

Silberhorn, Nadja; Hildebrandt, Lutz

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Nadja Silberhorn*
Lutz Hildebrandt*



* Humboldt-Universität zu Berlin, Germany

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Spandauer Straße 1, D-10178 Berlin



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Is cross-category brand loyalty determined by risk aversion?¹

Nadja Silberhorn and Lutz Hildebrandt

Institute of Marketing, Humboldt-Universität zu Berlin, Germany

{silberhorn,hildebr}@wiwi.hu-berlin.de

Abstract

The need to understand and leverage consumer-brand bonds has become critical in a marketplace characterized by increasing unpredictability, diminishing product differentiation, and heightened competitive pressure. This is especially true for fast moving consumer goods (FMCG) manufacturers and retailers. Knowing why a customer stays loyal to a brand in multiple product categories is necessary for deriving suitable marketing strategies in the context of a brand extension, yet research on the motives, characteristics, life styles and attitudes of cross-category brand loyal customers has been investigated only in a limited number of studies. We will fill a gap in the literature on cross-category brand choice behavior by analyzing revealed preference data with respect to brand loyalty in several categories in which a brand competes. Provided with purchase and corresponding survey data we investigate the product portfolio of a leading nonfood FMCG brand. We segment consumers on the basis of their revealed brand preferences and, focusing on consumers' risk aversion, identify cross-category brand loyal customers' personality traits as determinants of their brand loyal purchase behavior.

JEL classification: M31, C51

Keywords: cross-category brand loyalty, risk aversion, share of category requirements, customer segmentation

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1 Introduction

The need to understand and leverage consumer-brand bonds has become especially critical in a marketplace characterized by increasing unpredictability, diminishing product differentiation, and heightened competitive pressure [Shocker et al., 1994, Fournier and Yao, 1997]. This is especially true for fast moving consumer goods (FMCG) manufacturers and retailers. By offering products in multiple categories, they aim at attracting customers to also buy their particular brand(s) across several categories. Manufacturers and retailers today are increasingly trying to leverage their brands by cross-promoting and cross-selling different product categories under an umbrella brand [Kumar et al., 2008].

Among the several ways to achieve and retain competitive advantage, the brand extension strategy, i.e., the use of established brand names to launch new products, is regarded as being easier, more profitable, and less cost intensive than launching a new product under a new name [Hem et al., 2003]. Here the questions of *whether* to extend the brand, *where* to extend the brand, and *how* to target the brand loyal customers arise. Marketing research has extensively investigated the factors that lead to brand extension success, emphasizing in particular *where* the brand should be extended. The focus herein lies on the perspective of the extension product rather than on the customers' perspective. Numerous studies on the determinants of brand extension success [Aaker and Keller, 1990, Smith and Park, 1992, Broniarczyk and Alba, 1994, Reddy et al., 1994, Sattler and Zatloukal, 1998, Sattler, 2001, Sattler et al., 2003, Sattler and Völckner, 2003, Völckner and Sattler, 2006] have found evidence that parent-brand characteristics and the fit between parent brand and transfer product are the most influential factors driving brand extension success. Several empirical studies point to the fact that consumers' quality perceptions of the parent brand will most likely be transferred to the brand extension if the two product categories are perceived to fit [Aaker and Keller, 1990, Loken and John, 1993]. The transferability of brand loyalty as success determinant of brand extensions has been widely neglected so far.

In general, consumers are likely to be attracted to a product with a familiar brand name and, from their impression of this brand name, form expectations for what the new product will be like. The brand is used as a cue before the product's specific attributes and their relation to the product category with which the brand is associated [Yeung and Wyer, 2005] are considered. Brand extension is an attempt, in part, to exploit a consumer's loyalty to the parent brand [Rundle-Thiele and Mackay, 2001]. Taking this into account, the prerequisite of a successful brand extension is the capability to draw the brand's loyal customers from the original product category to the newly introduced product in another category, i.e., to turn single-category brand loyal customers into cross-category brand loyal customers [Mundt et al., 2006].

Knowing why a customer stays loyal to a brand in multiple product categories is necessary for deriving suitable marketing strategies in the context of the brand extension. Yet research on the motives, characteristics, life styles and attitudes of cross-category brand loyal customers has been investigated only in a limited number of studies (e.g. Heilman and Bowman [2002]), despite the fact that it is of great relevance to know more about the cross-category loyal customers. Rungie and Laurent [2005] argue that market analysts should identify the causes and impact of brand loyalty rather than merely measure loyalty through repeat purchase. Unlike Klink and Smith [2001], Smith and Park [1992], and Völckner and Sattler [2006] who bring attention to product related consumer-specific factors that may influence brand extension success (such as parent brand involvement, parent brand experience, and brand knowledge), we focus our research on personality traits as determinants of cross-category brand loyalty.

When it comes to purchase decisions, it is often more relevant for consumers to avoid mistakes than to maximize utility. Because of this, risk has been regarded as a very influential variable on consumer behavior [Mitchell, 1999, Wang et al., 2005, de Palma et al., 2008] and is known to drive single-category brand loyalty. As perceived risk increases, the likelihood of loyalty to one brand increases [Javalgi and Moberg, 1997]. Customers may become uncertain about the performance and quality of products in categories in which they have not been purchased before. This uncertainty may create perceived risk which in turn reduces the overall utility the customers achieve by cross-buying. Assuming that consumers dislike uncertainty, i.e., consumers are risk averse, umbrella branding, the practice of labeling more than one product category with a single brand name [Sullivan, 1990, Erdem, 1998], has a positive influence on product choice decisions as umbrella brands decrease consumer perceived risk [Montgomery and Wernerfelt, 1992].

Risk aversion is a key concept not just in marketing but in economics and finance [Mandrik and Bao, 2005]. Researchers have long been interested in how it affects various behaviors, including brand choice [Tellis and Gaeth, 1990]. The probability of cross-buying is higher when customers can reduce the uncertainty by relying on past experiences, by seeking more information, or by using brand names as quality cues [Erdem, 1998, Erdem and Swait, 1998, Erdem et al., 2006, Kumar et al., 2008].

Hence, our contribution may be summarized as follows. We will fill a gap in the literature on cross-category brand choice behavior by analyzing revealed preference data with respect to brand loyalty in several categories in which a brand competes. Provided with purchase and corresponding survey data we investigate the product portfolio of a leading nonfood FMCG brand. We segment consumers on the basis of their revealed brand preferences and identify cross-category brand loyal customers' personality traits as determinants of their brand loyal purchase behavior. In particular, the investigation of the relation between

customers' risk aversion [Steenkamp et al., 1999] and their cross-category brand loyal purchase behavior comes to the forefront. The managerial purpose of our research is to derive suitable implications for the brand management in terms of how to address those customers, especially in the context of brand extensions.

This paper is structured as follows: we start with a short section on cross-buying in consumer research, followed by a discussion about brand loyalty as a theoretical construct. Then, we introduce our measure for cross-category brand loyalty, which is based on the share of category requirements approach. We then examine the determinants of cross-category brand loyal purchase behavior, followed by the derivation of our research hypotheses. In the empirical study, we start with a short introduction of our data, and an operationalization of the impact variables. We then approach our hypotheses from two sides: simple measures of contingencies and multivariate logistic regression analysis. In the final section, we summarize our results, derive implications for marketing management, and also offer some suggestions for future research.

2 Cross-buying and brand loyalty in consumer research

The identification of what drives cross-buying and the resulting improvement of marketing activities (e.g., direct mailing) by adequately and effectively targeting the right customers, i.e., those who are most likely to cross-buy, is of enormous relevance for retailers. By doing so, they are able to develop a cross-selling strategy and increase the revenue contribution from existing customers [Kumar et al., 2008]. Recent survey-based studies have investigated cross-buying in service markets [Verhoef et al., 2001, Ngobo, 2004, Mundt et al., 2006]. In these studies, there is only weak support for a relation between customers' perceived quality and satisfaction with the service provided on the one hand and cross-buying or cross-buying intentions on the other. The customers' perception of fairness of price, as well as demographic characteristics and marketing instruments (e.g., loyalty programs), however, are important determinants of cross-buying [Verhoef et al., 2001]. Kumar et al. [2008] identified exchange characteristics, such as average interpurchase time, ratio of product returns, and focused buying, as well as customer characteristics, such as age of the head of household and household income, as important drivers of cross-buying in a non-contractual retail setting. Reinartz and Kumar [2003] found that customers who buy in multiple product categories from a firm tend to have longer profitable lifetime duration.

Cross-buying in general does not necessarily imply brand (or product and/or service) loyalty across categories. But the degree to which consumers' brand loyalty is correlated over product categories [Cunningham, 1956, Wind and Frank, 1969] and to which a customer segmentation transcends category boundaries

is of increasing managerial interest [Heilman and Bowman, 2002]. Such findings are a useful tool for managers developing and implementing a positioning strategy for brands that compete in multiple categories. The results of Heilman and Bowman [2002] show that it is difficult to use the results of a series of single-category segmentation analyses when devising consistent and executable strategies across all the categories in which a brand competes. While attention to a single product category provides a common ground on which the loyalty phenomenon can be examined, it does by definition limit the generalizability of findings obtained [Fournier and Yao, 1997]. However, the determinants of cross-buying and brand loyalty in general may also have an effect on the emergence of cross-category brand loyalty.

