AN INVESTIGATION OF

CONSUMER LOYALTY

TO STORES

BY

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Abstract

In recent years there has been growing commercial and academic interest into the question of consumer purchasing behaviour at stores, and a great deal of research has been done on this topic using aggregate consumer data. The main study objective of this investigation was to ascertain the nature of consumer store loyalty across different product fields, consumer characteristics, and shopping trip characteristics, based on an analysis of consumer purchasing sequences carried out by the 'run test'. The analysis of data extracted from the Cardiff Consumer Panel, a data set which includes continuous records of the grocery shopping behaviour using the this approach revealed a number observations on the nature of consumer purchasing behaviour., including a link between car ownership and store loyalty.

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Chapter One

Introduction

The spatial behaviour of urban dwellers is of primary interest to many geographers, and is the focus of much geographic research. The movement patterns of individuals can be investigated in a number of ways, one of which is through the study of retail shopping behaviour. The spatial behaviour of consumers, and the individual's choice of retail facility to patronize, has attracted a great deal of interest from geographers, sociologists, psychologists, regional scientists, market researchers and, indeed, retailers. The purpose of this research is to investigate the extent to which consumer purchasing of certain products exhibits store switching. In other words, this is an investigation of the extent to which consumers patronize different stores in their purchasing of certain goods.

Studies such as this can reveal the extent to which consumer behaviour exhibits loyalty to stores, and to what extent consumer's movement patterns exhibit regularity. Knowledge of this type is valuable in terms of understanding the dynamics of retail markets and the way in which consumers carry out shopping trips. This type of understanding can aid retailers in the preparation of marketing and pricing strategies, and can aid geographers in

identifying and explaining urban shopping patterns.

Despite the past attention of academics and practitioners regarding consumer behaviour, most preceding studies, have been conducted at an aggregate level both in terms of the studied population and the time scale of the data collected on purchasing behaviour. Information on consumer behaviour at the individual household level was simply not available until the advent of so-called "scanner panels", unless it was collected by ad-hoc and expensive surveys. This investigation takes advantage of one such survey of individualized consumer data using the Cardiff Consumer Panel (Guy et al., 1982). This data set includes high quality, continuous grocery purchasing information collected on a daily basis for 451 households.

Chapter Two

The Analysis of Store Loyalty: a Literature Review.

In recent years there has been growing commercial and academic interest in the question of consumer purchasing behaviour at stores. During this time, large retail organizations have increased their influence in the marketplace, and manufacturers have lost the dominance they once had in marketing decisions. As a result, new research into the question of consumer loyalty to stores has been added to the existing marketing research into brand loyalty. And since, movement patterns influence site selection, the study of consumer loyalty, has been added to geographical research.

Interest in store loyalty actually dates back to the 1960's, when brand loyalty studies were being carried out using panel surveys. Cunningham (1960), in fact, saw brand loyalty and store loyalty as interrelated. He found that for 10 of the 18 product classes he studied, that there was a significant association of high brand-loyal families concentrating their purchases in one store. (Cunningham, 1960, 134.) This popular connection seems to have been pioneered by Cunningham or at least popularized by his work, despite little subsequent analysis of the relationship between store loyalty and brand loyalty. Cunningham's work

has been influential since the 1960's because of its pioneer nature, his definition of loyalty, and his findings. Cunningham defined loyalty in terms of a household's total food purchases that are made in any one particular store. Loyalty was measured hierarchically in terms of 1st or 'favourite' store loyalty, 2nd store loyalty and so on. Cunningham's results were three fold. Firstly, he found that the average household makes 80% of its food store purchases in its leading three stores. Secondly, he ascertained that 86% of families had concentrated the majority of their food purchases at a particular store, and were therefore essentially loyal to that specific store within the year of his study. Finally, Cunningham argued that a knowledge of store loyalty for particular product groups would be helpful in the merchandising decisions that the retail sector must face. (Cunningham, 1960, 128.)

Another early investigation into the loyalty question was carried out by Carman.(1970) Although basically putting forth a paper on brand loyalty, Carman,does include a study of loyalty to particular food chains. This analysis is based on the total number of store visits for all types of purchases and different stores of the same chain were grouped together. Data from the Berkeley Food Panel was used in the analysis, but this data did not provide much

information on buying sequences, an exclusion noted as a
limitation of the data by Carman. However, analysis of the
data revealed support for the concept of store loyalty.
Carman defined loyal shoppers as those who made an average
of 4 or more trips per week to a single store. Surprisingly,
he found that the most loyal shoppers were those that lived
in neighbourhoods with the greatest number of competing
stores. A connection between store loyalty and some
socioeconomic variables was also found. Carman's paper
contended that non-loyal households are those with full time
housewives, and loyal households have a working woman.
Although Carman's paper deals mainly with household
characteristics and brand loyalty, it notes that loyalty to
stores differs across product fields, and suggests that
buying sequences should be considered in loyalty analysis.
Carman further suggested that a product's status or nature
may have some bearing on loyalty. For example, he points
out that the notion that different products play different
roles in the life of the consumer is a generally accepted
concept.

Enis and Paul (1970) contributed further to the
subject of store loyalty. They introduced not only
different loyalty criteria but also revealed a rationale for
marketing research firms and academics interested in

'loyalty' analysis. They argued that studies of store loyalty could replace investigations of socioeconomic status and demographic studies as methods of identifying target groups. They contended that loyal customers cannot be identified in advance of their shopping behaviour, but only through their revealed choices. In taking steps to identify loyal customers through studies of store loyalty, the firm is provided with information about the customers which prefer to patronize their firm and can alter their marketing strategies accordingly.

For their study, Enis and Paul employed a loyalty index which involved the proportion of a household's budget allocated to certain stores, the number of stores patronized by the household and the number of switches or changes in the consumer's choice of store. They found that this loyalty index could discriminate among panel members as to the degree of first store loyalty they exhibited.

An interesting result of Enis and Paul's investigation, was the fact that they showed that variations in a household's 'first-store loyalty' could not be attributed to differences in 5 of 7 socioeconomic variables, including total income and the number of automobiles owned by the household.

