

# Brand importance across product categories in the Czech Republic

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**Abstract.** *This paper deals with customer loyalty to brands and provides an analysis of brand-related attitudes among Czech consumers. Brand loyalty is a very important aspect of competitive marketing and we contribute an empirically supported point of view on the topic. Based on primary data from a complex consumer survey carried out for the purpose of this study, we investigate the extent of brand loyalty across different product categories, mostly fast moving consumer goods (FMCG). For convenience, the analysis of our survey-data may be divided in two main areas. First, product categories are ranked according to their potential power to attract customers' interest and loyalty towards brands. When loyalty programs are prepared, it is important to discern product categories where loyalty potential is weak from those categories that attract consumer loyalty. Second, sociodemographic features and lifestyle factors from the survey are evaluated with respect to different product categories, by means of logistic regression and subsequent average partial effect (APE) analysis. A detailed and practically oriented interpretation of the empirical results is provided by the authors. However, both corporate marketers and academic readers can use the tables with empirical estimation outputs that are provided in this article to draw their own conclusions, which may be focused on the product category of interest and/or focused on any specific consumer group that is of particular interest. Among other topics, this paper emphasizes the fact that brand loyalty is a highly complex phenomenon and that it can and should be analysed from different perspectives.*

**Keywords:** Product categories, brand, loyalty, customer, FMCG

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## Introduction

Corporate managers are well aware of the high value of customers who make repeated purchases and become in some way bound to an enterprise or to a particular brand. Such attitude of a customer to a brand is called customer loyalty. Loyalty is defined by many factors. Apart from specific properties of products or services, an important role is played by customers' emotions. Customers may use products for comparing themselves with a certain reference group, either associatively (to a group that the customer wants to be included in) or dissociatively.

From a general perspective, the main reason for strengthening customer loyalty lies undoubtedly the expected effects on corporate profits, both short-term and long-term. Companies frequently use various supporting marketing tools, with the aim of increasing customer loyalty towards their brands. Such tools are often called loyalty programs. Nowadays, accent is being placed on the continuity (i.e. uninterrupted nature) of the relation with customers. Long-term connections foster relational dynamics and

enhance the positive impact of trust, commitment, and involvement on use (Grayson, Ambler, 1999, p.132).

Another well-known fact is that a loyal customer becomes part of the communication channel mix, because he/she consciously or unconsciously informs other people, thus generating new potential customers. The Word of Mouth (WOM) information (e.g. Cengiz and Yayla, 2007) is always relevant, driven by customer needs and with a potential for exponential growth in its impact. Customers who are loyal, will more probably disseminate the positive WOM than those whose loyalty is at a low level.

The question of loyalty distinctively applies to sectors dealing with fast moving consumer goods or frequently used services, where the purchasing cycle is relatively short. Competitiveness in most markets is mounting and companies acknowledge the necessity to actively establish and strengthen ties with their customers. No company can grow if its customer bucket is leaky, and loyalty helps to eliminate this outflow (Reichheld, 2003, p. 3). We can say that a customer can be considered loyal when he/she repeatedly buys the brand and does not intend to buy any other brand in the same product category.

This paper analyses the potential for customer loyalty in different product categories, mostly fast moving consumer goods. Our approach is based on the assumption that certain product categories have a stronger tendency to create loyalty bonds among the whole population or its parts, while in other categories the bonds are weaker. Consumer perceptions and preferences with respect to brand categories have received little attention in the academic research literature (Ghose and Lowengart, 2013).

This paper is organized as follows: section 1 provides a brief literature review and section 2 focuses on different brand importance aspects along diverse product categories. In section 3, the main research questions are explicitly formulated and section 4 provides information on the methodology applied and specific data handling issues. Section 5 covers the empirical results of the research and the last section concludes our contribution, along with the list of references.

## Literature review

Although loyalty and its aspects belong to the most important contemporary tools of marketing, it is worth mentioning that there is quite a long marketing history, dating back to 1940s, as can be observed in the following quotation: "When loyalty is considered in relation to specific brands, a fairly high degree of loyalty exists" (Guest, 1944). The concept was further developed in the 1950s, when the behavioural aspects of loyalty were stressed (e.g. Cunningham, 1956). Later on, this particular concept repeatedly re-emerged. For example, Bennet (2001) shows that attitudinal brand loyalty has the strongest impact on the behavioural brand loyalty.

In its earliest period, dating back to the middle of the 20th century, loyalty was introduced as a unidimensional rendition, defined by the measurement paradigm adopted by the researcher. Later on, loyalty became the multi-dimensional concept that is currently used by marketing practitioners and researchers (see Rundle-Thiele, 2005).

By its very nature, customer loyalty is a sensitive phenomenon. There are many factors that may influence customer behaviour and they are summarized by different types of definitions. Loyalty can be described as a deeply held commitment to rebuy preferred products or patronize a service consistently in the future (Oliver, 1999, p. 34). Loyalty is very firmly linked to satisfaction. For example, Sambandam and Lord (1995)

conclude that their research results indicate less concern with seeking alternatives in customers who have found a service they enjoy and continue to use.

Customer loyalty should be understood as the result of a mental process, taking place in customers' minds. In literature, it is often described as a process that consists of several tiers. For example, Oliver (1999, p. 35) describes loyalty as a three-phase process: in the first phase, the customer prefers a brand to its alternatives, in the second phase liking of the brand as based on satisfying usage occurrences has developed and the third phase is defined by a specific level of commitment to repurchase. The same attitude may also be observed in research papers of reputable companies. For example, the SAS company in its research papers frequently accents the fact that customer satisfaction is intensively tied to brand affinity (SAS, 2014).

