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Intern. J. of Research in Marketing 14 (1997) 405–420

International Journal of

**Research in
Marketing**

Decline and variability in brand loyalty

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Abstract

In this paper, we examine the over-time behavior of brand loyalty for a large set of brands drawn from 21 consumer packaged goods categories. Using the brand-loyalty operationalization of Colombo and Morrison (1989), the following conclusions are obtained. First, little support is found for the often-heard contention that brand loyalty is gradually declining over time. Second, while the short-run variability around a brand's mean loyalty level is not negligible, no evidence is found that this variability has systematically increased over time, and it can be reduced considerably through a simple smoothing procedure. Finally, the brand-loyalty pattern for market-share leaders is found to be more stable than for other brands. The study findings were robust to variation in the time interval used to construct the switching matrices, and to different treatments of multiple purchases. © 1997 Elsevier Science B.V.

Keywords: Brand loyalty; Temporal stability

1. Introduction

A critical issue for the continued success of a firm is its capability to retain its current customers and make them loyal to its brands. Indeed, the costs of attracting a new customer have been found to be up to six times higher than the costs of retaining old ones (Rosenberg and Czepiel, 1983). Loyal customers are typically less price sensitive (Krishnamurthi and Raj, 1991), and the presence of a loyal

customer base provides the firm with valuable time to respond to competitive actions (Aaker, 1991). A large number of loyal customers is a competitive asset for a brand, and has been identified as a major determinant of its equity.

Managers are, therefore, worried about recurring claims in the popular press that the brand loyalty of many national brands is gradually eroding. Brand loyalty is often said to be replaced by price loyalty (see, e.g., Discount Merchandiser, 1993), while also the increasing fragmentation of the market (Marketing, 1993), and the growing popularity of cheaper regional and private-label brands (Brandweek, 1993) have been cited as reasons for an apparent decrease in brand loyalty in recent years. Moreover, this pattern is expected to continue in the future, both in the United States (Beverage World, 1993) and Eu-

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rope (Marketing, 1993). Pfouts (1994) calls the diminishing brand loyalty on the part of the consumer, especially in food items, one of the most striking revolutions in recent years, and a recent article in *Industry Week* (1993) even claims that brand loyalty is 'a thing of the past'.

Still, the empirical evidence in the academic literature is equivocal. Several authors (see, e.g., Dodson et al., 1978 and Strang, 1975) have argued that the growing reliance of many national brands on price promotions will be harmful to their long-term health, and East and Hammond (1996) and Ehrenberg (1988) find that the percentage of buyers who repeat purchase in a given time period steadily falls over time. Johnson (1984), on the other hand, calls the overall decline in brand loyalty a myth, and neither Ehrenberg et al. (1994) nor Lal and Padmanabhan (1995) have found any evidence of negative long-run consequences of price promotions (see also Blattberg et al., 1995 for a more detailed literature review).

In line with recent calls for empirical generalizations in marketing as a means to advance marketing knowledge (see, e.g., Bass and Wind, 1995), we contribute to this debate by conducting a large-scale study in which we analyze the over-time evolution of brand loyalty for many (92) brands in a large number of (21) frequently-purchased product categories. In this study, we adopt the 'behavioral approach' to brand loyalty, which is the approach on which most model development in brand loyalty over the last decade is based (see Mellens et al., 1996 for a recent review of the literature). The defining element of the behavioral approach is that a consumer's degree of brand loyalty is inferred from his or her observed purchase behavior. An alternative stream of research, the 'attitudinal approach' to brand loyalty, focuses on the underlying evaluative and cognitive processes when interpreting a given purchasing decision as evidence of brand loyalty. Our motivation for choosing a behavioral measure is twofold. First, behavioral measures are easier and less costly to collect than attitudinal data, a consideration especially relevant when studying the evolution of brand loyalty over an extended period of time. Second, while we do not argue that behavioral measures are always superior to attitudinal measures, we agree with Colombo and Morrison (1989) that behavioral data refer to what consumers actually do, and therefore should, at the

very least, be used as a benchmark or test of convergent validity to any other measure.

Within the broad array of behavioral measures that has appeared in the marketing literature, we have chosen the Colombo and Morrison (1989) model to operationalize brand loyalty. Our choice is based on the following three considerations: the Colombo and Morrison model is well established in the marketing literature (see, e.g., Bayus, 1992; Bordley, 1989; Bultez, 1990a,b; Kannan and Sanchez, 1994 for other applications), its parameter estimates have clear managerial interpretations, and the data requirements are few. The crucial parameter in the Colombo and Morrison model (at least in the context of the present paper) is the brand-loyalty parameter α_i which indicates the proportion of current buyers of brand i which is intrinsically loyal. Following Colombo and Morrison, in our paper, α_i will be used as measure of brand loyalty, with higher levels of α_i indicating higher brand loyalty.

When studying the over-time behavior of brand loyalty, attention should not be limited to the presence/absence of a systematic or long-run increase or decrease in its level. Equally important is the extent of variability around the brand's mean loyalty level, or around this observed long-run trend. Conceptually, large fluctuations would cast doubt on the managerial and scientific usefulness of the brand-loyalty concept, since one of its underlying principles is a substantial degree of consistency over an extended period of time (Jacoby and Chestnut, 1978). Moreover, large fluctuations in brand loyalty would question the validity of the findings in earlier studies (e.g., Bultez, 1990a,b; Kannan and Sanchez, 1994) which have provided a one-shot description of a particular market. In this study, we quantify the extent of variability in brand loyalty for a wide variety of brands and product categories, and assess whether this variability has increased over time. Indeed, a growing reliance on price promotions may not only have affected the intrinsic health of the brand (as reflected in the size of its loyal customer base), but may also have resulted in increasing fluctuations around that level. To the best of our knowledge, we are the first to empirically assess this aspect of the dynamic behavior of brand-loyalty measures.

To summarize, the purpose of this study is to examine both the over-time evolution of brand loyalty

alty and the fluctuations in brand loyalty around the trend (if any) for a large set of brands drawn from many product categories. It is not our purpose, however, to *explain* these trends for individual brands through marketing or consumer covariates, although some preliminary analyses are conducted to shed some light on factors that may warrant further investigation in this context.