The literature reviewed thus far indicates that up until the early 1970's, the study of shop choice or store loyalty appears to have been in a somewhat experimental stage. This is shown by the varied results of the studies done by Cunningham (1960), Carman (1970), and Enis and Paul (1970), although, these are worth our attention since they represent the earliest efforts to study such issues. In a paper written in 1973, Charlton reviewed the past literature, including the above mentioned studies and ascertained that the "preceding marketing literature does not represent a coherent view of shop loyalty" (Charlton, 1973,35). He believed that emphasis on brand loyalty in the past was due to the dominance of the manufacturer which focused advertising, merchandising and market research on the brand. With what he sees as an expanded, more important role of the retailer in the early 1970's, Charlton argues "shop choice to be an even more relevant variable in the study of buyer behaviour".(Charlton, 1973, 36) Charlton also evaluated the 'loyalty' measures used by other researchers on such criteria as the extent to which they led to generalisable patterns and the ease with which they can be related to other marketing variables. In light of this analysis, Charlton suggests that simple operational measures may be more preferable than the formulation of loyalty

indices and that shop loyalty does not seem to be generalisable for the individual across different product fields. He also argues that shop loyalty is a valid concept similar to brand loyalty, and is therefore a valuable and viable concept to pursue.

In 1980, another review of the literature surrounding shop loyalty was carried out by Wrigley, a geographer by training. Wrigley (1980) argued that studies of consumer shopping behaviour have had a long and important tradition in urban geography, but noted that the way in which these studies were carried out had changed. He reviewed the shift from studies of shopping behaviour in terms of the city and its hierarchies(eg. Central Place Theory) in the 1950's and 1960's to studies done at a micro scale, looking at the shopping behaviour of the individual or household. He argued that this shift was connected to the rise of the 'diary' method of collecting data. (Wrigley, 1980, 46) Wrigley contended that, traditionally, geographers have been somewhat lacking in direction concerning the use of such data. He argued that since geographers are interested in where purchases are made and interested in the individual's choice of retail outlets and market centres, that geographers should put diary data to use in order to analyze shop-choice or shopping centre

choice patterns. Using this link between geography and market research, Wrigley set out to consider a case study of the choice of retail outlets in Bradford, Yorkshire, attempting in the process to model multi-purpose purchasing patterns. This work by Wrigley has several important features. Firstly, it sets out a rationale for studying shop loyalty within a geographical context and suggests that geographers should work at a micro- rather than macro-scale. Secondly, it alludes to the fact that shop loyalty varies over product fields. Thirdly, it outlines the type of information needed from diary panel studies in order to carry out a geographical study of store loyalty. This paper set the stage for the later design and development of the Cardiff Consumer Panel, (Guy et al., 1982). It is from this source that data for this paper was extracted. The data provided by this panel survey also formed the basis of papers written by geographers Dunn, Reader and Wrigley in the early 1980's. (Dunn, Reader and Wrigley(1983); Wrigley and Dunn (1984a, 1984b, 1984c)

Wrigley and Dunn (1984a) considered the purchasing patterns of households at individual stores, using the high quality locational information provided by the Cardiff Panel. The main interest of this study was a consideration of how purchases of a particular product field were divided

between individual stores. This study is significant because it demonstrates that established approaches to investigating store-group or store-type loyalty can be carried over to the study of individual stores. It also shows that locational information provided by the Cardiff Panel, is important to 'loyalty' analysis, and found differences in suburban and inner city areas. The finding that the observed penetration(the percentage of households who buy a given product at a particular store in the 24 week study period) was slightly higher, in central areas, than that for suburban stores, is an example of such a difference.

Wrigley and Dunn,(1984b) investigated the question of multi-store purchasing patterns within a single city using the Cardiff Panel data. In this paper, multi-store purchasing patterns were investigated across a number of product fields, and multi-brand patterns were investigated for those products for which brand information had been collected. This paper adds to the literature the finding that regularities in multi-brand purchasing are not evident when looking at stores. In fact, variability in multi-store purchasing patterns is a norm rather than an exception in consumer behaviour. Wrigley and Dunn argued that the spatial structure of the city, the fixed location of

individual stores and the presence of differential accessibility across the city, all lead to this fundamental difference between brand and store choice. (Wrigley and Dunn, 1984b, 764) In this way, it is argued that the inclusion of a geographical context in 'loyalty' analysis is of central importance. A second major conclusion of this paper, is that the degree of store loyalty is observed to vary between stores and across product fields.

In their third paper in the series, Wrigley and Dunn, (1984c), furthered their investigation of 'loyalty' by considering the interaction between store choice and brand choice. They argued that store choice and brand choice were independent nested choices, in which store choice precedes brand choice because it involves geographical constraints such as distance and urban structure. (Wrigley and Dunn, 1984c, 1222) This furthers their argument that a study of 'loyalty' should take place within a geographical context.

The series of papers by Wrigley and Dunn, are significant to this study in two ways. Firstly they validate the importance of the study of individual stores, and the locational data included in the Cardiff consumer panel. Secondly, they provide a rationale for further empirical work on store loyalty across different product fields, and

continued 'loyalty' analysis in geography.

Kau and Ehrenberg, (1984) and Sirgy and Samli (1989), add further support to the assertions of Wrigley and Dunn. In their study of the patterns of store choice in the U.K. using store groups, Kau and Ehrenberg(1984), came to a number of conclusions. Firstly, they argued that the incidence of multi-brand and multi-store buying was a consistent phenomenon. Secondly, they also concluded that store loyalty exists but differs greatly across product fields.

In a recent paper, Sirgy and Samli (1989) add to the marketing literature a summary of the factors they consider to be important in store loyalty. Many of these factors relate more to a marketing context than a geographic context, but are valuable to note. Sirgy and Samli contend that store loyalty is a function of customer satisfaction in a retail store, which is based on the store's image, the self image of the consumer, and congruity between the store's image and the consumer's self image. All of these factors, however, are highly subjective and difficult to measure quantitatively. Sirgy and Samli, however, also consider socioeconomic status, area loyalty measures, and store loyalty measures based on the frequency of visits to a particular store. Each of these factors, unlike the

previous three, can be considered using quantitative data. This paper is of interest for a number of reasons. Firstly, it shows that research into 'loyalty' in the field of marketing research is investigating this issue in terms of qualitative as well as quantitative analysis. Secondly, Sirgy and Samli, argue that the study of store loyalty is an important pursuit and is very important to our understanding of consumer shopping behaviour.

