

# **Brand Loyalty Evolution and the Impact of Category Characteristics**

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## **Abstract**

A common managerial belief indicates that brand loyalty declines over the years, with consumers becoming more heterogeneous in their choices. The earlier research investigating the phenomenon of brand loyalty decline is, however, inconclusive and does not offer an answer to the reasons behind brand loyalty evolution. In this study, we investigate brand loyalty evolution and explore the impact that a number of category characteristics have on driving brand loyalty evolution. We use Danish panel data across 54 categories over a period of six years (2006-2011). Our findings show that at the aggregate level, brand loyalty declines, but this evolution is category-specific, with only a small number of categories showing a significant decline. We further demonstrate that an increase in category penetration results in a negative impact on brand loyalty evolution, whereas an increase in the share of private label brands has a positive impact. We discuss the implications for theory and practice.

**Keywords:** Brand Loyalty; Evolution; Polarization Index; Private Label Brands; Category Management

## **1 Introduction**

Marketers devote substantial effort to retain or increase loyalty toward their brands, thereby achieving greater profitability from loyal customers (Reinartz and Kumar 2000). However, anecdotal managerial evidence suggests that brand loyalty has been declining over the years (Kapferer 2005; Kusek 2016), a development with serious and troubling implications for marketing practice. The few academic studies that have taken an interest in brand loyalty evolution report mixed results, with some studies suggesting a slight decline (Johnson 1984; Stern and Hammond 2004; Uncles et al. 2010; Dawes et al. 2015), and other studies reporting no decline (East and Hammond 1996; Dekimpe et al. 1997).

Such mixed results can be attributed to study-related characteristics. A review of these studies (see Table 1) reveals differences in several aspects, such as time, time span, context, measurement of loyalty, and categories used. Time is a critical factor since market-related and economic developments influence the shape of the markets. Furthermore, the short time span and the small number of categories used are issues that prevent the detection of long-term changes in loyalty and the safe conclusion of what factors drive brand loyalty evolution. The most recent study by Dawes et al. (2015) overcomes the aforementioned issues, postulating that brand loyalty evolution is not a universal phenomenon, but rather, it is category-specific. However, this study looks into only a limited number of category characteristics that relate to brand loyalty evolution.

**Table 1. Studies on brand loyalty evolution and comparison of their main elements**

Study elements	Johnson (1984)	East and Hammond (1996)	Dekimpe et al. (1997)	Stern and Hammond (2004)	Uncles et al. (2010)	Dawes et al. (2015)	This study
<b>Country</b>	US	Germany, US, UK	The Netherlands	UK	China	US, UK	Denmark
<b>Number of years</b>	8	2	2	5	5	6–13	6
<b>Categories</b>	20	9	21	2	2	26	54
<b>Brand loyalty evolution</b>	Decline	No decline	No decline	Decline	Decline	Category-specific	Decline and category-specific
<b>Measure of loyalty</b>	Share of category requirements, loyal buyers, and repertoire size	Repeat-buying rate	Intrinsically loyal buyers	Share of category requirements and polarization index	Share of category requirements and 100% loyal consumers	Share of category requirements and polarization index	Polarization index
<b>Level of analysis</b>	Brand	Brand	Category	Brand	Brand	Category	Category
<b>Analytical approach/model</b>	Descriptive analysis	Dirichlet model	Colombo and Morrison's (1989) model	Dirichlet model	Dirichlet model	Dirichlet model	Dirichlet model
<b>Explanatory factors</b>	Category growth and number of brands in the category	Market leader and market concentration	Relative price, market concentration, and brand market share	Number of purchases	Stage of economic and retail development	SKUs and category purchase frequency	Category purchase frequency, category penetration, SKUs, and PLB share
<b>Main findings</b>	Negative impact of category growth and number of brands in category	Positive impact of being a market leader and negative impact of market concentration	Less variability in brand loyalty for brand leaders, less concentrated markets, and no effect of relative price	Negative impact of the number of purchases	Differences in economic and brand retail development result in brand loyalty decline	Negative correlation of the number of SKUs with category purchase frequency and brand loyalty	Negative impact of category penetration and positive impact of PLB share

In our study, we take the point of departure in the study by Dawes et al. (2015), and we consider brand loyalty evolution as a category-specific phenomenon instead of a universal one, with a tendency to decline. Based on data that originate from a different country (Denmark), a large number of fast-moving goods categories ( $n = 54$ ) and a long-term period (6 years), our aim is to shed light on the phenomenon of brand loyalty evolution and the impact that category characteristics have on such evolution.

