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Does umbrella branding really work? Investigating cross-category brand loyalty

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Does umbrella branding really work? Investigating cross-category brand loyalty[1]

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Abstract

Numerous studies on the drivers of brand extension success [Aaker and Keller, 1990, Broniarczyk and Alba, 1994, Hem et al., 2003, Völckner and Sattler, 2006] found evidence that parent-brand characteristics and the fit between parent brand and transfer product are the main and most influential factors driving brand extension success. However, the ability of a brand to transfer its brand loyal customers from the parent to the extension category has been widely neglected. Brand loyalty can be regarded as a consequence of the underlying assumption of customers transferring their quality perceptions, their brand knowledge, and their experience with the brand from one category to the other [Erdem and Swait, 1998]. We find empirical evidence that consumers who are loyal to the brand in the leading (parent) product category show a higher probability to be loyal to that same brand in another (extension) category compared to those consumers who are not loyal in the leading category. Moreover, as the overall success of the extension includes positive retroactive effects of the extension product on the parent product or brand [Erdem, 1998], the arising question is whether there are differences between extension product categories regarding their attachment to the parent category and their ability to stimulate brand loyal purchases in the parent category, i.e., speaking of 'leader' and 'follower' categories in terms of brand loyal purchase behavior. This might even hold true for the relationship of any two categories the brand competes.

JEL classification: M31, C43

Keywords: cross-category brand loyalty, loyalty leverage index, share of category requirements

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1 Introduction

Brand manufacturers are continuously searching for innovative ways to achieve and retain competitive advantage. Launching new products or increasing the sales volume and profits of those products already existing in the market can be attractive growth strategies. In the latter case, the focus can lie on the augmentation of the trial purchase rate (new customer attraction), or of the repeat purchase rate in that the share of loyal customers has to be escalated. Whereas, due to factors such as high advertising costs and the increasing competition for shelf space, succeeding with new products has become very difficult [Aaker, 1991, 1996], the increase of brand loyalty comes to a lower price and brings about some important benefits.

Brand loyal customers are a market entry barrier for potential new brands, and a brand switching barrier for brands already competing in the market [Delgado-Ballester and Munuera-Aleman, 1999]. It is those loyal customers who create a range of monopolistic price setting behavior, who offer cross-selling potential, and who contribute to new customer acquisition by positive word-of-mouth [Wildner and Twardawa, 2008]. Brand-loyal customers may be willing to pay more for a brand because they perceive some unique value [Chaudhuri and Holbrook, 2001], and are less price sensitive with regard to the choice decision but more price sensitive to the quantity decision [Krishnamurthi and Raj, 1991]. Altogether, a brand's loyal customer base is regarded as a company's strategic asset [Mellens et al., 1996].

Building on the notion that a brand is an intangible, market-based asset that can be leveraged with options to expand and extend the brand, on the other side, growth can also be reached by introducing new products into the market. Given the enormous cost and the extreme high failure rate of new product developments especially in fast moving consumer goods (FMCG) categories, brand extension[2] strategies have been developed to better implement new products into the market [Völckner and Sattler, 2006]. A motivation to extend a brand is to leverage the equity of an established brand to relatively easily develop profitable products [Balachander and Ghose, 2003]. The brand's image is leveraged across different product categories resulting in higher success rates than product introductions with a new brand. So when launching new products, an approach to reduce the risk for the company is to follow a brand extension strategy [Hem et al., 2003]. Extending brands beyond the original product category is determined to be more profitable and requires lower expenses such as advertising costs, trade deals, and price promotions [Tauber, 1988, Aaker, 1991, Völckner and Sattler, 2006]. Nevertheless, the success of such umbrella branding strategies is uncertain and, dependent on the product category, failure rates of brand extensions may be up to 80% [Völckner and Sattler, 2006].

[2]Brand extension is the use of established brand names to launch new products [Völckner and Sattler, 2006].

The success of the brand extension depends on the ability to transfer parent brand awareness and associations to the extension [Aaker, 1991, Erdem, 1998]. Numerous studies on the drivers of brand extension success [Aaker and Keller, 1990, Broniarczyk and Alba, 1994, Hem et al., 2003, Völckner and Sattler, 2006] found evidence that parent-brand characteristics and the fit between parent brand and transfer product are the main and most influential factors driving brand extension success. Several empirical studies point to the fact that consumers' quality perceptions of the parent brand will be most likely transferred to the brand extension if the two product categories are perceived to fit [Aaker and Keller, 1990, Loken and John, 1993]. The transfer of these quality perceptions is the key in umbrella branding [Wernerfelt, 1988]. To assist consumers in their choice decision by signaling product quality, the same brand name is used for several products [Erdem, 1998, Erdem and Swait, 1998]. The reciprocal effect of brand extensions, i.e., the affection of the quality perception of the parent brand by the use experience with the extension product, has been underresearched so far. Our research contributes here in that we also investigate reciprocal relations (albeit no quality perceptions but choice probabilities) between several products under the same umbrella brand.

In empirical studies on the drivers of brand extension success, the ability of a brand to transfer its brand loyal customers from the parent to the extension category has been widely neglected. Brand loyalty can be regarded as a consequence of the underlying assumption of customers transferring their quality perceptions, their brand knowledge, and their experience with the brand from one category to the other [Erdem and Swait, 1998]. We aim at finding empirical evidence that consumers who are loyal to the brand in the leading (parent) product category show a higher probability to be loyal to that same brand in another (extension) category compared to those consumers who are not loyal in the leading category.

Signaling theory can contribute in the formation and explanation of cross-category brand loyalty. But this is already the second step, given that this phenomenon does exist at all. We now focus on the first step and aim at giving empirical evidence for the existence of cross-category brand loyalty when considering all products under the umbrella brand. Without existence, the argumentation of signaling theory in the context of brand loyalty would grasp at nothing. Therefore, the purpose of this research is to provide some insights into cross-category loyalty for brands operating in multiple product categories. We want to determine whether there is a tendency for loyal consumers from one category to be loyal in other categories as well, or whether behavior is solely dependent on the product category. At this point, we do not aim at investigating the drivers of cross-category brand loyal behavior or the characteristics of cross-category brand loyal customers and refer to Silberhorn and Hildebrandt [2009] for personality traits as determinants of cross-category brand loyalty. Managerial implications, e.g., on the allocation of advertising budgets (see Erdem and

Sun [2002], Balachander and Ghose [2003] for the investigation of advertising spillover effects in umbrella branding) are to be derived.

From the methodological side, we contribute in that we develop a measure to quantify the overall loyalty relations of any product under the umbrella brand with each other category the brand competes. With this new and unique approach, we are able to quantify the role and strength of each umbrella branded product with respect to its integration within the umbrella brand's product assortment in terms of brand loyalty leverage.

This paper is structured as follows: First, we give a brief overview over the conceptual and theoretical background of umbrella branding and derive our research hypotheses. The subsequent section focuses on the measurement of brand loyalty and introduces the share of category requirements approach as basis for customers' loyalty segmentation. In an empirical study using purchase data from a household panel we then investigate the existence of cross-category brand loyalty and discuss the cross-category brand loyalty relations of a major national non-food brand. We conclude with a summary and managerial implications, as well as some limitations and ideas for further research.

2 Umbrella branding and signaling theory

Brand manufacturers are increasingly trying to leverage their brands by cross-promoting and cross-selling different product categories under an umbrella brand [Kumar et al., 2008]. The introduction of new products by labeling more than one product with a single brand name reaches a share of over 90% in many fast moving consumer good product categories [Sattler et al., 2005]. Umbrella branding is a form of economies of scope, as it economizes on the costs of creating a new brand [Cabral, 2007]. Growth through brand leverage [Tauber, 1988] is a standard business practice for experience goods and has received a lot of interest in the marketing literature in recent years [Hakenes and Peitz, 2008]. The marketing literature on brand extensions and umbrella branding is concerned with the sources of success and failure of these marketing instruments [Aaker and Keller, 1990]. It owes its success the fact that consumers make inferences from the characteristics, most important the quality of a product, observed in one product to the characteristics of others under the same umbrella brand [Hakenes and Peitz, 2004]. An umbrella brand can help consumers in their decision-making for new products when quality information is missing. Brand extensions work because all products under the umbrella contribute to the brand's reputation [Sullivan, 1990].

For brand manufacturers, brand extensions are a way to reduce the risk associated with new product introductions [Völckner and Sattler, 2006]. Many researchers have investigated the success factors of brand extensions [Aaker and

Keller, 1990, Smith and Park, 1992, Broniarczyk and Alba, 1994, Reddy et al., 1994, Sattler and Zatloukal, 1998, Sattler, 2001, Hem et al., 2003, Sattler et al., 2003, Sattler and Völckner, 2003, Völckner and Sattler, 2006]. Amongst others, the transfer of parent brand associations to the extension [Aaker and Keller, 1990, Aaker, 1991, Reddy et al., 1994] has been identified as important determinant of the brand extension's success. Research suggests that consumer evaluations of the parent brand have an impact on the perceived quality of the extension [Aaker and Keller, 1990, Loken and John, 1993]. These evaluations, especially consumer quality perceptions, are most likely to be transferred if the consumers perceive the extension to fit with the parent brand [Völckner and Sattler, 2006].

2.1 Theoretical background

The transfer of quality perceptions across products with the same brand name is the key in Wernerfelt's [1988] signaling theory of umbrella branding, which is built on the premises of existing uncertainty about product quality, and of consumers' believe that the extension of a high-quality brand is likely to be of high quality as well. Experimental and empirical work in the marketing literature shows that the signaling argument of umbrella branding is broadly consistent with the data [e.g., Reddy et al., 1994, Erdem, 1998, Balachander and Ghose, 2003]. Erdem [1998] applies this theory in that she develops a model of consumer learning under product quality uncertainty, which allows for quality perceptions to be correlated across categories. She finds evidence for consumer learning of quality through use experience across the two categories of toothbrushes and toothpaste.

The need to transfer quality perceptions arises from uncertainty about the true product quality because of asymmetric and imperfect information [Erdem et al., 2006]. Even after product usage, this uncertainty may still persist as some product attributes may not be fully revealed [Erdem and Swait, 1998]. Assuming that consumers dislike uncertainty, this uncertainty about product quality may induce perceived risk [Anand, 2003] in that consumers have to bear the risk of getting a low quality product. As consumers tend to be risk averse in most contexts [Rao and Bergen, 1992, Shimp and Bearden, 1982], and as strong brands are associated with higher perceived quality [Aaker, 1991], brands can reduce perceived risk by becoming symbols of product quality [Montgomery and Wernerfelt, 1992, Erdem and Swait, 1998, Erdem et al., 2006]. The clarity and credibility of brands as signals of product quality decrease this consumer perceived risk [Erdem and Swait, 1998, Erdem et al., 2006]. All products under the same umbrella brand may profit from 'brand credibility' as the key characteristic of a brand signal in that their expected utility and choice probability increases [Montgomery and Wernerfelt, 1992].

But why does umbrella branding work? Why do consumers associate their qual-

ity perceptions with the parent brand to any other product (if perceived to fit to the parent brand) under the same brand name? It is because of the reciprocal effect on the parent brand [Loken and John, 1993, Balachander and Ghose, 2003]. Parent brand perceptions and the parent brand's choice probability are expected to be affected by the extension. Negative use experience with an extension product due to poor quality will have a negative impact on the reputation of the parent brand. Consumers would then conclude that all other products with the same brand name are also of low quality, which threatens the profits from these other products [Erdem and Sun, 2002, Balachander and Ghose, 2003]. Firms cannot dare to offer low-quality products as these may harm the brand's overall image. Thus, in the case of umbrella brands, experience with any of the products is expected to affect the (positive) quality perceptions of other products that share the same brand name [Erdem, 1998].

