Measuring customer loyalty to product variants

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This paper measures patterns of loyalty for variants of a product, such as different pack sizes or flavour. Unlike brands, product variants are functionally highly differentiated. The study undertakes large-scale analysis of panel data and the results shows that product variants can attract markedly different loyalty levels. However, these different loyalty levels are closely related to big differences in the variants' market shares – higher loyalty predictably goes with higher sales. Some variants were found to be very popular, and some are bought by only a fraction of the market. However, neither large nor small variants seem generally to attract a special or unusually loyal customer base. The functional differentiation embodied in product variants therefore affects consumers' preferences but not the persistence of these preferences, i.e. loyalty. The study also illustrates a methodological basis for the analysis of consumer panel data. The mathematical model used here provides benchmarks for the variants' loyalty measures. The study has practical implications in analysing market performance of variants, customer switching behaviour, and understanding the relationship between product differentiation and consumer choice.

Introduction

Variants of a product, i.e. its various flavours, forms or pack sizes, attract rather different levels of loyalty. But although loyalty is a marketing buzzword, these differences in variants' loyalty do not seem to have been documented in the past, let alone explained. This paper reports findings on loyalty and its complement – switching – for functionally highly differentiated variants, and also on whether the variants show demographic segmentation. The results here are based on empirical analyses of consumer panel data across eight packaged goods categories.

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For a number of years now, product variants have proliferated in most categories. This increase in numbers has often contributed to costly loyalty-building programmes (e.g. Shugan 2005) and price (e.g. Ailawadi *et al.* 2001) and volume promotions (e.g. Bawa & Shoemaker 2004), as well as the expensive task of gaining and keeping adequate retail facings.[1] However, manufacturers, retailers and marketers generally seem to have little empirical knowledge about buyer behaviour for variants. Even in the marketing literature, consumers' loyalty levels to variants has seldom been measured, analysed or discussed. In overviews of consumer behaviour this lack of any know-how about loyalty to product variants is rarely mentioned (e.g. Engel *et al.* 1995; Aaker 1996; Bucklin & Gupta 1999; Kotler 1999; East *et al.* 2008). Yet their loyalty matters because most consumers choose a product by form, flavour, pack size and other physical features, as well as by brand and price.

Loyalty considerations could hardly affect marketing decisions if the different variants all attracted much the same loyalty. However, even though loyalty in fact varies, the big loyalty differences for variants that occur are predictable from the variants' market shares, as this study reveals. Marketers involved with product variants could benefit from this finding that large variants have more people buying them more often, irrespective of the variants' functional attributes (which merely drive their shares). This has implications for the launching of new variants, cannibalisation, targeting, media selection and market dynamics more generally. Compared with brands, product variants receive relatively little repetitive advertising or promotional support (except perhaps at launch, shelf-space decisions and selective price offers). Variants largely 'sell themselves' because people generally appear to learn (and remember) about relevant variants from on-pack information, retail display, occasional brochures perhaps, and word of mouth.

The literature

Guadagni & Little (1983) and Fader & Hardie (1996) in their pioneering papers reported that product variants' market shares were significantly related to consumers' previous purchase histories (as a part of logit-type multiple regression models). But as Fader and Hardie suggest, there was little by way of tangible outcomes, e.g. for specific loyalty measures. Another earlier work was by Kahn *et al.* (1988) who suggested that small

[1] A number of studies have analysed the impact of these factors on the performance of brands (e.g. Bergen *et al.* 1996; Ailawadi *et al.* 2001; Bawa & Shoemaker 2004; Shugan 2005), but none on variants.

segments of consumers frequently develop special needs for a 'niche' or 'speciality' brand, with relatively few but highly devoted customers (i.e. buying it exceptionally often). The authors proposed that some other brands (or variants) might be bought 'just for a change of pace', with many customers buying, but only occasionally. However, there has been little or no empirical follow-up. Even in studies relating to measurement of attribute-based perceptions and brand extensions, the results are sporadic at best (e.g. Reddy *et al.* 1994; Ratneshwar *et al.* 1997; Andrews & Manrai 1999; Campbell & Goodstein 2001; Sinha *et al.* 2005; Desai & Ratneshwar 2003). More recently, Lomax & McWilliam (2001) suggested that variant loyalty and switching can determine how line extensions cannibalise the existing variants. Again, even though this study sought to understand the related phenomena of cannibalisation, there were no substantive basic findings about loyalty to the product variants.