Chapter Three

The Methodology of Analyzing Store Loyalty Issues.

3.1 Introduction

The main study objective of this research is to ascertain the nature of consumer store loyalty. This was carried out through a simple analysis which looked at unbroken sequences of consumer behaviour, to ascertain the extent to which an individuals successive store choices are independent of shop choices made in the past. In other words, an analysis aimed at assigning some value to the amount of store switching that occurs over a successive number of shopping trips.

Additionally, this research set out to investigate the extent to which store switching varies over a number of product fields, and to what extent variations in store switching behaviour can be related to consumer characteristics such as car ownership or the number of dependant children within the household.

3.2 Description of the Cardiff Panel Data Set

Based on Enis and Paul's assertion that loyal consumers cannot be identified in advance of their shopping behaviour, but only through their revealed choices, (Enis and Paul, 1970) and Wrigley's belief that geographers should put diary data to use to analyze store choice.(Wrigley, 1980) The

investigation of consumer behaviour seems best carried out through the use of a comprehensive, longitudinal, consumer survey, using 'diary' data. (Wrigley, 1980) For these reasons, the Cardiff Consumer Panel (Guy et al. 1982), was chosen for the data base used in this investigation.

The Cardiff Panel was a survey carried out in 1981 to create a data base for two associated research projects being carried out at the University of Bristol and the University of Wales, Institute of Science and Technology. In terms of its locational components, this particular panel survey is thought to be the most comprehensive manual diary survey of shopping behaviour ever carried out in the United Kingdom, and perhaps the world. Centred on the city of Cardiff, Wales, this data includes continuous records of the grocery shopping behaviour of 451 panellists for a twenty-four week period between January and July. During this period, panellists were asked not only to record their purchases, but also the identity of shops at which they purchased each of these items. Panellists were also asked to record brand information for a number of products. Additionally, panellists were also asked to complete a questionnaire which investigated consumer characteristics such as socioeconomic and employment status, and household characteristics such as the size of household, the number of

dependant children and vehicle ownership and use. This questionnaire data was used in this investigation, to study the relative influences of such variables on store switching behaviour.

3.3 Analysis Methodologies for Investigating Store Loyalty.

Based on Charlton's suggestion that simple operational measures may be more preferable to the formulation of loyalty indices which attempt to aggregate a number of consumer variables into a single measure, such as those of Cunningham (1960) and Enis and Paul (1970), the initial method of analysis in this investigation will take the form of the 'run test',as used by Frank (1960, 1962) in his research on brand loyalty. Use of the 'run test' is further justified by Carman's suggestion that an investigation of buying sequences is important to loyalty studies. (Carman, 1970)

3.3.1 The 'Run Test' Processes

The theory of runs states that "the number of runs in a sequence of Bernoulli trials is the number of unbroken sequences of successes or failures", (purchases or non purchases of a certain product). Within this framework, it is assumed that "every purchasing unit, or household has a constant probability of purchasing any given product at the household's 'favourite store', (Cunningham, 1960), (Enis and

Paul, 1970) on any given purchase trial, regardless of the past history of the process." (Massey, et al., 1970,56)

The statistics of the run test are as follows;

r = the number of runs,

n_1 = number of purchases of product at 'favourite store'

n_2 = number of purchases of product at other stores

n = n_1 + n_2 total number of purchases

$E(r \mid n_1, n_2)$ = expected number of runs given n_1 purchases and n_2 non-purchases of product at households favourite store

Derivation of $E(r \mid n_1, n_2)$: Let
n_1 = number of 0
n_2 = number of 1

and note that

r=(number of transitions from 0 to 1 or from 1 to 0) plus 1, then

$$E(r \mid n_1, n_2) = [(n_2/n)(n_1/n) + (n_1/n)(n_2/n)]n+1$$
$$= [2n_1 n_2 /n]+1 = m$$

The variance of the conditional random variable r is difficult to derive; therefore, it is merely stated.

$$Var(r \mid n_1, n_2) = \frac{2n_1 n_2 (2n_1 n_2 - n)}{n^2 (n-1)} = \sigma^2$$

The normalized deviate from the mean is

$$K = \frac{r + 0.5 - m}{\sigma}$$

The 'run test' requires data on consumer purchasing at the household scale for a large number of consumers, which was extracted from the Cardiff Panel. From this data, for each individual household, the test looks at unbroken sequences of successes and failures or 'runs'. For this analysis, a success was defined as a purchase of a certain product at the household's 'favourite store', and a failure was defined as the purchase of a certain product at a store other than the household's 'favourite', in other words a purchase at a store in the aggregate 'all others category'.

3.3.2 Additional Analysis Methodologies

In addition to the initial analysis carried out by the 'run test,' further analysis on loyalty was carried out by means of cross tabulation analysis and multiple regression analysis. For a selected group of products, a cross tabulation of variables was carried out in order to ascertain whether or not any trends within the data could be identified. In this way, variables extracted from the questionnaire data, could be easily compared with K values derived from the 'run test' to ascertain if any relationships exist.

Additionally, a multiple regression analyses, was carried out between K values derived from the 'run test',

and a number of consumer characteristic variables extracted from questionnaire data. The use of K values derived from the 'run test', provides a continuous dependent variable for regression. The ability to use such a continuous dependent variable in a regression analysis, overcomes the difficulties associated with analyzing discrete choice data, such as having to use limited-dependent variable models such as the logit model.