The managerial relevance of umbrella branding results from the formation of consumer quality perceptions across product categories and their impact on consumer brand choice. Firms offering products in several product categories can use the brand name of an established and successful product for a new product, assuming that they have a good quality reputation [Erdem, 1998]. Consumers may be informed about the quality of brand extension by using the brand name as quality cue [Wernerfelt, 1988, Erdem, 1998, Erdem and Swait, 1998, Erdem et al., 2006]. Experience with the parent product provides consumers with information about the new product. Moreover, Erdem and Sun [2002] give evidence for the existence of marketing-mix spillover effects for umbrella branded products, resulting in an enhanced effectiveness of marketing-mix activities. Sullivan [1990] was the first to present non-experimental evidence for spillovers in umbrella-branded products. Consumers are even loyal to a multiproduct firm when it does not offer a product that matches their preferences better than a product of competing firms [Anand and Shachar, 2004]. Anand and Shachar [2004] examine a new source of brand loyalty, called 'excess loyalty', based on a firm's profile. Morrin [1999] shows that brand extensions can modify the perceived profile of a multiproduct firm.

The framework of signaling theory proposes that brand loyalty is a consequence of brand equity, defined as the added value a brand gives a product [Erdem and Swait, 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 for a constant quality [Erdem and Swait, 1998]. Any product under the same umbrella brand is associated with high perceived quality whereby the perceived risk assigned to the product is decreased. Thus, the expected utility increases and motivates consumers to buy the same brand repeatedly. It is this increase in expected utility that underlies the value of a brand signal to consumers [Erdem and Swait, 1998]. Taken this as legality for any umbrella branded products, the existence of cross-category

brand loyalty has been widely assumed in that explanations and determinants of this phenomenon are well discussed in the literature.

2.2 Hypotheses

There is a theory explaining a phenomenon whose existence has not yet been empirically confirmed in the context of an umbrella brand's complete product assortment. We fill this gap in that our approach is coming from the opposite direction. We examine cross-category brand loyalty in an empirical study with a data set covering 28 product categories in which a selected umbrella brand's products compete. Our contribution lies therein to quantify the cross-category brand loyalty relations between the products under the umbrella brand, and thus, give empirical evidence for the theoretical argumentation of the underlying psychological process.

From the signaling theory approach we derive the following general hypotheses:

> H1: Consumers, who are loyal to the brand in the parent product category, exhibit a higher probability to also be loyal to that same brand in any extension product category, compared to consumers who are not loyal to the brand in the parent product category.
>
> H2: Consumers, who are loyal to the brand in an extension product category, exhibit a higher probability to also be loyal to that same brand in the parent product category, compared to consumers who are not loyal to the brand in the extension product category.

Parent brand experience and parent brand conviction have been identified as drivers of brand extension success [Völckner and Sattler, 2006]. Additionally following the argumentation of the signaling theory, the signaling effect of the umbrella branded product in the parent product category is highest. The core competence product is decisively responsible for the brand's equity and, therefore, for the pure existence of the brand's extension potential. On account of this, we hypothesize that

> H3: The probability to be loyal to the brand in any extension product category, given loyalty to the brand in the parent product category, is higher than the probability to be loyal to the brand in the parent product category, given loyalty to the brand in any extension product category.
>
> H4: The parent product category has a higher signaling role within the umbrella brand's product assortment than any of the extension products under the umbrella brand.
>
> H5: The overall reciprocal signaling effect is highest on the parent product category.

The comparison of a branded product's overall signaling effect on all the other products under the same umbrella brand and the overall impact it receives, in terms of reciprocal signaling effects, from all the other products under the same umbrella brand yields to a net signaling balance. In line with H3 we finally hypothesize that

> H6: The parent product category has a positive net signaling balance.

The hypotheses H1, H2, and H3 are addressed in section 4.4, the hypothesis H4 in section 4.5.2, the hypotheses H5 in section 4.5.3, and the hypothesis H6 in section 4.5.4 of the empirical study. Preliminary to the empirical study starting in section 4, we introduce our measure of brand loyalty in the subsequent section.

3 Measuring brand loyalty

The brand loyalty concept has been of enduring concern to both marketing practitioners and academics [Day, 1969, Wind and Frank, 1969, Jacoby and Chestnut, 1978, Aaker, 1991, Oliver, 1999, Chaudhuri and Holbrook, 2001]. Loyalty comes in many forms: contractual loyalty, transactional loyalty, functional loyalty, and emotional loyalty. The most widespread and largely supported conceptual definition of brand loyalty was presented by Jacoby and Chestnut [1978]. According to this definition, brand loyalty is: *"The (a) biased, (b) behavioral response, (c) expressed over time, (d) by some decision-making unit, (e) with respect to one or more alternative brands out of a set of such brands, and (f) is a function of psychological (decision-making, evaluative) processes,"* [Jacoby and Chestnut, 1978, p.80]. While there is a considerable agreement on the conceptual definition of brand loyalty, no standardized perspective to measure it has yet emerged. A vast overview of indices of brand loyalty can be found in Jacoby and Chestnut [1978]. These measures can be classified (amongst others) into proportion-of-purchase, sequence-of-purchase, and probability-of-purchase measures. Mellens et al. [1996] discuss each of Jacoby and Chestnut's six requirements for brand loyalty in somewhat more detail and describe a systematic two-dimensional classification of brand loyalty measures. They distinguish between behavioral and attitudinal measures, and individual-oriented vs. brand-oriented measures, resulting in four main categories of brand loyalty measures (see table 1).

Behavioral loyalty is the willingness of the average consumer to repurchase the brand and is reflected in the repeated purchases of the brand. A consumer's degree of brand loyalty is inferred from her observed purchase behavior [Bhattacharya, 1997, Dekimpe et al., 1997, Chaudhuri and Holbrook, 2001]. In contrast, attitudinal loyalty refers to the level of commitment of the average consumer toward the brand [Jacoby and Chestnut, 1978] and includes a degree of dispositional commitment in terms of some unique value associated with the brand. The focus herein lies on the underlying evaluative and cognitive

processes when interpreting a given purchasing decision as evidence of brand loyalty [Dekimpe et al., 1997, Chaudhuri and Holbrook, 2001]. Most often, brand loyalty - neglecting its attitudinal component - is measured according to the past purchasing patterns of customers [Chaudhuri and Holbrook, 2001]. So the majority of all brand loyalty measures are behavioral [Bhattacharya, 1997]. Behavioral measures are easier and less costly to collect than attitudinal data (especially relevant when studying the evolution of brand loyalty over an extended period of time) [Dekimpe et al., 1997]. Several publications introduce [Colombo and Morrison, 1989] or investigate [Bhattacharya et al., 1996, Dekimpe et al., 1997] possible measures for behavioral loyalty.

It becomes clear, that THE one and only brand loyalty measures does not ex-

	Attitudinal	Behavioral
Brand-oriented	Stated purchase intentions Preference measures Commitment measures	Measures based on aggregated data (switching matrices, market shares) Measures based on individual-level data
Individual-oriented	Measures on category level General measures	Proportion-of-purchase measures Sequence-of-purchase measures

Table 1: *Main categories of brand loyalty measures*

ist, and that researchers and managers have to decide appropriate to the data availability and the context which measure to use. The share of category requirements[3] measure has long been used as a metric of brand loyalty in the context of consumer packaged goods [Fader and Schmittlein, 1993] and has become an important metric of customer relationship strength [Du et al., 2007]. According to Rundle-Thiele and Mackay [2001] the share of category requirements measure is significantly strongly associated with the attitudinal brand preference measure, thus somehow combining attitudinal and behavioral aspects of brand loyalty as already postulated by Day [1969].

The **share of category requirements** (SCR) [Fader and Schmittlein, 1993, Bhattacharya, 1997, Yim and Kannan, 1999, Danaher et al., 2003, Stern and Hammond, 2004, Jung et al., 2009] captures the relative share of category purchases that individual households give to each brand they buy [Stern and Hammond, 2004], defined to be each brand's market share. The SCR measure indicates how much 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 simplicity and widespread use by brand managers and in academic research [e.g., Bhattacharya et al., 1996, Danaher et al., 2003, Stern and Hammond, 2004, Du et al., 2007], the SCR measure is a very common loyalty measure [Bhattacharya, 1997].

[3]Du et al. [2007, p.96] define share of category requirements as the ratio of a customer's requirements for a particular category of products from a focal supplier to the customer's total requirements for products from all suppliers in the category (i.e., total category requirements).

Although the SCR measure[4] is generally reported at an aggregate level, several studies use it on an individual level [e.g., Du et al., 2007]:

$$SCR_{hicT} = \frac{\sum\limits_{t \in T} q_{hict}}{\sum\limits_{k} \sum\limits_{t \in T} q_{hkct}} \tag{1}$$

where SCR_{hicT} is household h's share of category requirements for brand i in category c during time period T, q_{hict} is the quantity of brand i purchased in category c by household h on purchase occasion t (where t is an index of all purchase occasions during time period T), and k is an index for all brands in the category.

The SCR as we use it can be classified as individual-oriented behavioral proportion-of-purchase measure according to table 1. Behavioral brand loyalty is of great importance when it comes to customer segmentation. According to their brand-specific SCR measure consumers can be segmented as first choice buyers (FCB), second choice buyers (SCB), and competitive choice buyers (CCB) with respect to a specific brand within a product category.

First choice buyers are those buyers of a brand who buy this brand the most in terms of the amount purchased of this particular brand in that category. In case of two brands with equal amounts, the monetary value spent on this brand is of relevance. Second choice buyers 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. The investigated brand is just an additional choice besides some other majorly preferred brand. Competitive choice buyers are those buyers who did not purchased this particular brand during the investigated time period at all. They rather chose one or more competitive brands in that product category.

Studies of the GfK Panel Services reveal that consumers' share of category requirements for their first choice brand has decreased from 71% in 1989 to 62% in 2007. And this is despite the fact that the average number of different brands purchased by a household within a product category has only little increased from 2.9 to 3 brands, although the number of competing brands has almost doubled within this period [Wildner and Twardawa, 2008].

The share consumers assign to a particular brand is one important aspect in the context of brand loyalty measurement. A second issue, though, is to account for different shopping types in terms of buying rates (see, e.g., heavy, average, and light buyers in Parfitt and Collins [1968]). Only the combination of category purchase frequencies and share of category requirements can bring important insights into consumers' brand loyal purchase behavior and arising

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

customer potential. In our successional empirical study, we suggest a median split of households according to category purchase frequencies into frequent and seldom buyers.

4 An approach to estimate cross-category brand loyalty leverage in FMCG

In general, consumers are likely to be attracted to a product with a familiar brand name and form an impression-based expectation for what the product is like based on this name before considering the product's specific attributes and their relation to the product category with which the brand is associated [Yeung and Wyer, 2005]. Brand extension is an attempt, in part, to exploit the loyalty to the parent brand and to supposedly lower the company's risk of new product failure [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 loyals [Mundt et al., 2006].

With this empirical study, we combine research in umbrella branding, brand extensions, and brand loyalty. Here we contribute in that the brand loyalty aspect, to the best of our knowledge, has been widely neglected in the empirical analysis of the determinants of successful brand extensions. Even though we do not investigate success factors of brand extensions in general (like, e.g., Völckner and Sattler [2006]), we do point attention to the existence of cross-category brand loyalty, which has to be considered when thinking about extending the brand or evaluating the success of a brand extension. Furthermore, in umbrella branding, firms take advantage of their reputation for quality by using the brand name of an established product for a new good. Within the signaling theory framework brand loyalty is regarded as a consequence of the added value a brand gives a product [Erdem and Swait, 1998]. Though, the empirical evidence of the existence of cross-category brand loyalty in the context of the complete product assortment under an umbrella brand has not yet been given.

In principle, our measure is based on the brand's share of category requirements [Bhattacharya, 1997, Jung et al., 2009]. According to that, we assign each panel household to the first, second, or competitive choice buyer segment for each product category separately. We propose that brand loyal (first choice) buyers of a brand exhibit a higher probability to also be brand loyal to that same brand in another category. Taking the behavior of the second or competitive choice buyers as baseline, we calculate the differences in conditional probability to be a first choice buyer in any other product category, given being a first choice buyer in the investigated product category. Significant differences are weighted depending on the probability level they emerge and summed up for all

categories the brand competes. Detailed descriptions of the construction of our loyalty leverage measures follow in the sections 4.5.2 and 4.5.3.

4.1 The data set

Our data were provided by GfK SE. The household panel covers 20,000 representative panel households in Germany. Our data includes the households' 2007 and 2008 self-reported FMCG purchase data. To account for panel membership duration the data are weighted with a continuous mass weight[5]. Reported are purchases of the household leader. This study does not distinguish between the decision makers, the buyers, and the users within a panel household. Still using our household panel data we could think of only selecting one-person households for analysis to overcome this mentioned issue.