Thus, in seeking to understand consumers' loyalty and switching for variants, the current study found virtually no directly relevant previous empirical findings to build on. An exception was an early study by Ehrenberg and Goodhardt (1970) that examined customer loyalty to the largest and the smallest pack sizes of the five leading brands in six varied UK fmcg categories. The remarkable outcome was that the two pack sizes were bought at much the same average rates for each brand, about six times overall in half a year. However, there were no follow-up studies to this.

Findings in the present study elaborate greatly, as well as often contradict, what little is known about product variants so far. The outcomes show that there are simple patterns. In particular, loyalty to variants varies closely with their market shares – big variants predictably have higher loyalty, with only small deviations,[2] despite their different functional attributes, such as the differences in flavours or pack sizes. Thus while product attributes can greatly affect how many consumers prefer a variant (some of the variants covered here are very popular), product attributes do not directly affect how persistent these preferences are in the marketplace, as will be discussed later. Exceptions, such as a niche variant[3] (with few but exceptionally loyal customers), do not seem to occur, nor does the opposite – a popular variant that is bought only occasionally by its many customers, e.g. 'for a change'. A variant does not seem to have appeal to a distinct, exclusive segment with unique needs. Instead, its customers

[2] This is the well-documented double jeopardy effect (see Ehrenberg *et al.* 1990) which is already known to occur for near-look-alike brands.

[3] What are often referred to as niche variants are in fact just small variants with very few customers and *lower* than average loyalty.

usually buy other variants as well, to an extent that is again predictable just from the variants' shares, without explicitly taking into account their differing attributes as such. The variants' intrinsic product differentiation in question therefore does not directly drive loyalty. A wider implication is that for *brands*, achieving any differentiation or adding values may also not affect consumers' deeper brand involvement or loyalty.

The data and research methodology

Our research approach includes analysis of scanner-panel purchase records from TNS in the UK (for seven varied fmcg categories as listed in Table 5) and from IRI in the US (for fabric conditioners). The TNS panel consists of 15,000 households across the UK and the IRI data had 870 households in Philadelphia, USA. To analyse loyalty for variants, we chose five widely used loyalty-related measures:

1. Customers' overall average rate of buying a variant in the analysis period (typically a year).
2. A direct index of repeat buying (the percentage making at least two purchases).
3. The incidence of 100%-loyal buyers.
4. The SCR[4] (the variant's share of its customers' total category requirements).
5. The duplication of purchase measure: the percentage of the customers of, say, the large pack size in the analysis period who also bought the small size in the same period.

The model used for analysis here is the Dirichlet[5] which has previously provided benchmarks for measuring loyalty to brands. The model has given comparative norms for the brands in the past (Goodhardt *et al.* 1984; Ehrenberg *et al.* 2004) and is valid for near-steady-state markets (at least over a year or so, as applies here). The model yields accurate theoretical benchmarks for a brand's loyalty just from its observed market

[4] Share of category requirements (SCR) was calculated using purchase occasions. SCR is defined as each brand's share among the group of households who bought the brand at least once during the time period under study. The reason for using SCR based on purchase occasions rather than volume is a simplification, which does not compromise overall trends. Moreover, most choice-based consumer behaviour models are based on purchase occasions.

[5] The Dirichlet or the NBD-Dirichlet model was first proposed by Goodhardt *et al.* (1984). A fuller discussion and application of the model can be found in Ehrenberg *et al.* (2004). The parameters of the Dirichlet model can be calculated in Excel or any similar software package. The figures produced in this study came from a program developed by Zane Kearns (Kearns 2000).

share, as the only item-specific input. It assumes that consumers have steady habitual purchase propensities (or probabilities in the model) for the particular brand or product variant. Furthermore, the model requires no marketing-mix inputs in a steady market and assumes a purchase does not influence subsequent purchase propensities.