3.4 Data Set Derivation

The first task involved manipulating the Cardiff Panel Data into a form for analysis using the 'run test'. This involved determining the favourite store of the consumer for each of the products to be analyzed. In this instance, the 'favourite' store was defined as the store most frequently visited by the household in order to purchase the product in question. Other stores visited by the household were placed in the aggregate 'all others' category. For analysis using the 'run test', raw data was first analyzed and then recorded into binary sequences of 1's(successes) and 0's(failures). This process involved two passes through the raw panel data, and was a very time consuming operation which required specially written Fortran

programs.[1]

The second task was to identify and extract data only from those consumers who purchased a certain product 10 or more times. This process excludes those consumers who could be considered non-buyers or infrequent buyers of the product who would only have produced short, and statistically misleading choice sequences. On the other hand this selection process does build bias into this analysis since consumers with low purchase frequencies are omitted. Results of analysis attempting to investigate the relationship between purchase frequency and loyalty, later in this paper, may be affected by this sampling strategy, necessary as it was. This selection criteria, however, does include those consumers who may show bi-weekly shopping behaviour. Such consumers would typically have purchasing frequencies of 12 or higher. In Addition, the implementation of a sampling selection criteria produces both a manageable and statistically significant data set. Frank,(1960,1962) in his original analysis, used similar selection criteria on the data he included in his analysis,. using a threshold of 20 purchases. However, the data set he employed was of a longer duration (2 years) than the Cardiff Panel, and so the

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[1] These programs were written by Dr. S. Reader, and Ms. F. McNeill.

adoption of his threshold was not feasible for the 6 months of data the Cardiff Panel contains.

3.5   The Derivation of K Values Using the 'Run Test'

Once the above tasks were completed, the elements of the run test could be calculated.

These are;

(a) the number of purchases (successes) of a good at the favourite store,

(b) the number of purchases (failures) of a good at a store in the 'all other category',

(c) the number of runs,(number of unbroken sequences of successes or failures),

(d) the expected number of runs, given the number of successes and failures.

These four elements were then entered into further calculations which produced a K value for each consumer. The value K indicates the nature of the independence of a consumer's successive purchases.   Values of K greater than 2, suggest an excessive amount of switching while values of K greater than -2 suggest that once a product is purchased at a particular store, the same decision is more likely on the next trial. (Massey, et al.,1970,57) Within this analysis, K values only indicate the amount of switching between a household's favourite store and the aggregate 'all

other' category.   In this way, values for K fail to
illustrate switching that exists within this aggregate 'all
other' class. However, by looking at unbroken sequences of
successes   and failures, the   'run test' can indicate
variations in purchasing behaviour that are not indicated
through simple probability. For this reason, the 'run test'
is a valuable analytical   tool. For example, while the two
following sequences use the same probability of purchase,
they express quite different types of behaviour and thus
different K values.

     e.g.

 010101010101010101010101   K   4

 00000000001111111111   K   -4.

Chapter Four

The Analysis of Store Loyalty

4.1 Introduction

A Bernoulli process involves constant probability of store choice and independence from one choice to the next, and this implies a distribution of K values across the population which is approximately normal with zero mean and unit variance. Frank (1960), compared frequency distributions of his empirically derived K values for various products, with the normal distribution of values predicted from Bernoulli Theory. (Massey, et al.,1970,57) This procedure was replicated in the present investigation in which frequency distributions were prepared for each of the products analyzed and then compared to a normal distribution of expected K values across individuals. In each, the percentage of K values falling into 1 unit class values from 6 to -6 were calculated. These comparisons are given in Table 4.1.

In addition, further descriptive statistical analysis was carried out on the values of K obtained for each of the various products. The results of this analysis are likewise displayed in table form. (Table 4.2) The compilation of these statistics and the frequency distributions into summary tables permits a comparison of

the products to be carried out, and offers some insight into

nature of the consumer purchasing of these products.

Table 4.1   Empirical Values for K

K EXP. % FOR N(1,0)		PROD. 38	PROD. 47	PROD. 27	PROD. 41	PROD. 4
6		0	0	0	0	0
5 TO 6		0	0	0	0	0
4 TO 5		0	0	0	0	0
3 TO 4	0	0	2	3	2	0
2 TO 3	2	5	4	5	4	5
1 TO 2	14	12	14	14	10	14
0 TO 1	34	21	26	21	26	24
-1 TO 0	34	26	26	30	27	25
-2 TO -3	14	31	20	23	24	25
-3 TO -2	2	6	6	3	7	7
-4 TO -3	0	0	1	1	0	0
-5 TO -4	0	0	0	0	0	0
-6 TO -5	0	0	0	0	0	0
COMPLETE LOYALTY		8	4	11	7	10
(SAMPLE SIZE)		135	392	132	281	219

K EXP. % FOR N(1,0)		PROD. 16	PROD.21	PROD. 34	PROD. 52	PROD.61
6		0	0	0	0	0
5 TO 6		0	0	0	0	0
4 TO 5		0	1	0	0	0
3 TO 4	0	1	3	1	0	2
2 TO 3	2	6	4	4	1	5
1 TO 2	14	12	16	12	12	16
0 TO 1	34	24	21	28	24	23
-1 TO 0	34	22	18	26	30	27
-2 TO -1	14	25	28	26	29	20
-3 TO -2	2	9	9	3	4	6
-4 TO -3	0	0	0	0	0	0
-5 TO -4	0	0	0	0	0	0
-6 TO -5	0	0	0	0	0	0
COMPLETE LOYALTY		8	14	4	5	8
(SAMPLE SIZE)		333	270	231	218	290

K EXP. % FOR N(1,0)	PROD. 51	PROD. 54	PROD. 63	PROD. 46	PROD. 64
6	0	0	0	0	0
5 TO 6	0	0	0	0	0
4 TO 5	0	0	0	1	0
3 TO 4	0	0	0	0	0
2 TO 3	2	2	6	7	13	2
1 TO 2	14	7	9	14	11	11
0 TO 1	34	20	34	27	24	22
−1 TO 0	34	30	22	27	21	30
−2 TO −1	14	26	26	20	26	29
−3 TO −2	2	13	4	4	5	6
−4 TO −3	0	1	0	0	0	1
−5 TO −4	0	0	0	0	0	0
−6 TO −5	0	0	0	0	0	0
COMPLETE LOYALTY		1	9	8	10	4
(SAMPLE SIZE)		407	138	144	42	305