To illustrate our research issues, some scenarios are presented graphically in Fig. 1. We give consecutive empirical loyalty estimates for a brand of condensed milk, cat food (dry), and regular beer, respectively. The horizontal axis indicates the time variable

and the vertical axis shows the brand-loyalty estimates (α_i) derived from the Colombo and Morrison (1989) model (see Section 2.1), which was applied to household purchase data as described in Section 3. In panel 1A, there is no evidence of a decline in brand loyalty, and also the variability around the mean loyalty level is very limited. This gives the manager a clear and unambiguous indication of the magnitude of the loyalty commanded by this brand. In Panel 1B, on the other hand, the fluctuations around the mean level seem to have become more pronounced over time, making it harder to draw inferences about the brand's intrinsic strength. In panel 1C, there is clear evidence of a decline in loyalty. The latter two scenarios are unfavorable, and the observed loyalty patterns provide management with a clear warning signal which may warrant managerial action. The graphs in Fig. 1 are just illustrative examples of some scenarios, and the empirical analyses in Section 4 are meant to formalize the discussion on their relative occurrence.

The remainder of the paper is organized as follows. Section 2 outlines the research methodology used to address our two main research questions. Section 3 describes the data set, and empirical results are presented in Section 4. Section 5 provides conclusions, limitations of the present study and areas for future research.

2. Model development

2.1. The Colombo and Morrison model

Central to our analysis is the model of Colombo and Morrison (1989), which is applied to successive switching matrices to create a time series of brand-loyalty estimates. The input to the model is a switching matrix whose elements (i,j) represent the proportion of consumers that bought brand i on one purchase occasion but switched to brand j on the next occasion. The element (i,j) , therefore, gives the conditional probability that brand j is purchased, given that i was bought the previous time. The key

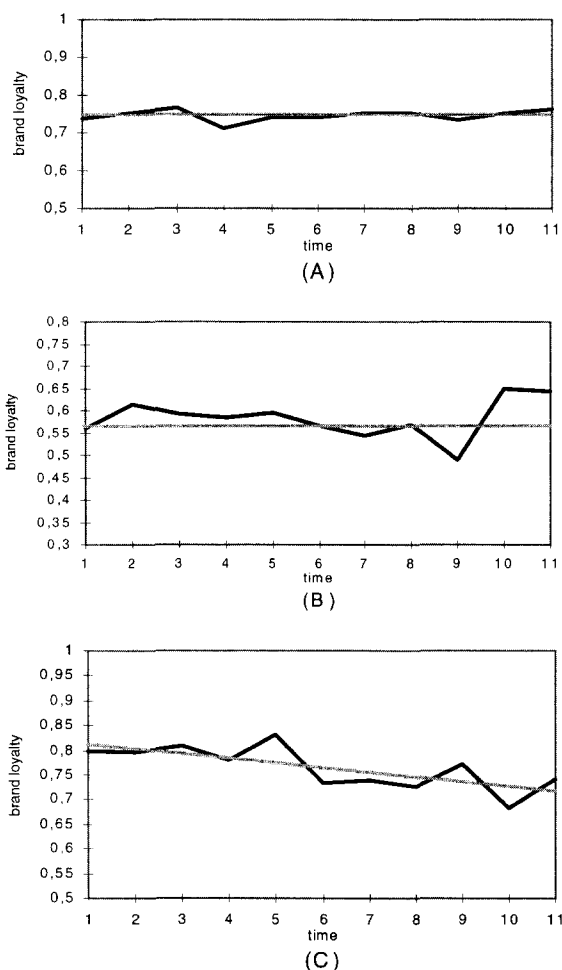


Fig. 1. Loyalty estimates for a major brand of (A) condensed milk, (B) cat food (dry), and (C) regular beer at 11 consecutive points in time.

underlying assumption of the model is that there are two kinds of consumers:

- people who are *intrinsically loyal*, and stay with the same brand, and
- *potential switchers*, who on every purchase occasion choose between brands according to a zero-order process.

All potential switchers are assumed to have the same probability to buy a specific brand, but this probability may differ across brands. The proportion of loyal buyers and the potential switchers' choice probabilities are linked to the elements of the observed switching matrix through:

$$\begin{aligned} p_{ii} &= \alpha_i + (1 - \alpha_i)\pi_i, \\ p_{ij} &= (1 - \alpha_i)\pi_j \quad i \neq j \end{aligned} \quad (1)$$

where p_{ij} is an element of the switching matrix, π_i the proportion of potential switchers buying brand i , and α_i the proportion of the current buyers of brand i which is intrinsically loyal. The first equation states that the (conditional) probability to repurchase brand i depends on (1) the proportion of loyals (α_i), and (2) the proportion (π_i) of the potential switchers $[(1 - \alpha_i)]$ who decide to re-purchase brand i after all. The second equation shows how the conditional probability p_{ij} equals the proportion (π_j) of the potential switchers $[(1 - \alpha_i)]$ which chooses brand j . Clearly, every actual switcher is a potential switcher, but not every repeat purchase comes from a loyal customer.

The π_i parameters also have a clear managerial interpretation, viz., the respective brands' conquering power with respect to the potential switchers. However, in line with the topic of the special issue, attention in this study will be focused on the α_i -estimates, which indicate the proportion of *loyals* of brand i . We refer the interested reader to the original Colombo and Morrison article for a more detailed discussion of both the model and its estimation.

2.2. Analysis of decline in loyalty

The application of the C&M-model to successive switching matrices results in a time-series of α_i -parameters, whose over-time evolution is assessed using both deterministic- and stochastic-trend analyses. In the deterministic analyses, we check whether there is a systematic and continuing decrease (in-

crease) in brand loyalty over time. In the stochastic-trend analyses, attention is focused on whether all observed deviations are just temporary deviations from a fixed mean level. If this is the case, any observed drop in loyalty is only of a temporary nature, and does not initiate a persistent or continuing decrease in brand loyalty. While there is considerable debate in the economics literature on the relative merits of both approaches (see, e.g., Diebold and Nerlove, 1990), we will treat both analyses as *complementary* ways to study the relative incidence of loyalty decline.