In the model, each consumer has certain propensities or probabilities to buy the available brands or product variants. These probabilities are assumed to be individually steady (at least for the time being), but very heterogeneous, i.e. differing greatly across consumers. The model itself is defined for markets that are both stationary and non-partitioned (i.e. with steady market shares and no clustering of particular brands). The model only purports to describe what markets are like when they *are* approximately steady and non-partitioned. It also provides benchmarks against which dynamic situations and partitioned markets can be assessed, as well as any potential marketing-mix drivers of market change.

The model is parsimonious in terms of assumptions and input requirements. In summary, it assumes that:

- for purchase incidence
  - the product purchasing incidence over time follows a Poisson distribution with mean μ_i for the $_i$th consumer
  - the mean purchasing rates vary between consumers according to a gamma distribution

- for brand choice
  - brand choice probabilities and the mean purchasing rates of different consumers are independent
  - the brand choices over a sequence of purchases for the $_i$th consumer among the available brands follow a multinominal distribution; the brand choices at successive purchases are assumed independent
  - these choice probabilities follow a multivariate beta distribution across consumers.

In order to obtain theoretical values, estimators for the parameters of the model are used as input values:

- Brand performances are estimated by market shares.
- The negative binomial distribution heterogeneity parameter K can be estimated by the product category penetration B and category average purchase frequency W.

- The category brand switching parameter *S* can be estimated by using the penetrations and purchase frequencies of brands.

The algebra for the model's theoretical estimate of a chosen performance measure is illustrated below.

The Dirichlet's theoretical formulae for the penetration

An illustration of the exact model calculations is given below.

An illustration

The Dirichlet theoretical formulae for the penetration of brand X with market-share z_x is indirect. It requires first calculating ΣC_n, i.e. how many consumers do *not* buy X but do buy the category any number of times. Here:

$$C_n = C_{n-1}\frac{(K+n-1)}{n}\frac{[S(1-z_x)+n-1]}{(S+n-1)}\frac{A}{1+A}$$

where *K*, *A* and *S* are the parameters of the fitted Dirichlet model.

Source: Ehrenberg *et al.* 2004

In this study the theoretical Dirichlet-derived benchmarks were used to interpret the loyalty and switching patterns. These had already worked well for the variants in an exploratory US study, and also more generally for brands (e.g. Singh *et al.* 2004; Table 5 below). The observed data are usually for markets which are approximately steady (stationary) in the aggregate, with no marked trends in any brand's or variant's sales.

The model provides a parsimonious way of analysing the loyalty patterns. Some authors have noted its limitations in certain situations, such as in cases of 'excess brand loyalty' to high market share brands or deviations from the predicted norm (e.g. Fader & Schmittlein 1993; Bhattacharya *et al.* 1996; Bhattacharya 1997; Danaher *et al.* 2003). These studies, though yet to be substantiated, could stimulate further discussions on the general application of the model in varying situations. However, the purpose of this study is limited to reporting our observed results for the variants and establishing the fit of the model to these observed results.

Results and analysis

We illustrate and summarise the common patterns of loyalty found for product variants in the five subsections that follow. The first three subsections give results for the loyalty measures and analyse the fit with the model predictions. The patterns of duplication of purchase (or 'switching') between different variants are given in the fourth section, and the lack of strong demographic segmentation for variants in the fifth subsection. The results here are for the different levels of variants, e.g. large pack size (or close equivalents) of *any* brand or own label, of any flavour, format, quality/price, or other attributes, the *medium* pack size of any brand, etc. The findings are therefore relevant for retail policy, and as background for competitive brand variants.[6]

Loyalty to detergent variants: an example

Functionally differentiated product variants, such as different pack sizes or different flavours, can be broadly substitutable and competitive. This view is supported by the market-share-driven patterns found here. But in some broad markets there can also be distinct sub-markets (e.g. carbonated drinks vs bottled water, caffeinated vs non-caffeinated coffee). This has to be determined on a case-by-case basis. What the present findings show is that there are many well-defined markets with quite strongly differentiated variants which appear to leave these items as largely substitutable. Some variants are much more popular than others. But once allowance for that has been made, the variants do not differ intrinsically in consumer loyalty or involvement.