Before starting with our analyses, we applied some general data screening criteria to improve data quality and adequateness. The data cover 1,290 different brand names, one of them being the 'store brand' labeled brands. Store brand purchases are included and coded such that each store's store brand is treated as an individual brand. For the store brands we use the sub-brand label as identifier, leading to an additional 190 sub-brands. Altogether, we end up with 1,479 different brands in 28 product groups in our basic data set.

Our data cover all purchases in those categories one major national brand in the FMCG non-food sector competes. This brand's core competence is in the area of body care. For a long time, the brand solely was competing in this market, before it was extended within an umbrella branding strategy to several other, more or less related product groups. We want to investigate each umbrella branded product's integration within the product assortment in that we identify cross-category umbrella brand loyal households and quantify the brand's ability to leverage loyal customers across product categories back and forth.

4.2 Measuring aggregated category-specific brand loyalty

We counted each household's number of different shopping days over the two year examination period, regardless of the number of items purchased, the location of purchase, or the purchase volume. Households with a total of less than four shopping days 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, leading to 19,098 remaining panel households for our investigations.

According to the median value of 28 shopping days in the two year observation

[5]For example, a panel household with the continuous mass weight of 3.75 is representative for 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.

period, households were then grouped into 'frequent' or 'seldom' buyers. This distinction holds true for any of the following analyses. The width of the product group spectrum may be susceptible for substitutional relations between product groups. Therefore, purchases in a high number of the 28 product groups become very unlikely. For this reason, we clustered the 28 product groups in 9 product categories (visage, 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 with their only occurrence or with their highest occurrence frequency.

To shed more light on households' purchase behavior within each of the 9 product categories and also to start investigating households' loyalty behavior, 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), second choice buyer (SCB), or competitive choice buyer (CCB) for brand i in category c according to the following rules:

$$
\begin{aligned}
&FCB_{ic} \text{ if } SCR_{hicT} \neq 0 \text{ and } SCR_{hicT} > SCR_{hjcT} \text{ for any } j \neq i \\
&SCB_{ic} \text{ if } SCR_{hicT} \neq 0 \text{ and } SCR_{hicT} < SCR_{hjcT} \text{ for any } j \neq i \\
&CCB_{ic} \text{ if } SCR_{hicT} = 0
\end{aligned}
$$

Separately for frequent ($n = 10,473$) and seldom ($n = 8,626$) buyers, the tables 2 and 3 show the shares of first choice buyers, second choice buyers, and competitive choice buyers of the investigated brand, as well as households that did not purchase (no choice) within each category.

For both, frequent and seldom buyers, the highest proportion of no choice oc-

	FCB	SCB	CCB	choice	no choice
visage	**0.10**	0.16	0.58	0.84	0.16
beaute	**0.01**	0.10	0.81	0.91	0.09
hair	**0.07**	0.35	0.57	0.99	0.01
body	**0.20**	0.22	0.51	0.92	0.08
sun	**0.06**	0.03	0.45	0.54	0.46
hand	**0.03**	0.04	0.57	0.64	0.36
deo	**0.09**	0.20	0.64	0.92	0.08
clean	**0.06**	0.34	0.60	0.99	0.01
men	**0.21**	0.16	0.35	0.73	0.27

Table 2: *Relative frequencies of frequent buyers ($n = 10,473$)*

curs in the sun product category. This should be due to the seasonality effect because sun lotion, after sun products, and self-tanning lotion strongly underlie seasonal variations. Hand care products also exhibit large shares of no choice

which might be due to the fact that people regard hand care as less important than body, hair, and facial care, or use general care products for their hands rather than specialized hand care products.

Leaving out those households that do not exhibit any category preference, we

	FCB	SCB	CCB	choice	no choice
visage	**0.06**	0.04	0.40	0.50	0.50
beaute	**0.00**	0.02	0.63	0.65	0.35
hair	**0.05**	0.15	0.72	0.91	0.09
body	**0.17**	0.08	0.46	0.71	0.29
sun	**0.03**	0.01	0.25	0.28	0.72
hand	**0.01**	0.01	0.29	0.31	0.69
deo	**0.06**	0.07	0.58	0.71	0.29
clean	**0.05**	0.15	0.75	0.95	0.05
men	**0.13**	0.07	0.29	0.49	0.51

Table 3: *Relative frequencies of seldom buyers* ($n = 8,626$)

re-calculate the shares of first choice, second choice, and competitive choice buyers among those households that made category purchases during the two year observation period (tables 4 and 5).

Among the category buyers, the highest shares of first choice buyers occur in the men (shaving equipment or men's deodorant) and in the body (body lotion, body gel, after depilatory creme) category. The exposed status of the men category may be the due to the special target market of its products. The brand's core competence lies in body care products and was extended over decades to various other product categories. In the tables above it becomes obvious that the brand does not play a significant role in the beaute category. The brand's extension to this category has not (yet) established itself with regard to brand loyalty. This fact leaves room for speculation if the beaute category is too far away from the brand's core competence, and therefore, the brand name is not able to attract the brand's loyal customers in this area.

What the results in the tables 2 to 5 do not tell is whether there are first choice buyers within a category that are also first choice buyer in another category. The displayed results are only category-specific and do not allow to draw any conclusions on cross-category brand loyal behavior. The subsequent section is devoted to this aspect.

	FCB	SCB	CCB	choice	n
visage	**0.11**	0.20	0.69	1.00	*8,781*
beaute	**0.01**	0.11	0.88	1.00	*9,566*
hair	**0.07**	0.35	0.58	1.00	*10,392*
body	**0.22**	0.23	0.55	1.00	*9,679*
sun	**0.10**	0.06	0.84	1.00	*5,679*
hand	**0.04**	0.06	0.89	1.00	*6,680*
deo	**0.09**	0.21	0.69	1.00	*9,622*
clean	**0.06**	0.34	0.60	1.00	*10,415*
men	**0.29**	0.23	0.49	1.00	*7,606*

Table 4: *Relative frequencies of frequent buyers with category preference*

	FCB	SCB	CCB	choice	n
visage	**0.12**	0.09	0.79	1.00	*4,332*
beaute	**0.00**	0.04	0.96	1.00	*5,615*
hair	**0.06**	0.16	0.78	1.00	*7,871*
body	**0.24**	0.11	0.65	1.00	*6,106*
sun	**0.09**	0.03	0.88	1.00	*2,424*
hand	**0.05**	0.02	0.93	1.00	*2,692*
deo	**0.09**	0.09	0.82	1.00	*6,100*
clean	**0.05**	0.16	0.79	1.00	*8,209*
men	**0.27**	0.13	0.59	1.00	*4,253*

Table 5: *Relative frequencies of seldom buyers with category preference*

4.3 Measuring aggregated cross-category brand loyalty

So far, we have not yet crossed the product category boarders in the examination of brand loyalty. But the existence of households that are loyal to products of the umbrella brand not only in one but in multiple categories is a prerequisite for any further investigations. On this account, we now examine households' first choice buying behavior over the 9 product categories.

Figure 1 underlines the assumption that there do exist customers that exhibit

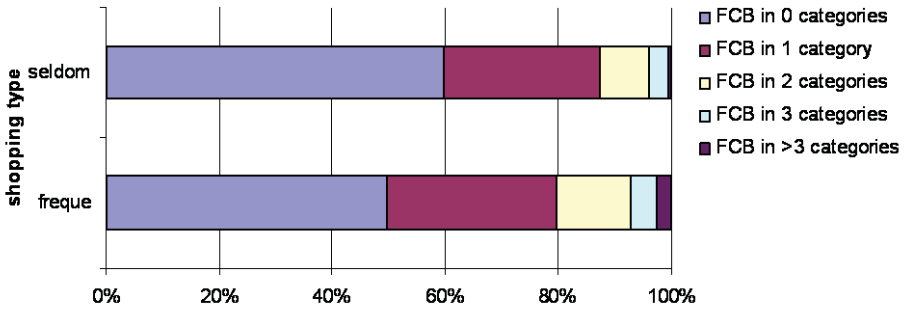

Figure 1: *Distribution of the number of categories where a household is the first choice buyer*

brand loyalty in more than just a single product category. About 20% of the frequent shoppers ($n = 10,473$ households with at least 28 shopping trips in the two-year observation period) and 13% of the seldom shoppers ($n = 8,626$ households with at least 4 and a maximum of 27 shopping trips in the two-year observation period) dedicate their largest share in terms of purchase volume to our investigated brand in at least two different product categories. As the number of first choice buyer categories strongly depends on the total number of categories purchased, in the figure 2 we therefore additionally differentiate between the number of categories purchased.

Figure 2 displays that frequent buyers have to purchase in at least four different categories to exhibit cross-category first choice buying behavior. The majority (about 1/3) of frequent buyer households purchases in 8 of the 9 product categories, and also high numbers of households purchase in 7 or even 9 categories. One fifth to one fourth of these households are first choice buyers in at least two different categories. Both, the total number of households that are first choice buyers in at least 4 product categories, and the relative share within

the respective buyer segment is comparably low. The majority (about 1/4) of seldom buyer households purchases in 6 of the 9 product categories, and also high numbers of households purchase in 5 or 7 categories. Again, both, the total number of households that are first choice buyers in at least 4 product categories, and the relative share within the respective buyer segment is very low.

Up to now, these initial results show that about 20% of the panel households do

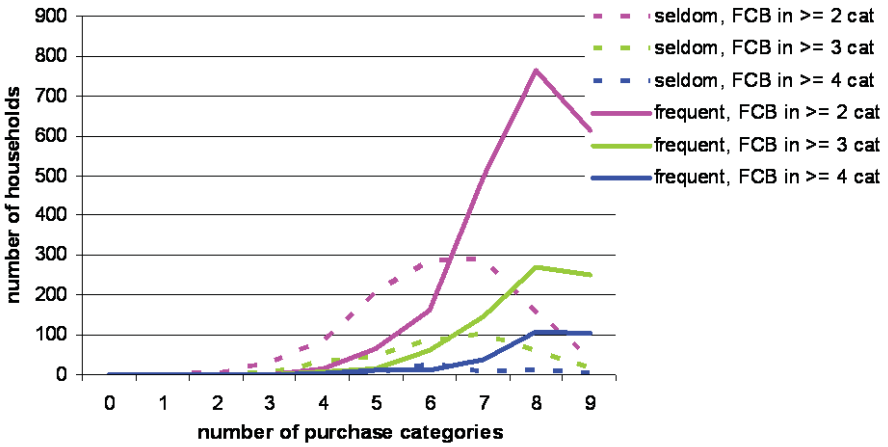

Figure 2: *FCB purchase behavior in total numbers ($n = 10,473$ frequent buyers, and $n = 8,626$ seldom buyers)*

exhibit first choice buying behavior in multiple categories. Although a minimum number of purchases in 4 categories is needed to find evidence for the existence of cross-category brand loyalty. But in general, we provide evidence that the share of cross-category brand loyal customers cannot be neglected.

4.4 Measuring disaggregated cross-category brand loyalty

Subsequently, we leave the general perspective of cross-category brand loyalty and focus our view on any of the 9 product categories and their relations among each other separately. We aim at quantifying each category's role and strength in terms of its integration within the loyalty structure of the brand's product portfolio. Are there product categories in which customers exhibit a significantly higher share of loyalty to the umbrella branded product if they are also loyal to the umbrella brand in some other product category?