2.2.1. Deterministic-trend analysis

The presence of deterministic trends is tested using a linear regression model with the α_i 's as dependent and time as independent variable¹. All analyses are performed at three levels of aggregation. At the highest level of aggregation, we pool all α_i -vectors, but allow for brand-specific differences in the intercept, i.e.,

$$\alpha_{i,t} = b_0 + b_1 T_t + \sum_{k=2}^K \delta_k \text{BRAND}_k + u_{i,t}, \quad (2)$$

where $\alpha_{i,t}$ is the brand-loyalty estimate of brand i derived from its t th switching matrix, T_t the corresponding value of a deterministic-trend variable, BRAND_k ($k = 2, \dots, K$) are brand-specific dummy variables, $u_{i,t}$ is an error term, and b_0 , b_1 , and δ_k are parameters which have to be estimated. A significantly negative coefficient b_1 would confirm an *overall* decline in brand loyalty in the market.

Second, to allow for different patterns of decline across product categories (e.g., because of differing levels of competition or because of differences in the overall level of promotional expenditures), deterministic-trend regressions were also estimated at the

¹ As our loyalty estimates are proportions, we also estimated a logistic model (Hanssens et al., 1990) to ensure logical consistency. Since our substantive findings were very similar in both instances, attention will be focused on the simpler linear model, but detailed results for the nonlinear model are available from the authors upon request.

category level:

$$\alpha_{i,t}^{(p)} = b_{0,p} + b_{1,p}T_t + \sum_{k=2}^{K_p} \delta_{k,p} \text{BRAND}_{k,p} + u_{i,t}^{(p)}, \quad (3)$$

where K_p gives the number of brands in product category p ($p = 1, \dots, P$), and where the superscript (p) is added to indicate that we now pool observations within a given product category. As indicated in Section 3, data were available for 21 product categories, and Eq. (3) was applied separately to each product category.

Third, we assessed the presence of deterministic trends at the individual-brand level:

$$\alpha_{i,t} = b_{0,i} + b_{1,i}T_t + u_{i,t}. \quad (4)$$

ninety-two such analyses (see Sections 3 and 4) were carried out. A significantly negative coefficient $b_{1,p}$ [$b_{1,i}$] in Eq. (3) [Eq. (4)] indicates a decline in loyalty for product category p [brand i].

Finally, a meta-analysis was conducted on the p -values associated with the trend-regression coefficients in Eqs. (3) and (4), using the method of adding weighted Z 's (Rosenthal, 1991). This is an even stronger test than the significance tests on the individual regression coefficients. For example, in the situation where each trend effect is rather weak (e.g., $p < 0.15$) but in the same direction, a case-by-case test would indicate no significant trends, while the *collective* evidence, as reflected in the meta-analysis, would suggest a highly-significant trend in brand loyalty (see Rosenthal, 1991 for details).

It should be noted that in the present study, and contrary to much other research in marketing, the null-hypothesis of nonsignificant trend effects is intrinsically as interesting as the alternative hypothesis of significant trends. As argued above, there is considerable uncertainty whether brand loyalty is declining or not, and conflicting evidence has been reported in the literature. Given the importance of brand loyalty in marketing theory and practice, it is of great managerial and academic importance to shed light on this issue, *whichever way the evidence goes*. In addition to the *statistical significance* of an effect, we will also give some attention to the *size* of the trend effect when we discuss the results for the pooled analysis. Especially from a managerial per-

spective, another interesting question concerns the magnitude of the trend effect.

2.2.2. Stochastic-trend analysis

Deterministic-trend analysis is but one approach to quantify long-run evolutions. Following Dekimpe and Hanssens (1995a,b), we also assess whether a stochastic trend is present in a given sequence of loyalty estimates. This allows us to determine whether the observed fluctuations are just temporary deviations from a fixed (mean) level, or whether they initiate a new trend without any reversion to previous levels.

This distinction can be clarified through the following first-order process describing the over-time behavior of brand i 's loyalty estimates:

$$(1 - \phi_i L) \alpha_{i,t} = c_i + u_{i,t}, \quad (5)$$

where ϕ_i is an autoregressive parameter, L the lag operator (i.e., $L \alpha_{i,t} = \alpha_{i,t-1}$), $u_{i,t}$ a series of zero mean, constant-variance and uncorrelated shocks, and c_i a constant. Applying successive backward substitutions allows us to write Eq. (5) as

$$\alpha_{i,t} = [c_i / (1 - \phi_i)] + u_{i,t} + \phi_i u_{i,t-1} + \phi_i^2 u_{i,t-2} + \dots \quad (6)$$

Clearly, when $\phi_i < 1$, the impact of past shocks diminishes and eventually becomes zero, i.e., any shock (which may, for example, be caused by an increase in promotional support) then causes only a temporary deviation from the series' mean level $c_i / (1 - \phi_i)$, and, therefore, does not initiate a continuing decline or increase. On the other hand, when $\phi_i = 1$, past effects do not diminish and the loyalty estimates do not revert to any historically observed level. Instead, the series evolves freely in one direction or another, and a stochastic trend is said to be present. Following Dekimpe and Hanssens, the Augmented Dickey and Fuller (1979) test is used to empirically determine whether ϕ_i equals one (i.e., whether there is a unit root in the autoregressive polynomial of Eq. (5)). The test equation used is

$$\Delta \alpha_{i,t} = a_{0,i} + b_i \alpha_{i,t-1} + a_1 \Delta \alpha_{i,t-1} + \dots + a_m \Delta \alpha_{i,t-m} + u_{i,t}, \quad (7)$$

where the $m \Delta \alpha_{i,t-j}$ are added to ensure that $u_{i,t}$ is white noise. The t -statistic of b is compared with the critical values in Fuller (1976), and the unit-root null

hypothesis is rejected if the obtained value is smaller than the critical value. Tests for stochastic trends will only be performed at the individual brand level (the strict temporal ordering in the test equation cannot handle pooled data), and will only be implemented for the longer time series because of power considerations (see Sections 3 and 4 for details).