3 Brand loyalty and cross-category brand loyalty as theoretical constructs

3.1 The concept of brand loyalty

The conceptualization and operationalization of brand loyalty has been of enduring concern to both marketing practitioners and academics [Day, 1969, Wind and Frank, 1969, Jacoby and Chestnut, 1978, Aaker, 1991, Keller, 1998, Keller and Lehmann, 2006]. Loyalty is a multi-dimensional construct which has been the focus of much research in its own right. There are two conceptions of brand loyalty operationalization. From the economic perspective, brand loyalty is regarded as an observable process based on revealed brand choices (behavioral perspective). In contrast, the behavioral science perspective focuses on the attitudes that are underlying choice behavior (attitudinal perspective). There are also approaches that combine both perspectives in order to capture the complexity of brand loyalty [Dick and Basu, 1994].

Attitudinal loyalty refers to the level of commitment towards the brand as essential element of brand loyalty [Jacoby and Chestnut, 1978]. The focus lies on discovering the underlying evaluative and cognitive processes [Chaudhuri and Holbrook, 2001] contributing to brand loyalty involved in any given purchasing decision [Dekimpe et al., 1997]. Attitudinal measures are based on stated preferences, commitment or purchase intentions of the consumer and give insight into the motivations for brand loyalty [Mellens et al., 1996]. However, attitudinal measures are often based on data observed at a single point in time and may not be an accurate representation of reality. Although attitudinal measures better account for the evaluative and affective components of brand loyalty, they often suffer from low predictive power: loyalty is determined on the basis of what people think and say but often does not predict what they will actually do [Dubois and Laurent, 1999].

On the other side, a consumer's degree of behavioral brand loyalty, i.e., her

attitudinal component	high	latent loyalty (variety seekers)	loyalty (loyals)
	low	no loyalty (switchers)	spurious loyalty (habituals)
		low	high
		behavioral component	

Table 1: *Operationalization of brand loyalty*

likelihood to repurchase the brand based on her past purchases of the brand, is inferred from the pattern of her observed purchase behavior [Bhattacharya, 1997, Dekimpe et al., 1997, Chaudhuri and Holbrook, 2001]. Behavioral brand loyalty is of great importance when it comes to customer segmentation. Behavioral measures have the advantage that they are not likely to be incidental as they are usually based on behavior over a period of time [Mellens et al., 1996]. However, they do not tell whether repeat buying was out of habit, for situational reasons, or for more complex psychological reasons [Odin et al., 2001].

Dick and Basu [1994] integrate behavioral and attitudinal loyalty components and introduce a conceptual framework to explain the relationship between relative attitude and repeat patronage. Knox and Walker [2001] identify both brand commitment (attitudinal) and brand support (behavioral) as necessary and sufficient conditions for loyalty. The matrix in table 1 is based on the classifications of Dick and Basu [1994] and Knox and Walker [2001] and illustrates the two components with a dichotomous intensity scaling and the resulting loyalty segments.

Besides attitudinal and behavioral measures, a distinction between individual-oriented and brand-oriented measures of brand loyalty can be made. Brand loyalty may be seen as a property of the brand [Aaker, 1991] or may be considered more as a characteristic of the consumer who processes the information [Sproles and Kendall, 1986]. If brand-oriented measures are used, a value of brand loyalty is derived for each brand, whereas the loyalty of specific customers is estimated by an individual-oriented measure.

In this study, we adopt the individual-oriented behavioral approach to brand loyalty, which is the approach on which most model development in brand loyalty over the last decade has been based [Bhattacharya, 1997]. While we do not argue that behavioral measures are always superior to attitudinal measures, we agree with Colombo and Morrison [1989] and Dekimpe et al. [1997] that behavioral data represent 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. Furthermore, as we want to use brand loyalty for segmentation purposes, we regard brand loyalty as a property of the individual and argue that an individual is brand loyal if one particular brand accounts for a high proportion of her total purchases in the product category (proportion-of-purchase measure). On the basis of the individual’s brand choice behavior in any of the investigated product categories we then develop a measure of cross-category brand loyalty.

3.2 Measuring cross-category brand loyalty

One of the most widely used measures of brand loyalty is the **share of category requirements** (SCR) [Bhattacharya, 1997, Yim and Kannan, 1999, Rundle-Thiele and Mackay, 2001, Danaher et al., 2003, Stern and Hammond, 2004]. It captures the relative share of category purchases that individuals give to each brand they buy, which is defined to be each brand’s market share. The SCR measure indicates to what extent the customers of each brand satisfy their product needs by purchasing a particular brand rather than buying competing alternatives [Uncles et al., 1994]. Because of its simplicity² and widespread use by brand managers and by academics [Fader and Schmittlein, 1993, Bhattacharya et al., 1996, Danaher et al., 2003, Stern and Hammond, 2004, Du et al., 2007, Silberhorn, 2009], the SCR measure is a very common loyalty measure [Bhattacharya, 1997] and has become an important measure of customer relationship strength [Du et al., 2007]. It has been shown that the share of category requirements measure is significantly strongly associated with the attitudinal brand preference measure [Rundle-Thiele and Mackay, 2001], thus somehow combining attitudinal and behavioral aspects of brand loyalty [Day, 1969].

Although the SCR measure³ is generally reported at an aggregate level, several studies use it on an individual-level [e.g., Du et al., 2007]:

$$SCR_{hicT} = \frac{\sum_{t \in T} q_{hict}}{\sum_k \sum_{t \in T} q_{hkct}} \quad (1)$$

SCR_{hicT} = household h ’s share of category requirements for brand i in category c during time period T ,

q_{hict} = quantity of brand i purchased in category c by household h on purchase occasion t (where t is an index of all purchase

² "In applied marketing settings, it may be advisable to use simple measures, as they are often cheaper, easier and faster to obtain. Moreover, more complicated techniques often require data of higher quality. If these data are not available (or are too expensive to collect), increased measurement errors may offset the theoretical advantages of the advanced methods. Also, theoretical research has not yet adequately shown the severity of the (potentially negative) consequences of using simple measures." Mellens et al. [1996, pp. 527–528]

³For detailed descriptions of the equation we refer to Bhattacharya et al. [1996].

occasions during time period T), and
 k = index for all brands in the category.

According to equation (1), an individual customer-specific SCR measure can be calculated for each brand in any category. The primary value of the SCR measure is its use as basis for a category-specific customer segmentation. First choice buyers (FCB) are those buyers of a brand who prefer this brand the most in terms of the amount purchased of this particular brand in that category ($SCR_{hicT} \neq 0$ and $SCR_{hicT} > SCR_{hjcT}$ for any $j \neq i$). In the case of two brands with equal amounts, the monetary value spent on this brand is of relevance. Second choice buyers (SCB) are those buyers of a brand who made purchases of that brand within a certain time period, but did not assign their highest preference to that brand in terms of the purchased total amount ($SCR_{hicT} \neq 0$ and $SCR_{hicT} < SCR_{hjcT}$ for any $j \neq i$). The investigated brand is merely an additional choice besides some other majorly preferred brand. Competitive choice buyers (CCB) are those buyers who did not purchase this particular brand in the category during the investigated time period at all ($SCR_{hicT} = 0$). Rather, they choose one or more competitive brands in that product category. Henceforth, we will regard first choice buyers of our investigated brand as brand loyal households in that respective product category.

We extended the SCR's limited category perspective by combining the respective category-specific SCR measures for each considered brand. Our measure of individual cross-category brand loyalty is based on a household's category-specific SCR measures. For each household, we calculated the share of product categories in which brand loyalty to our investigated brand is exhibited. To account for product group preferences, we first selected only households that have made purchases in a minimum number of categories. We then randomly selected product categories for each household and calculated the share of first choice buying categories among them. This share is the basis for the segmentation of panel households into cross-category brand loyal or non-loyals. Our approach will be described in more detail in the empirical study in section 4.2.

3.3 Explaining cross-category brand loyalty

Regardless of the way brand loyalty is operationalized and measured, the literature on how brand loyalty can be conceptualized is characterized by two divergent streams of research: the stochastic and the deterministic approach [Knox and Walker, 2001, Odin et al., 2001, Jensen and Hansen, 2006]. In the stochastic conception of repeat purchase, consumers are considered to purchase brands in a random fashion which is predictable from known probability distributions of purchases [Schmittlein et al., 1985, 1987, Ehrenberg, 1988, Fader and Schmittlein, 1993]. Applications of this view do not provide any causative explanations [Colombo and Morrison, 1989, Bayus, 1992, Dekimpe et al., 1997], and it is impossible to detect any causes of repeat purchases. Therefore companies gain no understanding of how to influence repeat purchasing behavior and

build brand loyalty [Odin et al., 2001]. Contrary to this, in the deterministic view of repeat purchase behavior, a limited number of causes are considered influential for product choice decisions [Jacoby and Chestnut, 1978, Knox and Walker, 2001]. In the deterministic approach, brand loyalty is conceptualized more as an attitudinal concept, with which the researcher can investigate the determinants. As these influential factors may provide valuable insights into the creation and retaining of brand loyalty among customers, we adopted this deterministic approach to try to explain cross-category brand loyalty.