We organize this text as follows. The following section describes the rationale behind brand loyalty decline. We then demonstrate the impact that category characteristics can have on brand loyalty evolution and propose our hypotheses. Next, we describe our methodology and the measures we use to operationalize brand loyalty. We continue by presenting our findings, and we finally conclude with implications and directions for future research.

## **2 Background**

Several factors explain brand loyalty decline. First, consumers are becoming more price-sensitive, which, in turn, makes them less loyal toward brands (Mela et al. 1998). The increased price sensitivity can be attributed to retailers' heavy price promotions (Hendel and Nevo 2006) as well as the economic downturn of 2008, which resulted in such behaviors even after its end (Lamey 2014). Second, consumers are more educated and empowered than in the past, resulting in them being more cynical about marketing practices and brands in general (O'Dell and Pajunen 2000). Additionally, their lack of trust toward brands, in turn, makes them less loyal. Finally, the increasing fragmentation of markets, the growing popularity of niche brands, and the growth of private label brands (PLBs) may also explain this decline in brand loyalty.

In regard to empirical evidence on the long-term evolution of brand loyalty, the literature is scarce. We identified six studies that explore brand loyalty evolution (Johnson 1984; East and

Hammond 1996; Dekimpe et al. 1997; Stern and Hammond 2004; Uncles et al. 2010; Dawes et al. 2015). In Table 1, we provide an overview of the studies and compare them against the present study. The findings on brand loyalty evolution are inconclusive. Some studies find evidence of brand loyalty decline (Johnson 1984; Stern and Hammond 2004; Uncles et al. 2010), and some find no evolution (East and Hammond 1996; Dekimpe et al. 1997), whereas Dawes et al. (2015) suggest that brand loyalty evolution is not universal but category-specific. Johnson (1984) finds a negative impact of category growth and the number of brands on brand loyalty evolution. East and Hammond (1996) indicate a positive impact of a market leader brand and a negative impact of market concentration on brand loyalty evolution. Dekimpe et al. (1997) postulate that relative price has no impact on loyalty evolution, while brand leaders and concentrated markets have a negative impact. Stern and Hammond (2004) show that the number of purchases has a negative impact on loyalty evolution. Uncles et al. (2010) further suggest that loyalty decline is the result of differences in economic and brand retail development. Finally, Dawes et al. (2015) show that stock-keeping units (SKU) and category purchase frequency correlate negatively with loyalty evolution.

The abovementioned studies have weaknesses. First, the studies by Johnson (1984) and East and Hammond (1996) are based on datasets from the 1980s, while Dekimpe et al.'s (1997) study is from the 1990s, and since then, markets have changed considerably. Second, the time span in the studies by East and Hammond (1996) and Dekimpe et al. (1997) is small (2 years), which is not sufficient to detect long-term changes in loyalty. Third, while more recent studies overcome the above weaknesses (Uncles et al. 2010; Dawes et al. 2015), the number of categories is too small to account for the factors behind brand loyalty evolution.

Earlier literature supports the role of category-related characteristics in influencing brand loyalty (Johnson 1984; Ehrenberg 1988; Sethuraman and Gielens 2014). In our study, we

consider category characteristics that relate to market structure, namely, SKUs, category penetration, category purchase frequency, and share of PLBs in the category. Next, we develop our hypotheses on the impact of each category characteristic on brand loyalty evolution.

## **2.1 Category penetration**

Category penetration is the proportion of buyers buying from the category at least once within a given period of time. An increase in category penetration can be the result of brand and retailer strategies aimed at attracting new buyers, such as price promotions. Those buyers are more likely to be less loyal since consumers who respond to promotional activities are variety seekers and more elastic to price changes (Narasimhan et al. 1996). In addition, some of those buyers are more likely to be light users of the category with no strong preferences, thus leading to a decrease in brand loyalty. Therefore, we propose that when category penetration increases, brand loyalty in the category will decline. Therefore, we propose the following hypothesis:

*H<sub>1</sub>: An increase in category penetration has a negative impact on brand loyalty evolution.*