2.3. How variable are the brand-loyalty estimates?

When analyzing the amount of short-run variability in the loyalty estimates, we distinguish two scenarios: brands exhibiting a trend in brand loyalty as indicated by the deterministic-trend regressions in Eq. (4), and brands showing no trend in brand loyalty. Due to statistical considerations (the population mean and variance of trending series are not defined, making the interpretation of their sample

counterparts debatable), we treat both situations somewhat differently.

For the 'non-trending' brands, we compute the sample standard deviation in their over-time loyalty estimates to get insight into their absolute amount of variability. This measure of within-brand variability will be calculated for each of the non-trending brands, and summary statistics will be presented. Second, we consider whether the short-run variability has changed over time. For this purpose, we calculate whether the absolute deviations from a brand's mean loyalty level have systematically increased (or decreased) over time. This test is based on the following equation:

$$|\alpha_{i,t} - \alpha_i| = b_{0,i} + b_{1,i}T_t + u_{i,t}, \quad (8)$$

where α_i is the sample mean of the series, and

Table 1
Data description

Product category	Time span	Median inter-purchase time (days)	(Bi) monthly switching matrices	No. of loyalty estimates per brand	No. of brands satisfying share requirement	Total market share included brands	Concentration ^a
Food / beverage							
Frying margarine	2	17	m	23	2	79	81
Regular beer	2	22	b	11	7	83	60
Decaffeinated coffee	1	20	b	5	3	78	78
Lowfat margarine	2	18	m	23	6	72	55
Condensed milk	1	16	m	11	5	60	51
Regular coffee	1	17	m	11	4	83	76
Cola	1	18	m	11	3	79	79
Water	1	22	b	5	3	73	73
Orange juice	1	23	b	5	5	66	58
Apple sauce	1	24	b	5	4	57	46
Chocolate sprinkles	1	32	b	5	5	55	45
Regular margarine	2	15	m	23	6	73	55
Cereals	1	25	b	5	4	86	82
Light beer	2	31	b	11	3	96	96
Muesli	1	23	b	5	6	68	55
Green peas	1	28	b	5	4	55	48
Crackers	1	23	b	5	3	74	74
Personal hygiene							
Panty liners	2	38	b	11	4	80	74
Sanitary towels	2	30	b	11	3	83	83
Pet food							
Cat food (wet)	1	9	m	11	6	82	61
Cat food (dry)	1	17	m	11	6	69	47

^aThe concentration of a product category is defined as the total market share of the three largest brands (e.g., Clarkson and Miller, 1982).

where $b_{1,i}$ reflects the change in variability over time.

For the 'trending' brands, we compute the standard deviation of the residuals in Eq. (4) as a measure of the absolute amount of variability². Similarly, we test whether the variability has increased over time by replacing the absolute deviation in Eq. (8) by the absolute deviations from the trend line identified in Eq. (4).

3. Data description

Panel data describing the purchase histories in 1993–1994 of approximately 4000 Dutch households in 21 different product categories were provided by GfK Foodscan. GfK Foodscan is the market leader with respect to household panel data in The Netherlands and is part of the pan-European market research agency GfK. All product categories were frequently-purchased packaged consumer goods, covering a variety of food/beverage (e.g., margarine, beer), personal-hygiene (e.g., sanitary towels) and pet-food (e.g., dry and wet cat food) products (see Table 1). Within a product category, all brands with an average market share of more than four percent were retained. The number of brands satisfying this minimum-share requirement varied across product categories, and ranged from two (frying margarine) to seven (regular beer), but the combined market share of the included brands exceeded 50 percent in all instances. In total, 92 brands were extracted from the data set. Moreover, for every product class we added an 'others' category to the switching matrix to accommodate purchases of the smaller brands³.

The length of the available time span was either one or two years, which is comparable to the sample

length in the erosion studies of East and Hammond (1996) and Ehrenberg et al. (1994), and to the scanner-data study of Lal and Padmanabhan (1995) on the negative long-run impact of price promotions. Depending on the mean interpurchase time in the product category, monthly or bimonthly switching matrices were constructed. This resulted in, respectively, 23, 11 or 5 switching matrices and corresponding loyalty estimates per brand⁴. Monthly switching matrices were constructed when more than 70 percent of the households had a mean interpurchase time of less than 28 days. In all other instances, switching matrices were constructed on a bimonthly basis to ensure that enough purchases had been made to get numerical stability of the parameter estimates. Monthly intervals were used as the smallest unit of analysis as this corresponds to the reporting interval of GfK Foodscan in its commercial services.

To accommodate people who did not purchase any brand in a product category within the considered (bi)monthly interval, a null-category was introduced (Chiang, 1991; Colombo and Morrison, 1989). The size of the switching matrix in product category p is, therefore, $N_p + 2$, with N_p the number of brands satisfying the minimum-share requirement in

² This is a natural extension of the measure proposed for the non-trending brands, since their sample standard deviation corresponds to the standard deviation of the residuals of a prior regression on an intercept.

³ An exception is the light-beer market, where the combined market share of the other brands was less than 4%. Because of the limited number of purchases in this 'other' group, its inclusion would have resulted in numerical instabilities in the estimation procedure.

⁴ For initialization purposes, the first interval in each time series was lost. Indeed, to determine whether the first purchase in given time interval was a 'repeat purchase' or 'a switch', we compared this purchase to the last purchase in the preceding time interval. Clearly, no such procedure could be applied for the first (bi-)monthly interval. Further, no purchase records were recorded during weeks 28–32 of each year. In sum, either 48 or 96 weeks of sales records were available, and depending on the length of the sampling interval (4-weekly or 8-weekly), 23 ($= 96/4 - 1$), 11 (e.g., $48/4 - 1$) or 5 ($48/8 - 1$) switching matrices were constructed. As such, our analyses included a matrix incorporating switches from weeks 25–28 to weeks 33–36 (i.e. we looked at the last purchase in the time interval 25–28 to determine whether a consumer's first purchase in, say, week 33 was a switch or a repeat purchase). To check whether this has an effect on the results, we changed the time variable in the pooled model analysis from a continuous count (1, 2, 3, 4, ...) to a count where there is an interval of two units rather than one unit when the α in question is based on a switching matrix comparing weeks 25–28 and weeks 33–36. The results were almost completely the same, the only difference being that the category-level trend coefficient for crackers also became significant (it was borderline significant in the original analysis).

that category, and the two extra columns (rows) reflecting, respectively, the 'others'- and the 'null'-category. However, only the N_p α -estimates corresponding to 'real' brands are used in subsequent analyses.