In this section, we examine our initially proposed research hypotheses H1 and H2 by (1) investigating the occurrence and relevance of cross-category brand loyalty, and (2) determining a household's probability to be brand loyal, i.e., to be a first choice buyer, in a product category provided she is also brand loyal in another category. It is also of interest, whether we find differences between product categories. Assuming that the sample's descriptive frequency statistics can be used for inferences about the underlying population, and thus, be taken as probability values, we derive the following hypotheses:

H1a: If a household is a *first choice buyer* of the brand in the parent category, her probability to also be a *first choice buyer* of the brand in any extension category is higher compared to a household that is a *competitive choice buyer* of the brand in the parent category.
$\rightarrow Prob(FCB_{ext}|FCB_{par}) > Prob(FCB_{ext}|CCB_{par})$

H1b: If a household is a *first choice buyer* of the brand in the parent category, her probability to also be a *first choice buyer* of the brand in any extension category is higher compared to a household that is a *second choice buyer* of the brand in the parent category.
$\rightarrow Prob(FCB_{ext}|FCB_{par}) > Prob(FCB_{ext}|SCB_{par})$

H2a: If a household is a *first choice buyer* of the brand in any extension category, her probability to also be a *first choice buyer* of the brand in the parent category is higher compared to a household that is a *competitive choice buyer* of the brand in the extension category.
$\rightarrow Prob(FCB_{par}|FCB_{ext}) > Prob(FCB_{par}|CCB_{ext})$

H2b: If a household is a *first choice buyer* of the brand in any extension category, her probability to also be a *first choice buyer* of the brand in the parent category is higher compared to a household that is a *second choice buyer* of the brand in the extension category.
$\rightarrow Prob(FCB_{par}|FCB_{ext}) > Prob(FCB_{par}|SCB_{ext})$

H3a: The probability to be a *first choice buyer* of the brand in any extension category, given being a *first choice buyer* of the brand in the parent category is higher than vice versa for the case of the comparison of *first and competitive choice buyers* of the brand.
$\rightarrow Prob(FCB_{ext}|FCB_{par}) - Prob(FCB_{ext}|CCB_{par}) > Prob(FCB_{par}|FCB_{ext}) - Prob(FCB_{par}|CCB_{ext})$

H3b: The probability to be a *first choice buyer* of the brand in any extension category, given being a *first choice buyer* of the brand in

the parent category is higher than vice versa for the case of the comparison of *first and second choice buyers* of the brand.
$\rightarrow Prob(FCB_{ext}|FCB_{par}) - Prob(FCB_{ext}|SCB_{par}) > Prob(FCB_{par}|FCB_{ext}) - Prob(FCB_{par}|SCB_{ext})$

We start with a cross-tabulation of segment membership (FCB, SCB, or CCB) frequencies for any possible combination of two categories, followed by a calculation of relative frequencies. As our data set is a quota sample ($n = 20,000$) of the total population and is representative in terms of the investigated attributes, we view the probability of a certain outcome as the frequency with which that outcome occurs in the long run, when the drawing from the population is repeated a large number of times (law of large numbers).

Our aim of research requires the calculation of conditional probabilities. For frequent buyers, table 6 displays the conditional probabilities of being a first choice buyer in the respective category (columns), given the category-specific purchase behavior in any category under investigation (lines). For example, the value 0.12 in the first line (visage FCB) and the third column (FCB hair) means that if we take any of the $n = 1,008$ households that is a first choice buyer in the visage category, with a probability of 12% this chosen household is also a first choice buyer in the hair category. On the other hand, if we take the third line (visage CCB) as basis, we get the result that choosing any of the $n = 6,059$ households that is a competitive choice buyer in the visage category with a probability of 6% she is also a first choice buyer in the hair category. The corresponding results for seldom buyers are available upon request, but not displayed here.

Both, for frequent and seldom buyers, the categories body, men, and visage exhibit the highest conditional probabilities, whereas the beaute category does not attract first choice buyers of the brand. To further investigate our hypotheses, we need to compare the conditional probabilities in the FCB and the CCB lines for the body category (H1a), and in the FCB and the SCB lines for the body category (H1b), as well as the FCB and CCB conditional probability values in the body category for any extension category (H2a), and the FCB and SCB conditional probability values in the body category column for any extension category (H2b).

frequent $Pr(FCB_c \mid behavior_{c^*})$		c	FCB visage	FCB beaute	FCB hair	FCB body	FCB sun	FCB hand	FCB deo	FCB clean	FCB men
c^*	*behavior*	*n*									
visage	FCB	*1,008*		0.02	0.12	0.37	0.14	0.07	0.17	0.14	0.28
visage	SCB	*1,715*		0.01	0.09	0.24	0.07	0.04	0.12	0.08	0.26
visage	CCB	*6,059*		0.00	0.06	0.16	0.04	0.02	0.07	0.05	0.19
beaute	FCB	*53*	0.32		0.24	0.34	0.09	0.03	0.36	0.23	0.39
beaute	SCB	*1,065*	0.20		0.12	0.24	0.10	0.05	0.14	0.11	0.27
beaute	CCB	*8,448*	0.08		0.06	0.19	0.05	0.03	0.08	0.05	0.20
hair	FCB	*724*	0.17	0.02		0.32	0.10	0.08	0.15	0.18	0.32
hair	SCB	*3,674*	0.11	0.01		0.22	0.06	0.04	0.11	0.07	0.26
hair	CCB	*5,994*	0.08	0.00		0.18	0.05	0.02	0.07	0.04	0.16
body	FCB	*2,113*	0.18	0.01	0.11		0.09	0.05	0.14	0.13	0.27
body	SCB	*2,264*	0.11	0.01	0.08		0.05	0.03	0.11	0.07	0.24
body	CCB	*5,302*	0.06	0.00	0.05		0.05	0.02	0.07	0.03	0.17
sun	FCB	*590*	0.24	0.01	0.12	0.32		0.07	0.14	0.15	0.29
sun	SCB	*346*	0.15	0.01	0.12	0.21		0.03	0.10	0.08	0.26
sun	CCB	*4,744*	0.08	0.00	0.06	0.17		0.03	0.08	0.05	0.20
hand	FCB	*292*	0.24	0.01	0.20	0.39	0.15		0.11	0.16	0.28
hand	SCB	*434*	0.16	0.01	0.10	0.24	0.09		0.09	0.10	0.28
hand	CCB	*5,954*	0.09	0.00	0.07	0.18	0.05		0.09	0.06	0.20
deo	FCB	*914*	0.19	0.02	0.12	0.31	0.09	0.04		0.17	0.33
deo	SCB	*2,055*	0.11	0.01	0.10	0.22	0.06	0.03		0.07	0.29
deo	CCB	*6,653*	0.08	0.00	0.05	0.17	0.05	0.02		0.04	0.17
clean	FCB	*654*	0.21	0.02	0.20	0.41	0.13	0.07	0.23		0.41
clean	SCB	*3,525*	0.12	0.01	0.09	0.25	0.07	0.04	0.11		0.29
clean	CCB	*6,236*	0.07	0.00	0.04	0.15	0.04	0.02	0.06		0.14
men	FCB	*2,186*	0.13	0.01	0.11	0.26	0.08	0.04	0.14	0.12	
men	SCB	*1,715*	0.08	0.00	0.06	0.21	0.07	0.03	0.09	0.05	
men	CCB	*3,705*	0.08	0.00	0.05	0.16	0.04	0.02	0.06	0.03	

Table 6: *Conditional probabilities of first choice buying behavior of frequent buyers*

We can only capture the cross-category impact of brand loyalty when comparing probability values, not when taking the absolute values of the conditional probabilities. The conditional probability of being a first choice buying household in category c, given being a first choice buying household in category c^* has to be related to a reference conditional probability value ('baseline' value), e.g., the conditional probability of being a first choice buying household in category c, given being a competitive buying household in category c^*. If the difference between those two values is very small or not significant, the loyalty behavior in category c is independent of the loyalty behavior in category c^*, regardless of the absolute value of the conditional probability. The differences between the two respective conditional probabilities are displayed in table 7 for H1a and H2a (FCB-CCB), and in table 8 for H1b and H2b (FCB-SCB).

The differences were tested on their statistical significance under the null hypothesis that the shares of first choice buyers in the respective category are equal, i.e., that there is no difference between the conditional probabilities. The t-test assesses whether the means of two groups are statistically different from each other. Even though we do not test the difference of means but rather the difference of (conditional) probabilities here, the t-test is appropriate, because the (conditional) probabilities are the share of first choice buyers (see Simonson and Tversky [1992] for a similar approach). First choice buyers are coded as '1', all else are coded as '0'. Calculating the mean of this variable returns the share of first choice buyers. 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 ($\alpha = 0.05$) for any of the cases above. Depending on the results of these tests, the adequate t-test statistic was used, i.e., either the one for equal variances, or the one for unequal variances. The tables 7 and 8 display the significant absolute differences in conditional probabilities. These differences are a valuable measure to quantify the relation between two categories. As the absolute differences may differ from both directions, the matrices are asymmetric.

	visage	beaute	hair	body	sun	hand	deo	clean	men
visage(f)		0.02^{***}	0.06^{***}	0.21^{***}	0.10^{***}	0.05^{***}	0.11^{***}	0.09^{***}	0.09^{***}
visage(s)		0.01^{**}	0.03^{**}	0.14^{***}	–	0.04^{***}	0.08^{***}	0.10^{***}	–
beaute(f)	0.24^{***}		0.18^{***}	0.15^{***}	–	–	0.28^{***}	0.17^{***}	0.19^{**}
beaute(s)	0.28^{**}		–	0.18^{*}	0.18^{*}	-0.02^{***}	–	-0.05^{***}	–
hair(f)	0.09^{***}	0.01^{***}		0.14^{***}	0.05^{***}	0.06^{***}	0.09^{***}	0.14^{***}	0.16^{***}
hair(s)	0.04^{**}	–		0.12^{***}	–	–	0.07^{***}	0.09^{***}	0.12^{***}
body(f)	0.12^{***}	0.00^{**}	0.06^{***}		0.04^{***}	0.03^{***}	0.07^{***}	0.09^{***}	0.10^{***}
body(s)	0.06^{***}	0.00^{**}	0.04^{***}		0.02^{***}	–	0.05^{***}	0.07^{***}	0.06^{***}
sun(f)	0.16^{***}	–	0.06^{***}	0.14^{***}		0.05^{***}	0.06^{***}	0.09^{***}	0.08^{***}
sun(s)	–	–	–	0.12^{***}		–	–	0.05^{*}	–
hand(f)	0.14^{***}	–	0.13^{***}	0.20^{***}	0.09^{***}		–	0.10^{***}	0.08^{**}
hand(s)	0.14^{***}	0.00^{***}	–	0.09^{*}	–		–	0.06^{*}	0.14^{***}
deo(f)	0.12^{***}	0.02^{***}	0.07^{***}	0.14^{***}	0.04^{***}	–		0.12^{***}	0.15^{***}
deo(s)	0.09^{***}	–	0.06^{***}	0.13^{***}	–	–		0.05^{***}	0.05^{**}
clean(f)	0.14^{***}	0.02^{***}	0.16^{***}	0.26^{***}	0.09^{***}	0.05^{***}	0.17^{***}		0.27^{***}
clean(s)	0.12^{***}	0.00^{***}	0.10^{***}	0.23^{***}	–	0.02^{**}	0.06^{***}		0.15^{***}
men(f)	0.06^{***}	–	0.05^{***}	0.10^{***}	0.03^{***}	0.02^{***}	0.08^{***}	0.09^{***}	
men(s)	0.04^{***}	–	0.05^{***}	0.10^{***}	–	0.02^{***}	0.05^{***}	0.07^{***}	

(f) frequent buyers
(s) seldom buyers

*** significance at $\alpha = 0.01$
** significance at $\alpha = 0.05$
* significance at $\alpha = 0.10$

Table 7: *Differences between the conditional probabilities of first choice buyers and competitive choice buyers* ($\Delta(FCB - CCB)$)

According to table 7, for frequent buyers the hypothesis H1a (line body(f)) holds true in all cases but one. Only in the beaute category there is no difference in conditional probabilities. The picture does not change largely when investigating the seldom shoppers (line body(s)). The differences are lower in value, though, and we find one difference (hand category) that is lacking significance. The brand's parent category of body care products underlines its important position. The first choice buyers in the body category exhibit a significantly higher probability to also be a first choice buyer in any of the extension categories compared to competitive choice buyers in the body category.

> H1a cannot be rejected for frequent shoppers in all but the beaute category.

> H1a cannot be rejected for seldom shoppers in all but the beaute and hand category.

The results displayed in the body column of table 7 give empirical evidence for the hypothesis H2a. Both frequent and seldom shoppers exhibit a significantly higher probability to also be brand loyal in the parent body category if they are already loyal in any extension category, compared to competitive choice buyers in the respective extension category. Again, the differences in conditional probabilities are higher in value for the frequent than for the seldom shoppers.