## **2.2 Category purchase frequency**

Category purchase frequency is the average number of times buyers buy from the category within a given period of time. The assumption behind an increase in purchase frequency is that buyers will dedicate the additional purchases either to the same brand or to different brands. In the former case, this will result in an increase in loyalty in the category, whereas in the latter case, there will be an increase in variety seeking and thus a subsequent decrease in loyalty. An increase in purchase frequency results in higher expenditure in the category,

which may make buyers more concerned about price and thus more likely to switch between cheaper brands. Increased consumption will further result in greater knowledge and familiarity with the category, which may result in buyers switching between brands. Finally, earlier research provides evidence that purchase frequency and loyalty evolution are more likely to be negatively correlated (Stern and Hammond 2004; Dawes et al. 2015). Thus, we propose that when category purchase frequency increases, brand loyalty in the category will decline. Therefore, we propose the following hypothesis:

*H<sub>2</sub>: An increase in purchase frequency has a negative impact on brand loyalty evolution.*

### **2.3 Number of stock-keeping units (SKUs)**

Historically, the number of SKUs has followed an upward trend (USDA 2010), with large companies tending to rationalize them (Kumar and Steenkamp 2007; Kumar et al. 2014). An increase in SKUs may result in larger assortment sizes that subsequently may weaken buyer preferences and increase the likelihood of buyers buying other products (Johnson 1984; Bawa et al. 1989; Chernev 2003). Furthermore, while SKUs increase, the set of alternatives eventually expands, resulting in an increase in variety-seeking behaviors (Chintagunta 1998). Finally, an increase in SKUs may result in increased competition between brands, which may result in brand managers employing strategies that increase variety-seeking behavior. Thus, we propose that when the number of SKUs increases, brand loyalty in the category will decline. Therefore, we propose the following hypothesis:

*H<sub>3</sub>: An increase in the number of SKUs has a negative impact on brand loyalty evolution.*



## **2.4 Share of private label brands (PLBs)**

Private label brands have managed to establish a considerable share in retail markets (Sethuraman and Cole 1999; Ter Braak et al. 2013; Koschate-Fischer et al. 2014; Ter Braak et al. 2014), with the average global share increasing from 15.0 percent in 2010 to 16.5 percent in 2013 (Nielsen 2011; Nielsen 2014). When the share of PLBs in a category increases, buyers' price elasticity is more likely to increase as a result of frequent retail price promotions (Sethuraman and Gielens 2014) and the overall positioning of PLBs as lower-cost alternatives to national brands (Geyskens et al. 2010). Such an increase in buyers' price elasticity may result in a shift of buyer preferences from brand to price and thus result in buyers becoming less loyal toward brands (Hendel and Nevo 2006). Thus, we propose that when the PLB share increases, brand loyalty in the category will decline. Therefore, we propose the following hypothesis:

*H<sub>4</sub>: An increase in PLB share has a negative impact on brand loyalty evolution.*

## **3 Method**

### **3.1 Data and modeling**

We use consumer panel data from GfK in Denmark. The panel consists of approximately 2,500 households and is geographically and demographically representative of the Danish population. The data cover purchases for a period of six years (2006 to 2011) across 54 fast-moving consumer goods categories.

We measure brand loyalty from a behavioral perspective (Dick and Basu 1994). Various behavioral measures of brand loyalty are proposed in the literature, such as purchase frequency, share of category requirements or repeat buying rate (East and Hammond 1996; Dawes et al. 2015). However, the abovementioned measures have a drawback, as they are

systematically related to market share (Fader and Schmittlein 1993; Danaher et al. 2003; Pare and Dawes 2012). In addition, they vary according to the time frame of analysis (Sharp 2010). To avoid such confounding factors, we use the polarization index ( $\varphi$ ) that represents the repeat rate standardized for the market share (Fader and Schmittlein 1993). The advantage of  $\varphi$  is that it is independent of the time frame, category purchasing and market share (Rungie and Laurent 2012). The polarization index ( $\varphi$ ) is a function of the  $S$  switching parameter, taken from the Dirichlet model (Ehrenberg 1988), which we calculate from the following equation:

$$\varphi = 1/(1 + S) \quad (1)$$

The  $S$  parameter is the sum of the individual brand parameters of the Dirichlet multinomial distribution, expressed as  $S = \sum_1^h \alpha$  (Rungie et al. 2013), and captures changes in the heterogeneity of consumer choice. While the  $S$  parameter ranges from zero to infinity,  $\varphi$  ranges between zero and one, which is easier to interpret. Values of  $\varphi$  close to zero indicate pure homogeneity in consumer choice, signaling more brand switching and lower loyalty (i.e., all buyers have the same propensity to buy individual brands). Values of  $\varphi$  close to one indicate maximum heterogeneity in consumer choice, which signals less brand switching and higher loyalty (i.e., each buyer buys only his/her favorite brand; Fader and Schmittlein 1993).

