	3.8	3.7	5.2	3.1	3.3
Brand A2	4.4	3.4	4.2	4.7	5.2	2.7	2.4
Brand A3	3.6	3.2	3.4	5.0	5.8	2.0	2.4
Store Z							
Brand A1	3.1	3.1	3.6	4.0	4.4	5.6	3.7
Brand A2	3.0	3.0	3.9	4.2	4.7	4.1	3.0
Brand A3	2.7	2.7	3.1	5.7	5.4	3.7	3.0
Average	3.7	3.6	3.8	4.5	5.1	3.1	2.7

Notes:
- D(1) = predictions from Dirichlet calibrated to the relevant BCwS context.
- D(2) = predictions from Dirichlet calibrated to the relevant SCwB context.
- For further clarification see text relating to Table 13.10.

TABLE A8.14

Context:	**Brand and Store Choice.**
Product/Region:	**Tea Bags, Region I.**
Measure(s):	**Buying Other Brands and/or at Other Stores: Amount Bought.** Predictions from Dirichlet Calibrated Separately to Each BCwS and SCwB Submarket.

Buyers of: **purchase frequency of:**

	----- B/S -----			OB/S		B/OS	
	O	D(1)	D(2)	O	D(1)	O	D(2)
Store X							
Brand B1	6.1	5.9	6.1	1.7	2.1	1.8	1.8
Brand B2	4.3	4.8	3.5	4.8	4.3	2.8	3.3
Brand B3	3.6	4.5	2.9	7.8	4.9	2.7	1.9
Store Y							
Brand B1	4.7	3.4	5.5	3.3	4.2	4.2	3.0
Brand B2	3.0	3.3	3.3	3.0	4.4	3.7	3.8
Brand B3	2.7	2.8	2.8	6.5	5.7	2.0	2.1
Store Z							
Brand B1	6.4	5.6	5.6	.7	1.1	3.1	2.7
Brand B2	2.3	3.5	3.0	7.5	5.6	3.8	4.5
Brand B3	1.9	3.4	2.6	7.5	5.9	1.6	2.5
Average	3.9	4.1	3.9	4.8	4.2	2.9	2.8

Notes:
- D(1) = predictions from Dirichlet calibrated to the relevant BCwS context.
- D(2) = predictions from Dirichlet calibrated to the relevant SCwB context.

TABLE A8.15

Context: Brand and Store Choice.
Product/Region: Instant Coffee, Region I.
Measure(s): Buying Other Brands and/or at Other Stores: Amount Bought.
Predictions from Dirichlet Calibrated Separately to Each BCwS and SCwB Submarket.

Buyers of:	purchase frequency of:						
	----- B/S -----			OB/S		B/OS	
	O	D(1)	D(2)	O	D(1)	O	D(2)
Store X							
Brand C1	5.9	5.5	5.7	2.5	3.0	1.8	2.0
Brand C2	4.5	4.8	4.5	3.4	4.4	3.6	3.1
Brand C3	3.7	4.5	3.7	4.7	5.1	2.2	2.7
Store Y							
Brand C1	3.5	3.9	5.0	2.6	3.9	5.3	3.3
Brand C2	4.7	4.3	4.4	3.0	3.0	4.4	3.4
Brand C3	3.7	3.9	3.7	4.6	3.9	3.0	2.8
Store Z							
Brand C1	6.7	5.3	5.1	1.9	1.7	4.2	3.1
Brand C2	3.1	4.3	3.9	3.0	3.9	9.0	4.4
Brand C3	3.3	4.3	3.4	5.6	3.9	3.8	3.4
Average	4.4	4.5	4.4	3.5	3.6	4.1	3.1

Notes:
- D(1) = predictions from Dirichlet calibrated to the relevant BCwS context.
- D(2) = predictions from Dirichlet calibrated to the relevant SCwB context.

TABLE A8.16

Context:	Brand and Store Choice.
Product/Region:	Automatic Washing Powder, Region I.
Measure(s):	Buying Other Brands and/or at Other Stores: Amount Bought Predictions from the Dirichlet Calibrated Separately to Each BCwS and SCwB Submarket, Excepting the any-B/any-S Category where the "Non-Interaction" Dirichlet's Predictions are Used.