> H2a cannot be rejected for frequent shoppers in all extension categories.

> H2a cannot be rejected for seldom shoppers in all extension categories.

Before examining the differences between first and second choice buyers (see table 8), we shortly look at the other results displayed in table 7. The insignificant results for frequent buyers all occur when the beaute or hand product category is involved. Taking the beaute category as basis, the changes in conditional probabilities for the sun and hand category are not significant, and taking the hand category as basis, the changes for beaute and deo category are not significant. On the other hand, the conditional probabilities for being a first choice buyer in the beaute category do either exhibit significant but only small changes when comparing competitive and first choice buyers in the basis category, or do not change significantly at all. A similar picture is revealed for the conditional probabilities in the hand product category. The exceptional positions of the beaute and the hand category may be due to the relatively small number of first choice buyer households in those categories ($n = 53$ for beaute, and $n = 292$ for hand). Moreover, the hand category additionally suffers from a high share of households that do not buy at all in the category (see tables 2 and 3).

	visage	beaute	hair	body	sun	hand	deo	clean	men
visage(f)		–	0.03^{*}	0.13^{***}	0.07^{***}	0.02^{**}	0.05^{***}	0.06^{***}	–
visage(s)		–	–	0.09^{***}	-0.05^{***}	–	0.04^{*}	0.11^{***}	–
beaute(f)	0.12^{**}		0.13^{**}	0.10^{**}	–	–	0.21^{***}	0.11^{*}	–
beaute(s)	0.27^{**}		–	–	0.18^{*}	-0.04^{**}	–	-0.12^{***}	–
hair(f)	0.06^{***}	0.01^{**}		0.10^{***}	0.04^{***}	0.04^{***}	0.04^{***}	0.11^{***}	0.07^{***}
hair(s)	-0.04^{*}	–		0.09^{***}	–	–	–	0.08^{***}	0.08^{***}
body(f)	0.07^{***}	0.00^{*}	0.03^{**}		0.03^{***}	0.03^{***}	0.03^{*}	0.06^{***}	–
body(s)	0.02^{*}	–	–		–	–	–	0.07^{***}	0.06^{***}
sun(f)	0.09^{***}	–	–	0.10^{**}		0.04^{**}	–	0.07^{***}	–
sun(s)	–	–	–	0.15^{***}		–	–	–	–
hand(f)	0.08^{**}	–	0.09^{***}	0.14^{***}	0.05^{*}		–	0.06^{**}	–
hand(s)	–	–	–	–	–		–	–	–
deo(f)	0.08^{***}	0.02^{***}	–	0.10^{***}	0.03^{**}	–		0.09^{***}	–
deo(s)	0.03^{*}	–	–	–	–	–		0.03^{*}	-0.05^{**}
clean(f)	0.10^{***}	0.01^{**}	0.11^{***}	0.17^{***}	0.06^{***}	0.03^{***}	0.12^{***}		0.12^{***}
clean(s)	0.08^{***}	-0.01^{***}	0.04^{**}	0.08^{**}	–	–	0.03^{*}		–
men(f)	0.05^{***}	0.01^{***}	0.05^{***}	0.05^{***}	–	–	0.05^{***}	0.07^{***}	
men(s)	–	0.01^{**}	0.04^{***}	–	–	–	–	0.06^{***}	

(f) frequent buyers
(s) seldom buyers

*** significance at $\alpha = 0.01$
** significance at $\alpha = 0.05$
* significance at $\alpha = 0.10$

Table 8: *Differences between the conditional probabilities of first choice buyers and second choice buyers* ($\Delta(FCB - SCB)$)

Similar to the results in table 7 (comparison of FCB and CCB) table 8 (comparison of FCB and SCB) displays that frequent buyers that are first choice buyers in the parent body category exhibit a significantly higher probability to also be first choice buyers in any extension category when compared to second choice buyers in the parent body category (H1b). Besides the lack of a difference in conditional probabilities in the beaute category, the difference in the men category is also non-existent. For the seldom shoppers we only find three extension categories with significant differences: visage, clean, and men. In the clean category the difference is even larger in value than for frequent shoppers, and in the men category the significance of the difference is appearing.

> H1b cannot be rejected for frequent shoppers in all but the beaute and men category.

> H1b cannot be rejected for seldom shoppers in the visage, clean, and men category.

The results displayed in the body column of table 8 give empirical evidence for the hypothesis H2b. Frequent shoppers exhibit a significantly higher probability to also be brand loyal in the parent body category if they are already loyal in any extension category, compared to second choice buyers in the respective extension category. For seldom shoppers, we do not find significant differences in the beaute, hand, deo, and men category.

> H2b cannot be rejected for frequent shoppers in all extension categories.

> H2b cannot be rejected for seldom shoppers in the visage, hair, sun, and clean category.

Compared to the values in table 7, the differences between first and second choice buyers are lower in value, both for frequent and seldom shoppers. This is consistent with the assumption that buyers that at least have brand experience (second choice buyers) in a category, have a higher propensity to be first choice buyers in any other category than those customers that do not have brand experience (competitive choice buyers).

Again, we have a look at the other results in table 8. For frequent buyers, only when the hair or clean product category is the basis category we get significant differences in any case. Besides the categories beaute and hand (as mentioned above), the categories sun, deo, and men now also suffer from insignificant results. Especially the results for the men category are noteworthy. The conditional probabilities for being a first choice buyer in the men category do not change significantly when comparing second and first choice buyers in the basis category, with the exception of hair and clean as basis category. Albeit the beaute category delivers significant results as basis category (see tables 7 and 8), the difference in conditional probability to be a first choice buyer in

the beaute category, given a second choice vs. a competitive choice buyer in any basis category is either of a very small size or not significant. Altogether, when comparing first choice and competitive choice buyers, we do get significant differences in first choice buying probabilities for all categories.

So far, we have given evidence that, overall, brand loyal customers (first choice buyers) in the brand's parent category, exhibit a significantly higher probability to also be brand loyal in any of the extension categories, compared to competitive choice buyers in the parent category. The differences in first choice buying propensity are smaller when comparing first and second choice buyers in the parent category, and are mainly significant for frequent choice buyers. Vice versa, brand loyal buyers in any extension category exhibit a consistently significantly higher probability to also be brand loyal in the parent body category. This holds also widely true for seldom shoppers.

Following the argumentation of signaling theory, we have hypothesized (H3) that the matrix of conditional probabilities is asymmetric in that the probability to be loyal to the brand in any extension product category, given loyalty to the brand in the parent product category, is higher than vice versa. If we compare the values in the body category line with those in the body category column both in the table 7 for the difference between first and competitive choice buyers, and in the table 8 for first and second choice buyers, we have to reject H3 for any case.

> H3a has to be rejected for frequent and seldom shoppers in all extension categories.

> H3b has to be rejected for frequent and seldom shoppers in all extension categories.

This means that if we randomly select a household that is brand loyal in any extension category, the probability that this household is also brand loyal in the parent product category is higher than the probability for a randomly selected parent category brand loyal household to also be brand loyal in any extension category. A joint occurrence of parent category and extension category brand loyalty is more likely among those who are brand loyal in an extension category than vice versa.

Our contribution up to this point lies in the proof of existence and in the quantification of the bilateral cross-category loyalty relations between the products under the umbrella brand. Hence, we have given empirical evidence for the theoretical argumentation of the underlying psychological process in signaling theory. Consumers exhibit a higher probability to be loyal to the brand in some extension product category if they are brand loyal in the parent product category, and vice versa. If we assume that any household becoming a first choice buyer behaves like a first choice buying household in our sample (statistical in-

ference), we can derive the managerial implication that any marketing activity to increase the share of brand loyal customers in the parent category of body care involves positive effects in any of the extension categories, and vice versa.

The arising question now is whether this positive spillover effect is only true for the bilateral relation between the parent category and any one extension category, or also appears within the complete product assortment. Therefore, in the subsequent section, we take all the bilateral relations a category can have (in our case one category has bilateral relations with 8 other categories) and generate an overall general measure for the brand's category-specific power in terms of cross-category loyalty leverage.

4.5 Quantifying the category-specific brand loyalty leverage force

In this section, we examine our initially proposed research hypotheses H4, H5, and H6 by quantifying the integration of the brand within the umbrella brand's product assortment by investigating the brand's ability to leverage brand loyal customers between product categories.

> H4a: Comparing *first and competitive choice buyers* of the brand, the body product category has a higher loyalty tractive force than any extension product category under the umbrella brand.

> H4b: Comparing *first and second choice buyers* of the brand, the body product category has a higher loyalty tractive force than any extension product category under the umbrella brand.

> H5a: Comparing *first and competitive choice buyers* of the brand, the body product category has a higher loyalty attractive force than any extension product category under the umbrella brand.

> H5b: Comparing *first and second choice buyers* of the brand, the body product category has a higher loyalty attractive force than any extension product category under the umbrella brand.

> H6a: Comparing *first and competitive choice buyers* of the brand, the body product category has a positive net loyalty leverage force.

> H6b: Comparing *first and second choice buyers* of the brand, the body product category has a positive net loyalty leverage force.

Investigating this, we may find evidence for an accentuated product category within the multiproduct firm's umbrella branded product portfolio, besides or instead of the parent product category.

So far, we have given evidence for different conditional probabilities of first choice buying of the umbrella brand. In the next section, we are no longer focusing on bilateral non-causative relations, and rather assume causal multilateral relations between the choice behavior in the investigated categories. Our goal is to derive directions of brand loyalty leverage between product categories. But as correlations do not prove causation, we first need to discuss the relation between conditional probabilities and causal inferences.

4.5.1 Conditioning and causation

A simple form of the frequency interpretation states that the conditional probability of an event A in a finite reference class B is the relative frequency of the actual occurrence of A within B. The notion of conditional probability is a basic tool of probability theory [Feller, 1968, Krämer and Gigerenzer, 2005]. The question of what constitutes relevant information, on which the computation of probabilities should be conditioned, was researched by Falk [1989]. From a psychological point of view, the person who assesses the conditional probability P(A/B) may perceive different types of relationships between A and B depending on the context [Tversky and Kahneman, 1982]. If B is perceived as a cause of A, P(A/B) is viewed as a *causal* relation, and if A is perceived as a possible cause of B, P(A/B) is viewed as a *diagnostic* relation [Falk, 1989, Diaz and de la Fuente, 2007].

There are two claims of causal inference. In *generic* causal claims, we are interested in establishing causal relations that hold for the population. Whereas in *single-case* causal claims, we focus on a particular individual [Russo, 2007]. The key question here is how to combine causal knowledge gathered from population-level or sample data with specific knowledge about a particular individual. Single-case causal claims do not state frequency of occurrence but express a belief, in particular a rational degree of belief, about what did or will happen. Moreover, because single-case causal statements are informed by population-level causal knowledge, degrees of belief in the single case seem to be empirically based upon frequencies stated in the generic causal claim. It is a rational degree of belief in the hypothesis concerning the individual, given the available evidence about the generic causal claim. The knowledge about frequencies that hold at the generic level is leading to a support or a rejection of the hypothesis in the single case [Russo, 2007, Russo and Williamson, 2007].

An event that occurred later than the target event is legitimate as a conditioning[6] event. While this causal inference is natural and compatible with the time axis, the 'backward inference' calls for probabilistic reasoning that is indifferent to temporal order[7] [Falk, 1989]. Einhorn and Hogarth [1986] state, that *"whereas temporal order greatly affects causal judgements, it has no role in*

[6] see Krämer and Gigerenzer [2005] for the differentiation of conditioning and conditional event

[7] see Falk [1989] for an urn example

formal probability theory" [Einhorn and Hogarth, 1986, p. 9].

In our case, even though our data cover two years in time, we did not carry out a dynamic analysis, and thus, we do not have a temporal order of choice behavior. But, inverting the argumentation of Einhorn and Hogarth [1986] and Falk [1989], we do not need it. What we do instead is to compare households' behavior in two different loyalty segments by balancing the two referring conditional probabilities. This can be explained by the following example: There are $1,000$ households that are brand loyal in category A. 200 of them are also brand loyal in category B, which is a conditional frequency of 20%. From the $4,000$ households that are **not** brand loyal in category A, 400 are also brand loyal in category B. This means that even though they are not brand loyal in category A, they do exhibit brand loyalty in category B. This can be interpreted as category B brand loyalty that is not caused by brand loyalty in category A. So 10% of the $1,000$ category A brand loyal households are brand loyal in category B **not** because of their brand loyalty in category A. But on the other hand, the category A brand loyalty is causal for category B brand loyalty in the remaining 100 cases.