### **3.2 Analytical procedure**

We first produce the following brand and category metrics for each quarter:

1. *Market share*, as the total unit sales of the brand divided by the total unit sales in the category.

2. *Brand and category penetration*, as the number of households buying the brand/category at least once divided by the number of total households.
3. *Brand and category purchase frequency*, as the total number of purchases of the brand/category divided by the number of households buying the brand/category.

These metrics are used as input for the Dirichlet model (Ehrenberg et al. 2004), which we fit with a package provided in R (Chen 2008). We only consider brands with a market share higher than one percent to prevent the bias that small brands introduce. Therefore, prior to the analysis, we group all remaining brands as ‘other brands’ (Ehrenberg 1988).

We further calculate the category characteristics for each quarter: *SKUs*, as the number of stock-keeping units, and *PLB share*, as the total unit sales of PLBs divided by the total unit sales of all brands in the category. We consider unit sales share to be more appropriate than value sales share because average PLB prices tend to be lower than those of national brands (Sethuraman and Cole 1999; Batra and Sinha 2000).

Given that  $\varphi$  varies between zero and one, we first make a logistic transformation (Ailawadi et al. 2008; Koschate-Fischer et al. 2014) and then estimate the growth rate of loyalty for every category using a semilog growth model. We do this for one category at a time:

$$\ln \left[ \frac{\varphi_{it}}{1-\varphi_{it}} \right] = \alpha_i + b_i t \quad (2)$$

where  $\ln \left[ \frac{\varphi_{it}}{1-\varphi_{it}} \right]$  is the logistic transformation of the polarization index, ‘ $a$ ’ is the constant, ‘ $b$ ’ is the growth rate, ‘ $i$ ’ is the category, and ‘ $t$ ’ is the quarter. We then group categories according to their growth rate in one of the following three brand loyalty evolution groups: a) *decreasing loyalty*, when the growth rate is negative and significant; b) *no change*, when the

growth rate is insignificant; and c) *increasing loyalty*, when the growth rate is positive and significant.

To test our hypotheses, we fit a two-level growth model that accounts for between-category differences in growth rates with repeated measurements nested within categories. We use the logistic transformation of the polarization index as the dependent variable. At level 1, we model the dependent variable as a function of time as follows:

$$\ln \left[ \frac{\varphi_{it}}{1-\varphi_{it}} \right] = \beta_{0i} + \beta_{1i}t + \varepsilon_{it} \quad (3)$$

At level 2, we model the intercept and slope of level 1 as a function of category characteristics. We mean-centered the category characteristics to create the interaction terms with time. We then model the intercept and the slope through the predictor as follows:

$$\beta_{0i} = \gamma_{00} + \gamma_{01}CH_{it} + \mu_{0i} \quad (4)$$

$$\beta_{1i} = \gamma_{10} + \gamma_{11}CH_{it} + \mu_{1i} \quad (5)$$

where  $CH_{it}$  is the mean-centered value of each category characteristic. By replacing equation (3) with equations (4) and (5), we obtain the following equation:

$$\ln \left[ \frac{\varphi_{it}}{1-\varphi_{it}} \right] = \gamma_{00} + \gamma_{01}CH_{it} + \gamma_{10}t + \gamma_{11}CH_{it}t + \mu_{1i}t + \mu_{0i} + \varepsilon_{it} \quad (6)$$

where  $\gamma_{00} + \gamma_{01}CH_{it} + \gamma_{10}t + \gamma_{11}CH_{it}t$  represents the fixed effects and the remaining part represents the random effect.

We use a sequential modeling strategy. We first model only the intercept (Model A). We then introduce into the model the random effect of time and category (Model B). Next, we introduce the fixed effect of time and category characteristics (Model C). Finally, we test our full model by including the interaction terms between time and category characteristics

(Model D). These interactions with time are of interest to answering our hypotheses since we focus on the evolution of the polarization index. We compare the fit of the models by comparing the deviance of each model (-2LL log likelihood estimator).