Following Rao and Sabavala (1981), Carpenter and Lehmann (1985) and Grover and Srinivasan (1987), we used all purchases a household made in given (bi)monthly interval. We only deleted purchases when multiple purchases in the same category were made on the same day, as it was impossible to empirically determine the purchase order in those instances (see Carpenter and Lehmann, 1985 and Shoemaker and Shoaf, 1977 for a similar practice).

4. Empirical findings

4.1. Has brand loyalty declined over time?

Results for the pooled model in Eq. (2) are given in Table 2. Differences in the sampling interval (monthly or bimonthly) were accommodated by giving the trend variable in the latter case the mean value of the corresponding monthly values (i.e., 1.5, 3.5, ...).

To account for differences in both the sampling interval and the length of the considered time span (one or two years), both weighted and unweighted estimation procedures were used. Weighted least squares was applied to prevent product categories for which more data points were available from driving the results. Three weighting schemes were adopted. In the first scheme, the weight is proportional to the length of the sampling interval (monthly = 1; bimonthly = 2). Second, to account for differences in the number of years for which we have data (one or

Table 3

Decline in brand loyalty at the product-category and brand level

	Insignificant regressions (5% level)	Significant regressions (5% level)
Number of product categories	18	3 (1+; 2-)
Number of brands	83	9 (3+; 6-)

two year), we assigned a weight proportional to the inverse of the sampling length. Finally, a combination of the two was used according to the following scheme: monthly–1 year = 2; bimonthly–1 year = 4; monthly–2 years = 1; bimonthly–2 years = 2. In none of these instances was the slope of the trend variable statistically significant. In terms of the managerial significance of these parameter estimates, the magnitude of the decline in brand loyalty pooled across all brands and product categories over the time period considered, varies between -0.0012 and 0.0103 (on a scale for α between 0 and 1), depending on the weighting scheme used. Thus, both from a statistical and a managerial point of view, no evidence is found of an overall decline in brand loyalty.

Results at the product-category and brand level are presented in Table 3. Again, little evidence of loyalty reduction is found. We observed a significant trend for only three (low-fat margarine, frying margarine, and panty liners) of the 21 product categories considered. Moreover, one of these three trend coefficients (for the low-fat margarine market) was positive, and the two other categories experienced a major new-product introduction. After controlling for this event in Eq. (3) through a step dummy variable, the trend in both markets became insignificant.

Table 2

Decline in brand loyalty at the aggregate level: Results of the pooled model

	Trend coefficient ($\times 10^{-3}$) (Standard error ($\times 10^{-3}$))	Significant trend (5% level)
Unweighted	0.053 (0.349)	No
Weighted		
Weight = sampling interval	-0.170 (0.352)	No
Weight = 1/sampling length	-0.224 (0.402)	No
Weight = 2 * (sampling interval/sampling length)	-0.468 (0.404)	No

A meta-analysis on the p -values associated with the 21 trend coefficients, using the method of adding weighted Z 's (Rosenthal, 1991) revealed that also collectively, the product-category analyses showed no significant trend in brand loyalty ($p > 0.20$). This provides strong evidence for the absence of any trend in brand loyalty as a number of insignificant but consistent trend coefficients could yield a highly-significant trend at the combined meta-level of analysis (Rosenthal, 1991).

A similar picture emerged at the individual-brand level. A significant trend was found in merely 9 instances, of which only 6 were negative. For brands exhibiting a negative trend, the average magnitude of change in loyalty from the first to the last period

considered was 0.063 (mean α 's were 0.676 and 0.613, respectively). The average magnitude of change for positively trending brands was 0.172 (mean α 's were 0.475 and 0.647, respectively).

One of the 6 brands exhibiting a negative trend in brand loyalty belongs to one of the aforementioned categories which experienced a new-product introduction, and its trend coefficient became insignificant after controlling for this event. This suggests that the 'apparent' decline was caused by a major structural break in the market, and therefore should not be interpreted as evidence of a gradual decline or erosion in brand loyalty. A meta-analysis on the p -values associated with the 92 trend coefficients at the brand level provided further support for this

Table 4
Brand loyalty at product-category level: Descriptive statistics

Product category	Average (over-time) mean ^a	Number of estimates on which the average is based ^b	Average (over-time) standard deviation ^a	Average coefficient of variation ^a	Range across brands ^a
Food/beverage					
Frying margarine	0.847	46	0.036	0.043	0.013
Regular beer	0.802	66	0.026	0.032	0.086
Decaffeinated coffee	0.797	15	0.056	0.071	0.063
Lowfat margarine	0.770	115	0.048	0.064	0.130
Condensed milk	0.742	55	0.037	0.051	0.165
Regular coffee	0.697	44	0.080	0.119	0.198
Cola	0.695	33	0.051	0.075	0.076
Water	0.681	33	0.060	0.088	0.049
Orange juice	0.664	20	0.072	0.110	0.103
Apple sauce	0.663	15	0.037	0.057	0.105
Chocolate sprinkles	0.644	20	0.060	0.095	0.135
Regular margarine	0.626	138	0.041	0.067	0.172
Cereals	0.605	20	0.071	0.125	0.265
Light beer	0.603	33	0.055	0.091	0.029
Muesli	0.593	30	0.047	0.090	0.329
Green peas	0.566	20	0.037	0.064	0.109
Crackers	0.539	10	0.046	0.082	0.089
Personal hygiene					
Panty liners	0.624	44	0.064	0.107	0.124
Sanitary towels	0.554	22	0.035	0.063	0.057
Pet food					
Cat food (wet)	0.539	66	0.051	0.107	0.370
Cat food (dry)	0.502	55	0.062	0.125	0.133

^a The descriptive statistic is based on non-trending brands only as it does not have a meaningful interpretation for trending brands.

^b Based on the number of loyalty estimates per brand \times the number of non-trending brands in the category.

conclusion. Combining all results at the brand level revealed once more that there was no evidence for a trend in brand loyalty ($p > 0.20$).