Buyers of:	purchase frequency of:								any B/ any S	
	B/S		OB/S		B/OS		OB/OS			
	O	D	O	D	O	D	O	D	O	D
X										
A1	5.1	4.6	3.7	4.1	2.4	2.3	1.7	3.6	13	15
A2	4.6	4.3	4.8	5.2	2.0	2.1	2.5	3.5	14	15
A3	3.5	3.9	4.8	5.7	2.6	2.1	3.8	3.7	15	15
Y										
A1	3.0	3.6	3.7	5.2	3.1	3.3	3.0	3.1	13	15
A2	4.4	3.8	4.7	5.2	2.7	2.4	3.2	3.9	15	15
A3	3.6	3.3	5.0	5.9	2.0	2.4	4.7	3.9	15	15
Z										
A1	3.1	3.3	4.0	4.7	5.6	3.8	5.2	3.8	18	16
A2	3.0	3.5	4.2	5.0	4.1	2.9	5.2	4.3	17	16
A3	2.7	2.9	5.7	5.8	3.7	3.0	6.5	4.0	19	16
Av	3.7	3.7	4.5	5.2	3.1	2.7	4.0	3.8	15	15

Notes:
- For clarification see text relating to Table 13.12.

TABLE A8.17

Context: Brand and Store Choice.
Product/Region: Tea Bags, Region I.
Measure(s): Buying Other Brands and/or at Other Stores: Amount Bought.
Predictions from the Dirichlet Calibrated Separately to Each BCwS and SCwB Submarket, Excepting the any-B/any-S Category where the "Non-Interaction" Dirichlet's Predictions are Used.

Buyers of:	purchase frequency of:									
	B/S		OB/S		B/OS		OB/OS		any B/ any S	
	O	D	O	D	O	D	O	D	O	D
X										
B1	6.1	6.0	1.7	2.1	1.8	1.8	2.3	4.3	12	14
B2	4.3	4.1	4.8	4.3	2.8	3.4	2.5	3.4	14	15
B3	3.6	3.7	7.8	4.9	2.7	1.9	2.1	5.0	16	15
Y										
B1	4.7	4.4	3.3	4.3	4.2	3.0	4.2	3.6	16	15
B2	3.0	3.3	3.0	4.4	3.7	3.8	4.5	3.8	14	15
B3	2.7	2.8	6.5	5.7	2.0	2.1	6.6	4.9	18	16
Z										
B1	6.4	5.6	.7	1.1	3.1	2.7	4.6	5.6	15	15
B2	2.3	3.3	7.5	5.5	3.8	4.5	5.0	2.3	19	16
B3	1.9	3.0	7.5	5.8	1.6	2.5	5.2	4.3	16	16
Av	3.9	4.0	4.8	4.2	2.9	2.9	4.1	4.1	16	15

TABLE A8.18

Context: Brand and Store Choice.
Product/Region: Instant Coffee, Region I.
Measure(s): Buying Other Brands and/or at Other Stores: Amount Bought.
Predictions from the Dirichlet Calibrated Separately to Each BCwS and SCwB Submarket, Excepting the any-B/any-S Category where the "Non-Interaction" Dirichlet's Predictions are Used.

Buyers of:	purchase frequency of:								any B/ any S	
	B/S		OB/S		B/OS		OB/OS			
	O	D	O	D	O	D	O	D	O	D
X										
C1	5.9	5.6	2.5	2.9	1.8	1.9	2.5	3.6	13	14
C2	4.5	4.7	3.4	4.3	3.6	3.1	2.4	2.4	14	14
C3	3.7	4.1	4.7	5.1	2.2	2.7	1.9	2.8	12	15
Y										
C1	3.5	4.5	2.6	3.9	5.3	3.3	2.7	3.1	14	15
C2	4.6	4.4	3.0	2.9	4.4	3.4	2.9	3.9	15	15
C3	3.7	3.8	4.6	4.0	3.0	2.8	3.8	4.2	15	15
Z										
C1	6.7	5.2	1.9	1.7	4.2	3.0	3.9	4.6	17	15
C2	3.1	4.0	3.0	3.9	9.0	4.3	3.2	2.7	18	15
C3	3.3	3.9	5.6	3.9	3.8	3.4	5.1	3.8	18	15
Av	4.4	4.5	3.5	3.6	4.1	3.1	3.2	3.4	15	15