Marketers often emphasize that loyalty is closely interconnected with trust. In some studies (e.g. Lau and Lee, 1999), trust is described as customer's willingness to face the risk of the next purchase based on a positive past experience. Thus, B2C (Business to Consumer) marketers rely on brands to build the relationship and brands operate as an important link between producers (companies) and their customers.

Based on these facts, we can describe loyalty as a pyramid built on several tiers. Repeated purchases, as the first step, do not necessarily indicate loyalty, because they can be caused by many other factors, like geographical locality, absence of competitors etc. Satisfaction can be considered as the second step. Loyalty is at the top of the pyramid that reflects the mental stages of brand attitude in customers' minds. It mirrors in customers' behaviour and therefore is transmitted to their milieus as well (see García and Gutiérrez, 2006).

The preference analysis approach may be used to identify the attributes that consumers use to develop a specific degree of preference for a particular brand category. Naturally, different drivers could be salient for each of the three brand categories (Ghose and Lowengart 2013, p. 7).

### **Product categories and brand importance**

Loyalty can be approached and analysed from many perspectives. Some studies emphasize the role of loyalty programs (e.g. Meyer-Waarden, 2007), others focus on situational loyalty that is related to events such as annual purchases bound with some special occasion (e.g. McMullan and Gilmore, 2008).

The central point of all such studies must be a brand. The reason is that customers' loyalty is tied to a particular product, product group or particular service. Some product categories may be characterized by their tendency to induce customers' loyalty towards a specific brand easily (e.g. Oliver, 1999). The importance of brands is emphasized by many other authors (e.g. Chaudhuri and Holbrook, 2001) who state that brands have a potential to elicit positive emotional responses in the average customer as a result of its use. Generally, both category and brand/product marketing influence consumers to purchase a brand or product and to be loyal toward those objects (Huy and Olsen, 2013).

With regard to the mentioned facts, we use product categories as the basic unit of analysis in this study. It is common in marketing that a virtual funnel is used for classification of brands and that brands are clustered into product categories or sectors. Especially in cases when appropriate (quantitative or Likert-type) scales are used to measure the magnitude of loyalty, it is worth examining how customers classify product categories according to the loyalty potential they feel towards brands in different categories.

Based on the mentioned aspects of loyalty, our research aims to contribute to the existing knowledge, bringing forward stratified information about the loyalty potential of brands in selected product categories for different sociodemographic groups of consumers. The strength of the power that attracts a customer to a brand is important, because marketers need to be aware of how much of a customer's purchases are coming their way – both in terms of actual and potential sales (Garland, 2006). From the marketers' perspective, it is essential to know (i.e. to have reliable quantified estimates) whether there are any gender differences in loyalty, whether loyalty potential in a given product category varies along with standard sociodemographic factors (age, education) and if other factors (such as lifestyle preferences) may play a significant role.

## Research questions

In today's highly competitive market environment, companies invest a significant effort to build up loyalty schemes and programmes in order to retain their customer portfolios. For companies, the brands are loyalty bearers. Brand attitudes are an important starting point in building a conceptual model of consumer-brand relationships. (Fullerton, 2005, p. 100). In connection with brand loyalty, some authors use the terms "brand commitment", „brand trust", or "brand community" (Hur et al., 2011), to encompass trust and repurchase intention.

The description of target groups by means of lifestyle factors is very useful for marketing purposes. It is convenient for a company to imagine a typical customer in a broader context, i.e. not only from the viewpoint of "hard facts" of basic sociodemographic characteristics, like age, living place, education, but to be able to see even the profile based on "soft information". An essential part of such soft information that can suitably complement a customer's profile is represented by purchasing habits, technologies used, cultural background, work preferences, free time activities and attitudes toward issues such as nature conservation, etc. For example, Chung and Hsu (2012, p. 304) make a similar statement, by stressing the benefits of quantified lifestyle factors knowledge for tasks such as developing market strategies or market segmentation.

In this paper, we aim to answer two main research questions:

*Research question 1:* What are the product categories where customers attach importance to brands and how prominent are the brand importance differences between such categories?

*Research question 2:* Based on sociodemographic variables and lifestyle characteristics, which attributes may be significant in defining brand loyalty for diverse product categories and what is the extent (magnitude) of such factors?

In our research, we take into consideration product categories characterized by fast moving consuming cycle, which tend to be purchased repeatedly. Fast moving consumer goods (FMCG) are purchased repeatedly, with a relatively high frequency. This allows consumers to develop expertise in their purchases (Srivastava and Sharma, 2013, p. 178). In addition, we assume that different product categories may be characterized by diverse levels of brand importance from the customers' perspective.

## Data handling and research methodology

Our research on brand loyalty takes into consideration the following product categories: (1) Drugstore, (2) Master domestic appliances, (3) Small domestic appliances, (4) Electronics, (5) Hobby & garden, (6) Toys, (7) Household equipment, (8) Clothing, (9) Shoes, (10) Food & beverages. This classification reflects practice, when products are

categorized for purpose of retail audit or for purpose of arranging items in commerce. Using categories for the purpose of classifying products is supported also in literature (e.g. Oliver, 1999). A complex anonymized survey was performed, gathering respondents' sociodemographic data and their answers to questions related to brand stance on different product categories, free-time preferences, self-positioning and attitudes toward various types of work and leisure activities. Both closed and open-type questions were used in the survey: quantitative (mostly interval-based), qualitative (Yes/No), Likert scale (different degree spans) and fill-in questions (Can you name 8 brands you would recommend to a good friend?).