## 4 Results

### 4.1 Category characteristics

Appendix 1 presents the category characteristics for each category averaged across quarters. The average polarization index ( $\varphi$ ) is .54 and ranges from .20 in cheese to .92 in beer. The average penetration is .39 and ranges from .04 in diapers and cosmetics to .80 in milk. The average purchase frequency is 5.6 and ranges from 1.4 in mustard to 44.9 in beer. The average number of SKUs is 202 and ranges from 31 in toilet blocks to 659 in chocolate. Finally, the average PLB share is .28 and ranges from .05 in toothbrushes to .63 in toilet paper.

**Table 2. Growth rate of the polarization index ( $\varphi$ ) for every category**

Category	Growth rate	<i>p</i>	Category	Growth rate	<i>p</i>
Asian and Mexican Food <sup>2</sup>	-.001	.890	Jam <sup>2</sup>	.003	.657
Bacon <sup>2</sup>	-.001	.895	Juice <sup>3</sup>	.006	.097
Beer <sup>3</sup>	.034	.059	Ketchup <sup>2</sup>	.001	.881
Biscuits <sup>3</sup>	.017	.025	Liqueur <sup>2</sup>	-.080	.140
Biscuits – Other <sup>2</sup>	.001	.888	Liver Pate <sup>1</sup>	-.012	.000
Bubble Bath <sup>2</sup>	.014	.111	Margarine <sup>2</sup>	-.003	.240
Butter <sup>1</sup>	-.012	.001	Milk <sup>1</sup>	-.009	.000
Cereals <sup>3</sup>	.009	.009	Mustard <sup>2</sup>	-.000	.993
Cheese <sup>3</sup>	.017	.009	Oil <sup>2</sup>	.010	.174
Chicken <sup>2</sup>	.003	.478	Pasta/Rice Dish <sup>2</sup>	.034	.576
Chips <sup>3</sup>	.015	.000	Rye Bread <sup>2</sup>	.000	.957
Chocolate <sup>2</sup>	-.003	.785	Sauce Mix <sup>2</sup>	.006	.120
Coffee <sup>1</sup>	-.012	.036	Sausages <sup>3</sup>	.017	.058
Conditioner <sup>2</sup>	-.002	.918	Shampoo <sup>3</sup>	.021	.062
Cosmetics <sup>2</sup>	-.042	.101	Skin Care <sup>3</sup>	.014	.065
Cream <sup>3</sup>	.007	.058	Soda <sup>3</sup>	.018	.055
Deodorants <sup>3</sup>	.014	.020	Soft Drinks <sup>1</sup>	-.010	.048
Detergents <sup>2</sup>	.007	.283	Soups <sup>2</sup>	-.031	.172
Detergents - Other <sup>3</sup>	.011	.086	Spaghetti <sup>2</sup>	-.008	.223
Diapers <sup>3</sup>	.043	.000	Spices <sup>2</sup>	.005	.433
Eggs <sup>1</sup>	-.007	.047	Sugar <sup>2</sup>	-.008	.245
Flour <sup>3</sup>	.018	.052	Tea <sup>3</sup>	.031	.000
Frozen Pizza <sup>2</sup>	.003	.478	Toilet Blocks <sup>2</sup>	.014	.727

Fruit Juice <sup>2</sup>	-.010	.250	Toilet Paper <sup>3</sup>	.013	.045
Hand Soap <sup>2</sup>	.002	.830	Toothbrush <sup>2</sup>	-.002	.785
Ice Cream <sup>2</sup>	.000	.993	Toothpaste <sup>3</sup>	.016	.073
Instant Coffee <sup>2</sup>	-.006	.233	Wheat Bread <sup>2</sup>	-.007	.528

Note: <sup>1</sup> Decreasing loyalty; <sup>2</sup> No change; <sup>3</sup> Increasing loyalty

## 4.2 Brand loyalty evolution

The growth rate of the polarization index ( $\varphi$ ) for every category is presented in Table 2.