From the customers' perspective, the brand can be seen as a signal that a product possesses many favorable features associated with a particular brand. Brand extensions take advantage of the fact that consumers make inferences from the characteristics observed in one product, most important being the quality of the product, to the characteristics of others under the same umbrella brand [Erdem, 1998, Hakenes and Peitz, 2004]. Negative feelings about a product result in a preference for a different brand because these negative feelings create perceptions of risk about the product, and this perception, in turn, leads to a preference for a favored alternative [Chaudhuri, 1998]. Consumers offer their loyalty with the understanding that the brand will provide them utility through consistent product performance [Keller, 1998], they trust in the brand and its promise [Chaudhuri and Holbrook, 2001]. For the customer, the brand is an indicator of constant quality and reduces the risk of incomplete information for the customer. Customers may become uncertain about the performance and quality of products in those categories in which they have not purchased before. Lack of experience with a new product results in a significant level of uncertainty and risk, and this in turn reduces the overall utility the customers achieve by cross-buying. The probability of cross-buying is higher when customers can reduce the uncertainty by either relying on past experiences or by seeking more information [Kumar et al., 2008], but also by using brand names as quality cues [Erdem, 1998, Erdem and Swait, 1998, Erdem et al., 2006].

Some general hypotheses on the determinants of cross-category brand loyalty may be derived from both the theoretical research and empirical work on single-category brand loyalty. On the one hand, individual-specific characteristics (e.g., age, household size, gender) and personality traits (e.g., risk aversion, variety seeking, innovativeness) may guide behavior. Their influence, on the other hand, is moderated by marketing-mix variables (e.g., price, promotion, display) as well as by individual preferences for a particular brand or attitudes towards a brand.

The structural model in figure 1 clarifies the relation between general psychological variables of the customer and the observable brand choice pattern revealing cross-category brand loyalty.

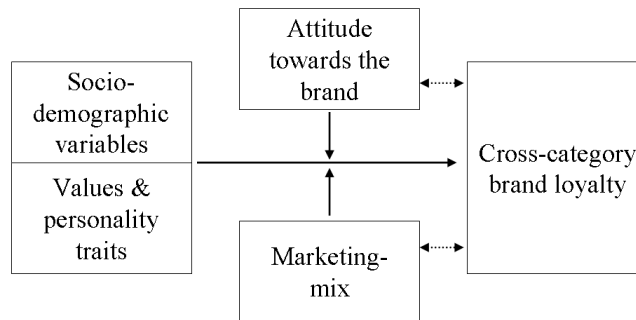


Figure 1: *Structural model*

The model displays that the pattern of behavior (cross-category brand loyalty in our case) is dependent on more general psychological constructs. As psychologists *"think of personality traits as relatively enduring, general factors influencing many if not all behaviors"* [Sproles and Kendall, 1986, p.268], values and typical personality traits like innovativeness, risk aversion, or quality orientation may be regarded as such "general factors". In our empirical study we will focus on the relation between those personality traits as causal factors for cross-category brand loyalty and on socio-demographic descriptors as control variables. In a natural choice setting, we would also have to account for specific attitudes towards a brand and implemented marketing mix [Yim and Kannan, 1999, Danaher et al., 2003], which are both correlated to brand loyalty.

3.4 Hypotheses

Our specific research hypotheses (see figure 2) focus on a selection of the general determinants of brand loyalty displayed in figure 1, and are derived from the theoretical research and empirical work on consumers' general decision-making styles [Sproles and Kendall, 1986, Siu and Hui, 2001, Walsh et al., 2001, Wesley et al., 2006] which are influenced and determined by their individual personality traits. Consumers are thought to approach the market with certain basic decision-making styles, e.g., quality seekers, information seekers, or brand loyal customers [Jacoby and Chestnut, 1978, Bettman, 1979]. These decision-making styles are stable over time and may play an important role in their purchase and loyalty behavior.

Sproles and Kendall [1986] assume that consumer decision-making behavior can be explained by eight decision-making dimensions (see table 2) that influence a consumer's decision-making behavior. These styles are defined as a mental orientation characterizing a consumer's approach to choosing a product.

High-quality consciousness / perfectionism	Decision style of consumers who systematically search for the best quality products possible.
Brand consciousness/ price equals quality	Decision style of consumers concerned with getting the most expensive, well-known brands.
Novelty consciousness	Decision style of consumers who like new and innovative products and who gain excitement from seeking out new things.
Recreational and shopping consciousness	Decision style of consumers who take pleasure in shopping and who shop just for the fun of it.
Price consciousness / value for money	Decision style of consumers who are concerned with getting lower prices.
Impulsiveness/ carelessness	Decision style of consumers who tend to buy spontaneously and who are unconcerned about how much money they spend.
Confusion from overchoice	Decision style of consumers who feel they have too many brands and stores to choose from and who likely experience information overload in the market.
Habitual orientation towards consumption	Decision style of consumers who shop at the same stores and tend to buy the same brands each time.

Table 2: *Consumers' decision-making styles*

We consider the concept of risk aversion as the key variable to loyal purchase behavior and aim at giving empirical evidence that cross-category brand loyalty is determined by risk aversion. The concept of risk aversion evolved from discussions of risk taking by early decision theorists, mostly working with economic applications [Kahnemann and Tversky, 1979]. Until now it has been conceived as an individual difference or predisposition, an attitude toward taking risks that is relatively invariant across situations. Mandrik and Bao [2005] investigate a 'general risk aversion' construct as a personality trait and find evidence for the existence of an overall attitude toward risk. We argue that consumers' status quo bias and innovativeness may be regarded as indicators of consumers' risk-taking propensity.

The status quo bias [Burmeister and Schade, 2007] refers to what Sproles and Kendall [1986] call 'habitual orientation towards consumption' and represents the decision style of consumers who tend to buy the same brands at the same stores repeatedly. The concern for familiarity and security is related to the avoidance of risky decisions [Tan, 2001]. Risk averse decision-makers are in favor of keeping the status quo, rather than switching to unknown alternatives in general, or new product introductions in particular.

Innovativeness refers to what Sproles and Kendall [1986] call 'novelty consciousness' and is a personality trait related to an individual's receptivity to innovative ideas and her willingness to try new product concepts and brands (see the literature on diffusion of innovations [Rogers, 1983]). Innovative consumers are not afraid of trial purchases of new products and might even gain excitement from seeking out new things [Sproles and Kendall, 1986]. The response differences between more and less innovative individuals may also reflect risk-taking propensity [Klink and Smith, 2001]. Individuals high in innovativeness are more willing to try new products and brands [Steenkamp and Baumgartner, 1992] and hence are less likely to be loyal to the same brand in several product categories.

It can be assumed that consumers exhibiting high risk aversion have a more sensitive perception of different types of risk [Keller, 1998]. Although there are a number of different means by which consumers handle these risks, the main way by which consumers buying in different product categories cope with this is to only buy well-known brands. Uncertainty about product quality may induce perceived risk [Anand, 2003] in that consumers have to take the risk of getting a low quality product. Thus, a consumer who perceives a great risk associated with an unknown brand or a product category will be more prone to remain brand loyal.

Consumers may want to simplify the choosing process or may not want to spend time and effort evaluating other choice alternatives, thus trusting in brands which offer quality [Keller and Lehmann, 2006]. The impact of brand trust on loyalty was also examined by Chaudhuri and Holbrook [2001]. Their proposition

is based on the theory of brand commitment in relationship marketing [Fournier and Yao, 1997, Fournier, 1998]. For risk averse consumers, strong brands reduce perceived risk, because they stand for a certain credible and consistent product quality [Montgomery and Wernerfelt, 1992, Erdem and Swait, 1998]. Matzler et al. [2008] state that brands can serve as a means to reduce risk and find evidence that consumers with higher levels of risk aversion tend to be more loyal. Loyals use repeat purchasing of a brand as a means of reducing risk [Assael, 1995].

Assuming that the patterns of behavior for single-category brand choice decisions also hold true for brand choice decisions in multiple categories, we state the following hypotheses (see figure 2).

H1: Risk averse consumers are **more** likely to be cross-category brand loyal, in that

H1a: Habitual consumers are **more** likely to be cross-category brand loyal.

H1b: Innovative consumers are **less** likely to be cross-category brand loyal.

H2: Consumers who trust in the brand (and its quality) are **more** likely to be cross-category brand loyal.