Taking the argumentation above as legality and assumption in our further analyses, we state that a brand's cross-category loyalty leverage force in category c^* comes from two directions: tractive and attractive force. To what extent do first choice buyers in category c^* have a larger propensity to also be first choice buyer in category c, in comparison to second or competitive choice buyers in category c^* (tractive force of category c^*)? To what extent do first choice buyers in category c have a larger propensity to also be first choice buyer in category c^*, in comparison to second or competitive choice buyers in category c (attractive force of category c^*)?

4.5.2 Tractive force

We start with developing a measure of the tractive force by accounting for two different tractive levels: the difference in conditional probabilities between FCB (in the following referred to as group g_1 or number 1) and CCB (in the following referred to as group g_3 or number 3), and the difference between FCB and SCB (in the following referred to as group g_2 or number 2).

With the first measure (FCB vs. CCB) we can capture the total cross-category effect, consisting of a brand experience and a brand loyalty effect. For each product category c^* the two buyer segments of first and competitive choice buyers are compared regarding their buying behavior in any other category c. The competitive buyers are not only not loyal to the brand in category c^*, but do not even purchase the brand in category c^* during the two-year observation period, i.e., they neither exhibit brand loyalty, nor have any brand experience.

On the other hand, the second measure (FCB vs. SCB) disentangles the two effects and only captures the brand loyalty effect. In this case, the two buyer segments of first and second choice buyers are compared. The second choice buyers do have brand experience, i.e., they make purchases of the brand in category c^*, but do not assign the largest share in volume to the brand.

The cross-category loyalty leverage measure $LoyL_{c^*,tractive}^{g_1-g_j}$ for the differences in conditional probabilities between first choice buyers (g_1) and second ($g_j = g_2$) or competitive choice buyers ($g_j = g_3$) in the product category c^* is composed of three components.

$$LoyL_{c^*,tractive}^{g_1-g_j} = \left(\frac{1}{C-1} \sum_{c=1,c\neq c^*}^{C} d_{c^*c}^{g_1-g_j} w_{c^*c}^{g_1-g_j} I_{c^*c}^{g_1-g_j} \right) \cdot \left(\frac{1}{C-1} \sum_{c=1,c\neq c^*}^{C} I_{c^*c}^{g_1-g_j} \right) \cdot \left(\frac{1}{w_{max}} \right) \quad (2)$$

$$j \in (2,3)$$

In the first component, the differences d in conditional probabilities (see tables 7 (FCB-CCB) and 8 (FCB-SCB) for equation (2)) are weighted by a factor w and a dummy variable I, indicating the significance of the difference d, and are then summed up over all product categories $c \neq c^*$. This sum is averaged over the $(C-1)$ product categories under examination.

$$d_{c^*c}^{g_1-g_j} = Pr\left(g_{1c}|g_{1c^*}\right) - Pr\left(g_{1c}|g_{jc^*}\right) \quad (3)$$

$$I_{c^*c}^{g_1-g_j} = 1 \text{ if } d_{c^*c}^{g_1-g_j} \text{ significant, 0 else} \quad (4)$$

The weight w is introduced to capture the level of change in conditional probabilities, i.e., the same difference is evaluated differently dependent on the baseline conditional probability. For example, a rise from 0% to 5%, a rise from 20% to 25%, and a rise from 80% to 85% do all have the same difference of 5%. But do they all have the same value to our cross-category loyalty leverage measure? We suggest to give more value to changes in the lower regions of conditional probabilities. Comparable to Gossen's first law of decreasing marginal utility of a good we argue that the higher the baseline conditional probability already is (and, thus, the larger the share of loyal buyers of the brand among the reference group of second or competitive choice buyers), the fewer in value is the additional gain. Whereas starting with a very low or even zero share of loyal customers, an increase and, thus, a move into appearance or perception is valued comparably higher.

So with this weight factor we accommodate the fact that gaining the first percentage point in market share is harder than expanding the market share when

already competing in the market. Various studies on market share development underline this assumption of a logistic (s-shaped) functional relation (e.g., market and retailing space share [O'Kelly, 2001], or advertising spendings and the existence of threshold values [Vakratsas et al., 2004]).

$$w_{c^*c}^{g_1-g_j} = arcsin\left(\frac{1}{exp\left(Pr\left(g_{1c}|g_{jc^*}\right)\right)}\right) \tag{5}$$

The weight factor w considers $Pr\left(g_{1c}|g_{jc^*}\right)$, the basis level of conditional probability. By introducing the exponential function the case where the basis level is zero can also be included. The reciprocal of the exponential function accounts for the aimed effect of decreasing weight with increasing basis level of conditional probability. The *arcsin* function (domain $[-1;1]$ and range $[-\pi/2;\pi/2]$) makes sure that the weight of $w = 1$ (meaning that the difference in conditional probabilities is exactly its nominal value) occurs for a basis level of conditional probability of 16.67%. This percentage corresponds to an equally distributed share among six competitors in the market, or six brands in a product category.

The theoretical construct of a consideration set includes those brands that the customer considers seriously when making a purchase decision [Hauser and Wernerfelt, 1990]. The size of the consideration set tends to be small relative to the total number of brands that are available. According to the Assessor database [Silk and Urban, 1978] the mean consideration set size for, e.g., shampoo is 6.1, and for soap is 4.8 [Hauser and Wernerfelt, 1990]. Based on this, our assumption that changes in conditional probabilities are weighted by 1 when the baseline of conditional probability is 16.67%, representing the case of six competing brands and equal shares of all competitors, is justifiable. Differences corresponding to baselines below that value are weighted higher, differences corresponding to baselines above that value are weighted less. This argumentation also holds true for a decrease in shares. For example, a 5% rise in conditional probability from 3% to 8% is valued as 6.6%, whereas a 5% rise from 63% to 68% is valued 2.8%. The weight factor is plotted against the basis level of conditional probability (ranging from 0% to 100%) in figure 3.

In the second component of equation (2) the values of the dummy variable, indicating significance of a difference in conditional probabilities, are summed up over all other categories $c \neq c^*$. The sum value represents the number of categories with significant differences in conditional probabilities. The before mentioned first component of equation (2) is weighted by this averaged sum value to especially account for the cross-category leverage effect. The more categories $c \neq c^*$ with significant differences, the larger the tractive force of the category c^*.

The third component is a scaling factor. For reasons of interpretation, the range of the $LoyL_{c^*,tractive}^{g_1-g_j}$ index is normalized to $[0;1]$. The $LoyL_{c^*,tractive}^{g_1-g_j}$

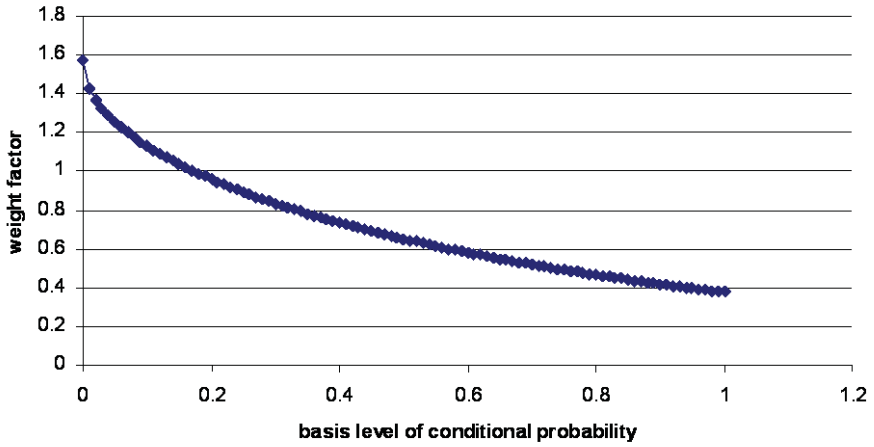

Figure 3: *Size of the weight factor w dependent on the baseline of conditional probability*

index without division by w_{max} has range $[0; w_{max}]$. According to equation (5), the maximum value of the weight function (w_{max}) is 1.571 for the case of a conditional probability $Pr\left(g_{1c}|g_{jc^*}\right)$ of zero. The maximum value is very unlikely, and can only be reached for significant changes in conditional probabilities from 0% to 100% in all of the examined categories.

As mentioned above, besides the weight factor ($w_{c^*c}^{g_1-g_j}$) and the number of categories with significant differences in conditional probabilities ($I_{c^*c}^{g_1-g_j}$), the size of the $LoyL_{c^*,tractive}^{g_1-g_j}$ index is dependent on the absolute difference in conditional probabilities ($d_{c^*c}^{g_1-g_j}$) and the baseline conditional probability ($Pr\left(g_{1c}|g_{jc^*}\right)$). Keeping all else constant, figure 4 displays the developing of $LoyL_{c^*,tractive}^{g_1-g_j}$ values dependent on $d_{c^*c}^{g_1-g_j}$ for three different baseline conditional probabilities $(0; 0.1; 0.3)$. The figure 5 shows the developing of the $LoyL_{c^*,tractive}^{g_1-g_j}$ values dependent on the baseline for three different differences in conditional probabilities $(0.03; 0.13; 0.23)$.

There is a linear relationship between $d_{c^*c}^{g_1-g_j}$ and $LoyL_{c^*,tractive}^{g_1-g_j}$. The gradient is decreasing with an increasing baseline conditional probability (figure 4). On the other hand, there is a convex relationship between the value of the baseline conditional probability and $LoyL_{c^*,tractive}^{g_1-g_j}$ (figure 5). This course is more clearly visible with increasing $d_{c^*c}^{g_1-g_j}$.

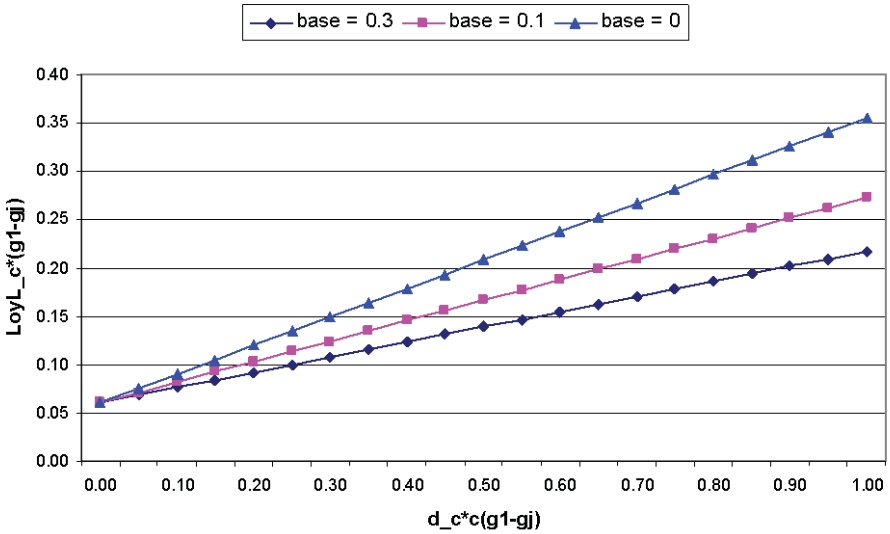

Figure 4: *Relation between* $LoyL^{g_1-g_j}_{c^*,tractive}$ *and difference in conditional probabilities*

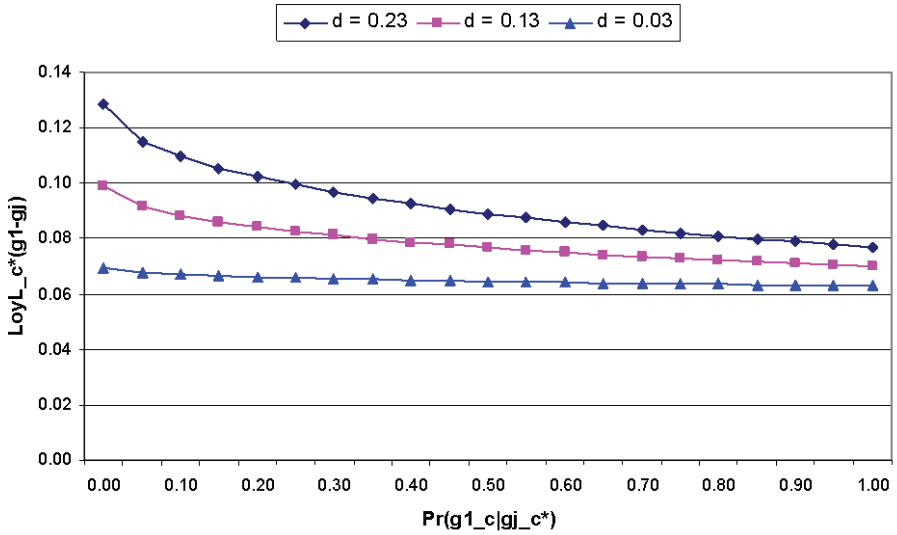

Figure 5: *Relation between* $LoyL^{g_1-g_j}_{c^*,tractive}$ *and the baseline value of conditional probability*

Figure 6 displays the results for the different category-specific $LoyL^{g_1-g_j}_{c^*,tractive}$ indices for frequent and seldom buyers. As mentioned before, the range of the index is $[0;1]$ with high occurrence probability of low values. The brand's tractive force in category c^* comes from brand loyalty (FCB-SCB), or from a total brand effect (FCB-CCB).