The survey was performed by researchers at the University of Economics, Prague. The research team was led by university employees and teachers who coordinate and supervise the work of students specializing in marketing research. This study is part of a long-term project of systematic surveys and analyses of customer loyalty (e.g. Tahal and Stríteský, 2014). An overall summary of the survey methodology is provided in Table 1. Stratified/quota sampling was based on gender, age segmentation and location (domicile) of the respondents. The empirical analysis (based on logistic regression and related tests and methods) is adjusted to control for stratified/quota sampling. Hence, our methodology ensures interpretability and relevance of the results and conclusions may be drawn with respect to the population. Also, for data-validation purposes, the Wald-Wolfowitz "Runs" test (Wackerly et al., 2008) was used to test the  $H_0$  of order of observations being attributable to chance against the  $H_1$  of potential survey mishandling.

**Table 1.** *Data collection details*

Characteristic	Survey value/description
Population	Retailer consumers, age 15+
Sampling method	Stratified/quota sampling
Sample size	632 respondents
Sampling date/period	November 2014
Sampling location	The Czech Republic
Survey method	Combination of personal and on-line data collection. Data gathered by a research team at the University of Economics, Prague

Source: Authors' own research results.

In the survey, respondents were asked questions about their positions on brand importance for each of the 10 product categories described above. A four degrees Likert scale was used to record the intensity of the respondents' approval or disapproval (value "1" = brand in the product category is very important to me; value "4" = brand in the product category is totally unimportant to me). In theory, such data allow for the application of ordered multinomial logistic regressions (Wooldridge, 2010, p. 665). However, this rather sophisticated approach, derived using a latent-variable paradigm, does not provide information that might be effectively focused on answering our main research questions. The estimated coefficients of an ordered multinomial regression can be unambiguously interpreted (at least in terms of their signs) only for the best and worst survey outcomes ("1" and "4"), while the expected effect on the intermediate outcomes may not be always determined by the sign of a regression coefficient. Using this reasoning – and through empirical means by evaluating the results from multinomial models – we have determined that transforming our surveyed data for use in a binary response logistic model does not impair interpretability of the results. Hence, the Likert scale brand loyalty answers were transformed into a binary variable

describing a perceived/expressed strong brand importance (and potential brand loyalty) for a particular product category: the response “1” on the Likert scale is considered “success” (i.e. the binary variable equals 1 for the  $i$ -th surveyed individual), while responses “2” to “4” on the Likert scale lead to zero-value observations.

Using this approach, binary variables are produced for all 10 product categories listed above. Wilcoxon signed rank tests for matched pairs (Wackerly et al., 2008) are used to test for differences in relative frequencies of brand loyalty across product categories: e.g. whether the reported percentage of brand loyalty in the Electronics category is statistically different from other product categories. All brand loyalty-based data series are then used as dependent variables in logistic regression models in order to quantify the importance (statistical significance and magnitude) of the effects of various sociodemographic factors and surveyed lifestyle preferences on the attitudes of individual respondents towards their perceived/expressed brand importance in different product types.

In a rather similar manner, 26 main lifestyle factors addressed in the survey, along with a few supplementary questions were used to produce 63 variables (mostly binary indicators). The transformation of Likert scale-based data for subsequent use in quantitative models may be briefly described using an example. For a statement “I am an active driver”, respondents were asked to position themselves on a five degree Likert scale (“1” = this statement describes me very well, “5” = this statement does not describe me at all). Both the actual car-driving volume and its subjectively perceived importance to one’s lifestyle are addressed here. Answers to this particular question were used to produce two binary variables: *Active\_drive\_yes* equals 1 for those who reported “1” on the Likert scale and zero otherwise, *Active\_drive\_no* equals 1 for those who dissociated themselves from the statement by answering “5” (and it equals zero otherwise). Using this approach, we are able to select all the cases where respondents have strong positions on a specific activity or lifestyle: e.g. going to cinema, reading books, doing sports, being a vegetarian, etc. To finalize the active driver example, we should note that all the answers “2” to “4” (not a very strong position on the topic) are combined into one category and may still be implicitly included in the analysis by forming a base (reference “state”, i.e. respondent’s position), necessary for interpretation of coefficients in the estimated regression models. Also, using the answers “2” to “4” as a basis has the advantage of de-coupling the *Active\_drive\_yes* and *Active\_drive\_no* binaries: those are not linearly dependent (at least theoretically) and might be both used as regressors in the same regression equation.

Hence, we have transformed the survey material into a 632-row dataset containing 10 binary indicators describing whether respondents attribute high importance to brands in different product types. Also in the dataset, we have 63 potential explanatory variables, containing sociodemographic data and other relevant information concerning the respondents. In order to select a representative, informative and consistent set of explanatory variables for estimation and comparison of effects on brand importance for all 10 product types, we use a non-parametric random forest approach (James et al., 2013, p. 318-321) which allows for assessing the importance of explanatory variables in a way that takes prediction accuracy into account. This computationally feasible approach (the random forest for each product category consisted of 5.000 trees in our case) may be regarded as an acceptable approximation to the computationally inaccessible search for true optimal model setups: for each of the 10 dependent variables in our dataset, a total of  $2^{63}$  possible regression model specifications would have to be estimated and evaluated (James et al., 2013).