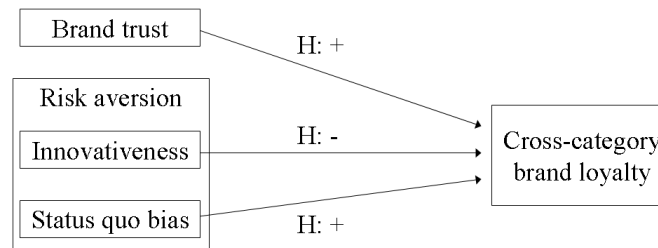


Figure 2: *Research hypotheses*

In summary, we propose that (1) consumers with less brand trust, (2) innovators and non-habitual consumers who, hence, are less risk averse, are less cross-category brand loyal than other consumers. In the context of brand extensions one can induce that innovative consumers are open to brand extensions, and try the new product, but do not stay loyal to it, whereas risk averse consumers try to cope with the different risks associated with new products by staying loyal to a brand.

4 Empirical study

In the following empirical study, we combine research in umbrella branding, brand extensions, and brand loyalty. Our research contribution is that we investigate customers' purchase decisions in order to identify cross-category brand loyal customers in the context of the brand's complete product assortment. Furthermore, in combining purchase and survey data, the determinants of cross-category brand loyalty are examined. We aim at finding evidence that cross-category brand loyal customers exhibit higher brand trust and a higher propensity to habitual decision-making, as well as lower innovativeness and risk-taking propensity, as they rely on the belief that the extensions of a high-quality brand are also of high quality, leading to brand loyalty in several of the brand's categories.

4.1 The data

The GfK SE household panel data covers 20,000 representative panel households in Germany and includes the households' 2007 and 2008 self-reported FMCG purchase data, as well as corresponding survey data from the year 2006 on the households' attitudes, characteristics, and behavioral habits. To account for panel membership duration, the data are weighted with a continuous mass weight⁴. Reported are the purchases of the household leader. This study does not distinguish between the decision makers, the buyers, and the users within a panel household. The panel households' demographics, as well as their views and attitudes on various topics⁵, are surveyed with a paper-and-pencil questionnaire.

The provided purchase data include all purchases in the product groups where one major national non-food FMCG brand competes, i.e., purchases of that brand and competitive purchases. By now, the brand's assortment comprises 28 different product groups. The brand's core competence has been extended over the last decades to various more or less related product groups bit by bit. Each store's store brand is treated as an individual brand (using the sub-brand label as identifier) and included in our analyses. We eliminated the 'residual manufacturers' and 'residual brands' cases from the purchase data.

Furthermore, since the width of the brand's product offerings may be susceptible to substitutional relations between product groups, and since, therefore purchases in a high number of the 28 product groups would then become very unlikely, we clustered the 28 product groups into 9 product categories (visage,

⁴For example, a panel household with the continuous mass weight of 3.75 is representative of 3.75 households in the population in the whole evaluation period. Any analyses that are based on the household and its behavior or use the household's behavior as basis for segmentation, are weighted with this continuous mass weight.

⁵e.g., media involvement, recent trends, advertising, environmental issues, health, nutrition, etc.

beaute, hair, body, sun, hand, deo, clean, men). This clustering is data-based in that we cross-tabulated purchase frequencies for the 28 product groups against the brand's subbrands that represent different product categories. The product groups are then assigned to the product category of their highest occurrence frequency.

Households with a total of less than four shopping days (regardless of the number of items purchased, the location of purchase, or the purchase volume) during the two year examination period and not at least two shopping days in each of the years are not of interest and were eliminated. Afterwards, households were grouped into 'frequent' or 'seldom' buyers according to the median value⁶ of 28 shopping days in the two year observation period.

In order to gain an overall initial impression about the households' cross-category brand purchase behavior, figure 3 plots the total number of different categories purchased against the number of categories where the investigated brand was purchased. The circle size represents the number of households for each combination.

Here we see that there do exist lots of households that purchase the brand in

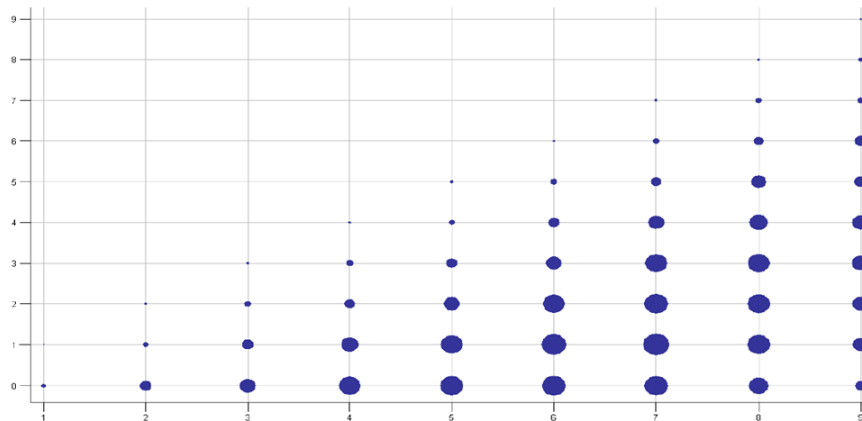


Figure 3: *Number of product categories with brand purchases (vertical axis) plotted against total number of product categories purchased (horizontal axis)*

several product categories. The data on the bisecting line represent the cases where the investigated brand was purchased in any of the product categories.

⁶For another application of the median split approach see Bettman and Sujun [1987].

Our goal now is to investigate the households' cross-category brand loyal buying intensity and to find the determinants of such a behavior.

4.2 Selection of households and product categories from the purchase data

Among the panel households, there may exist different product category preferences, and the fact that a household does not make purchases within a particular product category may be due to such individual preferences. Without such a category preference, the household can never be brand loyal in that respective category. In order to avoid biased results, we must account for this phenomenon. We therefore suggest the following data selection approach.

First, we decided on a minimum number of categories in which a household has to make purchases. Table 3 shows the distribution of the number of purchased product categories. A total of 16,516 panel households, representing 86.48% of the selected sample, make purchases in 5 or more different product categories, which is more than half of the categories available. This is then supposed to be our self-selected lower limit of categories purchased. All households that only exhibit purchases in 4 or less categories are eliminated from the data set.

For each panel household individually, we then selected 5 product categories

categories	count	pct	cum freq	cum pct
9	2,626	13.75	2,626	13.75
8	4,174	21.85	6,800	35.60
7	4,094	21.44	10,894	57.04
6	3,306	17.31	14,200	74.35
5	2,316	12.12	16,516	86.48
4	1,528	8.00	18,044	94.48
3	736	3.85	18,780	98.33
2	284	1.48	19,063	99.82
1	35	0.18	19,098	100.00

Table 3: *Number of categories purchased*

that are further investigated with respect to cross-category brand loyal purchase behavior. Those households with the minimum number of 5 categories purchased are hence considered with respect to exactly those 5 categories, and we randomly selected 5 product categories for households with more than the minimum of 5.

4.3 Operationalization of the key variables

4.3.1 Cross-category brand loyalty

We calculate the share of category requirements SCR_{hicT} for the brand i for each household h for any category c over the observation period T according to equation (1). A household h is finally assigned as first choice buyer FCB_{ic} of the brand i in category c if $SCR_{hicT} \neq 0$ and $SCR_{hicT} > SCR_{hjcT}$ for any $j \neq i$. Since our goal is to determine a household’s cross-category brand loyalty, we consider all 5 product categories 4.2 together and calculate the share of categories where the household is loyal to the brand, i.e., where the household is a first choice buyer of the brand. The share, resulting from the number of categories selected for investigation, can only take six different values (see column ‘FCB share’ in table 4). The distribution of the first choice buying share is given in table 4.

FCB share	count	cum freq	pct	cum pct
0	10,004	10,004	60.57	60.57
0.2	4,643	14,647	28.11	88.68
0.4	1,412	16,058	8.55	97.23
0.6	372	16,430	2.25	99.48
0.8	63	16,494	0.38	99.87
1	22	16,516	0.13	100.00

Table 4: *First choice buying share over five product categories*

A share of 0.4 and above means that the household is loyal to the brand in at least 2 of the 5 considered product categories. This group of households constitutes the segment of cross-category brand loyal customers, in contrast to those who are either no first choice buyers in any of the 5 categories or first choice buyers in just 1 of the 5 categories. The binary variable CCL reflects the classification of households, that is, the cross-category brand loyal households are coded $CCL = 1$, and the others are coded $CCL = 0$. This split of the data is carried out approximately at the 90% percentile.

4.3.2 Impact variables on cross-category brand loyalty

Now that we know about the panel households that exhibit brand loyalty in multiple product categories, we further investigate the characteristics of those households and the determinants of cross-category brand loyalty. For this reason, the purchase data are merged with the survey data via the household identifier variable. Due to missing survey data, the number of households for our further investigations reduces to $n = 11,178$. Our proposed research hypotheses are examined in two ways. First, we apply t-tests (section 4.4) on the statisti-

cal significance of the difference in the means of the two groups, cross-category brand loyal or non-loyal panel households. Second, the binary *CCL* variable, indicating cross-category brand loyalty, is used as the dependent variable in a logistic regression (section 4.5).