TABLE A8.19

Context: Brand and Store Choice.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Buying Other Brands and/or at Other Stores: Share of Requirement.
Predictions from the Dirichlet Calibrated Separately to Each BCwS and SCwB Submarket, Excepting the any-B/any-S Category where the "Non-Interaction" Dirichlet's Predictions are Used.

Buyers of:	% of total purchases devoted to:							
	B/S		OB/S		B/OS		OB/OS	
	O	D	O	D	O	D	O	D
Store X								
Brand A1	39	31	29	28	18	16	13	25
Brand A2	33	29	35	35	14	14	18	23
Brand A3	24	25	33	37	17	13	26	24
Store Y								
Brand A1	24	24	29	34	24	22	24	20
Brand A2	29	25	31	34	18	16	21	26
Brand A3	23	21	33	38	13	15	31	25
Store Z								
Brand A1	17	21	22	30	32	24	29	25
Brand A2	18	22	26	32	25	19	32	27
Brand A3	15	18	31	37	20	19	35	25
Average	25	24	30	34	20	18	25	24
Ave from Non-Intrctn Drchlt		25		13		13		49

Notes:
- For clarification see Table 13.12.

TABLE A8.20

Context: Brand and Store Choice.
Product/Region: Tea Bags, Region I.
Measure(s): Buying Other Brands and/or at Other Stores: Share of Requirement.
Predictions from the Dirichlet Calibrated Separately to Each BCwS and SCwB Submarket, Excepting the any-B/any-S Category where the "Non-Interaction" Dirichlet's Predictions are Used.

Buyers of:	% of total purchases devoted to:							
	B/S		OB/S		B/OS		OB/OS	
	O	D	O	D	O	D	O	D
Store X								
Brand B1	51	42	15	15	15	13	19	30
Brand B2	30	27	33	28	19	22	17	23
Brand B3	22	24	48	31	17	12	13	32
Store Y								
Brand B1	29	29	20	28	26	20	26	23
Brand B2	21	22	21	29	26	25	32	25
Brand B3	15	18	37	37	11	14	37	31
Store Z								
Brand B1	43	38	5	7	21	18	31	37
Brand B2	12	21	41	35	20	29	27	14
Brand B3	12	19	46	37	10	16	32	27
Average	26	27	30	27	18	19	26	27
Ave from Non-Intrctn Drchlt		28		11		14		47

TABLE A8.21

Context: Brand and Store Choice.
Product/Region: Instant Coffee, Region I.
Measure(s): Buying Other Brands and/or at Other Stores: Share of Requirement. Predictions from the Dirichlet Calibrated Separately to Each BCwS and SCwB Submarket, Excepting the any-B/any-S Category where the "Non-Interaction" Dirichlet's Predictions are Used.

Buyers of:	% of total purchases devoted to:							
	B/S		OB/S		B/OS		OB/OS	
	O	D	O	D	O	D	O	D
Store X								
Brand C1	46	40	20	21	14	14	20	25
Brand C2	33	32	24	30	26	21	17	16
Brand C3	29	28	37	35	18	18	15	19
Store Y								
Brand C1	25	30	19	26	37	22	19	21
Brand C2	31	30	20	20	29	23	20	27
Brand C3	25	26	30	27	20	19	25	28
Store Z								
Brand C1	40	36	11	12	25	21	23	32
Brand C2	17	27	17	26	49	29	17	18
Brand C3	19	26	31	26	21	23	29	25
Average	29	31	23	25	27	21	21	23
Ave from Non-Intrctn Drchlt		31		11		13		44

TABLE A8.22

Context: Brand and Store Choice.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Buying Other Brands and/or at Other Stores: Share of Requirement.
Predictions from the Dirichlet Calibrated Separately to Each BCwS and SCwB Submarket, and Using Observed Values Within the any-B/any-S Category.