We first use one category, laundry detergents, to report how loyalty measures and market shares vary for product variants such as different *Forms*, different *Pack Sizes*. The second subsection 'Variants in other categories' briefly shows how this also holds more generally for other markets.

Loyalty to different forms

In Table 1 below, we present the Observed (denoted by O) figures derived from the TNS data, along with their Dirichlet benchmarks (denoted by **T**). Powder, the original Form of laundry detergent, still dominates in Table 1 with a 61% share. Powder also has the highest annual purchase rate, a traditional loyalty measure. At 7.3 this is typically high, both as observed and as predicted by the model.

[6] Consumers' loyalty to competitive *brand* variants (e.g. the medium size of *brand X*) or to individual stock keeping units may follow similar patterns. However, that requires further systematic study.

Table 1 Forms: purchase rates vary with market share

Laundry detergents UK, 1999	Market share (%)	Purchases per buyer	
Forms	O	O	**T**
Powder	61	7.3	**7.3**
Liquid	21	5.5	**5.2**
Tablets	17	4.4	**5.0**
Average	33	5.7	**5.8**

Note: O = observed; **T** = theoretical Dirichlet.

Table 2 shows this predictable relationship with market share for three other commonly used loyalty-related measures:

1. the incidence of repeat-buying (here customers buying the variant two or more times in the year)
2. the incidence of 100%-loyal buyers of the variant
3. the share of category requirement.

In all cases, Powder, as much the biggest variant, also has the highest loyalty levels, both as observed and as predicted by the model. The model predictions show some deviations for Tablets but the figures are still of the right order of magnitude, i.e. all much lower than for Powder. The results here also show that a variant's share of category requirements is often less than 50% (except for very large variants), showing that its customers mostly buy other variants as well over the year analysed.

Table 2 Other loyalty measures also vary with share

Laundry detergents UK, 1999	Market share (%)	% of buyers				% share of category requirements	
		Buying 2+ times		Who are 100% loyal			
Forms		O	**T**	O	**T**	O	**T**
Powder	61	85	**85**	48	**45**	73	**70**
Liquid	21	70	**73**	24	**20**	44	**46**
Tablets	17	69	**72**	10	**18**	37	**44**
Average	33	75	**77**	27	**28**	53	**44**

Note: O = observed; **T** = theoretical Dirichlet.

Different length time-periods

In a shorter analysis period such as a quarter, some loyalty-related measures (purchase rates and repeat buying) are considerably lower than in a year and others are considerably higher (more 100%-loyals and higher SCRs) as illustrated in Table 3 below. The model typically responds well to there being fewer opportunities in a quarter for making purchases at all but also higher chances of being loyal. The model closely predicts for both the lower and the higher loyalty measures for a quarter. The relationship of loyalty with market share is therefore rather robust.

Table 3 Quarterly loyalty measures

Laundry detergents Average quarter '99	Market share	Purchases per buyer		% buying 2+ times		100% loyal		% share of requirements	
Forms		O	**T**	O	**T**	O	**T**	O	**T**
Powder	61	2.6	**2.5**	60	**62**	81	**77**	86	**84**
Liquid	23	2.3	**2.3**	52	**53**	59	**57**	72	**69**
Tablets	16	2.2	**2.3**	51	**50**	46	**50**	62	**64**
Average (quarterly)	33	2.3	**2.4**	54	**55**	62	**61**	73	**72**
Average (annual)	33	5.7	**5.8**	75	**77**	27	**28**	53	**44**
(From Tables 1 and 2)		*Lower quarterly*				*Higher quarterly*			

Loyalty for other variants

The same loyalty patterns hold more generally. Table 4 shows it for the four pack-size groupings Medium, Small, etc. Higher market share still goes with higher loyalty. But *Extra large* has some (small) deviations.