K EXP. % FOR N(1,0)	PROD. 8	PROD. 22	PROD. 44	PROD. 35	PROD. 30
6	0	0	0	0	0
5 TO 6	0	0	0	0	0
4 TO 5	0	0	0	0	0
3 TO 4	0	1	0	1	2	1
2 TO 3	2	4	4	3	1	4
1 TO 2	14	12	16	13	6	10
0 TO 1	34	21	26	23	27	21
−1 TO 0	34	26	18	27	29	31
−2 TO −1	14	33	35	27	26	23
−3 TO −2	2	3	2	5	10	8
−4 TO −3	0	0	0	1	0	2
−5 TO −4	0	0	0	0	0	0
−6 TO −5	0	0	0	0	0	0
COMPLETE LOYALTY		8	22	2	8	8
(SAMPLE SIZE)		83	73	408	213	298

Table 4.2   Table of Summary Statistics

PRODUCT	38	47	27	41	4
AVERAGE FREQ.(PANEL)	7.31	22.80	7.81	15.79	11.08
AVERAGE FREQ. (SAMPLE)	15.63	24.51	18.35	23.41	17.26
AVERAGE FREQ. FOR SMALL K	14.90	23.20	17.71	23.27	17.56
AVERAGE FREQ FOR LARGE K	16.36	25.82	19.00	23.54	16.96
AVERAGE K	0.35	0.11	0.06	0.18	0.22
ST. DEVIATION	1.26	1.37	1.37	1.32	1.26
MINIMUM K	-2.89	-3.70	-3.58	-4.74	-2.89
MAXIMUM K	2.91	5.13	3.11	3.34	2.91

PRODUCT	16	21	34	52	61
AVERAGE FREQ.(PANEL)	17.45	14.21	12.55	11.41	14.90
AVERAGE FREQ.(SAMPLE)	21.69	20.65	19.62	18.25	20.05
AVERAGE FREQ. FOR SMALL K	20.95	18.72	19.38	18.38	19.77
AVERAGE FREQ. FOR LARGE K	22.42	22.59	19.87	18.13	20.33
AVERAGE K	0.19	0.21	0.15	0.35	0.07
ST. DEVIATION	1.39	1.47	1.21	1.11	1.35
MINIMUM K	-4.63	-4.06	-3.24	-2.67	-4.83
MAXIMUM K	3.02	4.13	3.05	2.96	3.13

PRODUCT	51	54	63	46	64
AVERAGE FREQ.(PANEL)	33.63	7.42	8.70	3.43	13.98
AVERAGE FREQ.(SAMPLE)	36.34	15.35	20.07	16.33	17.85
AVERAGE FREQ. SMALL K.	33.57	15.03	20.24	15.48	17.15
AVERAGE FREQ FOR LARGE K	39.11	15.67	19.89	17.17	18.55
AVERAGE K	0.57	0.13	−0.01	0.07	0.46
ST. DEVIATION	1.28	1.24	1.28	1.39	1.23
MINIMUM K	−5.79	−2.83	−4.91	−2.81	−3.90
MAXIMUM K	4.32	2.33	2.18	2.14	3.63

PRODUCT	8	22	44	35	30
AVERAGE FREQ.(PANEL)	5.47	4.41	22.50	11.39	15.16
AVERAGE FREQ.(SAMPLE)	15.89	17.13	24.08	20.07	20.41
AVERAGE FREQ. FOR SMALL K	16.17	16.68	22.99	19.40	19.63
AVERAGE FREQ. FOR LARGE K	15.61	17.58	25.17	20.73	21.19
AVERAGE K	0.35	0.22	0.24	0.46	0.34
ST.DEVIATION	1.24	1.24	1.22	1.21	1.33
MINIMUM K	−3.08	−2.62	−3.32	−3.80	−3.52
MAXIMUM K	2.53	2.60	3.51	2.93	3.85

4.2 Analysis of the Frequency Distributions of The K Values

for Each Product

The frequency distributions, (Table 4.1), revealed that the empirical distributions were flatter than the expected distribution.   In addition,   each   of   the distributions were, to varying degrees, skewed to the right. In this case that meant that they were skewed toward more negative values of K. Consequently, at this level of analysis, this result would tend to support the existence of dependence between choices and in this case that means more loyalty to stores than is implied under the constant probability assumption of a Bernoulli process.

The tabulated descriptive statistics calculated for each of the products, indicate characteristics of the distribution of K values. The standard deviations of the various products, showed consistency across all products. The observed range of standard deviations consisted of values between approximately 1.1 and 1.4,   These results suggest the existence of more switching and more loyalty than is implied under the constant probability assumption of a Bernoulli process.

Analysis of the frequency distributions of K values

for each of the products, revealed that the distributions of two particular products showed indications of being differentiable from the other products. Of all the studied products, Product 47 (eggs), displays a distribution comparable to that expected for a process of independent Bernoulli trials (see Figure 4.1). However, evidence of a process at an aggregate scale does not necessarily identify the dissaggregate behaviour process actually taking place. Different dissaggregate processes can produce the same aggregate results and it is dangerous to assume that the simplest of disaggregate theories of behaviour is the correct one. Nevertheless, it is interesting that this product displays an almost perfect normal distribution of K values. This is despite the fact that we may expect this product to display a greater deal of loyalty than others because its average purchase frequency is 22.8 times. Since the panel encompasses a 24 week period, this average purchase frequency suggests that this product may be purchased on a regular weekly basis, and as such may be purchased at a specific store as part of a weekly shopping trip. This notion is borne out by the average purchase frequency of the sample included in the distribution, ie. those with purchases greater than 10 times, which at 24.51 strongly suggests a weekly purchasing pattern.