Following the criteria for establishing the brand loyalty evolution groups, 11 percent are categorized as *decreasing loyalty*, 56 percent are categorized as *no change* and 33 percent are categorized as *increasing loyalty* (see Table 3). The result of a mixed linear model using quarters as a repeated measures factor highlights the differences in category characteristics across brand loyalty evolution groups (see Table 3). The decreasing loyalty evolution group has the highest category penetration (.64) and category purchase frequency (12.1), whereas the increasing loyalty evolution group has the highest number of SKUs (231) and PLB share (.32).

**Table 3. Brand loyalty evolution groups**

	Total	Brand loyalty evolution group			<i>F</i> ( <i>p</i> )
		Decreasing loyalty	No change	Increasing loyalty	
N (%)	54	6 (11%)	30 (56%)	18 (33%)	-
$\varphi$	.54	.54 <sup>a, b</sup>	.53 <sup>a</sup>	.56 <sup>b</sup>	4.61 (.010)
Average growth rate	.003	-.010 <sup>a</sup>	-.003 <sup>b</sup>	.018 <sup>c</sup>	323.80 (.000)

<b>Category characteristics</b>					
Category penetration	.39	.64 <sup>a</sup>	.34 <sup>b</sup>	.39 <sup>c</sup>	156.18 (.000)
Category purchase frequency	5.6	12.1 <sup>a</sup>	3.9 <sup>b</sup>	6.1 <sup>c</sup>	94.14 (.000)
SKUs	202	196 <sup>a</sup>	182 <sup>a</sup>	231 <sup>b</sup>	17.61 (.000)
PLBs share	.28	.21 <sup>a</sup>	.27 <sup>b</sup>	.32 <sup>c</sup>	34.96 (.000)

Note: Superscript letters indicate differences in pairwise comparisons using the LSD criterion.

### 4.3 Impact of category characteristics on brand loyalty evolution

Table 4 presents the results of the two-level models. From Model A to Model D, deviance decreases, indicating an increasing level of fit. The introduction of the interaction terms that aim to test our hypotheses in Model D shows a marginal improvement in fit, with the difference in deviance being marginally significant between Model C and Model D ( $\Delta-2LL = 7.88$ ;  $p < 0.1$ ).

**Table 4. Parameter estimates for two-level models**

	<b>Model A</b>		<b>Model B</b>		<b>Model C</b>		<b>Model D</b>	
	<b>Beta (90% CI)</b>	<b>P</b>	<b>Beta (90% CI)</b>	<b>P</b>	<b>Beta (90% CI)</b>	<b>P</b>	<b>Beta (90% CI)</b>	<b>P</b>
<b>Fixed effects</b>								
<i>Main effects</i>								
Intercept	.237 [.137; .337]	.000	.207 [.023; .392]	.066	1.327 [1.039; 1.616]	.000	1.380 [1.076; 1.684]	.000
Quarter					-.009 [-.013; -.004]	.001	-.009 [-.013; -.005]	.000
Category penetration					-2.342 [-2.853; -1.832]	.000	-2.029 [-2.575; -1.483]	.000
Category purchase frequency					.031 [.015; .047]	.001	.030 [.014; .045]	.002
SKUs					-.002 [-.003; -.001]	.001	-.002 [-.003; -.001]	.000
PLB share					.374 [-.142 .890]	.223	-.082 [-.726; .561]	.833
<i>Interaction effects</i>								
Quarter $\times$ Category penetration							-.035 [-.057; -.013]	.009
Quarter $\times$ Category purchase frequency							.000 [-.000; .001]	.280

Quarter $\times$ SKUs				.000	.240
Quarter $\times$ PLB share				.028	.080
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<b>Random effects *</b>					
Category		.634	.000	.321	.000
		[.457; .881]		[.221; .466]	
Quarter		.000	.057	.000	.245
		[.000; .000]		[.000; .000]	
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$-2LL$	2613.14	2123.08		2038.86	2030.98
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$\Delta-2LL$		490.06		84.22	7.88
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\* Estimates are variance and follow a Wald test

The main effect of time on brand loyalty is negative and significant ( $\gamma = -.009$ ;  $p < .000$ ), indicating that at an aggregate level, brand loyalty declines. The main effect of category penetration ( $\gamma = -2.029$ ;  $p < .000$ ) and SKUs ( $\gamma = -.002$ ;  $p < .000$ ) on brand loyalty is negative and significant, whereas the main effect of category purchase frequency ( $\gamma = .030$ ;  $p = .002$ ) is positive and significant. This finding means that categories with higher penetration and more SKUs display a lower level of brand loyalty, whereas categories with higher purchase frequency display a higher level of brand loyalty. Finally, the main effect of PLB share ( $\gamma = -.082$ ;  $p = .833$ ) on brand loyalty is not significant.