In advance, 28 general (not referring to a specific brand) attitudinal variables from the survey data were taken to run an exploratory factor analysis to learn about the underlying dimensionality. We thus reduce the quantity of variables to a smaller number of unknown factors. The majority of the variables were surveyed on a 5-point Likert scale from "*I do not agree at all*" (value 1) to "*I totally agree*" (value 5). The remaining variables were measured on a 4-point scale, and were recoded to a 5-point scale without mid value for our analyses. Although we have an ordinal measurement level here, the variables are treated as interval-scaled with the assumption of equal appearing intervals [Janssens et al., 2008].

Principal component analysis with prior communality estimates set to 1 is used for factor extraction. By choosing the correlation matrix as input for the factor analysis, the standardization of the variables beforehand is unnecessary [Janssens et al., 2008]. The Kaiser-Meyer-Olkin measure of sampling adequacy (MSA) indicates if the variables involved are sufficiently correlated to one another. In our case, we get an overall MSA value of 0.79 for the whole correlation matrix, and individual MSA values for each variable of values between 0.65 and 0.88. According to Kaiser and Rice [1974] this means 'mediocre' (> 0.60), 'middling' (> 0.70) or even 'meritorious' (> 0.80) correlation, indicating that the variables are appropriate for a factor analysis.

	F1	F2	F3	F4	F5	F6	F7	commu- nality
<i>superflu</i>	-.01	-.27	.60	.00	.01	-.02	-.05	.44
<i>newprodu</i>	.00	.70	-.21	-.04	-.16	.08	.13	.59
<i>notknown</i>	.07	.83	-.09	.03	-.05	.05	-.01	.71
<i>newmucke</i>	.04	-.02	.67	-.04	.21	-.01	.02	.49
<i>enjoymon</i>	.04	.09	.11	.02	.00	.73	-.03	.56
<i>lookprod</i>	.04	.70	-.07	-.06	-.03	.18	.10	.55
<i>mistradv</i>	.01	-.11	.72	-.01	-.01	-.01	.00	.53
<i>sceptica</i>	-.08	-.07	.76	-.04	.13	-.01	.04	.60
<i>enjoylif</i>	-.06	.23	.03	-.04	-.13	.62	.15	.48
<i>earlybuy</i>	.07	.84	-.13	.02	-.04	.11	.00	.74
<i>nochange</i>	.03	-.12	.22	.07	.63	-.07	-.01	.47
<i>succeedi</i>	.08	-.07	.05	.05	.72	.07	-.06	.55
<i>foodqual</i>	.66	.09	.10	.17	-.10	-.01	-.01	.49
<i>brandbet</i>	.70	.06	-.10	.02	.24	.09	.00	.57
<i>nosorrow</i>	.09	-.02	-.04	.82	.03	.17	-.02	.71
<i>oldmoney</i>	.11	-.01	-.03	.88	.04	.11	-.03	.80
<i>foresigh</i>	.13	-.01	-.02	.75	-.01	-.10	.02	.59
<i>quantity</i>	-.02	.09	-.02	-.01	.05	.02	.81	.66
<i>newshops</i>	-.11	.08	.02	-.01	.01	.01	.79	.65
<i>foodbran</i>	.62	-.04	-.12	.08	-.20	-.03	-.21	.49
<i>trustbra</i>	.68	.00	.03	-.03	.26	.02	-.01	.53
<i>wellprov</i>	.04	-.07	.06	.02	.67	-.04	.12	.48
<i>demandin</i>	.41	.26	.13	.12	-.14	.13	.10	.31
<i>familiar</i>	.73	.04	-.10	-.01	.28	.05	.04	.62
<i>livehere</i>	-.01	-.01	-.04	.06	.01	.76	-.08	.59
<i>whatlike</i>	.12	.14	-.19	.11	-.08	.53	.05	.37
<i>shopqual</i>	.63	-.03	.04	.17	-.26	-.05	-.11	.51
<i>caredare</i>	-.09	-.01	.03	-.10	.45	-.30	.02	.31
explained variance	2.98	2.67	2.16	2.13	2.04	2.01	1.44	

Table 5: *Rotated factor pattern and communalities*

Following the 'Kaiser criterion' (*eigenvalue* > 1), seven factors can be extracted from the data (see table 5). For the present sample size, a factor loading will be statistically significant if it is greater than or equal to 0.30 [Janssens et al., 2008]. Items with factor loadings larger than 0.6 in value (explaining about 1/3 of the variance) are assigned to the corresponding factor. There are three variables (*demandin*, *whatlike*, *caredare*) that do not load on any of the seven factors.

Examining the variables that highly load on the factors F1 to F7 respectively, we suggest that these seven factors are *brand trust* (F1) with brands being quality cues, *innovativeness* (F2), *mistrust / carefulness* (F3), *light heartedness / precaution* (F4), *status quo bias* (F5), *pleasurable living* (F6), and *price consciousness* (F7). Table 6 displays our interpretation of the extracted factors and the corresponding variables with significant factor loadings.

The factors F1, F2, F5, and F7 correspond to Sproles and Kendall's [1986] decision-making styles, and for F1, F2, F3, and F7 there is a direct relation to shopping behavior and purchase decisions. The remaining factors F4, F5, and F6 represent some general attitudes and lifestyles. Our research propositions (see section 3.4) can be tested with the factors F1, F2, and F5. As our special interest is on the relationship between consumers' risk aversion or risk-taking propensity and their cross-category brand loyalty, we argue that lower scores on factor 2, as well as higher scores on factor 5 coincide with a higher probability for brand loyalty in multiple categories.

Then, we used the calculated factor scores as variables in t-tests (section 4.4) and as explanatory variables in logistic regression analyses (section 4.5). In the subsequent section, we start with examining the characteristics of the two loyalty groups, basing our examination on the results of the factor analysis.

Factor 1: Brand trust (<i>brandqua</i>)	<i>foodqual</i>	When buying food products, I only consider quality even if it is considerably more expensive.
	<i>shopqual</i>	I mainly consider quality when shopping.
	<i>brandbet</i>	Brand name products are better than products with unknown names.
	<i>trustbra</i>	I do not have sincere trust in food products without brand names.
	<i>familiar</i>	Food products with familiar brand names are better than those with unknown names.
	<i>foodbran</i>	I consider brand rather than price when buying foods.
Factor 2: Innovative- ness, novelty consciousness (<i>innovati</i>)	<i>newprodu</i>	I like to try new products.
	<i>notknown</i>	Many products, that I buy, are not yet known by other housewives.
	<i>lookprod</i>	I am always looking for new products that match my needs.
	<i>earlybuy</i>	I buy new products before my friends do.
Factor 3: Mistrust, carefulness (<i>mistrust</i>)	<i>newmucke</i>	If you buy totally new products, you often regret it.
	<i>superflu</i>	Most products that are introduced to the market are superfluous.
	<i>mistradv</i>	I regard advertising claims with great mistrust.
	<i>sceptica</i>	New products are often more expensive than the old ones, but not any better.
Factor 4: Light hearted- ness, precaution (<i>careless</i>)	<i>nosorrow</i>	I do not fret about my future.
	<i>oldmoney</i>	I do not fret about my financial state at old age.
	<i>foresigh</i>	I am financially prepared for old age.
Factor 5: Status quo bias (<i>statuquo</i>)	<i>nochange</i>	I do not like changes in my lifestyle, rather I stick to my old habits.
	<i>succeedi</i>	I only cook dishes that I know will be successful.
	<i>wellprov</i>	I prefer cooking well-tested recipes.
Factor 6: Pleasurable living (<i>enjoying</i>)	<i>enjoymon</i>	You should enjoy life with your money rather than save it.
	<i>enjoylif</i>	I want to enjoy my life to the full.
	<i>livehere</i>	I prefer living in the here and now rather than thinking about tomorrow.
Factor 7: Price consciousness (<i>pricecon</i>)	<i>quantity</i>	If I regard an offer as reasonably priced, I tend to buy more than originally planned.
	<i>newshops</i>	If there is an attractive offer, I'll shop in a store where I normally do not.

Table 6: *Factors and corresponding variables*

4.4 Simple measures of contingencies

The t-test assesses whether the means of the two loyalty groups are statistically different from each other, under the null hypothesis of equal means. A group test statistic for the equality of conditional probabilities is reported for equal and unequal variances. So, before deciding which test is appropriate, a test for equality of variances was conducted ($\alpha = 0.05$). Depending on the results of these tests, the adequate t-test statistic was used: either the one for equal variances or the one for unequal variances. The purchase decision on the investigated brand and the corresponding product categories (body care products) should be a question of age and income. Thus, besides the factor scores of the seven factors extracted in the factor analysis, we additionally include the age of the household leader (*age*), which is ordinally scaled from 1 (< 20 years) to 12 (> 70 years), the household's average monthly net income since 2002 (*hhincome*), which is ordinally scaled from 1 (<500 €) to 16 (>4,000 €), the average net income per capita since 2002 (*avgincome*) which is ordinally scaled from 1 (<500 €) to 12 (>2,000 €), and the household size (*hhsiz*e).