Buyers of:	% of total purchases devoted to:							
	B/S		OB/S		B/OS		OB/OS	
	O	D	O	D	O	D	O	D
Store X								
Brand A1	39	36	29	31	18	18	13	15
Brand A2	33	31	35	37	14	15	18	17
Brand A3	24	26	33	39	17	14	26	21
Store Y								
Brand A1	24	28	29	41	24	26	24	5
Brand A2	29	26	31	34	18	16	21	24
Brand A3	23	21	33	38	13	16	31	25
Store Z								
Brand A1	17	19	22	26	32	21	29	34
Brand A2	18	21	26	30	25	18	32	31
Brand A3	15	16	31	31	20	16	35	37
Average	25	25	30	34	20	18	25	23
Ave from Non-Intrctn Drchlt		25		13		13		49

Notes:
- For clarification see second last paragraph of Section 13.4.

TABLE A8.23

Context:	**Brand and Store Choice.**
Product/Region:	**Tea Bags, Region I.**
Measure(s):	**Buying Other Brands and/or at Other Stores: Share of Requirement.** Predictions from the Dirichlet Calibrated Separately to Each BCwS and SCwB Submarket, and Using Observed Values Within the any-B/any-S Category.

Buyers of: **% of total purchases devoted to:**

	B/S O	B/S D	OB/S O	OB/S D	B/OS O	B/OS D	OB/OS O	OB/OS D
Store X								
Brand B1	51	50	15	18	15	15	19	17
Brand B2	30	29	33	30	19	24	17	17
Brand B3	22	23	48	30	17	12	13	35
Store Y								
Brand B1	29	27	20	26	26	18	26	29
Brand B2	21	23	21	31	26	26	32	20
Brand B3	15	16	37	32	11	12	37	40
Store Z								
Brand B1	43	38	5	7	21	18	31	37
Brand B2	12	18	41	30	20	24	27	28
Brand B3	12	19	46	36	10	15	32	30
Average	26	27	30	27	18	18	26	28
Ave from Non-Intrctn Drchlt		28		11		14		47

TABLE A8.24

Context: Brand and Store Choice.
Product/Region: Instant Coffee, Region I.
Measure(s): Buying Other Brands and/or at Other Stores: Share of Requirement.
Predictions from the Dirichlet Calibrated Separately to Each BCwS and SCwB Submarket, and Using Observed Values Within the any-B/any-S Category.

Buyers of:	% of total purchases devoted to:							
	B/S		OB/S		B/OS		OB/OS	
	O	D	O	D	O	D	O	D
Store X								
Brand C1	46	44	20	23	14	15	20	18
Brand C2	33	34	24	31	26	22	17	13
Brand C3	29	33	37	41	18	22	15	4
Store Y								
Brand C1	25	31	19	27	37	23	19	19
Brand C2	31	29	20	20	29	23	20	28
Brand C3	25	25	30	26	20	19	25	30
Store Z								
Brand C1	40	31	11	10	25	18	23	41
Brand C2	17	22	17	21	49	24	17	33
Brand C3	19	22	31	22	21	19	29	37
Average	29	30	23	25	27	21	21	25
Ave from Non-Intrctn Drchlt		31		11		13		44

TABLE A8.25

Context: Brand and Store Choice.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Brand Loyalty Within and Across Stores, & Store Loyalty Within and Across Brands, Measured by Share of Requirement.

	Brand Loyalty		Store Loyalty	
	BLwS (%)	BLaS (%)	SLwB (%)	SLaB (%)
Store X				
Brand A1	58	58	68	68
Brand A2	49	44	70	66
Brand A3	43	40	58	56
Store Y				
Brand A1	45	50	49	55
Brand A2	48	46	62	60
Brand A3	42	30	64	52
Store Z				
Brand A1	44	52	35	43
Brand A2	41	44	42	45
Brand A3	32	36	42	47
Average	45	44	54	55

Notes:
- For clarification see Section 13.6.1.