Overall, the variable importance information gathered for all 10 dependent variables (as based on the random forest method) was used to generate a consistent model specification

$$y_i = \beta_0 + \beta_1 \text{Female}_i + \beta_2 \text{Age}_{15\_24_i} + \beta_3 \text{Age}_{25\_34_i} + \beta_4 \text{Age}_{35\_49_i} + \beta_5 \text{Moravia}_i + \beta_6 \text{Prague}_i + \beta_7 \text{Educ\_Uni}_i + \beta_8 \text{Paycard\_yes}_i + \beta_9 \text{Active\_drive\_yes}_i + \beta_{10} \text{FT\_w\_e\_house\_no}_i + \beta_{11} \text{FT\_tourist\_yes}_i + u_{c,i}, \quad (1)$$

where  $y_i$  is a binary dependent variable describing whether the  $i$ -th respondent regards brands in a specific product category as highly important to him/her and  $\beta_j$  are standard regression coefficients of the logistic regression (Wooldridge 2010, p. 565-568).  $\text{Female}_i$  is a binary explanatory variable distinguishing between female and male respondents,  $\text{Age}_{15\_24_i}$ ,  $\text{Age}_{25\_34_i}$  and  $\text{Age}_{35\_49_i}$  are binary variables indicating to which age category the  $i$ -th respondent belongs (upon variable importance evaluation as described above, age ranges 50-64 and 65+ were combined into a single base category: age 50+).  $\text{Moravia}_i$  and  $\text{Prague}_i$  variables describe the residence of respondents (Bohemia with Prague excluded was chosen as the reference category). Respondents with a university degree are discerned using  $\text{Educ\_Uni}_i$  (people with basic and secondary education were combined into a single base category).  $\text{Paycard\_yes}_i$  indicates whether the  $i$ -th respondent uses pay cards (credit and debit) frequently,  $\text{Active\_drive\_yes}_i$  has been introduced above,  $\text{FT\_w\_e\_house\_no}_i$  marks the respondents who do not-at-all identify themselves with owning/using a weekend-house (cottage) and  $\text{FT\_tourist\_yes}_i$  defines people fond of and actively participating in touristic activities.

Finally,  $u_{c,i}$  is the potentially heteroscedastic random element of regression. In matrix notation, the logistic function used for estimation of the  $\beta_j$  coefficients in (1) may be expressed as

$$P(y_i = 1 | x_i^T) = G(x_i^T \beta) = \exp(x_i^T \beta) / [1 + \exp(x_i^T \beta)], \quad (2)$$

where  $P(y_i = 1 | x_i^T)$  is the probability of success, i.e. whether the  $i$ -th respondent regards brands in a selected product category as important, given the observed row vector of explanatory variables  $x_i^T$ .  $G(x_i^T \beta)$  is a simplified notation for the logistic function  $\exp(x_i^T \beta) / [1 + \exp(x_i^T \beta)]$ , for which all fitted values of the dependent variable lie within the  $<0, 1>$  interval. In our analysis, the expression  $x_i^T \beta$  is the right-hand side of (1) with random element excluded. For any given binary dependent variable  $y_i$ , maximum likelihood estimation (MLE) method may be used to estimate the individual coefficients  $\beta_j$ :

$$LL(\beta) = \max_{\beta} \{ \sum_{i=1}^N (y_i \log[G(x_i^T \beta)] + (1 - y_i) \log[1 - G(x_i^T \beta)]) \}, \quad (3)$$

where  $LL(\beta)$  is the iteratively calculated maximized value of the log-likelihood function shown in (3). Under most practical circumstances in logistic regression models, the MLE provides consistent and asymptotically normal estimates of the coefficients (for detailed discussion, see Wooldridge 2010, p.568).

For a logistic model such as (1), the direction of the effect of change in the explanatory variable  $x_j$  on the probability of “success” in the dependent variable is always determined by the sign of the corresponding  $\beta_j$  coefficient. However, the magnitudes of the individual  $\beta_j$  coefficients are not particularly informative by themselves, given the nonlinear nature of the logistic function (2). From equation (2), we see that the resulting effect of a change in  $x_j$  on the probability of “success” for the  $i$ -th respondent must be calculated individually: it’s a composite function of  $\beta_j$ , all the remaining coefficients in vector  $\beta$  and all the observed values of the explanatory variables for the  $i$ -th respondent ( $x_i^T$ ). For the  $i$ -th respondent and a chosen binary

explanatory variable, say  $x_k$ , the partial effect from changing  $x_k$  from 0 to 1 (while holding all other explanatory variables unchanged) may be simply calculated as

$$\Delta G(.) = G(\beta_0 + \beta_1 x_{1,i} + \dots + \beta_{k-1,i} x_{k-1,i} + \beta_k) - G(\beta_0 + \beta_1 x_{1,i} + \dots + \beta_{k-1,i} x_{k-1,i}), \quad (4)$$