For frequent buyers, the brand's highest tractive force occurs in the clean cat-

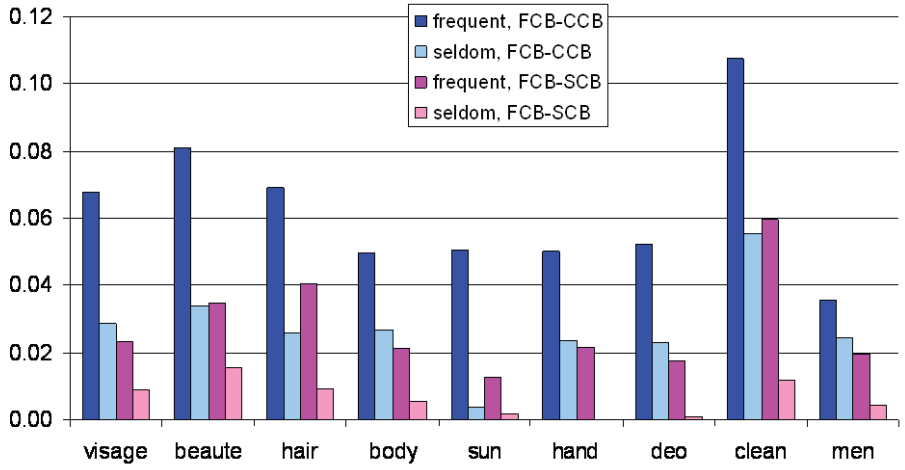

Figure 6: *Cross-category loyalty leverage force* $LoyL^{g_1-g_j}_{c^*,tractive}$

egory, where soap, bath additives, and shower gel are combined. Brand loyal customers in this category have the highest propensity to also be brand loyal in any of the other categories the brand competes. Visage, beaute, and hair build the mid range of index values, hand, deo, body, sun, and men constitute the group of product categories with low values. Amazingly, the index value for the beaute category is comparably high. Having the marginal share of first choice buyers in the beaute category (see tables 2 and 3) in mind, this result is very surprising. In any case, we have to keep in mind that the conditional probabilities, and therefore the differences in conditional probabilities and their significance are based on frequency counts with different segment sizes. For example, there are $n = 2,113$ frequently buying households that are first choice buyer in the body category, which is a share of 22% among the category buyers. In contrast, there are only $n = 292$ frequently buying households that are first choice buyer in the hand category, which is a share of 4% among the category buyers.

The $LoyL^{g_1-g_j}_{c^*,tractive}$ index only reaches a medium to small size for the brand's

parent category (body). The cross-category tractive force of the brand in the body category falls off compared to other categories such as clean, beaute, visage, and hair. Even though there is a high share of brand loyal customers in the body category (see tables 2 to 5), those customers obviously are less likely to exhibit brand loyal behavior in any other category. Whereas in the beaute category, for example, the almost negligibly low share of brand loyal customers shows a high propensity to also be brand loyal in other categories.

The index is lower for the seldom buyers than for the frequent buyers, which should be due to the lower number of significant differences between the conditional probabilities. The highest overall value (FCB-CCB) appears for the clean category, which is in line with the results for frequent buyers. The highest difference in first choice buying propensity in any other category c occurs when comparing first and second choice buyers in the beaute category. The differences between first and second choice buyers (almost) disappear for the sun, deo, and hand category. Both these results for the seldom shoppers, and those for the frequent shoppers lead to the rejection of H4 (body category with the highest tractive force under the umbrella brand).

H4a has to be rejected for frequent and seldom shoppers.

H4b has to be rejected for frequent and seldom shoppers.

The highest signaling role within the umbrella brand's product portfolio comes from the umbrella branded product in the clean product category. Only in the comparison of first and second choice buyers who are seldom shoppers the beaute product category exceeds the clean product category in its signaling role.

4.5.3 Attractive force

The process and the argumentation of developing a measure for the attractive force of the brand in each category c^* takes the equivalent course as for the tractive force in section 4.5.2. Accordingly, we account for two different attractive levels: the difference in conditional probabilities between FCB and CCB, and the difference between FCB and SCB. In the first measure (FCB vs. CCB), for each product category c the two buyer segments of first and competitive choice buyers are compared regarding their first choice buying propensity in the category c^*. In the second case (FCB vs. SCB), the two buyer segments of first and second choice buyers are compared respectively.

The cross-category loyalty leverage measure $LoyL^{g_1-g_j}_{c^*,attractive}$ for the differences in conditional probabilities between first choice buyers (g_1) and second ($g_j = g_2$)

or competitive choice buyers ($g_j = g_3$) is composed of three components.

$$LoyL^{g_1-g_j}_{c^*,attractive} = \left(\frac{1}{C-1}\sum_{c=1,c\neq c^*}^{C} d^{g_1-g_j}_{cc^*}\, w^{g_1-g_j}_{cc^*}\, I^{g_1-g_j}_{cc^*}\right)\cdot \left(\frac{1}{C-1}\sum_{c=1,c\neq c^*}^{C} I^{g_1-g_j}_{cc^*}\right)\cdot\left(\frac{1}{w_{max}}\right) \tag{6}$$

$$j \in (2,3)$$

The three components of $LoyL^{g_1-g_j}_{c^*,attractive}$ are similar to those of $LoyL^{g_1-g_j}_{c^*,tractive}$. The essential difference is the direction of examination and calculation. In equation (3), the differences between conditional probabilities are calculated between c^* and any other category c, with category c^* as anchor. In equation (7), the differences between conditional probabilities are calculated between c^* and any other category c, with any category c being the anchor one time. The same applies for the weight factor w (equations (5) and (9)) and the indicator variable I (equations (4) and (8)).

$$d^{g_1-g_j}_{cc^*} = Pr\left(g_{1c^*}|g_{1c}\right) - Pr\left(g_{1c^*}|g_{jc}\right) \tag{7}$$

$$I^{g_1-g_j}_{cc^*} = 1 \text{ if } d^{g_1-g_j}_{cc^*} \text{ significant, 0 else} \tag{8}$$

$$w^{g_1-g_j}_{cc^*} = arcsin\left(\frac{1}{exp\left(Pr\left(g_{1c^*}|g_{jc}\right)\right)}\right) \tag{9}$$

The basis level of conditional probability $Pr\left(g_{1c^*}|g_{jc}\right)$, where the probability to be a first choice buying household in the investigated category c^* is conditioned on the behavior in category c, is now considered in the weight factor. In the second component of equation (6) the values of the dummy variable, indicating significance of a difference in conditional probabilities, are summed up over all other categories $c \neq c^*$. The more categories $c \neq c^*$ with significant differences, the larger the attractive force affecting the category c^*. The scaling factor in the third component is again introduced for reasons of interpretation. Thus, the range of the $LoyL^{g_1-g_j}_{c^*,attractive}$ index is transferred from $[0; w_{max}]$ to $[0; 1]$. Figure 7 displays the results for the different category-specific $LoyL^{g_1-g_j}_{c^*,attractive}$ indices for frequent and seldom buyers. As mentioned before, the range of the index is $[0; 1]$ with high occurrence probability of low values.

In the frequent buyers case, the highest index values for the FCB-CCB case appear for the body product category ($LoyL^{g_1-g_3}_{c^*,attractive} = 0.108$) and the visage category ($LoyL^{g_1-g_3}_{c^*,attractive} = 0.099$). Clean, men, hair, and deo build the mid range of index values, sund, hand, and beaute constitute the group of product

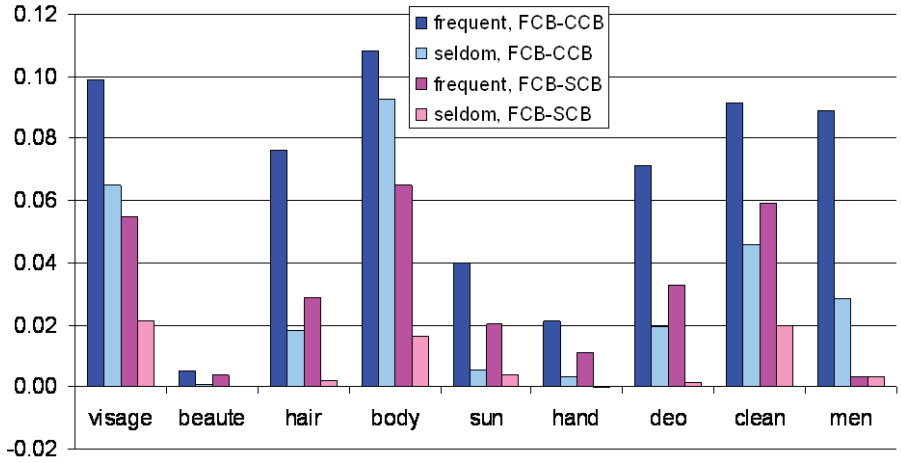

Figure 7: *Cross-category loyalty leverage force* $LoyL^{g_1-g_j}_{c^*,attractive}$

categories with low values. The relatively high difference between the FCB-CCB and the FCB-SCB case for the men product category is surprising. Obviously, the brand's overall ability in all other categories c together to stimulate first choice buying behavior in the men category gains much of its impact from the difference between competitive and second choice buyers in the respective categories c. Whereas when comparing first and second choice buyers in the respective categories c, there is very little attractive force ($LoyL^{g_1-g_2}_{c^*,attractive} = 0.003$) towards brand loyal behavior in the men category. The lowest attractive force comes from the beaute category. The households' first choice buying behavior in any other category c is nearly independent of the households' behavior in the beaute category, i.e., the probability to be a first choice buying household in any category c is about the same for competitive, second, and first choice buyers in the beaute category.

The highest attractive force appears for the parent body category. The high $LoyL^{g_1-g_j}_{c^*,attractive}$ index in the body category denotes that brand loyal customers in any of the extension categories exhibit a higher propensity to also purchase the brand in the parent category. Purchases in the parent body category do less likely lead to first choice purchases in an extension category than vice versa. This result underlines the brand's strength in the parent category. Customers that are loyal to the brand in any of the extension categories, are also more likely to be brand loyal in the parent category.

The picture for the seldom shoppers is quite similar. There is one negative result: when comparing FCB-SCB, the index value for the hand category is slightly negative ($LoyL^{g_1-g_2}_{c^*,attractive} = -0.001$). This result suggests that the probability to be a first choice buyer in any other category c is higher if the household is a second rather than a first choice buyer in the hand category. Nevertheless, this effect, just as well as the effects in the sun and beaute category are close to zero. The comparably strong attractive force affecting the parent body category becomes very distinct in figure 7. Moreover, the difference between the FCB-CCB and the FCB-SCB case is very explicit. Altogether, the results displayed in figure 7 by the majority support H5 (highest reciprocal signaling effect on body category).

> H5a cannot be rejected for frequent and seldom shoppers.
>
> H5b cannot be rejected for frequent shoppers, but has to be rejected for seldom shoppers.