Table 4 Loyalty to pack-sizes

Laundry detergents UK, 1999	Market share (%)	Purchases per buyer		% of buyers				% share of category requirements	
				Buying 2+ times		Who are 100% loyal			
Pack sizes*		O	**T**	O	**T**	O	**T**	O	**T**
Medium	51	6.8	**6.5**	85	**84**	23	**28**	63	**62**
Small	23	4.1	**4.3**	68	**70**	9	**10**	36	**38**
Large	12	3.3	**3.7**	59	**64**	10	**7**	30	**31**
Extra large	5	2.5†	**3.4**	50†	**60**	11†	**6**	25	**28**
Average	24	5.7	**4.5**	65	**69**	13	**13**	38	**40**

* In order of market share; † Somewhat discrepant (see text).

Similarly, these predictable relationships of loyalty with market share also hold (with no notable deviations) for two other kinds of detergent variants covered by the TNS data:

1. *Pack types*, where Standard has a vast 72% share compared with three types of Refills, and very high loyalty measures to match.
2. *Brands* (i.e. relatively undifferentiated variants) where, as in the past, shares and loyalties differ far less but still follow the traditional double jeopardy pattern.

Variants in other categories

Corresponding results have also been found for the other product categories analysed, as Table 5 illustrates for some typical variants of each. Overall, observed loyalty measures are predictable from market share virtually without bias.

Table 5 Average loyalty measures for different categories (annual – across typical variants)

Category	Variants	Purchases per buyer		% of buyers: Buying 2+ times		% of buyers: Who are 100% loyal		% share of category requirements	
		O	**T**	O	**T**	O	**T**	O	**T**
Breakfast cereals	Pack sizes	7.8	**8.3**	73	**74**	4	**3**	27	**28**
Dentifrice	Pack types	3.7	**4.0**	52	**47**	13	**10**	36	**38**
Yoghurt	Formats	9.0	**10.0**	66	**73**	11	**9**	31	**33**
Detergents	Brands	4.1	**4.1**	57	**63**	5	**8**	27	**32**
Tea bags*	Pack sizes	4.1	**4.4**	63	**66**	13	**10**	36	**33**
Soup	Flavour	3.9	**3.9**	54	**58**	6	**6**	22	**23**
Fabric conditioner UK	Fragrance	3.1	**3.1**	54	**55**	8	**11**	28	**27**
Fabric conditioner US	Format	2.9	**2.7**	59	**57**	18	**13**	39	**30**
Average		4.5	**4.7**	59	**61**	9	**8**	29	**29**

*Leaf tea is a partitioned submarket

This agreement occurs for the individual variants in each category, as in Table 6 for Yoghurt formats.

Table 6 A further example: loyalty to formats of yoghurt

Yoghurt UK, 1999	Market share (%)	Purchases per buyer		% of buyers				% share of category requirements	
				Buying 2+ times		Who are 100% loyal			
Formats		O	**T**	O	**T**	O	**T**	O	**T**
Original	66	19	**19**	90	**89**	29	**24**	67	**67**
Split pots	28	12	**11**	77	**79**	7	**7**	37	**33**
Custard style	3	3*	**6**	49*	**63**	2	**3**	8*	**17**
Greek	3	4*	**6**	51*	**63**	6*	**3**	11*	**17**
Average	25	9	**10**	66	**73**	11	**9**	31	**33**

Note: O = observed; **T** = theoretical Dirichlet; *somewhat discrepant – see text below.

The fit of the model

Deviations from the Dirichlet-predicted theoretical norms are fairly rare, mostly small, and irregular. Larger ones are typified by Custard style and Greek yoghurt in Table 6. The observed purchase rates of three or four are only about half the theoretical predictions of six. But both the observed and theoretical values are *much* lower than the rates of 19 for *Original*. The model's close predictions are typically reflected in the overall O vs T correlation for the four formats, high at about 0.97.