where the  $G(.)$  functions come from (2). In the expression (4), we may note that the  $\beta_k$  coefficient is present when  $G(.)$  is evaluated for  $x_k = 1$  and omitted for  $x_k = 0$ . Although the population-based  $\beta_j$  coefficients are not usually available, the expression (4) may be easily evaluated using the sample estimates of  $\beta_j$ , commonly denoted as  $\hat{\beta}_j$ . As an example, for our model (1) and the expected effect of changing *FT\_tourist\_yes* from 0 to 1 for the  $i$ -th respondent, we may write

$$\begin{aligned} \Delta G(.) = & G(\beta_0 + \beta_1 \text{Female}_i + \beta_2 \text{Age}_{15\_24_i} + \beta_3 \text{Age}_{25\_34_i} + \beta_4 \text{Age}_{35\_49_i} \\ & + \beta_5 \text{Moravia}_i + \beta_6 \text{Prague}_i + \beta_7 \text{Educ\_Uni}_i + \beta_8 \text{Paycard\_yes}_i \\ & + \beta_9 \text{Active\_drive\_yes}_i + \beta_{10} \text{FT\_w\_e\_house\_no}_i + \beta_{11}) \\ & - G(\beta_0 + \beta_1 \text{Female}_i + \beta_2 \text{Age}_{15\_24_i} + \beta_3 \text{Age}_{25\_34_i} + \beta_4 \text{Age}_{35\_49_i} \\ & + \beta_5 \text{Moravia}_i + \beta_6 \text{Prague}_i + \beta_7 \text{Educ\_Uni}_i + \beta_8 \text{Paycard\_yes}_i \\ & + \beta_9 \text{Active\_drive\_yes}_i + \beta_{10} \text{FT\_w\_e\_house\_no}_i). \end{aligned} \quad (5)$$

As a logical next step, equations (4) and (5) may be used across all individuals in the sample, to summarize the estimated partial effects of changes in any of the regressors. Such average partial effect (APE) approach is based on calculating the expected partial effects of changing a given binary regressor  $x_k$  from 0 to 1 (*ceteris paribus*) for each of the survey respondents and reporting the average value:  $\text{APE}(x_k)$ . Consistent estimates of  $\text{APE}(x_k)$  for binary regressors may be obtained by evaluating the expression

$$\text{APE}(x_k) = N^{-1} \sum_{i=1}^N [G(\hat{\beta}_0 + \hat{\beta}_1 x_{1,i} + \dots + \hat{\beta}_{k-1,i} x_{k-1,i} + \hat{\beta}_k) - G(\hat{\beta}_0 + \hat{\beta}_1 x_{1,i} + \dots + \hat{\beta}_{k-1,i} x_{k-1,i})], \quad (6)$$

where  $\hat{\beta}_j$  are the estimated regression coefficients and expression (6) is evaluated for all the individual observations – i.e. for all  $N$  respondents. Using expression (6), APEs may be calculated for all binary regressors  $x_j$  in our model (1). The estimated APEs may be used for interpretation and can be compared across different models (i.e. for different product category-related dependent variables). Although all regressors in model (1) are binary, the specification chosen provides enough control for diverse observed factors that it allows for a straightforward interpretation of individual APEs – a situation that is analogous to the Ignorability of treatment assumption (as in Wooldridge, 2010, p. 908).

## Research results

Various types of data evaluation are used to assess different aspects of consumers' brand loyalty and its structure. The research starts with a comprehensive analysis of loyalty across product groups. Based on our representative sample, product categories were ranked according to their attractive power attached by customers to brands in each of the categories. In Table 2, we order product categories by their associated brand importance and test for statistically significant differences in observed distributions. The higher the product category is in the table, the more the brands belonging to the category are tied with customer loyalty; and vice versa, the lower the product category is in the table, the less brands attract customer loyalty. Results of the Wilcoxon signed rank tests (matched pairs) – as performed on the 45 possible pair combinations of product groups – are visualized in the rightmost column of Table 2. The “matched pairs” attribute in Wilcoxon signed rank test serves to control for specific variances in paired (correlated) observations. At the 5% significance level, we have identified six groups of product categories with identical means (statistically speaking).



Table 2. Propensity to brand loyalty by product categories

Product category	Brand importance positive outcomes observed (632 respondents)	Brand importance (positive outcome) ratio	Variance	A “group” is highlighted if we do not reject H0 of equal means.					
Electronics	328	0.519	0.250						
Shoes	231	0.366	0.232						
Small domestic appliances	216	0.342	0.225						
Master domestic appliances	190	0.301	0.211						
Food & beverages	168	0.266	0.195						
Drugstore	158	0.250	0.188						
Clothing	143	0.226	0.175						
Home	98	0.155	0.131						
Hobby & garden	73	0.116	0.102						
Toys	56	0.089	0.081						

Source: Authors’ own research results.

It is worth noting that we have only identified two-element groups and not a single group consisting of three or more product categories was found. For example, when the category Drugstore is pairwise compared to Clothing and to Food & beverages, their means are not statistically different. However, when comparing the mean of Clothing against Food & beverages, we find a nonzero difference at the 5% significance level. Therefore, the three categories may not be combined into a single group. As shown in Table 2, two groups need to be created and Drugstore is involved in both. By elaborating on the same topic, we may point out that each product category is involved in two groups at most. Brand importance for the Electronics category stands out remarkably with a 51.9 % positive outcome, i.e. the percentage of respondents who perceive/express brands as important in a given product category. Interestingly, the decrease from 36.6 % of positive outcome in Shoes to 17.5 % in the Clothing category is very smooth: none of the six units involved (sorted in decreasing order) is statistically different from its neighbours, as far as pairwise differences in means are concerned.