TABLE A8.26

Context: Brand and Store Choice.
Product/Region: Tea Bags, Region I.
Measure(s): Brand Loyalty Within and Across Stores, & Store Loyalty Within and Across Brands, Measured by Share of Requirement.

	Brand Loyalty		Store Loyalty	
	BLwS (%)	BLaS (%)	SLwB (%)	SLaB (%)
Store X				
Brand B1	78	44	77	43
Brand B2	48	53	61	66
Brand B3	32	56	57	79
Store Y				
Brand B1	59	50	53	44
Brand B2	50	45	45	40
Brand B3	30	24	57	50
Store Z				
Brand B1	90	40	67	14
Brand B2	23	43	38	60
Brand B3	20	23	54	59
Average	48	42	57	51
Ave (excl B1-Z)	43	42	55	55

TABLE A8.27

Context: Brand and Store Choice.
Product/Region: Instant Coffee, Region I.
Measure(s): Brand Loyalty Within and Across Stores, & Store Loyalty Within and Across Brands, Measured by Share of Requirement.

	Brand Loyalty		Store Loyalty	
	BLwS (%)	BLaS (%)	SLwB (%)	SLaB (%)
Store X				
Brand C1	70	41	77	50
Brand C2	57	60	56	59
Brand C3	44	54	62	71
Store Y				
Brand C1	57	66	40	49
Brand C2	61	60	52	50
Brand C3	45	44	55	55
Store Z				
Brand C1	78	52	62	32
Brand C2	51	74	26	49
Brand C3	37	43	47	52
Average	56	55	53	52

TABLE A8.28

Context: BCwS and SCwB.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Duplication Coefficients.

Buyers of:		who also buy:								
		Store X			Store Y			Store Z		
Store	Brand	A1	A2	A3	A1	A2	A3	A1	A2	A3
	A1	--	.80	.69	.60			.77		
X	A2	.80	--	.63		.53			.57	
	A3	.69	.63	--			.60			.50
	A1	.60			--	.80	.94	.71		
Y	A2		.53		.80	--	1.00		.75	
	A3			.60	.94	1.00	--			.58
	A1	.77			.71			--	.73	.88
Z	A2		.57			.75		.73	--	.49
	A3			.50			.58	.88	.49	--
BCwS Ave		.75	.72	.66	.87	.90	.97	.81	.61	.69
SCwB Ave		.69	.55	.55	.66	.64	.59	.74	.66	.54

Overall BCwS Average = .78
Overall SCwB Average = .61

Notes:
- These D coefficients were calculated using **relative** penetrations, i.e. brand penetration among product buyers at the store, and store penetration among brand buyers.
- For further clarification see Section 13.7.2.

TABLE A8.29

Context: BCwS and SCwB.
Product/Region: Tea Bags, Region I.
Measure(s): Duplication Coefficients.

Buyers of:		who also buy:								
		Store X			Store Y			Store Z		
Store	Brand	B1	B2	B3	B1	B2	B3	B1	B2	B3
	B1	--	.64	.86	.56			.47		
X	B2	.64	--	1.31		.71			.38	
	B3	.86	1.31	--			.39			.25
	B1	.56			--	.65	1.16	.99		
Y	B2		.71		.65	--	.92		.92	
	B3			.39	1.16	.92	--			.53
	B1	.47			.99			--	.75	.70
Z	B2		.38			.92		.75	--	1.34
	B3			.25			.53	.70	1.34	--
BCwS Ave		.75	.98	1.09	.91	.79	1.04	.73	1.05	1.02
SCwB Ave		.52	.55	.32	.78	.82	.46	.73	.65	.39

Overall BCwS Average = .93
Overall SCwB Average = .58

TABLE A8.30

Context: BCwS and SCwB.
Product/Region: Instant Coffee, Region I.
Measure(s): Duplication Coefficients.

