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Context Effects as Customer Reaction on Delisting of Brands

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Context Effects as Customer Reaction on Delisting of Brands

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Abstract

The delisting of brands is frequently used by retailers to strengthen their negotiating position with the manufacturers and suppliers of their product assortment. However, retailers and manufacturers have to consider the risk of potential reactions when customers are faced with a reduced or modified assortment and thus, different choice. In this paper, two studies are presented which investigate customers` switching behavior if a (sub-)brand is unavailable and key determinants of the resulting behavior are discussed. Various conditions are tested by taking into account context theory. The results reveal that customer responses depend significantly on the context. A real-life quasi-experiment suggests that manufacturers may encounter substantially larger losses than retailers. Managerial implications for both parties can be derived and recommendations for further research are developed.

Keywords: *Consumer decisions, delisting, context effects, switching behavior, retailing, logistic regression*

JEL classification: *M31, C12, C13, C25, C38*

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1 Introduction

Delisting, defined as permanent deletion of a brand from the assortment of a retailer (Sloot & Verhoef, 2008), is a prevalent instrument in today's retailing practice. There may be a multitude of causes for delisting brands. Major reasons mentioned by retailers are a need for free shelf space to sell their own private labels, cost-saving programs to stay competitive, alleviating shopper confusion and an attempt to strengthen their negotiating power against manufacturers. The latter is especially important. Brand manufacturers mainly depend on retailers to sell their products. Hence, a delisting can induce declines in sales as customers are forced to switch brands if they want to stay loyal to the store. In addition, operational costs ascending with rising stock keeping units (SKUs), inventory costs and out-of-stock levels are lower. Reducing these costs helps conventional supermarkets to compete against the growing retail formats of discount stores. However, assortment reductions can also cause losses for retailers if brand loyal customers do not switch to the other brands on the shelf but to competing stores when the preferred item is no longer available. As delisting bears risks for both parties, it is of great relevance to investigate its implications, to predict choice modification and to measure the evoked changes in the competitive environment.

Removing brands permanently from the shelf alters the decision context of the customer and thus, has an influence both on his brand choice behavior and store choice. Experimental research, predominantly directed to market entry, has revealed that changes in the set of alternatives can induce systematic shifts in choice probabilities (Huber, Payne, & Puto, 1982). It is claimed that decision-making is highly influenced by a changed context[2]. Since context effects may cause potential violations of the rational choice principles (e.g. regularity and value maximization), they stress the need for context-dependent models (Kivetz, Netzer, & Srinivasan, 2004). Extensive experimental evidence from context effects research indicates that the introduction of a new alternative can cause significant changes in brand choice behavior (cf. Huber, 1982; Dhar & Glazer, 1996; Pan & Lehmann, 1993; Tversky, 1972). The aim of this paper is to analyze whether a similar effect can be observed for brand removals. Basically, the research takes into account context theory when investigating brand choice behavior in response to delisting strategies.

[2] Consistent with prior research, the term context is defined as the set of alternatives under consideration (Tversky & Simonson, 1993).

Thus, our paper contributes to marketing and retailing literature by relating context theory to delisting decisions and exploring their important determinants and consequences. In addition, this research provides knowledge that makes retailers` decisions easier when they consider removing items from their assortments. An improved understanding of customer responses to reduced product offerings may help retail managers to enhance buying conditions in negotiations with manufacturers. Insights on the severity of a threat to delist are of great value to brand manufacturers. Finally, recommendations for product portfolio decisions can be derived.

The article is organized as follows: As prior research on out-of-stock and permanent assortment reductions offers valuable insights for our analysis, it is reviewed and discussed in the next section. Then, the theoretical background on context effects is briefly presented, our research objectives are specified and hypotheses are developed. Two empirical studies examine the shifts in choice probabilities when brands are removed and, by means of a real-life quasi-experiment, significant determinants of a brand loyal reaction are explored. We conclude with a discussion of our key findings and an outlook on future research.