FIGURE 4.1

PROD. 47
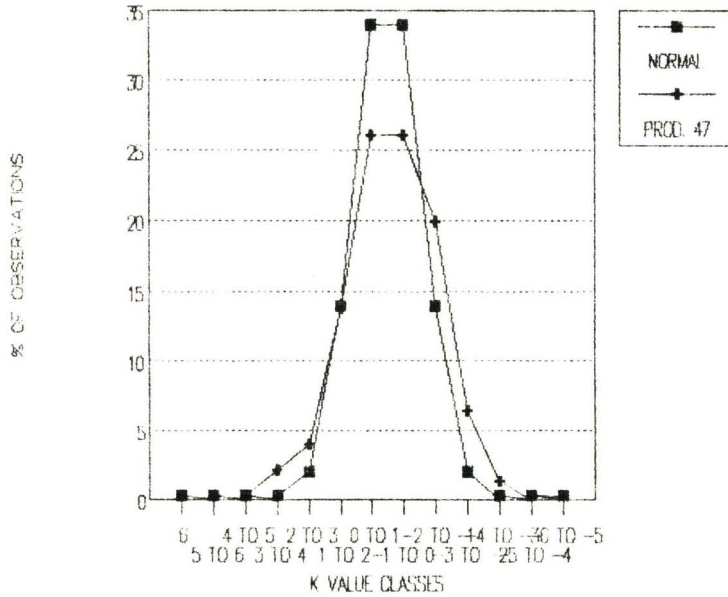
PROD. 47

	PROD. 47
AVERAGE PURCHASING FREQUENCY	22.8
AVERAGE FREQUENCY SMALL K	23.2
AVERAGE FREQUENCY LARGE K	25.82
AVERAGE SAMPLE FREQUENCY	24.51
AVERAGE K VALUE	0.11
STANDARD DEVIATION K	1.37
MINIMUM K VALUE	-3.7
MAXIMUM K VALUE	5.13

FIGURE 4.2

PROD. 51
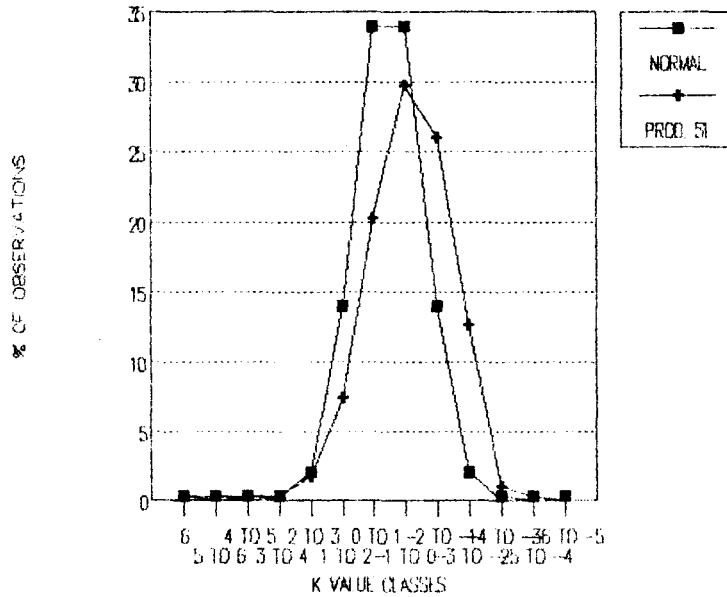
PROD. 51

	PROD. 51
AVERAGE PURCHASING FREQUENCY	33.63
AVERAGE FREQUENCY SMALL K	33.57
AVERAGE FREQUENCY LARGE K	39.11
AVERAGE SAMPLE FREQUENCY	36.34
AVERAGE K VALUE	0.57
STANDARD DEVIATION K	1.28
MINIMUM K VALUE	−5.79
MAXIMUM K VALUE	4.32

Another product which shows a distinct distribution is product 51(sausages, meat pies, cooked meats and beefburgers). (see Figure 4.2) The distribution of K values for this product shows a distinct skewness to the right, relative to the distributions of the other products which suggest either and increase in loyalty toward the favourite store or the aggregate 'all other category'. Interestingly, this product's average purchase frequency for the entire panel of 451 consumers is 33.43 suggesting that it is a highly used item, and, as such, might be expected to show a great deal of spatial switching. Within the sample of 407 consumers who purchased this product more than 10 times, (90% of the panel), the average purchase frequency was 36.4 which suggests that purchases of this product are made at less than weekly intervals, and may be purchased at a number of stores. This presumption can be supported by the fact that this product had the fewest number of completely loyal consumers(those who bought the product exclusively at their favourite store). Of the 407 consumers who purchased this product more than 10 times in the study period, only 4, or 1%, were completely loyal to their favourite store. Furthermore, this product shows the greatest range of K values, of all the studied products, from -5.79 to 4.32 and the highest average K value, 0.57. At this level of

analysis, however, this cannot be considered conclusive. This result suggests that further investigation is necessary to ascertain if loyalty is in fact being shown towards a households favourite store, or the aggregate class of all other stores. An example of such further investigation follows.

4.3 Store Loyalty and Average Purchase Frequency: An Aggregate-level Analysis.

The skewed nature of the frequency distribution for product 51 suggests that there may be some relationship between the purchasing frequency of a product and the K values displayed by the consumers purchasing that product. A regression analysis at an aggregate level was carried out to investigate whether or not such a relationship exists. Carman's suggestion that a product's nature might have some bearing on loyalty (Carman,1970), provides a justification for such an analysis. This aggregate-level analysis was carried out for both the entire panel, and then an extracted sample, of those consumers with purchase frequencies of greater than or equal to ten. In each case the average K value of each of the products was regressed with a measure of purchasing frequency(either the panel frequency, or the sample frequency) The results of this analysis are tabulated in Tables 4.5(a) and 4.5(b).

Table 4.5(a)   Average Purchasing Frequency (panel) versus
               Average K

Regression equation

  C1 = 0.135 + 0.00777 C2

  Predictor   Coef   Stdev   t-ratio   p
  Constant   0.13450   0.06935   1.94   0.068
  C2   0.007772   0.004675   1.66   0.114

  s = 0.1471   R-sq = 13.3%   R-sq(adj) = 8.5%

C2=average purchasing frequency of entire panel for each
product.

Table 4.5(b) Average Purchasing Frequency (sample) versus
              Average K

Regression equation

  C1 = 0.011 + 0.0111 C3

  Predictor   Coef   Stdev   t-ratio   p
  Constant   0.0112   0.1507   0.07   0.941
  C3   0.011137   0.007283   1.53   0.144

  s = 0.1486   R-sq = 11.5%   R-sq(adj) = 6.6%

C2=average purchasing frequency of extracted sample for each
product

        The level of explanation offered at this aggregate

level was very low. Both low r-squared, and insignificant

t-values suggest that variation in K values cannot be

accurately predicted by variations in the purchasing

frequency of a product. Since, the level of explanation

offered at the aggregate level, looking at all the study

products, is quite low, it was felt that shifting the

analysis to a more disaggregate level may indicate the

existence of influences among variables that were too small to detect at the aggregate level of analysis.