Buyers of:		who also buy:								
		Store X			Store Y			Store Z		
Store	Brand	C1	C2	C3	C1	C2	C3	C1	C2	C3
X	C1	--	.60	.70	.63			.48		
	C2	.60	--	1.26		.62			.78	
	C3	.70	1.26	--			.67			.41
Y	C1	.63			--	.50	.77	1.18		
	C2		.62		.50	--	1.04		1.14	
	C3			.67	.77	1.04	--			.91
Z	C1	.48			1.18			--	.55	.46
	C2		.78			1.14		.55	--	.72
	C3			.41			.91	.46	.72	--
BCwS Ave		.65	.93	.98	.64	.77	.91	.51	.64	.59
SCwB Ave		.56	.70	.54	.91	.88	.79	.83	.96	.66

Overall BCwS Average = .74
Overall SCwB Average = .76

TABLE A8.31

Context: BCwS and SCwB.
Product/Region: Automatic Washing Powder, Region I.
Measure(s): Buying Other Brands at the Same Store and the Same Brand at Other Stores: Duplication Coefficients.

Buyers of:	who also buy:		
	OB/S (q)	B/OS (r)	1-(r/q) (%)
Store X			
Brand A1	.73	.66	10
Brand A2	.73	.61	16
Brand A3	.75	.54	28
Store Y			
Brand A1	.73	.66	10
Brand A2	.76	.64	16
Brand A3	.83	.61	27
Store Z			
Brand A1	.64	.79	-23
Brand A2	.65	.78	-20
Brand A3	.69	.59	14
Average	.72	.65	9

Notes:
- E.g. buyers of Brand A1 at Store X are 0.73 as likely as the average product buyer at Store X to buy other brands there, and 0.66 as likely as the average buyer of Brand A1 to buy that brand at other stores.
- For further clarification see Section 13.7.2.

TABLE A8.32

Context: BCwS and SCwB.
Product/Region: Tea Bags, Region I.
Measure(s): Buying Other Brands at the Same Store and the Same Brand at Other Stores: Duplication Coefficients.

Buyers of:	who also buy: OB/S (q)	B/OS (r)	1-(r/q) (%)
Store X			
Brand B1	.68	.55	19
Brand B2	.71	.60	15
Brand B3	.85	.47	45
Store Y			
Brand B1	.69	.71	- 3
Brand B2	.66	.65	2
Brand B3	.86	.45	48
Store Z			
Brand B1	.69	.61	12
Brand B2	.73	.70	4
Brand B3	.78	.50	36
Average	.74	.58	20

TABLE A8.33

Context: BCwS and SCwB.
Product/Region: Instant Coffee, Region I.
Measure(s): Buying Other Brands at the Same Store and the Same Brand at Other Stores: Duplication Coefficients.

Buyers of:	who also buy: OB/S (q)	B/OS (r)	1-(r/q) (%)
Store X			
Brand C1	.67	.56	16
Brand C2	.73	.58	21
Brand C3	.81	.55	32
Store Y			
Brand C1	.55	.70	-27
Brand C2	.66	.70	- 6
Brand C3	.71	.67	6
Store Z			
Brand C1	.48	.66	-38
Brand C2	.59	.83	-41
Brand C3	.58	.76	-31
Average	.64	.67	- 8

TABLE A8.34

Context:	BCwS and SCwB.
Product/Region:	Automatic Washing Powder, Region I.
Measure(s):	Buying Other Brands at the Same Store and the Same Brand at Other Stores: Three Measures of Loyalty.