Table 4 provides a general summary of key results per product category. It provides information per product category based on the (over-time) summary statistics for nontrending brands. We report the average of the mean α 's (averaged across the brands in the product category), the average standard deviation, the average coefficient of variation, and the range in mean α 's in each category.

A logit model was estimated to examine whether the finding that a brand was trending ($= 1$) or nontrending ($= 0$) was systematically related to (1) the brand's market share, (2) its relative price (expressed as a ratio vis-a-vis the average price in the market), (3) the level of market concentration (measured as the combined market share of the three largest brands), and (4) the median interpurchase time in the product category. None of these covariates was found to have a significant effect. In contrast, East and Hammond (1996) report a negative relationship between erosion and market-share leadership, and a positive relationship between erosion and market concentration. The latter result, which according to East and Hammond was unexpected, is not confirmed in our analyses, nor did we find a systematic relationship with a variable not explicitly considered in East and Hammond (1996): the brand's relative price.

We also examined whether the identified trends in our brand-loyalty measure showed a parallel trend in the brands' market share, which would support the Double-Jeopardy principle (cf. Uncles et al., 1995). We determined whether this phenomenon occurred by re-estimating Eq. (4) for each of the 8 trending brands, using the brand's market share rather than its

Table 6

Covariates of the variability of brand loyalty

Covariates	Dependent variable: Standard deviation	
	Coefficient ($\times 10^{-2}$)	p-value
Intercept	2.280	0.097
Market-share leader	-1.416	0.008
Relative price	0.004	0.601
Market concentration	0.051	0.004
Length of the time span (1 = 2 years; 0 = 1 year)	-1.552	0.002
Length of the sampling interval (1 = monthly; 0 = bimonthly)	0.254	0.582
$R^2 = 0.210$ ($p = 0.002$)		

loyalty as dependent variable. No convincing evidence for a parallel trend in market share was found in our data. Only for 2 out of 8 trending brands was the hypothesis supported in that a parallel and significant trend was observed for both dependent variables.

The unit-root tests confirmed the absence of a systematic decline in brand loyalty. Eq. (7) was applied to the 14 brands for which 23 observations were available⁵. In only two instances did we find evidence of a stochastic trend. One of them was again a frying-margarine brand, but unlike the deterministic-trend case, this trend was preserved after we controlled for the new-product introduction in that category using the method of Perron and Vogelsang (1992).

4.2. Variability in the brand-loyalty estimates

For each of the 84 non-trending brands, we computed the standard deviation in the successive loyalty estimates⁶. Summary statistics for these 84 brands are given in the left-hand column of Table 5. For the

Table 5

Over-time variability in brand loyalty: Summary statistics

Standard deviation of the residuals of a regression on:	A fixed mean ^a	A linear trend
Number of brands	84	8
Mean	0.051	0.034
Median	0.046	0.029
Standard deviation	0.022	0.022

^aIf the brands belong to a product category with a new brand introduction, a step-dummy was added to the equation.

⁵ All analyses were conducted with $m = 0$ and $m = 1$.

⁶ For those instances where there was a new product introduction in the category, the standard deviation of the residuals of prior regression on an intercept and a step dummy was calculated.

8 trending brands, the square root of the residual variance of a deterministic-trend regression was derived, and the corresponding summary statistics are given in the right-hand column of Table 5. Even though an average (median) standard deviation of 0.051 (0.046) in brand loyalty estimates over time is not excessive compared to an average brand loyalty estimate across all nontrending brands of 0.653, it is *not* negligible either.

A linear regression model was estimated to determine whether the extent of variability was systematically related to (1) market-share leadership (a zero-one dummy variable), (2) the brand's relative price, (3) the level of market concentration in the product category, (4) the length of the sample (1 or 2 years), and (5) the length of the sampling interval (monthly or bi-monthly). The results are reported in Table 6. Three variables exerted a significant effect on variability in brand loyalty. Market leaders experienced a smaller amount of variability in their brand-loyalty estimates, while brands operating in less concentrated markets, and brands for which two years of data were available, were also characterized by less variability⁷.

To reduce the amount of short-run variability, a moving average of three consecutive point estimates was constructed. Similar summary statistics as in Table 5 were derived, and presented in Table 7. The short-run variability, as expressed in the series' standard deviation, has been reduced by more than 50%

⁷ Two reviewers argued that the significant effect for market leadership may not be due to any 'true' benefits, but rather caused by a 'statistical artifact'. A first statistical reason could be that market leaders command a higher brand loyalty, and that due to ceiling effects, this would reduce (limit) the standard deviation in the α_i 's. However, a regression analysis on the coefficient of variation also showed a significant effect of market leadership on variability. A second possible statistical explanation could be that the brand-loyalty estimates for market leaders exhibit less variability since they are based on a larger number of purchases. If this were the case, the same phenomenon should be observed (albeit to a lesser degree) for the second largest brand, etc. Variability should be smallest for the market leader, second smallest for the second brand in the market, third smallest for the third brand, etc. To examine this issue, we added two brand dummies to the regression model, indicating whether the brand in question was second in market share or third in market share. Neither one of these two dummy variables was significant.

Table 7

Over-time variability based on a moving average of three consecutive estimates: Summary statistics

Standard deviation of the residuals of a regression on:	A fixed mean ^a	A linear trend
Number of brands	84	8
Mean	0.021	0.015
Median	0.019	0.012
Standard deviation	0.013	0.009

^aIf the brands belong to a product category with a new brand introduction, a step-dummy was added to the equation.

through this simple smoothing operation, and now has a mean (median) value of 0.021 (0.019). Our results, therefore, suggest that some caution should be exercised with studies which only provide a single snap-shot of the market.

Finally, little evidence was found that the variability has systematically changed over time. Indeed, the absolute deviation from their mean loyalty level has only increased (decreased) significantly for 4 (3) of the 84 brands that showed no significant trend in brand loyalty (Section 4.1). For the 8 trending brands (Section 4.1), only two instances were found where the absolute deviations from that trend level had changed over time ($1 + / 1 -$). Using a logit model, no systematic relationship could be detected between the presence/absence of a trend in variability and the brand's market-share leadership or relative price, nor with the median interpurchase time or market concentration in the product category.