## 4.4 Store Loyalty and Consumer Characteristics.

The move to a disaggregate level of analysis, involves an investigation into relationships between store loyalty and consumer characteristics and involved an analysis of the extent to which consumer variables can be used to explain variations in the values of K for a particular product.

Three products were selected for this more specific investigation. The selection of these three products involved the plotting of the average K values of the study products to ascertain whether any natural groupings of K values by product existed. (Figure 4.3) Three groupings were identified, and one product from each of these groups was selected. These three products were Product 30 (Breakfast cereals), Product 34 (Frozen vegetables), and Product 51(Sausages, meat pies, cooked meats, and beef burgers). These products display a good range of K values, a good range of average purchase frequencies, and significant sample sizes of consumers with purchase frequencies greater than 10. (298,231,407, respectively)

The consumer characteristics chosen for this analysis were extracted from questionnaire data accompanying

Figure 4.3

AVERAGE K VALUES VERSUS PRODUCTS
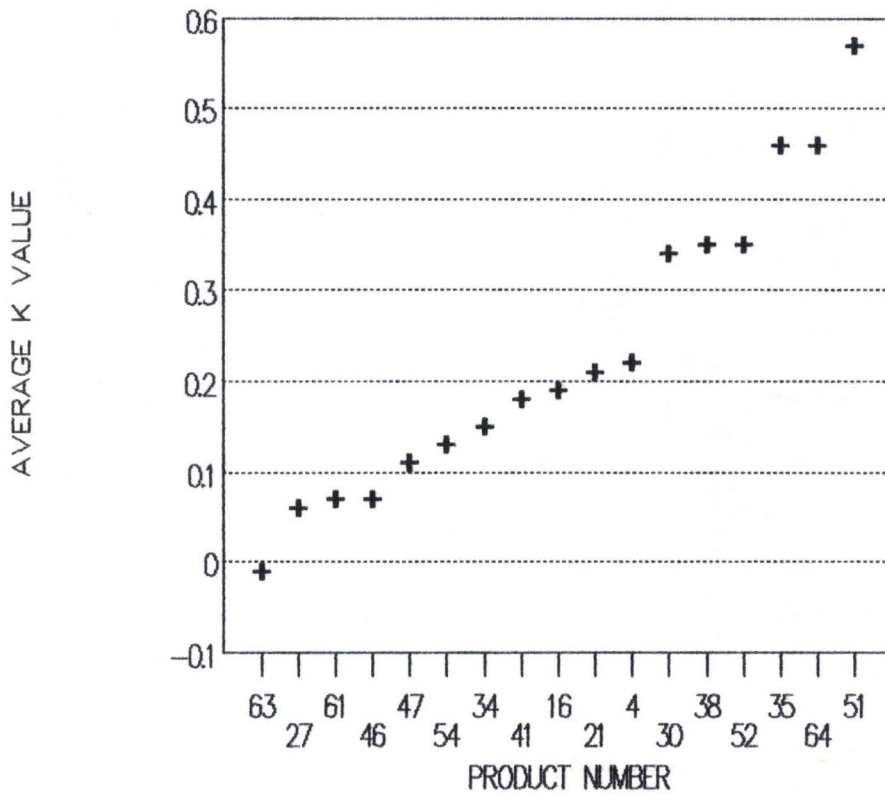
the Cardiff Panel. For each consumer contained in the extracted samples, information on car ownership, employment status, and number of dependent children were extracted from questionnaire data. These were the variables chosen by Dunn, Reader, and Wrigley, (1983) In addition, information about average purchase frequency(the average number of purchases of the selected products over the 24 week study period) and absolute differences in expenditure between the consumers favourite store and the aggregate ' all other stores' class, were included in this analysis.

Initial cross tabulation of the three products and consumer variables, revealed a number of trends. The results of this analysis are revealed in Table 4.7. These trends can be best summarized by considering each product separately.

Table 4.7

	Prod. 34			Prod. 30			Prod. 51		
	Avg.K	N		Avg. K	N		Avg. K	N	
Car Ownership									
Yes(1)	− 0.18	156		−0.31	201		0.50	266	
No(0)	0.11	75		0.20	95		0.53	141	
Employment Status									
No Job/Ret.	0.10	120		0.11	170		0.52	224	
Employed	−0.29	111		−0.50	126		0.50	183	

Number of Children

0	0.04	101	0.19	103	0.49	197
1	0.03	46	-0.14	52	0.82	63
2	-0.33	50	-0.10	83	0.24	87
>2	-0.27	34	-0.82	58	0.62	60

Average Purchases/week

<2	0.34	35	0.17	26	0.42	10
2-3	-0.01	77	0.14	93	0.29	55
3-4	-0.31	62	-0.25	90	0.65	64
4-5	-0.01	35	-0.18	52	0.52	59
>5	-0.54	22	-0.81	87	0.52	219

Absolute Difference In expenditure between stores
        (pounds sterling)

<1	0.29	28	0.29	43	0.50	124
1-4	0.02	88	0.14	81	0.54	195
4-7	-0.35	43	-0.50	56	0.28	54
7-10	-0.37	22	-0.40	44	0.77	18
>10	-0.14	50	-0.62	73	0.63	17
	N=231		N= 298		N= 407	

For Product 30, variables such as car ownership,
employment status and number of children seem to influence
loyalty. For example, at this level of analysis, it appears
that the ownership of a car, employment status and the
presence of children within the household produce more
negative values of K, suggestive of a decreased amount of
switching behaviour. These trends also seem present in
the cross- tabs for Product 34. However, Product 51, does
not seem to show these trends to the same extent.

Although, some relationships can be seen between
consumer variables and K values at this level of analysis,

no conclusive trends can be identified. For this reason, a
multiple regression analysis was carried out to ascertain
the extent to which the selected consumer variables might
influence consumer behaviour. Regression of K values
against the number of consumer characteristics was carried
out by Minitab, and the following results were output from
this process.

Table 4.7

Results of the regression of K values with consumer
variables.