Rather than quote many correlations (all high), we demonstrate the general fit of the model by showing how it occurs under many different conditions, always following the same simple high-to-low observed and high-to-low theoretical patterns. A somewhat consistent exception occurs for the *Extra large* pack size, with relatively low purchase rates (as in Table 4). *Extra large* could be too bulky or costly for some consumers some of the time, or may have patchy retail availability. *Extra large* has always a small market share, but low-share variants do not always have lower-than-predicted loyalty.

There are almost no *niche*[7] variants in the data, i.e. ones which attract few but unusually devoted customers. Three possible exceptions are *Generic, Unscented* and *Extra large* for fabric conditioners in the US. Each has relatively high purchase rates. But generics are not generally known as being niche-like. *Extra large* is an isolated exception here. Similarly, *Unscented* (with a possible anti-allergy appeal) fills only an un-niche-like 28% share of its customers' category requirements (SCR). These appear to be isolated deviations from the general pattern. This needs to be further explored.

[7] The niche variants are supposed to fulfil a particular customer need, and might over a period of time get identified as more strongly differentiated product, with high purchase frequencies and infrequent buyers.

Purchase duplication between variants

Most customers of a variant also buy some others, such as two or more flavours or pack sizes. As noted earlier in Table 5, overall about 1 in 10 customers of a variant were 100% loyal and the average share of a variant's category requirement was about 30%. For brands, the corresponding multi-brand buying has traditionally been modelled by the 'Duplication of Purchase Law' (a simplification of the Dirichlet model). This reads that in a year, say, how many customers of X also buy Y varies with how many category-users buy Y at all (i.e. Y's penetration): % of buyers of X who also buy Y ≒ percentage who buy Y.

This pattern has now been found to hold also for differentiated product variants, irrespective of the variants' attributes.[8] The attribute effects seem to be subsumed by the variants' penetrations, in line with the similarly flat market-share-driven loyalty patterns earlier.

Table 7 gives a typical example for different 'Formula' variants of toothpaste (as coded in the TNS data). Thus 36% of toothpaste buyers bought 'Mint' at least once in the year. And just over 36% of the customers of any of the other formula variants also bought 'Mint' in the year (42% or so). At the other extreme, 3% in all bought 'Tartar control', and again almost the same proportion (4% or so) of the other formulae's customers also bought 'Tartar control'.

The high purchase duplication from 'Tartar control' to 'Regular' is an isolated, and so far, unexplained deviation.

Table 7 Purchase duplication between formulae variants

Formulae toothpaste UK 1999	**% who also bought**					
Buyers of	Mint	Regular/ Standard	Whitening	Baking soda	Sensitive	Tartar control
Mint	–	19	12	11	9	3
Regular/Standard	43	–	14	12	9	7
Whitening	49	21	–	14	8	5
Baking soda	39	18	14	–	8	2
Sensitive	43	19	11	10	–	4
Tartar control	38	41*	18	9	10	–
Average duplication	**42**	**24**	**14**	**11**	**9**	**4**
Penetration†	**36**	**16**	**11**	**10**	**8**	**3**

Note: *Isolated deviation; † among annual category buyers.

[8] Comparing the percentage Duplications with in-category penetrations usually shows the two percentages approximately equal (rather than in some other fixed proportion – see Ehrenberg *et al.* 2004).

Table 8 Purchase duplication between pack sizes

Pack-size breakfast cereals UK, 1999	**% who also bought**			
Buyers of	Small	Medium	Large	Extra large
Small	–	78	43	5
Medium	96	–	54	6
Large	95	99	–	9*
Extra large	92	94	72*	–
Average duplication	**94**	**90**	**56**	**7**
Penetration	**92**	**75**	**41**	**5**

* High

The same duplication-law pattern is illustrated for pack sizes of breakfast cereals in Table 8. Surprisingly, there is generally no special overlap between adjacent pack sizes. But the high duplication between Extra large and Large also occurs in other categories; there may again be patchy retail availability (and hence low penetration) for Extra large.

The general finding, therefore, is that purchase duplications between variants vary just with their in-category penetrations even for these explicitly differentiated product variants. Table 9 illustrates this further across the four main types of variants of US fabric conditioners.