	Market share (%) *		% of duplicating buyers **		Buying rate of duplicating buyers ***		Buying rate of all buyers ****	
	BCwS	SCwB	OB/S	B/OS	OB/S	B/OS	OB/S	B/OS
Str X								
A1	36	42	57	50	6.5	4.7	3.7	2.4
A2	21	35	65	49	7.5	4.2	4.8	2.0
A3	15	36	69	40	7.0	6.5	4.8	2.6
Str Y								
A1	25	17	58	57	6.5	5.4	3.7	3.1
A2	26	26	67	56	7.0	5.0	4.7	2.7
A3	18	26	77	52	6.6	3.9	5.0	2.0
Str Z								
A1	25	7	49	76	8.1	7.4	4.0	5.6
A2	21	9	53	76	7.9	5.5	4.2	4.1
A3	12	7	63	57	9.1	6.7	5.7	3.7
Ave	22	23	62	57	7.3	5.5	4.5	3.1

Notes:

- * Market share of the brand or store within the relevant (BCwS or SCwB) submarket.
- ** The proportion of the buyers of Brand B at Store S who also buy OB/S or B/OS.
- *** Average purchase frequency of these duplicating buyers within the OB/S or B/OS options.
- **** Average purchase frequency of all the buyers of Brand B at Store S within the OB/S or B/OS options.

TABLE A8.35

Context: BCwS and SCwB.
Product/Region: Tea Bags, Region I.
Measure(s): Buying Other Brands at the Same Store and the Same Brand at Other Stores: Three Measures of Loyalty.

	Market share (%) *		% of duplicating buyers **		Buying rate of duplicating buyers ***		Buying rate of all buyers ****	
	BCwS	SCwB	OB/S	B/OS	OB/S	B/OS	OB/S	B/OS
Str X								
B1	58	47	41	36	4.2	4.9	1.7	1.8
B2	18	27	63	50	7.6	5.5	4.8	2.8
B3	7	26	83	39	9.4	7.0	7.8	2.7
Str Y								
B1	29	11	59	67	5.5	6.3	3.3	4.2
B2	27	19	49	55	6.2	6.8	3.0	3.7
B3	11	19	83	37	7.8	5.5	6.5	2.0
Str Z								
B1	80	21	33	54	2.2	5.7	.7	3.1
B2	10	5	67	67	11.3	5.6	7.5	3.8
B3	5	7	75	47	10.0	3.4	7.5	1.6
Ave	27	20	61	50	7.1	5.6	4.8	2.9
Ave excl B1-Z:	21	20	65	50	7.8	5.6	5.3	2.8

Notes:
* Market share of the brand or store within the relevant (BCwS or SCwB) submarket.
** The proportion of the buyers of Brand B at Store S who also buy OB/S or B/OS.
*** Average purchase frequency of these duplicating buyers within the OB/S or B/OS options.
**** Average purchase frequency of all the buyers of Brand B at Store S within the OB/S or B/OS options.

TABLE A8.36

Context: BCwS and SCwB.
Product/Region: Instant Coffee, Region I.
Measure(s): Buying Other Brands at the Same Store and the Same Brand at Other Stores: Three Measures of Loyalty.

	Market share (%) *		% of duplicating buyers **		Buying rate of duplicating buyers ***		Buying rate of all buyers ****	
	BCwS	SCwB	OB/S	B/OS	OB/S	B/OS	OB/S	B/OS
Str X								
C1	48	48	46	36	5.5	5.0	2.5	1.8
C2	24	31	63	44	5.3	8.1	3.4	3.6
C3	11	27	77	43	6.1	5.2	4.7	2.2
Str Y								
C1	20	10	45	65	5.8	8.2	2.6	5.3
C2	38	26	50	60	5.9	7.3	3.0	4.4
C3	19	24	63	58	7.3	5.2	4.6	3.0
Str Z								
C1	60	18	29	61	6.4	6.8	1.9	4.2
C2	15	6	50	81	6.1	11.1	3.0	9.0
C3	15	11	50	73	11.2	5.3	5.6	3.8
Ave	28	22	53	58	6.6	6.9	3.5	4.1
Ave excl C1-Z:	24	23	56	58	6.7	6.9	3.7	4.1

Notes:

* Market share of the brand or store within the relevant (BCwS or SCwB) submarket.

** The proportion of the buyers of Brand B at Store S who also buy OB/S or B/OS.

*** Average purchase frequency of these duplicating buyers within the OB/S or B/OS options.

**** Average purchase frequency of all the buyers of Brand B at Store S within the OB/S or B/OS options.