The overall reciprocal signaling effect (what we call attractive force) is highest on the parent product category of body care. Only in the comparison of first and second choice buyers who are seldom shoppers the visage and clean product categories do better.

4.5.4 Overall cross-category leverage force

In the sections 4.5.2 and 4.5.3 we investigated each category's tractive force, i.e., its ability to stimulate brand loyal purchase behavior in any other category the brand competes, as well as the attractive force each category develops in all the other categories. The results are now combined by subtracting the $LoyL^{g_1-g_j}_{c^*,tractive}$ and the $LoyL^{g_1-g_j}_{c^*,attractive}$ index values. This net-effect allows to assess each category with regard to its role and importance within the brand manufacturer's product range.

$$LoyL^{g_1-g_j}_{c^*} = LoyL^{g_1-g_j}_{c^*,tractive} - LoyL^{g_1-g_j}_{c^*,attractive} \tag{10}$$

A category with a positive $LoyL^{g_1-g_j}_{c^*}$ value evolves a stronger tractive force towards the other product categories, in comparison to the overall attractive force in the other categories. Accordingly, a negative $LoyL^{g_1-g_j}_{c^*}$ value denotes stronger attractive forces. The figure 8 displays the results for frequent and seldom buyers, distinguishing between the FCB-CCB and the FCB-SCB comparison.

For the frequent buyers, the core competence body category exhibits the highest negative $LoyL^{g_1-g_j}_{c^*}$ index values in both cases, meaning that this category is strongly affected by its attractive force towards all the other product categories the brand competes. Brand loyal customers in any other category are more likely also brand loyal customers in this core competence category than second or competitive choice buyers in those respective other categories. The

same holds true, in a diminished manner though, for the deo and visage categories. On the other hand, there are categories like hand, clean, and beaute, whose tractive force towards the other product categories exceeds the attractive force. Brand loyal customers in these categories are more likely also brand loyal customers in any other category than second or competitive choice buyers. The results for the men, sun, and hair category differ between the two cases of FCB-CCB and FCB-SCB customer groups in that the hair and especially the men category are dominated by attractive forces when comparing first and competitive choice buyers, whereas the sun category in this case develops stronger tractive force. For the comparison of first and second choice buyers the results are vice versa.

For the seldom buyers, mainly the body, beaute, and visage category show mentionable results. In line with the results for the frequent buyers, the body and visage category are affected by attractive forces towards the respective other product categories, whereas the beaute category has stronger tractive force towards the other categories. The hand and the hair category exhibit tractive force, especially when comparing first and competitive choice buyers. For the clean category the picture differs when comparing first and second, or first and competitive choice buyers.

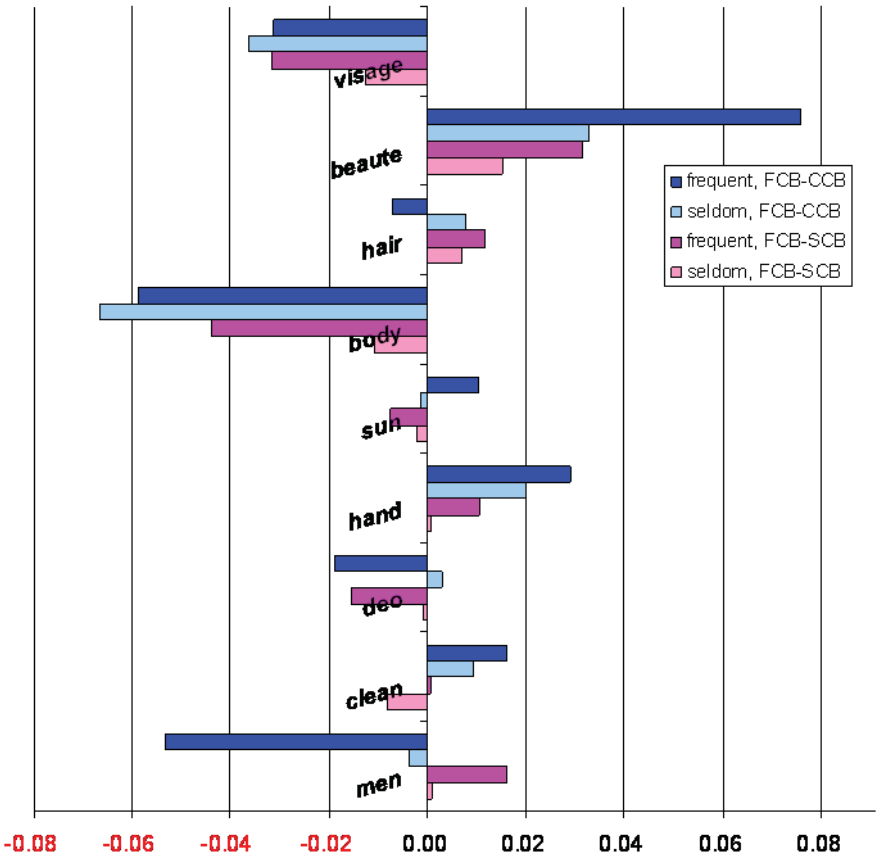

Figure 8: *Cross-category net loyalty leverage force* $LoyL_{c^*}^{g_1-g_j}$

Due to the negative net effects for the parent product category displayed in figure 8, H6 has to be rejected.

H6a has to be rejected for frequent and seldom shoppers.

H6b has to be rejected for frequent and seldom shoppers.

Altogether, we find evidence for stronger and weaker product categories in view of the brand's ability to leverage brand loyalty to other product categories within the product offering. We can identify product categories with a strong 'feedback' role within the brand's product offering. These categories exhibit a larger attractive force towards other product categories than exhibiting tractive force on the other categories. Our main interest category of body care products is the leading category when it comes to attractive force. The fact, that the brand's parent product category does not take the leading role when it comes to pulling other categories the brand competes, is a surprising result that demands managerial interest.

5 Summary and managerial implications

The purpose of this research was to examine customers' brand loyal purchase behavior in the context of multi-category analysis, which is of special interest to brand manufacturers of brands competing in multiple categories. From the 2007 and 2008 GfK SE German household panel data we selected a major national non-food brand for our investigation. According to households' total purchase frequencies we made a median split with our data. The resulting distinction between frequent and seldom buyers is carried out throughout all our analyses. We calculated each household's share of category requirements for that brand and grouped households into first choice (FCB), second choice (SCB), and competitive choice (CCB) buyers of that brand for 9 different product categories.

The lowest shares of category buyers occur in the sun and hand product category. Only considering category buyers, the categories men and body show the highest shares of first choice buyers. Taking the men category as special case, conditional upon the special target market, the results reflect the brand's historical development. The basic positioning 'natural care' originates from the body product category. The body category is the brand's core competence category with the highest share of brand loyal customers. We get a clear overall picture for all product categories in which the investigated brand competes. A share of approx. 20% of the frequent buyer panel households exhibits first choice buying behavior to the brand in at least two different product categories. So in general, we do find evidence for cross-category brand loyalty.

Given uncertainty about product quality, signaling theory proposes that consumers believe that the extension of a high-quality brand is likely to be of high quality as well. Taken this as legality for the products under an umbrella brand, our aim was to give empirical evidence for consumers' tendency to be cross-category brand loyal. Our accordingly stated propositions hold true for frequent buyers in the very most bilateral category relations. The probability to be a first choice frequent buyer in the respective other product category decreases with decreasing share of category requirements in the core competence product category. Especially in the parent category of body care, both propositions can be verified for frequent buyers, with the exception of the follower categories of beaute (in both, the FCB-CCB and FCB-SCB case) and men (in the FCB-SCB case). As required, for bilateral category-specific results the tables 7 and 8 deliver detailed results.

The brand's tractive force in the parent body category is lower compared to other categories like clean or hair. The fact that the brand's highest first choice buyers share occurs in the body category does not imply that this loyal customer base also involves brand loyalty in the extension categories. On the other hand, in the body category the brand develops a higher attractive force given the existence of brand loyal customers in the extension categories than in any

other category. Altogether, we find evidence for medium force going from, and comparably high force coming to the parent body category.

Comparing the brand's $LoyL^{g_1-g_j}_{c^*,tractive}$ and $LoyL^{g_1-g_j}_{c^*,attractive}$ index values, especially for the frequent buyers' results, in the clean, beaute, sun, and hand category the tractive force of the brand is higher in absolute value than its attractive force. Within this group of categories, the clean category occupies an exposed position because its $LoyL^{g_1-g_j}_{c^*,tractive}$ index value is the highest among the categories, and its $LoyL^{g_1-g_j}_{c^*,attractive}$ index value is among the highest. In contrast, the categories body, deo, men, and visage have a larger $LoyL^{g_1-g_j}_{c^*,attractive}$ index in absolute value than their $LoyL^{g_1-g_j}_{c^*,tractive}$ index. The index values for the hair category are quite even.

Even though there is a very little or even no share of first choice buyers in the beaute category, the category has a comparably high tractive force when it comes to stimulating loyal choice behavior in any of the other categories the brand competes. A similar, albeit alleviated picture is drawn in the clean category. These are starting points for the brand's management, i.e., the increase of the share of first and second choice buyers in these categories should be in the focus of marketing strategies. Once these shares are increased, there is a positive feedback effect also in other product categories.

In the other direction (attractive force), we find out that if there is a loyal customer base in any extension category, or if the brand management creates such a loyal customer base by promoting the brand accordingly, the probability to also keep those customers loyal to the brand in the parent body category is increased additionally. So in general, the loyal customers in the introduced brand extension categories altogether develop a shearing force for the brand in the parent body category. Only for the beaute and the hand category we need to cut back in this respect.

But overall, the brand's extensions to several, more or less related product categories proved to be successful in terms of leveraging brand loyal customers back and forth. We do find evidence for various relations between the different categories the brand is offered. Our results give references for the implementation of promotional activities and the allocation of advertising budgets across product categories. Against our expectation, promotional activities in the parent category are not recommended, as there are other extension categories with a higher net tractive force to involve positive spillover effects. Moreover, as we found empirical evidence for significant differences in brand loyalty already between second and competitive choice buyers of the brand in another category, e.g. free product trials could be a relevant marketing tool for an initial product or brand contact. This is given the assumption that category buyers who do not purchase the brand (CCB) would behave like category buyers who buy the

brand as one of several brands in the category (SCB).

6 Limitations and further research

In the second part of our empirical study (section 4.5), we follow the argumentation of Falk [1989] who states that temporal order has no role in formal probability theory and in probabilistic reasoning. We derive causality by balancing the conditional probabilities for brand loyalty in two different loyalty segments. The question here remains, though, if the resulting approach for the calculation of the loyalty leverage index really is pure causal reasoning. Of course, we are aware of the fact that this may be a potential target for criticism.

Our results present challenging opportunities for future research. First, our empirical analysis is ex post, i.e., after the investigated brand was extended from the core product category to various related product categories. We can only contribute on the question if, concerning the leverage of brand loyal customers, the umbrella branding strategy has been of success so far, and on the question of relative strength within the brand's product assortment. Though, it would be of enormous interest for the brand management to look ahead and examine further extension potential.

Second, it would be of enormous managerial interest to know about the households' characteristics. Therefore, we would like to stimulate further analyses that go beyond pure behavioral customer segmentation and investigate the drivers (e.g., demographics, attitudes, and marketing mix sensitivities) that may lie behind the shown purchase behavior. Who are those cross-category loyal customers that are valuable for any brand extension strategy? Provided with additional GfK SE household panel demographic and survey data, we broach this issue in a follow up paper [Silberhorn and Hildebrandt, 2009].

Third, we only investigated non-food product categories and the results may therefore not necessarily be generalized to other markets. Further research should also include food categories for comparison. We expect differences due to involvement levels. Moreover, we have focused only on one major national brand. It might be fruitful to extend our model to other brands.

Fourth, we segment the panel households based on category-specific share of category requirements in first, second, and competitive choice buyers of the brand. So our measure of brand loyalty is based on revealed brand preferences. The integration of an attitudinal component would probably be a more realistic approach to brand loyal behavior. And also the use of conditional probabilities as measures of brand loyalty leverage might be too narrowly defined. We hope that our research stimulates more effort in developing more comprehensive measures of cross-category brand loyalty.

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