The factor scores of the seven extracted factors have mean zero and variance one due to the standardization of the data matrix. A negative factor score means that a household exhibits a below average value for this factor compared to all other households and vice versa for a positive factor score. A factor score of zero indicates that the household has an average value with respect to this factor. The results of the t-tests are displayed in table 7.

Variable	CCL	total ($N_0 = 9,971, N_1 = 1,207$)		frequent ($N_0 = 6,111, N_1 = 754$)		seldom ($N_0 = 3,860, N_1 = 453$)	
		Mean	StdErr.	Mean	StdErr.	Mean	StdErr.
<i>brandqua</i>	0	-0.04	0.01	-0.04	0.01	-0.05	0.02
<i>brandqua</i>	1	0.36	0.03	0.37	0.04	0.34	0.05
<i>brandqua</i>	Δ	0.40***	0.03	0.41***	0.04	0.40***	0.05
<i>innovati</i>	0	0.01	0.01	0.00	0.01	0.03	0.02
<i>innovati</i>	1	-0.11	0.03	-0.09	0.03	-0.13	0.05
<i>innovati</i>	Δ	-0.12***	0.03	-0.09**	0.04	-0.16***	0.05
<i>mistrust</i>	0	0.01	0.01	-0.03	0.01	0.06	0.02
<i>mistrust</i>	1	-0.04	0.03	-0.11	0.04	0.08	0.05
<i>mistrust</i>	Δ	n.s.	0.03	-0.08**	0.04	n.s.	0.05
<i>lighthea</i>	0	-0.02	0.01	-0.02	0.01	-0.01	0.02
<i>lighthea</i>	1	0.12	0.03	0.10	0.04	0.16	0.05
<i>lighthea</i>	Δ	0.14***	0.03	0.12***	0.04	0.17***	0.05
<i>statuquo</i>	0	-0.01	0.01	0.00	0.01	-0.03	0.02
<i>statuquo</i>	1	0.07	0.03	0.06	0.04	0.09	0.05
<i>statuquo</i>	Δ	0.08***	0.03	n.s.	0.04	0.11**	0.05
<i>enjoying</i>	0	0.00	0.01	-0.03	0.04	0.05	0.02
<i>enjoying</i>	1	-0.02	0.03	0.01	0.04	-0.06	0.05
<i>enjoying</i>	Δ	n.s.	0.03	n.s.	0.04	-0.11**	0.05
<i>pricecon</i>	0	0.01	0.01	0.01	0.01	0.02	0.02
<i>pricecon</i>	1	-0.09	0.03	-0.10	0.04	-0.07	0.05
<i>pricecon</i>	Δ	-0.10***	0.03	-0.11***	0.04	-0.08*	0.05
<i>age</i>	0	7.11	0.03	7.15	0.04	7.05	0.05
<i>age</i>	1	7.92	0.08	7.88	0.10	7.98	0.15
<i>age</i>	Δ	0.81***	0.09	0.73***	0.11	0.93*	0.15
<i>hhincome</i>	0	8.48	0.04	8.77	0.05	8.01	0.06
<i>hhincome</i>	1	9.18	0.11	9.34	0.14	8.92	0.18
<i>hhincome</i>	Δ	0.71***	0.11	0.57***	0.14	0.91***	0.18
<i>hssize</i>	0	2.54	0.01	2.67	0.02	2.34	0.02
<i>hssize</i>	1	2.30	0.04	2.41	0.04	2.11	0.05
<i>hssize</i>	Δ	-0.24***	0.03	-0.26***	0.05	-0.23***	0.06
<i>avgincome</i>	0	7.03	0.03	6.98	0.04	7.10	0.05
<i>avgincome</i>	1	8.07	0.09	7.94	0.10	8.30	0.15
<i>avgincome</i>	Δ	1.04***	0.09	0.96***	0.12	1.20***	0.15

Table 7: *t*-test results

Households buying the brand in multiple product categories seek above average quality and are brand conscious (*brandqua*), whether they are frequent or seldom buyers. This gives rise to the conclusion that they are not searching for the best price offer, but rather trust in the brand, its quality, and its promise. Given this, together with the cognition from above, we can conclude that households that are already loyal to the brand in multiple categories, despite the fact that they are not actively searching for new products, do exhibit a higher propensity to also buy the brand in another new extension category.

Cross-category brand loyal households are less novelty conscious and innovative (*innovati*) than non-loyals. Their search for new and innovative products is not as distinctive as that of non-loyals. This initial result is in line with our proposed research hypothesis. Assuming that innovative consumers have a higher risk-taking propensity, the results of the t-tests show that risk aversion correlates with cross-category brand loyalty.

Only for frequent buying households do we find evidence for a negative relation between consumers' mistrust (*mistrust*) and their revealed brand loyal purchase behavior. Customers loyal to the brand in multiple categories are significantly less mistrustful. So on the one hand, cross-category brand loyals do not actively search for new and innovative products in the market, but generally encounter them with less suspicion.

The significant difference in light heartedness (*lighthea*) is that cross-category brand loyal households do not worry about their future. They worry less about their life, their future, and their financial subsistence, because they have already taken financial precautionary measures.

A lifestyle characterized by the pursuit of familiarity and security is more common among households that are brand loyal in multiple categories. It is the loyal households who stay with their habits and known processes, and therefore stay with their favorite brand (*statuquo*). If we investigate frequent and seldom buyers separately, we only find a significant difference for seldom buyers.

There is no significant difference between brand loyal and non-loyal households when it comes to a lifestyle of enjoyment (*enjoying*). Only for seldom buyers do we find evidence for a significant negative relation between cross-category brand loyalty and a pleasurable way of living. Loyal households prefer living in the here and now and take pleasure in spending below average.

Cross-category brand loyals are significantly less price conscious (*pricecon*), whereas the loyal households are predominantly not price conscious, and the non-loyals are in an almost neutral position. The differentiation between frequent and seldom buyers does not contribute any further insights.

So far, we can conclude from the results of the t-tests displayed in table 7, that our proposed research hypotheses cannot be rejected.

H1a: Cross-category brand loyal households exhibit significantly higher scores on the status quo index than non-loyals, meaning that loyals tend to be risk averse.

H1b: Cross-category brand loyal households exhibit significantly lower scores on innovativeness than non-loyals, meaning that loyals tend to be risk averse.

H2: Cross-category brand loyal households exhibit significantly higher scores on brand trust than non-loyals.

Concerning the demographic variables, we find evidence that the household leaders of loyal households are older than those of non-loyal households (*age*). The household leaders of cross-category loyal households are aged between 50 and 54, whereas those of non-loyal households are on average 5 years younger. With a mean of 2.30 persons, loyal households are a littler smaller than non-loyal households, where on average 2.54 persons live (*hsize*). The more members of a household, the more preferences have to be met, leading to a higher propensity to variety seeking rather than staying loyal to one single brand. The higher per capita income (*avgincome*) for loyal households is in line with these findings: A smaller household size means that there are fewer children living there, which in turn allows the parents to work full-time and have double the income. The average monthly net income per capita is about 1,300 € for loyals, and about 100 € to 200 € lower for non-loyal households. The household's total monthly net income (*hhincome*) is also on average slightly higher for loyals.

Keeping these initial results in mind, we further investigate the determinants of cross-category brand loyalty. We aim at explaining the binary categorical variable of loyalty segment membership on the basis of the factors extracted in the factor analysis, including socioeconomic and demographic control variables.

4.5 Multivariate analysis using logistic regression

Unlike OLS regression, logistic regression does not assume linearity of relationships between the independent and dependent variables, does not require normally distributed variables, does not assume homoscedasticity, and in general has less stringent requirements. It does, however, require that observations are independent and that the independent variables are linearly related to the logit of the dependent. It is often difficult to correctly specify loyalty models for a variety of reasons, e.g., causal factors are unknown or unmeasured, or the model has unknown functional form. Bodapati and Gupta [2004] present a counter-intuitive result: with very large samples, a binary regression to identify and target customers, even with an incorrectly specified response model, achieves

better predictive performance than a continuous regression [MacLachlan and Park, 2009]. This is in line with our interest to examine the differences between loyalty segments rather than examining the explanatory variables' general impact on the share of first choice buying categories.

To test our proposed research hypotheses and to get an idea of how the segmented households can be further described and differentiated, we conducted a logistic regression analysis. The logistic regression model is used to explain the effects of the explanatory variables x_j on the binary response of cross-category brand loyalty ($CCL = 1$) or not ($CCL = 0$).

$$\ln \left(\frac{\pi_{h,CCL=1}}{\pi_{h,CCL=0}} \right) = \alpha + \sum_{j=1}^J \beta_j x_{jh} \quad (2)$$

where

- π_h = probability of household h to belong to a certain segment
- α = intercept
- x_{jh} = characteristic of the explanatory variable j for household h
- β_j = effect coefficient for variable j
- h = household

The expected probability for any household h to belong to the cross-category loyal segment $CCL = 1$ for given values of x_j is given by

$$\pi_{h,CCL=1} = \frac{\exp \left(\alpha + \sum_{j=1}^J \beta_j x_{jh} \right)}{1 + \exp \left(\alpha + \sum_{j=1}^J \beta_j x_{jh} \right)}. \quad (3)$$

The goal of a logistic regression analysis is the prediction of an event which may or may not occur, as well as the identification of variables which play an important role in allowing this prediction to be made [Janssens et al., 2008]. Contrary to a linear regression analysis, a logistic regression analysis does not conduct an estimation of the dependent variable's binary observations, but to infer occurrence probabilities for these observations. Positive coefficients state that higher values of the corresponding explanatory variable increase the probability of belonging to the considered segment (in this case, $CCL = 1$), whereas negative coefficients state that higher values of the corresponding explanatory variable decrease the probability to belong to the considered segment, and increase the probability of belonging to the reference segment (in this case, $CCL = 0$). The coefficient that can be interpreted straightforwardly is the *odds ratio* which is equal to a translation of the estimated coefficient with the exponent function, i.e., the exponent constant is raised to the power of the estimated coefficient.