Using the information in Table 2, we may conclude that, for example, brand importance ratio in Small domestic appliances is not statistically different from Master domestic appliances. However, this does not mean that identical positive outcome ratios are generated by identical individual respondents (again, statistically speaking). Theoretically, positive outcomes in Small and Master domestic appliances may as well come from two mutually exclusive groups, which do not even need to have a defining common factor, such as gender.

In practice, many random elements and influences play a significant role at the individual level, yet by means of logistic regression, we are often able to quantify statistically significant differences in brand perception between specific demographic groups of respondents. In addition, diverse sociological attributes and survey-based differentiators (such as lifestyle preferences) may be used to identify brand-related dissimilarities between respondent groups. Such quantified results may provide easily accessible and often actionable information for diverse brand management and marketing tasks.

Next, our analysis concentrates on answering research question 2. Given the choice of sociodemographic and lifestyle explanatory variables described in section 4, the regression model (1) was estimated for each of the ten binary dependent variables describing brand importance in different product categories as shown in table 2. All estimated models are statistically significant and provide reasonable prediction accuracy. Because individual estimated coefficients of the logistic regressions are not very informative - except for their signs - we skip the regression output tables from this article and focus on the APE values and their interpretation. In fact, signs and statistical significances of the  $\beta_{c,j}$  coefficients are unambiguously reflected in the corresponding  $APE_c(x_j)$ , where the subscript  $c$  denotes the  $c$ -th product category used in equation (1). In Table 3, we report APE values calculated for each explanatory variable and every product category. The individual  $APE_c(x_j)$  values are reported along with their standard errors (heteroscedasticity corrected values) and p-values. Columns in table 3 are organized by brand importance in the same way as in Table 2, thus allowing for a simple comparison of APEs between regressors in adjacent columns, where product categories often do not differ in their positive outcome ratios (in terms of brand importance).

**Table 3.** *Estimated APEs of individual regressors for different product categories 1-5*

<b>Product categories</b>	<b>Electronics</b>	<b>Shoes</b>	<b>Small dom.</b>	<b>Master dom.</b>	<b>Food &amp; beverages</b>
<b>Regressors</b>			<b>an.</b>	<b>an.</b>	
Female ( standard error ) [ p-value ]	-0.2210 * ( 0.0537 ) [ 0.0000 ]	-0.0750 ( 0.0480 ) [ 0.1181 ]	-0.1245 * ( 0.0529 ) [ 0.0186 ]	-0.0296 ( 0.0398 ) [ 0.4561 ]	0.0799 * ( 0.0481 ) [ 0.0965 ]
Age_15_24	0.2077 * ( 0.0717 ) [ 0.0038 ]	0.1520 * ( 0.0770 ) [ 0.0483 ]	-0.1124 ( 0.0757 ) [ 0.1374 ]	-0.5611 * ( 0.0546 ) [ 0.0000 ]	-0.0111 ( 0.0756 ) [ 0.8834 ]
Age_25_34	0.1143 * ( 0.0632 ) [ 0.0706 ]	0.1285 * ( 0.0742 ) [ 0.0834 ]	0.0129 ( 0.0661 ) [ 0.8454 ]	-0.1798 * ( 0.0343 ) [ 0.0000 ]	0.1059 ( 0.0685 ) [ 0.1224 ]
Age_35_49	-0.0186 ( 0.0916 ) [ 0.8389 ]	0.0440 ( 0.0947 ) [ 0.6424 ]	-0.0047 ( 0.0813 ) [ 0.9544 ]	0.0356 ( 0.0610 ) [ 0.5598 ]	-0.0559 ( 0.0811 ) [ 0.4912 ]
Moravia	0.2619 * ( 0.0395 ) [ 0.0000 ]	-0.0664 ( 0.0410 ) [ 0.1058 ]	-0.0882 * ( 0.0452 ) [ 0.0508 ]	-0.2330 * ( 0.0276 ) [ 0.0000 ]	-0.1034 * ( 0.0390 ) [ 0.0080 ]
Prague	0.3020 * ( 0.0384 ) [ 0.0000 ]	-0.0944 * ( 0.0430 ) [ 0.0281 ]	0.0394 ( 0.0431 ) [ 0.3596 ]	-0.1965 * ( 0.0261 ) [ 0.0000 ]	0.0516 ( 0.0388 ) [ 0.1827 ]
Educ_Uni	-0.0898 * ( 0.0371 ) [ 0.0156 ]	-0.1619 * ( 0.0353 ) [ 0.0000 ]	-0.1625 * ( 0.0371 ) [ 0.0000 ]	0.0514 * ( 0.0273 ) [ 0.0592 ]	-0.0461 ( 0.0341 ) [ 0.176 ]
Paycard_yes	0.0230 ( 0.0370 ) [ 0.5343 ]	0.2376 * ( 0.0367 ) [ 0.0000 ]	0.1223 * ( 0.0371 ) [ 0.0010 ]	0.0281 ( 0.0261 ) [ 0.2819 ]	0.1109 * ( 0.0341 ) [ 0.0011 ]
Active_drive_yes	0.0901 * ( 0.0390 ) [ 0.0210 ]	0.1936 * ( 0.0374 ) [ 0.0000 ]	0.0959 * ( 0.0384 ) [ 0.0125 ]	0.0171 ( 0.0276 ) [ 0.5344 ]	0.2238 * ( 0.0333 ) [ 0.0000 ]
FT_w_e_house_no	-0.1345 * ( 0.0404 ) [ 0.0009 ]	0.0723 * ( 0.0396 ) [ 0.0680 ]	0.1169 * ( 0.0408 ) [ 0.0042 ]	0.0181 ( 0.0287 ) [ 0.5288 ]	0.0358 ( 0.0389 ) [ 0.3584 ]
FT_tourist_yes	0.0866 ( 0.0606 ) [ 0.1529 ]	-0.0510 ( 0.0545 ) [ 0.3492 ]	0.1876 * ( 0.0562 ) [ 0.0008 ]	-0.0321 ( 0.0435 ) [ 0.4611 ]	0.1248 * ( 0.0555 ) [ 0.0244 ]