Table 9 Summary of purchase duplications between fabric conditioners (US)

Buyers of	**% who also bought**			
Formula	*Regular*	*Light*	*Stainguard*	*Unscented*
Average duplication	88	47	13	10
In-category penetration	94	48	13	13
Form	*Concentrated*	*Sheet*	*Refill*	*Light*
Average duplication	69	53	28	5
In-category penetration	63	57	31	6
Pack size	*Medium*	*Small*	*Large*	*Extra large*
Average duplication	84	58	44	18
In-category penetration	87	58	40	19
*Brands**	*Downy*	*Snuggy*	*Bounce*	*Arm&Ham*
Average duplication	63	56	20	8
In-category penetration	60	51	21	7

*Representative selection
Source: IRI

Demographic segmentation

The final finding is that competitive product variants such as the different pack sizes appeal to much the same markets, at least for the limited segmentation criteria available in scanner-panel data (e.g. demographics, and ownership of microwaves, freezers, etc.). The results here show little or no such segmentation.

Table 10 illustrates this for the three forms of laundry detergents – one the very long-established (Powder), and one the much more recent (Tablets). Yet they are taken up almost equally by the different segments, with Tablets appealing to slightly more under-34s (to be expected) and to slightly fewer one-person households. The differences are only a few percentage points.

Table 10 Demographic profiles of forms of laundry detergents (four typical criteria)

Laundry detergents UK, 1999	**Age**		**Size of household**	
Forms	–34	65+	1	4+
Powder (%)	23	25	27	22
Liquid (%)	23	22	25	23
Tablets (%)	29	17	18	28
Average	25	21	23	24

A second illustration of this general result is for RTE Breakfast Cereals in Table 11. Here Extra large (with typically only a small 5% share) apparently appeals to older housewives (with smaller households). Extra large should also appeal to larger households, but again this is a small deviation.

Table 11 Demographic profiles for pack sizes of cereals

RTE cereals UK, 1999	**Age**		**Size of household**	
	–34	65+	1	4+
Small (%)	24	24	27	22
Medium (%)	25	23	25	24
Large (%)	23	25	22	27
Extra large (%)	16	33	22	28
Average	22	26	24	25

Overall, across some 5,000 cases (variants, categories and segmentation criteria) the average deviations (MAD) from the category profiles are only 2.5 percentage points. There is therefore no more demographic segmentation for functionally differentiated variants than for functionally similar brands (e.g. Kennedy & Ehrenberg 2001). This matters because demographics continue to be used in promotional and media targeting and in sample control. The general lack of segmentation seems to tie in with the earlier findings in this paper. Thus the functional attributes of product variants appeal to very different numbers of consumers, but not to very different *kinds* of consumer, whether in terms of their loyalty or their demographics.

Conclusions

This paper considers a wide range of issues relating to the measurement of loyalty to product variants. We conducted large-scale analyses of variants' patterns of loyalty measures, for a range of categories, in periods of different time-lengths, and also for switching behaviour. The results were benchmarked against model predictions, and the Dirichlet provided robust and accurate predictions for this purpose. Our results are simple (and quite possibly generalisable to other time periods, data sets, countries, services, etc.) and they have revealed a number of, so far, unknown aspects of buyer behaviour for variants. Marketing practitioners can benefit from the key findings here – how loyalty to variants, in fact, varies – which have implications for sales, for differentiation and positioning, and for the underlying explanation.