2 Effects of the Unavailability of Brands

"Product not available!" is an annoying situation, of which every regular grocery shopper is probably aware. The consumer may be confronted with two situations. The assortment unavailability can either be temporary (often indicated by an empty space in the shelf and the result of logistic problems) or permanent (shelves are readjusted, in this case the disappearance of the brand or delisting might be the cause). In the first case, a short-term effect can be expected, whereas the second case may have long-term implications which probably differ from temporary impacts. The peculiarities of both kinds of unavailability of (preferred) brands and their consequences are covered below.

2.1 *Temporary Assortment Unavailability*

In retailing research, the phenomenon of temporarily unavailable brands is referred to as an out-of-stock (OOS) or a stock-out. The European Optimal Shelf Availability (OSA) survey reveals an average out-of-stock level of 7.1 percent (ECR Europe & Roland Berger, 2003). To emphasize its meaning, recent studies on OOS have primarily considered customer reactions to short-term unavailability (cf., Anupindi, Dada, & Gupta, 1998; Campo, Gijsbrechts, & Nisol, 2000; Campo, Gijsbrechts, & Nisol, 2003; Emmelhainz, Stock, & Emmelhainz, 1991; Fitzsimons, 2000). Given that a remarkable percentage of purchase decisions are made in the store, such stock-out situations represent a serious threat to brand loyalty and the evaluation of the brand or store in general (Corsten & Gruen, 2004). In fact, they can lead to substantial losses for manufacturers and retailers. For instance, the study by Emmelhainz, Stock, and Emmelhainz (1991) detects that in certain instances the manufacturer loses more than 50 percent of his customers to a competitor and the retailer faces a loss up to 14 percent. The degree of damage strongly depends on the way consumers react. Previous studies, however, have revealed very inconsistent outcomes. It is assumed that immediate behavioral responses to an out-of-stock situation are item-switching, brand-switching, store-switching, postponement and cancelling the purchase altogether. The results from the perspective of the company could be an unexpected cannibalization or the loss of customers if the ties for an existing competing brand are stronger than those for another brand in the company’s own product line. Conversely, if customers decide to look for the missing item in another store, the retailer faces major losses. Existing research therefore has linked customer responses to an OOS to brand-related, store-related, consumer-related and situation-related variables (Zinn & Liu, 2001) in order to identify fundamental determinants of OOS reactions. Consumer characteristics that are of particular importance comprise shopping-attitude, mobility, shopping frequency, general time constraint and age (eg., Campo et al., 2000; Hegenbart, 2009; Sloot, Verhoef, & Franses, 2005). Situational characteristics that turned out to be relevant include, amongst others, required purchase quantity, specific time constraint and urgency of the purchase (e.g., Campo et al., 2000; Hegenbart, 2009; Zinn & Liu, 2001). Product-related variables of great importance are brand loyalty, availability of acceptable alternatives, purchase frequency, brand equity and product involvement (e.g., Campo et al, 2000; Hegenbart, 2009; Sloot et al., 2005; Zinn & Liu, 2001). Finally, store-related characteristics that significantly influence OOS reactions consist of store loyalty, perceived store prices and store distance (e.g., Campo et al., 2000; Hegenbart, 2009; Sloot et al., 2005). These findings on the implications of temporary unavailability provide a promising basis for the assumptions about our analysis of permanent unavailability. Obviously, similar reactions and underlying antecedents may be prevalent when investigating delisting.