Note: \* - coefficient significant at  $\alpha = 0.05$ ; ` - coefficient significant at  $\alpha = 0.1$ .

Source: Authors' own research results.

**Table 4.** *Estimated APEs of individual regressors for different product categories 6-10*

Product categories	Drugstore	Clothing	Home	Hobby & garden	Toys
<b>Regressors</b>					
Female	0.0527	-0.0467	-0.0003	-0.0735 *	0.0292
( standard error )	( 0.0436 )	( 0.0429 )	( 0.0312 )	( 0.0335 )	( 0.0254 )
[ p-value ]	[ 0.2267 ]	[ 0.2762 ]	[ 0.9917 ]	[ 0.0281 ]	[ 0.2505 ]
Age_15_24	-0.4910 *	0.0302	-0.0141	0.0582	-0.0665 `
	( 0.0281 )	( 0.0700 )	( 0.0512 )	( 0.0551 )	( 0.0374 )
	[ 0.0000 ]	[ 0.6662 ]	[ 0.7832 ]	[ 0.2905 ]	[ 0.0753 ]
Age_25_34	-0.3753 *	0.0735	0.0152	0.0081	-0.0500 `
	( 0.0286 )	( 0.0612 )	( 0.0473 )	( 0.0509 )	( 0.0273 )
	[ 0.0000 ]	[ 0.2297 ]	[ 0.7483 ]	[ 0.8727 ]	[ 0.0674 ]
Age_35_49	-0.3106 *	-0.0061	0.0060	0.0186	-0.0610
	( 0.0174 )	( 0.0719 )	( 0.0582 )	( 0.0648 )	( 0.0452 )
	[ 0.0000 ]	[ 0.9325 ]	[ 0.9177 ]	[ 0.7745 ]	[ 0.1771 ]
Moravia	0.0252	-0.0077	-0.0822 *	-0.1608 *	0.0685 *
	( 0.0417 )	( 0.0380 )	( 0.0270 )	( 0.0216 )	( 0.0253 )
	[ 0.5467 ]	[ 0.8384 ]	[ 0.0023 ]	[ 0.0000 ]	[ 0.0068 ]
Prague	0.0152	-0.0012	-0.0146	-0.2018 *	0.0160
	( 0.0368 )	( 0.0365 )	( 0.0247 )	( 0.0250 )	( 0.0231 )
	[ 0.6803 ]	[ 0.9743 ]	[ 0.5544 ]	[ 0.0000 ]	[ 0.4898 ]
Educ_Uni	-0.0400	-0.2155 *	-0.1643 *	-0.0555 *	-0.0274
	( 0.0316 )	( 0.0316 )	( 0.0273 )	( 0.0232 )	( 0.0200 )
	[ 0.2058 ]	[ 0.0000 ]	[ 0.0000 ]	[ 0.0169 ]	[ 0.1721 ]
Paycard_yes	-0.0052	0.1543 *	-0.0610 *	0.0514 *	-0.0944 *
	( 0.0318 )	( 0.0318 )	( 0.0247 )	( 0.0246 )	( 0.0210 )
	[ 0.8698 ]	[ 0.0000 ]	[ 0.0134 ]	[ 0.0368 ]	[ 0.0000 ]
Active_drive_yes	0.0360	0.1409 *	0.2669 *	0.0079	0.1645 *
	( 0.0320 )	( 0.0309 )	( 0.0202 )	( 0.0257 )	( 0.0174 )
	[ 0.2605 ]	[ 0.0000 ]	[ 0.0000 ]	[ 0.7570 ]	[ 0.0000 ]
FT_w_e_house_no	-0.0179	0.1401 *	-0.1047 *	0.0226	-0.0410 `
	( 0.0339 )	( 0.0356 )	( 0.0222 )	( 0.0260 )	( 0.0219 )
	[ 0.5984 ]	[ 0.0001 ]	[ 0.0000 ]	[ 0.3838 ]	[ 0.0610 ]
FT_tourist_yes	0.1256 *	-0.0121	0.1072 *	0.0645 `	0.1780 *
	( 0.0457 )	( 0.0479 )	( 0.0352 )	( 0.0359 )	( 0.0283 )
	[ 0.006 ]	[ 0.8011 ]	[ 0.0023 ]	[ 0.0724 ]	[ 0.0000 ]

Note: \* - coefficient significant at  $\alpha = 0.05$ ; ` - coefficient significant at  $\alpha = 0.1$ .

Source: Authors' own research results.