The interaction effect between time and category penetration ( $\gamma = -.035$ ;  $p = .009$ ) is negative and significant. We thus provide support for hypothesis  $H_1$  that postulates that category penetration has a negative impact on brand loyalty evolution. The interaction effects between time and purchase frequency ( $\gamma = .000$ ;  $p = .280$ ) and between time and SKU ( $\gamma = .000$ ;  $p = .240$ ) are both insignificant, and thus, we reject hypotheses  $H_2$  and  $H_3$ . Finally, the interaction effect between time and PLB share ( $\gamma = .028$ ;  $p = .080$ ) is positive and marginally significant. This finding suggests that PLB share has a positive impact on brand loyalty evolution, which is opposite to what we hypothesized. We therefore reject hypothesis  $H_4$ .



## 5 Discussion

Taken together, our findings show that although brand loyalty declines at the aggregate level, it is category-specific (Dawes et al. 2015). Our results further show that categories demonstrate different brand loyalty evolution; therefore, we group them into increasing, stable and decreasing categories. Out of the total categories we analyzed, 11 percent showed a decrease in brand loyalty, whereas a higher percentage (33%) showed an increase.

Furthermore, the three brand loyalty evolution groups differed substantially in the levels of category characteristics. On the one hand, categories belonging to the decreasing brand loyalty evolution group had, on average, higher category penetration and category purchase frequency and lower PLB share. On the other hand, categories belonging to the increasing brand loyalty evolution group had, on average, higher SKUs and a higher PLB share.

A notable observation is that the decreasing brand loyalty evolution group consists only of food and mainly perishable categories. This pattern may explain why the conclusion of earlier studies, suggesting a decline in brand loyalty (Johnson 1984; Uncles et al. 2010; Dawes et al. 2015), could be due to their data consisting of only food categories. In addition, this pattern confirms earlier studies that show that product categories that display increasing brand loyalty are mainly those allowing for consumers to stockpile, especially during promotions (Hendel and Nevo 2006).

Our findings show that category characteristics have an impact on brand loyalty evolution. More specifically, changes in category penetration have a significant negative impact, and PLB share has a significant positive impact on brand loyalty evolution. However, changes in category purchase frequency and SKUs do not have any impact on brand loyalty evolution. These results indicate that in categories in which their customer base grows (i.e., leading to higher penetration), brand loyalty in the category will eventually decline. This finding is in

line with those of the earlier literature that suggests that an increase in category penetration erodes brand loyalty due to an increase in the proportion of variety seekers (Narasimhan et al. 1996). To conclude, strategies designed to increase penetration (e.g., sales promotions) might erode loyalty (Papatla and Krishnamurthi 1996).

An increase in PLB share in a category results in an increase of brand loyalty – a finding opposite to what we originally hypothesized. Therefore, the argument that an increase in PLB share will decrease brand loyalty through an increase in buyers' price elasticity in the category as the result of the positioning of PLBs on price seems not to hold true. This result may be because PLBs gradually tend to be considered similar to national brands in terms of product quality and price (Geyskens et al. 2010; Ter Braak et al. 2014), which may have resulted in canceling out their negative effect on brand loyalty evolution. It is worth noting that categories with increasing brand loyalty evolution had the highest PLB share compared to the remaining two brand loyalty evolution groups. In fact, in earlier studies that found a decline in brand loyalty, the proliferation was not as high as in our sample (for instance, Uncles et al.'s (2010) study uses data from China, with the PLB share in 2013 being approximately one percent (Nielsen 2014)). Therefore, the introduction of PLBs might have worked against this decline. Finally, another plausible explanation of this finding is that an increase in the PLB share might eventually increase the preference toward brands in the category as a result of a higher market share of PLBs and greater brand-related competition.