4.3. Assessing the robustness of the results

In any empirical study, a number of decisions have to be made on how to handle specific data issues. Two decisions appear especially important in the context of the present study, viz. the selection of the time interval used to construct the switching matrices and our treatment of multiple purchases. The robustness of our basic conclusions was assessed with respect to both issues.

As described above, our choice of data interval (monthly or bi-monthly) for a product category was based on the mean interpurchase time of the households. However, it is possible that some consumers have a purchase interval that is consistently longer

than the considered interval. For example, he/she may buy low-fat margarine, for which we used a monthly interval (see Table 1), every six weeks. This consumer would therefore fall into the [no-purchase, brand i]-cell in our monthly switching matrices, which could lead to biased results. To investigate this issue, we doubled the time interval for all product categories for which we initially had 11 or 23 brand loyalty estimates (see Table 1). Thus, product categories that were analyzed above using monthly data were now re-analyzed using bimonthly data, and product categories that were previously analyzed with bimonthly data were now reanalyzed using four-monthly data. This left us with 12 product categories and 54 brands.

All the α_i 's were recomputed, based on the new switching matrices, and the trend analyses were performed on these new α_i 's. The conclusions remained substantively the same. No strong evidence for a decline in brand loyalty was found. At the pooled level, the trend was not significant, neither for the unweighted procedure nor for any of the weighted procedures. One product category showed a significant trend. The analyses at the brand level indicated that, if anything, the evidence for a decline in brand loyalty is even less after doubling the time interval. Only 3 out of 54 brands included in the analyses exhibited a significant trend (2 negative, 1 positive). Neither at the product category level nor at the brand level did the meta-analysis on the p -value of the trend coefficients indicate a significant overall effect (both p 's > 0.20). Finally, only 4 of the 51 nontrending brands ($1 + /3 -$) and none of the three trending brands showed a significant trend in variability over time.

As may be expected, the mean value of α across all nontrending brands included in the analyses was higher when the sampling interval was doubled (0.700 versus 0.663, $p < 0.001$)⁸, but the actual magnitude of the difference was modest (an increase of 0.037 or 5.6% compared to the original analyses). However, the variability in brand loyalty estimates

was reduced by about 25% when the sampling interval was doubled (mean variability of 0.037 and 0.048, respectively; $p < 0.001$). The latter reduction is not surprising, as the doubling of the time interval conceptually resembles the smoothing operation discussed before.

The second robustness check that was performed dealt with our treatment of multiple purchases. As indicated above, multiple purchases were deleted from the data. However, when a consumer buys multiple brands on the same date, this could be evidence of disloyalty. Hence, deletion of multiple purchases may cause an upward bias in the loyalty estimates. Multiple purchases did not appear to be a major issue in our data, and did not exhibit a trend over time. On average, only 4.3% of all purchases were multiple purchases, and in only three product categories (cat food wet, cat food dry, regular margarine; none of which showed a trend in the analyses reported above) did the multiple purchases account for more than 10% of all purchases.

To assess the robustness of the conclusions with respect to our treatment of multiple purchases, trend analyses were also conducted after putting multiple purchases in a random order. Again, the results remained substantively the same, and no strong evidence for a decline in brand loyalty was found. At the pooled level, the trend was not significant, neither for the unweighted procedure nor for any of the weighted procedures. Four product categories showed a significant trend (including the three product categories that showed a trend in the original analyses reported in the paper; the new category was borderline insignificant in the original analyses). For none of the three product categories with a relatively high level of multiple purchases did the trend coefficient approach significance (all p 's > 0.20). Twelve out of 92 brands included in the analyses exhibited a significant trend (8 negative, 4 positive). Neither at the product category level nor at the brand level did the meta-analysis on the p -value of the trend coefficients indicate a significant overall effect (both p 's > 0.20). Finally, 6 of the 80 nontrending brands ($3 + /3 -$) and 2 of the 12 trending brands ($1 + /1 -$) showed a significant trend in variability over time.

In line with expectations, the mean value of α across all nontrending brands included in the analy-

⁸ Pairwise t -tests based on nontrending brands that were common to both treatments are used to compare the different treatments. Hence, the means reported in this section for the original analyses slightly deviate from the means reported earlier in the paper as the subsets are different.

ses was lower when multiple purchases were included (0.631 versus 0.647, $p < 0.001$). However, the actual magnitude of the difference was small (a decrease of 0.016 or 2.5% compared to the original analyses). The variability in the brand loyalty estimates was slightly lower when multiple purchases were included (means of 0.050 and 0.053, respectively; $p < 0.001$) but again, the difference is negligible in magnitude.

Collectively, these analyses suggest that the study findings are robust to our treatment in terms of both time interval and multiple purchases.

5. Conclusions: Areas for future research

The main findings of our research are encouraging to brand managers and marketing researchers alike:

- we find little support for the often-heard contention that brand loyalty continues to decline;
- even though the short-run variability around a brand's underlying loyalty level is not negligible, it has not increased systematically over time;
- brand loyalty is more stable for market leaders than for others; and
- after a simple smoothing operation, the amount of short-run variability can be reduced considerably.

Further, the results were found to be robust to different treatments of the time intervals used to construct the switching matrices and to the deletion or incorporation of multiple purchases.

It is often argued in the popular press that brand loyalty is gradually declining over time, and a variety of arguments (such as the increasing fragmentation of the market or the growing popularity of private-label brands) have been put forward to support this contention (see Section 1). Our first result, however, supports Johnson's contention that this 'decline' may be more of a buzz-word than a well-founded empirical fact. On the other hand, it does not appear to concur with the conclusion of East and Hammond (1996) that the percentage of repeat-buyers tends to decline. Further research is needed on this issue as a number of different factors may drive this apparent contradiction. First, one could argue that the divergence in findings confirms Lal and Padmanabhan (1995) (p. 106) contention that two segments

of inert consumers exist: a 'loyal' segment of consumers with low switching probability and another segment which is more prone to switching on the basis of price. East and Hammond operationalized brand loyalty as the percentage of *all* purchasers who repeat-purchase in a given time period, while the C&M method employed by us distinguishes between loyal buyers and potential switchers, both of whom can be repeat purchasers. One could, therefore, argue that East and Hammond's findings may partially reflect the intensifying promotional battle for share in the switching-prone segment.