Product 30
Regression Equation

K=-0.902 +0.641 C3 -0.363 C4 + 0.023 C5 +0.192 C6 -0.0315 C7

Predictor	Coefficient	St. Dev.	t-Ratio	p
Constant	-0.9023	0.4382	-2.06	0.040
C3	0.6408	0.2693	2.38	0.018
C4	-0.3630	0.2591	-1.40	0.162
C5	0.0275	0.1066	0.26	0.796
C6	0.1918	0.1034	1.85	0.065
C7	-0.0315	0.0174	-1.81	0.072

s= 2.097   R-squared= 4.7%

Product 34
Regression Equation

K=-0.555 +0.55 C3 +0.006 C4 -0.0762 C5 +0.0852 C6 -0.0157 C7

Predictor	Coefficient	St. Dev.	t-Ratio	p
Constant	-0.5546	0.3800	-1.46	0.146
C3	0.5498	0.2492	2.21	0.028
C4	0.0061	0.2302	0.03	0.979
C5	-0.0762	0.0898	-0.85	0.397
C6	0.0852	0.0708	1.20	0.230
C7	-0.0157	0.0178	-0.88	0.377

s= 1.674   R-squared= 3.3%

Product 51

Regression Equation

K=−0.177 +0.309 C3 −0.162 C4 −0.009 C5 + 0.083 C6 + 0.022 C7

Predictor	Coefficient	St. Dev.	t-Ratio	p
Constant	−0.1772	0.2168	−0.82	0.414
C3	0.3091	0.1535	2.01	0.045
C4	−0.1599	0.1438	−1.11	0.267
C5	−0.0091	0.0577	−0.16	0.875
C6	0.0828	0.2100	3.94	0.000
C7	0.0222	0.0222	1.00	0.317

s= 1.410   R-squared= 4.3%

C3= Car Ownership
C4= Employment Status
C5= Number of Children
C6= Average Purchase Frequency/week
C7= Absolute Difference in Expenditure between Stores.

The overall explanation of K values offered by the consumer variables is quite low as evidenced by the low r-squared values revealed in Figure 4.7. However, car ownership emerges as having a statistically significant, positive influence on K values for each of the three products considered. Results of a t- test yield t values of t=2.38,t=2.21, and t=2.01, respectively. This relationship is strongest for Product 30, in which the ownership of a car produces an increase of 0.64 in the value of K. Because car ownership increases K values positively, it implies that car ownership increases consumers tendency to switch between their favourite store and the aggregate "all other store category. This result would support the intuitive notion

that the ownership of a car, may decrease the amount of store loyalty that a consumer shows, because it offers the individual more freedom of movement.

Further variables are revealed as having some significance in terms of influencing a consumer's K value. For instance, the average frequency of purchase per week, seems to have a slight, positive, influence on switching behaviour for product 51, but none of the other products. This influence was shown as statistically significant by a t score of 3.94. Additionally, the purchase frequency and expenditure difference variables showed a marginal influence on the derived values of K for product 31. Although the t scores for these two variables, were less than 2, they were relatively high in terms of the t scores of the other variables.

The other variables considered in this multiple regression were generally shown as having no significance in terms of influencing a consumer's K value. This result belies a number of intuitive notions concerning these variables. Intuitively, one would think that employment status might have a greater effect on store switching. For example, employed people might be exposed to more shopping opportunities, both close to home and close to work, and therefore might exhibit more spatial switching. In addition, it could be said that unemployed or retired people

, because they have more available time for shopping, might display more store switching. In terms of the number of children in the household, an intuitive relationship between increases in loyalty coinciding with increases in the number of children might be expected. As we have seen, however, none of these influences were seen as significant influences on variations in the K values exhibited by a number of products.

Chapter 5

Conclusions

The intent of this paper was to further the study of consumer shopping behaviour through an investigation of the question of store loyalty across different product fields, consumer characteristics and shopping trip characteristics. This was accomplished through an examination of data extracted from the Cardiff Consumer Panel using the 'run test', a simple measure of the independence of successive purchasing behaviour, as the basis of analysis.

From this investigation, a number of conclusions can be made about the nature of store loyalty. Firstly it can be said that frequency distributions and statistics carried out on of K values derived by the 'run test' for the 20 study products, offered some insight into the nature of the consumer purchasing of these products. For example, it was observed that the empirically derived frequency distributions of the study products, were flatter than the normal distribution predicted through Bernoulli Theory , and each of the distributions were, to varying degrees, skewed to more negative values of K. At this level of analysis, this result tends to support the existence of dependence between consumer choices and the existence of more loyalty to stores than is implied under the constant probability assumption of a Bernoulli process. In addition, the

variation that is observed between, the various study products adds support to the notion that loyalty varies across product fields.

Perhaps the most interesting results of the paper came out of the multiple regression analyses carried out for product 30, product 34 and product 51 in terms of a number of consumer and shopping trip characteristics. Although, the overall explanation of these product's K values, by 4 of the 5 consumer variables used in this analysis were generally quite low, car ownership emerged as having a statistically significant, positive influence on K values for each of the three products considered. This result implies that car ownership increases a consumers tendency to exhibit store switching behaviour and it is an exciting result for two reasons. Firstly it supports the intuitive notions concerning the impact of car ownership on store loyalty and secondly it indicates a significant relationship between car ownership and store loyalty measures, a result that alluded analysts such as Enis and Paul.(1970)

The final conclusion of this paper is that much more research into the question of consumer behaviour is necessary in order for us to gain a more comprehensive understanding of urban shopping patterns.

Appendix i

Product Identification Number	Product Description
38	Canned/bottled Fruit
47	Eggs
27	Canned soup/ (any kind)
41	Butter
4	Washing Detergent
16	Sugar (any type)
21	Canned Baked Beans
34	Frozen Vegetables
52	Canned Meat/Ham & Other Meat Products
61	Tea(packets/bags/instant)
51	Sausages, meat pies, cooked meats, beefburgers
54	Frozen fish (not fingers)
63	Fruit Juices (any pack)
46	Cooking oil
64	Pickles, salt, vinegar, stuffings etc.
8	Disinfectants
22	Canned milk puddings
44	Cheese (any type)
35	Canned/bottled vegetables
30	Breakfast cereals (any type)

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