For interpretation purposes, we shall use the Shoes and Small domestic appliances product categories as an example. We may combine the information from Tables 2 and 3 as follows: Although Shoes and Small domestic appliances do not differ in their brand importance perception ratios, significant differences exist between respondent groups as defined by regressors from equation (1). While brand importance perception is not influenced by gender for Shoes, women are approximately 12.5 % less likely to regard brands as important in the Small domestic appliances category. Age plays no role for brand importance in Small domestic appliances. For Shoes, people aged 15 to 24 are 15.2 % more likely to report brand importance as compared to those aged 50+, who form our reference group (and we observe + 12.8 % in success probability for the age group 25-34). The influence of education is practically identical for both Shoes and Small domestic appliances: university degree is associated with some 16.2 % decrease in brand importance perception as compared to the reference group (basic and secondary education levels combined). While people who report being active drivers are 19.4 % more likely to report brand importance in Shoes (as compared to those who report either indifferent or negative stance on the subject), the same active drivers are only 9.6 % more likely to report brand importance in Small domestic appliances.

Gender plays no role in brand attitude for the Drugstore category, but significant age-based differences exist: people in the age group 15-24 are 49.1 % less likely to attribute brand importance in this category in comparison to the 50+ reference group. Also, age groups 25-34 and 35-49 are significantly less inclined towards brand loyalty in the Drugstore category – the estimated decreases in probability are 37.5% and 31.1 % respectively. When focusing on the age classification, it is worth mentioning a contrary example in the Electronics product category. There, the potential for brand loyalty decreases with age: people aged 15-24 are 20.8 % more prone to brand loyalty and for the age group 25-34 the difference is + 11.4 % for this product category (we do not find a statistically significant difference between the age group 35-49 and the reference group).

With the sole exception of Master home appliances, respondents with a university degree ( $Educ\_Uni_i = 1$ ) are less likely to show brand loyalty as compared to the reference group (basic and secondary education combined). The most prominent difference was observed for the Clothing product category - with a 21.6 % decrease in probability (the difference is not statistically significant for three product categories, as shown in table 3).

For the lifestyle variables *Active\_drive\_yes* and *FT\_tourist\_yes*, some interesting facts may be pointed out. Respondents who associate themselves with being active drivers or active tourists are more likely to attribute importance to brands in every product category considered (i.e. difference probability towards the reference group is always positive, whenever it is statistically significant). Product categories considered, active drivers are 26.7 % more likely to attribute importance to brands in the Home category, while the differences in Food & Beverages and Shoes categories are + 22.4 % and + 19.4 % respectively. The main difference between active tourists and their reference group may be observed in the Small home appliance product group, where active tourists are 18.8 % more prone to brand loyalty.

People who dissociate themselves from owning/using a weekend house or cottage (i.e. respondents where  $FT\_w\_e\_house\_no_i = 1$ ) are less likely to attach importance to brands in the following categories: - 13.5 % in Electronics, - 10.5 % in Home and - 4.1 % in Toys. On the other hand, those respondents regard brands as important in the Clothing (+ 14.1 %), Small home appliances (+ 11.7 %) and Shoes (+ 7.2 %) categories.

This research may be used by marketers to identify differences and similarities in brand loyalty across selected product categories. In a stratified manner, each of the product categories can be characterized by the strength of its potential to attract consumers from different sociodemographic groups and from groups defined by specific lifestyle activities.

## Conclusions

An important part of marketing and shopping behaviour consists of emotions connected with particular brands. For shopping decisions, emotional aspects go hand in hand with rational deliberations. While rational decisions take into account measurable product parameters, emotional decisions reflect many diverse factors, such as consumers' social and demographic characteristics, their aspirations and dissociative tendencies towards diverse lifestyle activities and/or reference groups, etc. In this contribution, we apply a wide range of quantitative analysis tools in order to examine brand loyalty across different product categories or sociodemographic groups of consumers.

This study addresses its two main research questions as follows. First, based on the statistical analysis, product categories are ranked according to their power to attract customers' interest for brands in each of the categories. Second, based on the logistic regression-based analysis, the variables representing the sociodemographic features and lifestyle factors that most distinctly characterize the respondents are highlighted and interpreted for each of the product categories.

As many important aspects of the results gathered in Tables 2, 3 and 4 are explicitly interpreted, readers can easily draw their own conclusions based on the estimates provided, given their product category of interest and/or a specific consumer group they may focus on. All estimation outputs omitted from this article are available from the authors upon request, along with supporting plots, data and R-code used.

Considering the results shown in previous studies and the results shown here, we are convinced about the usefulness of further research in the field of customer loyalty as an integral part of marketing science. For example, when building up effective loyalty programs, it is important to discern brands where loyalty is predetermined by the very product category from product categories where brand choice is unstable and where focused marketing activities are desirable.

Among other topics, this paper emphasizes the fact that brand loyalty is a highly complex phenomenon and that it can and should be analysed from different points of view. Our research can help marketers to find out whether their brands belong to a product category with an inherent tendency to give rise to positive emotions and to attract customers, or whether spontaneous bonds in the category are weak and it is therefore meaningful to support customer loyalty by investing time and money into a suitable loyalty-enhancing program. Our research also shows that the segmentation based on sociodemographic and life-style factors would be very useful for customization of loyalty programs, because numerous significant differences in brand attitudes were found between customer groups within product categories.

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