For a one unit change in the predictor variable, the odds ratio for a positive outcome is expected to change by the respective coefficient, given that the other variables in the model are held constant. Values greater than 1 indicate that the probability that the event occurs (in our case $CCL = 1$) is *odds ratio* times higher as the value of the corresponding explanatory variable is increased one unit. Likewise, values smaller than 1 indicate that the event is *odds ratio* times less likely with an increase of the explanatory variable by one unit. An odds ratio of value 1 indicates that there is no relationship between the explanatory variable and the event [Long, 1997, Hosmer and Lemeshow, 2000, O'Connell, 2006].

Although they are not of primary theoretical interest to our study, we include socioeconomic and demographic control variables in our model. Their major purpose here is to help remove statistical noise due to omitted variable bias in a case in which we can capture effects that have been shown elsewhere to make a difference [Chaudhuri and Holbrook, 2001]. A correlation analysis did not reveal any significantly high correlations between the variables used in the regression. The factor scores of the seven extracted factors in the factor analysis possess no correlation. The multicollinearity problem present with regard to the original variables is thus compensated for.

$N_{CCL=1}$	1,207	754		453		
$N_{CCL=0}$	9,971	6,111		3,860		
Variable	total	frequent		seldom		
	Std. Err.	Odds Ratio	Std. Err.	Std. Err.	Odds Ratio	
Variable	Est.	Ratio	Est.	Est.	Ratio	
<i>intercept</i>	-2.50***	0.15	-2.38***	0.20	-2.65***	0.23
<i>brandqua</i>	0.32***	0.03	0.33***	0.04	0.31***	0.05
<i>innovati</i>	-0.11***	0.03	-0.09**	0.04	-0.13**	0.05
<i>mistrust</i>	-0.06*	0.03	-0.10***	0.04	n.s.	0.88
<i>careless</i>	n.s.		n.s.		n.s.	
<i>statuquo</i>	0.08**	0.03	n.s.		0.12**	0.05
<i>enjoying</i>	n.s.		n.s.		-0.10**	0.05
<i>pricecon</i>	-0.06**	0.03	-0.08**	0.04	n.s.	0.90
<i>age</i>	0.04***	0.01	0.03**	0.02	0.04*	0.02
<i>hhincome</i>	0.06***	0.01	0.05***	0.01	0.08***	0.02
<i>hhsize</i>	-0.20***	0.03	-0.19***	0.04	-0.24***	0.06
Model Fit Statistics						
Cox & Snell- R^2	0.03		0.03		0.03	
Nagelkerke- R^2	0.05		0.05		0.06	
Hosmer-Lemeshow Goodness-of-Fit Test						
Chi ²	7.61		6.01		11.49	
Pr > Chi ²	0.47		0.65		0.18	
Association of Predicted Probabilities and Observed Responses						
Somers' D	0.30		0.29		0.34	
Gamma	0.31		0.29		0.34	
Tau-a	0.06		0.06		0.06	

Table 8: Results of logistic regression analysis

4.5.1 Model fit

Before interpreting the estimates of our model, we carefully look at the model fit statistics. There is no widely-accepted direct analog to OLS regression's R^2 [Hosmer and Lemeshow, 2000]. This is because R^2 is used to learn about the percentage of variance explained, but the variance of a dichotomous dependent variable depends on the frequency distribution of that variable. In the binary case, variance is at a maximum with a 50 – 50 split, and the more lopsided the split, the lower the variance. Nonetheless, a number of logistic R^2 measures have been proposed, all of which may be reported as approximations to OLS regression R^2 , not as actual percent of variance explained. They are not goodness-of-fit tests but rather an attempt to measure strength of association [Garson, 2009].

There are several approaches to thinking about R^2 in OLS regression. These different approaches lead to various calculations of pseudo R^2 with regressions of categorical outcome variables. In both, the Cox & Snell- R^2 and the Nagelkerke- R^2 , the ratio is indicative of the degree to which the model parameters improve upon the prediction of the null model: the smaller this ratio, the greater the improvement and the higher the R^2 . Note that Cox & Snell's pseudo R^2 has a maximum value that is less than 1 [Cox and Snell, 1989]. Nagelkerke's R^2 adjusts Cox & Snell's so that the range of possible values extends to 1 [Nagelkerke, 1991].

In our case, neither of these R^2 measures indicates a satisfying model improvement upon the prediction of the null model. But, as many researchers consider these R^2 substitutes to be of only marginal interest, we rely on classification rates which are regarded as a preferable measure of effect size [Garson, 2009]. Several chi-square tests are used to indicate how well the logistic regression model fits the data.

The purpose of any overall goodness-of-fit test is to determine whether the fitted model adequately describes the observed outcome experience in the data [Archer and Lemeshow, 2006]. A model fits if the differences between the observed and estimated values are small. A test that is commonly used to assess model fit is the Hosmer-Lemeshow test [Hosmer and Lemeshow, 1989, 2000, Archer and Lemeshow, 2006]. The Hosmer-Lemeshow statistic is a measure of lack of fit. Hosmer and Lemeshow [1980] recommend partitioning the observations into equal sized groups according to their predicted probabilities. The observed number of cases in each group is compared with the expected number of cases in this group under the null hypotheses of no difference between the numbers. Ideally, incorrect model specifications such as non-linearity in the predictors or missing predictors should be detectable by this statistic. Lower values (and nonsignificance) indicate a good fit to the data and, therefore, good overall model fit.

In our case, the chi-square test statistics suggest that there is no lack of fit. The null hypotheses of no differences between observed and expected responses cannot be rejected at the 95% significance level. We get two contradictory results for the goodness-of-fit of our model. On the one hand, our proposed model only very slightly improves upon the null model (Cox & Snell- R^2 and Nagelkerke- R^2). A considerable proportion of variability in the data cannot be accounted for by our statistical model. But how meaningful are these R^2 measures given the fact that our dependent variable has a very lopsided distribution of about 10 – 90? On the other hand, the Hosmer-Lemeshow statistic suggests a very good model fit. Hosmer and Lemeshow [2000], Archer and Lemeshow [2006], and Garson [2009] argue that the latter is the preferable measure for dichotomous dependent variable regressions. Reverting to this, we can proceed with the interpretation of the coefficients estimated in the logistic regression.

4.5.2 Interpretation of results

The intercept term represents the mean when all variables in the model are evaluated at zero. It is very rarely of interest by itself, but it is important for the model fit statistics, a comparison of the model with intercept only, and the model with intercept and covariates.

A higher score on brand trust (*brandqua*) increases the probability of being cross-category brand loyal. This indicates that although there may be several well-known and established brands available, the households stick to just one brand they trust in. This underlines the notion that brands in general deliver high-quality. Once consumers have found their high-quality brand, they exhibit a higher probability to stay loyal to that brand across several product categories where this brand is available.

We find evidence for a significant negative relation between the households' innovativeness (*innovati*) and their probability of belonging to the cross-category brand loyal segment, that is, the higher the score on the households' innovativeness, the higher the probability of being a non-loyal household. Innovative households search for new and innovative products and do not stay loyal to just a single brand. Viewed from the opposite perspective, cross-category brand loyals are rather risk averse in that they are less interested in searching for new and innovative products compared to non-loyals. They meet their risk aversion with loyalty to the brand in multiple categories.

We also find a significant negative effect of suspiciousness (*mistrust*) on cross-category brand loyalty group membership. Households that encounter new products with mistrust are less likely to be loyal to the brand in multiple categories. Whereas novelty conscious and innovative households search for new products and variety and therefore exhibit a smaller probability of purchasing the same brand in various categories, mistrustful households exhibit a smaller

cross-category loyalty probability because they do **not** search for new products and rather stick to their old habits. However, we do not find evidence for that in the case of the seldom buyers.

There is no significant effect between the households' lifestyle of enjoying a care-free life (*careless*) and brand loyalty in multiple categories. This might be due to the very general items that constitute that factor. The transfer to decision-making in every day shopping might be too big.