The different findings may also be explained, however, by the different scope and operationalization of both measures⁹. While we derive our brand-loyalty estimate from an *aggregate* switching matrix (thereby taking a 'macro' point of view), East and Hammond look at the repeat-buying behavior of each *individual* consumer (the 'micro' level), and subsequently compute the percentage of consumers which satisfies the repeat-buying criterion (i.e., we aggregate at an earlier stage).

Third, both measures look somewhat differently at the same purchasing string. A consumer buying brands X and Y in month 1 and brands X and Y in month 2 would contribute to the off-diagonal elements in our switching matrices for months 1 and 2, but would still belong to the fraction of repeat buyers in the East and Hammond approach. Finally, we define loyalty decline as the gradual decrease of brand loyalty over consecutive time points, while East and Hammond compare repeat buying from period 1 to 8 with the fraction of repeat buyers from period 1 to 2. No such 'anchoring' is present in our approach. A more directly comparable operationalization could be obtained if our switching matrix were constructed from pairs of purchases which are not consecutive, but separated by a number of months. Clearly, a detailed empirical study is needed to disentangle the relative contribution of each of the above factors, which we leave as an important area for future research.

As with any empirical study, the present study also has some limitations, which may provide other

⁹ We thank two anonymous reviewers for bringing these interpretations to our attention.

promising avenues for future research. A first limitation is the time span of 1–2 years used to analyze whether or not a decline in brand loyalty can be observed. Some observers may have longer time spans in mind when they hypothesize a decline in brand loyalty. It should be noted though that our time span is in line with previous research (see, e.g. East and Hammond, 1996; Lal and Padmanabhan, 1995). Moreover, we considered 21 product categories, all with their own idiosyncracies in terms of market characteristics or marketing strategies, among others. In almost none of the many instances we considered did we find evidence of brand-loyalty erosion, and also in the meta-analyses, no evidence of a decline in brand loyalty was found. These combined findings across so many markets at least compensate somewhat for the shorter time period. Notwithstanding these arguments, future research should also analyze brand loyalty over a longer time period of say 5–10 years, perhaps for a smaller number of categories. Combined with moving-window techniques, this could provide insights on the length of periods of relative stability and decline. This would be an important extension of the present study.

A second limitation is our exclusive reliance on the Colombo and Morrison model to estimate brand loyalty. Although the model is well established in the marketing literature, it has, like any other model, its limitations. For example, it is assumed that the market only consists of two groups of consumers: intrinsically-loyal consumers and switchers. This simplifying assumption clearly is not an exact representation of reality, where varying degrees of loyalty between these two extremes may exist. Moreover, the model assumes homogeneity in that all potential switchers have the same probability to buy a specific brand. Recent research (Yim and Kannan, 1996) has relaxed this assumption, albeit at the cost of added complexity.

A third limitation of the Colombo and Morrison model, shared with other models based on switching matrices, is that its loyalty estimates are to some extent affected by the regularity of purchase. If a person does not buy in the time interval used in the analysis, an apparent decrease in brand loyalty is observed, which need not be the case. In this paper, we used the normal commercial reporting practice of

the market-research agency that collected the data as guideline, and only modified this if the purchase frequency was too low. We found that lengthening the time interval reduced the variability of the brand-loyalty estimates by about one-fourth, but the effect on the mean loyalty estimates was relatively minor. Most importantly, however, we found that the basic conclusions of the paper remained unaltered. It should also be noted that the selection of the time interval in switching matrices is not only determined by statistical, but also by theoretical and managerial considerations. For example, time intervals of 4 months may produce more stable results, but managers typically do not want to wait that long before receiving market information. Using the shorter time intervals employed in the present study with a moving average works quite well in practice, and reduces the variability to about half of the variability obtained when doubling the time interval, while providing managers with monthly updates on developments in brand loyalty. Future research should further investigate the robustness of models based on switching matrices to changes in the underlying time intervals.

A further limitation of the C&M model, common to all behavioral brand loyalty models, is that brand loyalty is inferred from observed data. An ideal measure of brand loyalty would incorporate both observed behavior *and* the underlying commitment to the brand (Jacoby and Chestnut, 1978). A particularly important area of future research is to examine the reliability and convergent validity of brand loyalty estimates provided by different models (cf. Van Trijp and Steenkamp, 1990 for such a study in the area of the inverse of brand loyalty, viz. variety seeking) derived from different research paradigms.

Finally, we want to point out the absence of marketing, product-category, and consumer covariates. We found that the over-time variability of loyalty *within* brands was not negligible, and conducted a preliminary analysis in which the effect of several factors on this variability was examined. This issue needs more research attention, however. One group of factors that is especially likely to affect the within-brand variability are marketing-mix factors. Marketing-control variables such as price, advertising, and sales promotions often vary over time, and probably more so than product-category and con-

sumer factors, and this variability in the brands' marketing support may indeed contribute to the observed within-brand variability in the loyalty estimates. Future research could test this proposition.

More research is also needed on what causes differences in brand loyalty *between* brands, and on the effects and relative contribution of marketing-mix factors, as well as product-category characteristics and consumer characteristics in explaining these differences. Do certain brands succeed in disproportionately attracting brand-loyal consumers and why? Which marketing mix variables are most effective in building a brand-loyal consumer base? What is the role of consumer characteristics? Is it easier to build brand loyalty in some product categories than in others and why? These are all important questions for future research.

Future research could also study the flip-side of the brand-loyalty issue, i.e., the evolution and variability in the brands' conquering power, which is expressed in the π_i estimates of the C&M model. Last but not least, to further enhance our understanding of the loyalty phenomenon, our findings should be replicated under different conditions (Barwise, 1995; Uncles et al., 1994), such as other countries and other product categories.

Acknowledgements

The authors are indebted to GfK Foodscan for providing the data used in this study. This work was financially supported by the Flemish Science Foundation (F.W.O.) under grant No. G.0145.97 and by the Research Council of the Catholic University of Leuven under grant OT.96.4. The authors gratefully acknowledge the many helpful and constructive suggestions provided by three anonymous reviewers and the special-issue editors.

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