The market share explanation

Consumer choice behaviour is often thought to be influenced by many factors, such as the product attributes, price, availability, advertising, consumer needs and attitudes. However, the sheer popularity or market share of the choice item seems seldom to be 'considered'. Market shares of product variants differ mainly because these are not restricted by direct 'me-too' competition among both retailers and consumers, or by regulators' 'monopolistic' considerations (i.e. with a notional 25% maximum). To illustrate, 'Forms' variants for laundry detergents are dominated by the 'Standard' version with a share just over 70%, the remaining 30% or so being split between three minor types of 'Refills'. In contrast, the biggest UK detergents brand (Persil) has only a 19% share. The leading Form

then has much higher loyalty (an observed and predicted SCR of 76%) than does the leading brand (an observed 40% and a predicted norm of 38%). For items with small market shares – and therefore also with small penetrations (10% or less) – the loyalty measures hardly differ, as predicted by the Dirichlet model. The double jeopardy phenomenon only becomes numerically effective with larger penetrations.[9]

The results here illustrate that market share can be taken as the sole explanatory variable for consumer loyalty to product variants. The possible reasons are:

- The market-share-based explanation of loyalty works (for different products, variants, loyalty measures, with correlations in excess of 0.9).
- It remains very parsimonious, with no need to make special allowances (explicitly) for attributes. This is substantiated by theory, i.e. the Dirichlet model's assumption of consumers' habitual zero-order propensities to choose from personal repertoires.

Implications for analysing sales

Product variants – for example, orange vs lemon flavour, or the large pack size in general – relate to category sales, not to brand sales. For category management, or for insights into the category context of brand management, the implication is that one can judge a variant's performance just in terms of its market share, and variants' performance can be improved by increasing their penetrations.

Customers' persistence with the variant, and their loyalty to it, matters because it varies. But it is normally predictable from shares. Even switching between product variants is in line with that, i.e. *pro rata* to each variant's popularity or market share, with little clustering.

Differentiation for brands and variants

A paradox is that product variants have their own specific functional differentiation; however, this is seldom used as a potential selling proposition for advertising and promotion. Indeed, variants are only

[9]The double jeopardy phenomenon in terms of brand X's average purchase rate w_x and penetration b_x (as a proportion) has long been shown to follow the simple Dirichlet approximation $w_x(1 - b_x) = w_o$, a virtual constant for any X (w_o being the theoretical limiting value of w_x as the penetration b_x tends to 0). For any b_x less than 0.1 (10%), w_x hardly varies – from $1.01w_o$ which is $w_o/(1 - b_x)$, for b_x = 0.01 to $1.10w_o$ for b_x = 0.1 (10%).

rarely advertised (except perhaps at launch). Instead, they are expected to 'sell themselves', by their labelling, shelf space and familiarity. Perhaps the relevant attributes, e.g. flavour, or pack-size price, are sufficiently simple or distinctive.

Not all product variant attributes are clear-cut. Flavour interacts with odour perceptions and colour, sweetness, keeping quality, etc. However, any complexities seem unlikely to affect the conclusion that consumers' loyalty is not directly affected by product attributes anyway. Choosing between product attributes remains complex (e.g. Sharp & Dawes 2001) and is subject to a vast amount of preference testing, focus groups, trade-off analyses, and what-if modelling. But *loyalty* to product variants, though little studied in the past, has now been found to follow a predictable pattern.

Further research

Loyalty to *brand variants* has still to be systematically tackled. They compete not only with the other functionally differentiated variants in the category but also with functionally *similar* variants as carried by other brands (e.g. the same flavour). Previous studies (e.g. Bergen *et al.* 1996) have mainly looked at the issue from the retailers' point of view. Our expectations for brand variants, which still remain to be systematically studied, are twofold:

1. Loyalty measures will probably also follow Dirichlet-type patterns. However, as individual brand-variants' market shares are usually small, loyalty levels of different brand variants could often be near equal.
2. For brand variant *switching*, the Duplication of Purchase Law will probably still hold but perhaps with some simple partitioning, such as much higher switching between different variants of the same brand, (e.g. Large X with Medium X) than between variants of *different* brands (Large X with Medium Y).

However, there seem to be few, if any, 'strong' variants. Furthermore, *niche* variants are conspicuously absent, i.e. ones with few buyers but outstanding loyalty or commitment. Planning to launch a niche variant or aiming to build a variant's loyalty would therefore need special consideration. The brand data already suggest that any particular type of variant tends to

have much the same share within each brand (e.g. the share of Extra large is always small). This needs to be further explored and generalised.

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