Besides consumers' innovativeness and a continuous hunt for new products (*innovati*), their reliance on well-proven processes (*statuquo*) can be seen as an indicator of their risk-taking propensity. Except in the case of frequent buyers, we find evidence for a positive relationship between consumers' need for familiarity and their loyalty to a brand in multiple product categories. They are afraid of the unknown, so they do not switch between brands and continue with their habitual brand choice behavior.

A pleasurable way of living, i.e., spending one's life in the here and now rather than worrying about the future, does not turn out to be influential on consumers cross-category buying pattern. Only for seldom buyers is the fact that households prefer spending their money rather than saving it (*enjoying*) of negative influence on brand loyal purchase behavior. This lifestyle does not match with a responsible purchase behavior.

There is a significant negative relation between the (frequent buying) household's price consciousness (*pricecon*) and the propensity to buy the same brand in multiple product categories. The greater the sensitivity to prices, the more a household does not stay loyal to the brand but rather search for the best price offer.

We can conclude from the results of the logistic regression analysis displayed in table 8, that both proposed research hypotheses cannot be rejected.

H1a: Households with a higher score on the status quo index, meaning that they tend to be risk averse, exhibit a higher probability of being cross-category brand loyal.

H1b: Households with a lower score on innovativeness, meaning that they tend to be risk averse, exhibit a higher probability of being cross-category brand loyal.

H2: Households with a higher score on brand trust exhibit a higher probability to be cross-category brand loyal.

The older the household leader (*age*), the higher the propensity to be cross-category brand loyal. Elderly people might have had a better experience with

the brand or have already found their favorite brand and will therefore stay within their developed brand relationship. The household's monthly net income (*hhincome*) appears to have a significant positive relation to the cross-category loyalty group membership. The higher the monthly net income, the higher the probability of being loyal to the brand in multiple categories. This might be due to the fact that the investigated brand is neither a premium priced brand nor a brand taking part in the downward price competition. The household size (*hhsiz*e) appears to have a negative relation to the household's probability of being cross-category brand loyal, that is, the more people living in a household, the less likely the household's brand loyalty. This result is quite intuitive, as the variety of different product and brand preferences increases with the number of household members.

5 Discussion

5.1 Summary

We used purchase and survey data from the GfK SE household panel in our empirical study and investigated one major national FMCG non-food brand that competes in 28 different product groups. To overcome substitutional relations between those groups, we clustered them into 9 product categories which were then used for further examinations. Based on the share of category requirements approach we used the share of category requirements as a loyalty measure, which captured consumers' cross-category brand loyalty. To account for category preferences, we randomly selected five product categories for each household individually. Panel households were then segmented into cross-category brand loyals and non-loyals based on their revealed purchase behavior in those five categories. The dichotomous variable indicating cross-category brand loyalty was used as a grouping variable in various t-tests and as a dependent variable in logistic regression analysis.

In a factor analysis on 28 attitudinal variables from surveying the panel households, we could extract seven factors that could partly be interpreted according to Sproles and Kendall's [1986] decision-making styles. t-tests revealed significant differences between the two loyalty segments. The results of the t-tests were basically confirmed in logistic regression analyses, and the Hosmer-Lemeshow statistic indicated a good model fit. There are only minor differences between predicted and observed segment membership.

Our goal was to determine the personality traits of cross-category brand loyal households, our focus being the investigation of the impact of consumers' decision-making styles and risk aversion on their cross-category brand loyalty. Based on earlier empirical findings, we argued that novelty conscious consumers like to try new and innovative products. This innovativeness is negatively related to consumers' risk aversion. Risk averse consumers, again, stay loyal to a brand

in multiple categories to reduce the risk of dissatisfaction with the product. Moreover, we supposed that households that prefer staying with their habits and following known processes (status quo bias) would have a higher propensity for a cross-category brand loyal purchase behavior. We find evidence for our research hypotheses that households with a higher score on innovativeness, and therefore regarded as less risk averse, as well as with a lower score on the pursuit of a lifestyle of familiarity and security, exhibit a smaller propensity to be loyal to the brand in multiple categories. In other words, our results suggest that risk aversion indeed is a determinant of cross-category brand loyalty (see figure 1).

Moreover, brand loyalty in multiple categories is determined by several decision-making styles [Sproles and Kendall, 1986]. Price consciousness and suspiciousness were found to be negatively related to cross-category loyalty. Furthermore, cross-category loyal households are on average larger in size, have an older household leader, and have a higher disposable income.

5.2 Managerial implications

For brand manufacturers it is important to extend their product lines giving variety-seeking consumers the opportunity to vary their purchase experiences without having to switch brands. Reaching a large part of the target market is of enormous relevance for the success of the newly introduced brand extension. A new product's trial rate is for the most part composed of two customer segments: innovative and risk-averse consumers. On the one hand, there are innovative consumers who are novelty conscious and like to try new products. Novelty conscious households search for new and innovative products and do not stay loyal to just a single brand. Confronted with brand extensions, they may purchase the new product, but do not stay loyal to it over time, buying new products on and off. On the other hand, there are risk averse consumers who might already know the brand from previous experiences in other product categories and therefore trust in the brand and its promise. It is those loyal customers who are essential for the brand extension's success in the long run.

Numerous studies on the causes of brand extension success found evidence that parent-brand characteristics and the fit between parent brand and transfer product are the most influential factors driving brand extension success [Aaker and Keller, 1990, Broniarczyk and Alba, 1994, Hem et al., 2003, Völckner and Sattler, 2006]. Besides these product-specific prerequisites, adequate targeting of the consumers plays an essential role. When brand managers think about extending their product portfolio by launching a new product in a new category but under the same brand name, they also need to account for certain consumer personality traits when promoting and advertising this brand extension. Already Raj [1982] has found evidence that advertising has a different effect on loyal and non-loyal consumers. The integral role of advertising in maintaining and leveraging current loyal buyers often goes unrecognized and unappreciated.

Advertising plays a large role for the loyals in increasing the risks associated with moving away from the brand (see also Knox and Walker [2001]); currently loyal buyers may be kept from drifting into competing brands and may be persuaded to increase their purchase of the advertised brand.

Our empirical findings give hints on how to target these brand loyal customers. Based on their motives and personality traits, brand managers can derive suitable marketing strategies. As cross-category brand loyal consumers tend to be risk averse, the brand has to reduce perceived risk by becoming a credible and consistent symbol of product quality. Transferring perceptions of a brand's quality to the brand extension, the key to umbrella branding, has to be the focus of the new product's communication strategy. Basically, cross-category brand loyal customers encounter both new products and their advertising with mistrust. Therefore, the communication strategy also has to stress the honesty of the brand manufacturer, the reliability of the brand, and the usefulness of the brand's new product.

5.3 Limitations and further research

Our results present challenging opportunities for future research. First, our study is about fast moving consumer goods, and its results should not necessarily be generalized to other markets. Moreover, we have focused only on one major national non-food brand. It might be fruitful to extend our model to other non-food brands and categories, as well as to also investigate food brands. Studies on other product classes, such as luxury goods, services, and impulse purchases, might reveal findings that corroborate or extend our approach.

Second, our proposed segmentation is based on category-specific share of category requirement measures for each panel household. Moreover, the dichotomous dependent variable could be regarded as too narrowly defined. We hope that our research stimulates more effort in developing more comprehensive measures of cross-category brand loyalty.

Third, we used secondary attitudinal survey data that was not specifically collected for our needs. A more specifically tailored data ascertainment could give better insights into the determinants of cross-category brand loyalty and how marketing activities in the context of brand extensions may be targeted to cross-category brand loyal customers.

Fourth, a consumer may have different styles for each product category and thus, the generality of consumer style characteristics may be doubtful. Can we assume that a brand conscious consumer would consider 'name' products on every decision? We deal with this issue in part by investigating several product categories. Nevertheless, a more thorough examination of various consumer decisions could be addressed in future research.

Fifth, our measure of brand loyalty is based on revealed brand preferences. Although Elrod [1988] argues that for frequently purchased low-priced goods behavioral and attitudinal measures of brand loyalty are likely to agree, the integration of an attitudinal component would bring about a better understanding of the reasons for loyal behavior.

Sixth, we only capture a small cutout of the conceptual background displayed in figure 1. A comprehensive causal model including external and internal determinants of brand loyalty, as well as correlations between the investigated constructs, would enhance the understanding of reciprocal effects and could shed more light on the impact factors underlying cross-category brand loyal purchase behavior.

Seventh, our model does not account for potential hierarchical relations between the several latent constructs. The hybrid choice model [Walker, 2001, Ben-Akiva et al., 2002a,b, Dannewald et al., 2008] offers the possibility to integrate a (hierarchical) latent factor structure into predictive choice models. This comprehensive and sophisticated approach enables the simultaneous estimation of attitudinal and behavioral components of brand loyalty and may bring about some important insights into brand loyal purchase behavior and its determinants.

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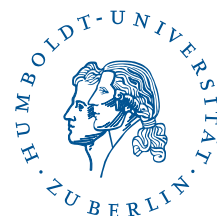
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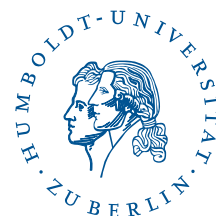
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