Our work contributes to the literature on brand loyalty evolution. It further contributes to knowledge on the role of category characteristics on brand loyalty evolution. From a managerial perspective, we provide evidence that changes in brand loyalty may occur from changes in category characteristics, especially from changes in category penetration and PLB share. Thus, managers should be careful when employing strategies that aim to increase category penetration since they may eventually erode brand loyalty. In addition, retailer

strategies to promote and increase the market share of PLBs may result in an increase in brand loyalty in the category. Of course, our approach considers the average change, and we cannot conclude if national brands benefit from this or whether this increase is the result of changes in loyalty only in PLBs, which is an interesting question that deserves further research.

## **6 Limitations and directions for further research**

Our study is not free of limitations, which point to directions for future research. First, our results are bound to the Danish market where the data come from. Thus, studies using data from other countries would be necessary to provide further support for our findings. Second, given that our main finding asserts that trends in brand loyalty evolution are category-specific, it is inevitable that our results depend on the categories we used as well as how these categories are formed. Future research could incorporate additional categories and explore whether the same categories across different markets show similar trends in brand loyalty evolution. Third, in the analytical approach, we do not account for individual brand-related effects within categories. Future studies should examine whether brand-related characteristics have an impact on brand loyalty evolution. Finally, our study only explored a specific number of category characteristics. Other category-related characteristics that our data did not include (e.g., promotions and competitive structure) could be the focus of future research.

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**APPENDIX 1. Category characteristics averaged across quarters**

Category	$\phi$	Penetration	Purchase frequency	SKU	PLB share
Beer	.92	.38	44.9	448	.14
Liqueur	.81	.14	4.0	75	.11
Coffee	.80	.55	7.3	194	.25
Shampoo	.77	.28	2.6	210	.14
Deodorants	.77	.22	2.5	246	.08
Toilet Blocks	.76	.06	1.7	31	.14
Pasta/Rice Dish	.75	.13	3.5	57	.11
Conditioner	.75	.08	2.0	82	.14
Fruit Juice	.74	.24	3.4	96	.16
Soda	.72	.17	5.0	116	.48
Soups	.71	.24	3.1	114	.23
Frozen Pizza	.71	.14	3.3	85	.26
Hand Soap	.70	.26	2.0	124	.30
Bubble Bath	.70	.17	1.9	127	.13
Toothpaste	.67	.40	2.1	108	.06
Diapers	.67	.04	3.8	56	.45
Tea	.64	.27	2.9	202	.21
Toilet Paper	.64	.58	3.1	96	.63
Toothbrush	.63	.15	2.0	117	.05
Instant Coffee	.62	.25	2.5	117	.27
Asian and Mexican Food	.61	.22	2.8	156	.53
Soft Drinks	.60	.53	20.5	428	.11
Margarine	.56	.57	5.3	71	.37
Detergents	.56	.40	1.8	122	.49
Butter	.55	.70	7.7	66	.16
Juice	.55	.51	7.8	268	.50
Ketchup	.53	.37	2.6	90	.23
Spaghetti	.51	.42	3.8	282	.44
Jam	.50	.43	3.3	306	.33
Liver Pate	.48	.60	4.2	111	.21
Cereals	.47	.53	4.7	235	.46
Mustard	.47	.22	1.4	71	.35
Oil	.46	.31	1.6	137	.51
Ice Cream	.45	.40	4.1	284	.25
Spices	.45	.31	2.4	263	.20
Biscuits	.45	.47	4.3	334	.22
Sauce Mix	.44	.43	3.8	313	.27
Sugar	.43	.53	4.0	92	.23
Sausages	.43	.50	3.8	248	.37
Flour	.42	.51	3.6	138	.46
Skin Care	.42	.27	2.6	391	.28
Bacon	.41	.53	3.7	139	.45

Milk	.41	.80	3.2	236	.36
Eggs	.40	.68	4.4	148	.17
Chips	.40	.41	5.7	343	.32
Biscuits - Other	.39	.43	3.8	292	.30
Detergents - Other	.34	.35	1.9	180	.39
Cream	.33	.63	6.0	87	.47
Chocolate	.31	.53	9.0	659	.11
Cosmetics	.30	.04	1.6	63	.15
Chicken	.30	.59	4.3	394	.30
Rye Bread	.30	.75	9.6	227	.33
Wheat Bread	.25	.77	16.8	500	.25
Cheese	.20	.75	6.3	510	.25
<b>Average/%</b>	<b>.54</b>	<b>.39</b>	<b>5.6</b>	<b>202</b>	<b>.28</b>

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