2.2 *Permanent Assortment Unavailability*

In marketing literature, studies on permanent assortment reductions (PAR), i.e. a considerable percentage of items in a category is eliminated by the retailer, concentrate on permanent item deletion and its consequences for category and store sales and assortment perception (e.g., Boatwright & Nunes, 2001; Borle, Boatwright, Kadane, Nunes, & Shmueli, 2005; Broniarczyk, Hoyer, & McAlister, 1998). It has been commonly assumed that more choice is better (Oppewal & Koelmeijer, 2005). This postulation is confirmed by various store choice studies (e.g., Hoch, Bradlow, & Wansink, 1999; Steenkamp & Wedel, 1991) and has been adopted by retailers. Larger assortments are supposed to attract more customers, as they are thought to better meet the customer’s needs along with varying preferences (Bettman, Luce, & Payne, 1998) and reduce time and transportation costs associated with a one-stop shopping (Messinger & Narasimhan, 1997). A large assortment offers flexibility for variety seekers and increases the probability to get one`s favored alternative. Recent research, however, calls this “more choice is better” belief into question and reveals that sales can actually go up when items are removed from the assortment and do not affect store choice (Boatwright & Nunes, 2001). Broniarczyk et al. (1998) found that smaller assortments may be perceived as being more attractive as long as they include the preferred items and category space is held constant. Similarly, the “paradox of choice” is shown by Schwartz (2004). It implies that a too large assortment can overstrain the consumer`s mind and increase choice difficulty on a typical grocery shopping trip. The information overload may result in consumer confusion and lower satisfaction with the decision process (Iyengar & Lepper, 2000). This is consistent with the work of Gourville and Soman (2005), who discovered that increasingly large assortments (“overchoice”) can have a negative impact on consumer choice and brand share. They claim that this effect is significantly moderated by assortment type. Chernev (2003) further demonstrates in four experiments that the selections made from larger assortments can result in weaker preferences subject to the identified key factor ideal point availability. The same has been shown by Zhang and Krishna (2007) who examine brand-level effects of SKU reductions and find varying outcomes across brands, categories and customers. In general, the discussed phenomenon is referred to as the “choice overload hypothesis.” It also has important theoretical implications as it violates the regularity axiom, a keystone of classical choice theory. To sum up, there is an ongoing debate about the benefits and downsides of large assortments in retailing research.

By contrast, delisting (referring to “the removal of all items of a single brand, leading to unavailability of the brand within the store,” Sloot & Verhoef, 2008) and its impact on customer reactions have only been of limited interest in academic research, even though it is a prevalent method in the retailing industry to stay competitive, to increase private label ranges or to strengthen negotiating power against manufacturers. An exception is the study of Sloot and Verhoef (2008). They examine the behavioral consequences of a brand delisting by means of store switching intention (SSI) and brand switching intention (BSI) in sixteen different stores and ten product categories taking into account different antecedents. Their study reveals that many consumers stay brand loyal and that a small proportion cancels their purchase if the favored brand becomes unavailable. Additionally, they found that it is not only the assortment size but the composition of the assortment which matters. As pointed out the delisting, in particular of high market share brands in hedonic product groups, has a negative impact on category sales and store choice. They further show that retailers with relatively large assortments are less affected by brand delistings and that large categories face greater negative consequences. Sloot and Verhoef (2008) only include delisting of the primary brand. However, in order to study a context-dependent switching behavior, a design which contains different initial situations will be reasonable.

To summarize, Table 1 provides an overview of research on the unavailability of items in marketing literature.

Length of unavailability	**Type of unavailability**	**Studies**
Short-term (OOS)	Item(s)	Peckham (1963), Walter & Grabner (1975), Schary & Christopher (1979), Emmelhainz et al. (1991), Campo et al. (2000), Fitzsimons (2000), Zinn & Liu (2001), Campo et al. (2003), Corsten & Gruen (2003), Campo, Gijsbrechts, & Nisol (2004), Sloot et al. (2005), Kalyanam, Borle, & Boatwright (2007), and Hegenbart (2009)
Short-term	Brand(s)	Verbeke, Farris, & Thurik (1998)
Long-term (PAR)	Items(s)	Drèze, Hoch, & Purk (1994), Broniarczyk et al. (1998), Iyengar & Lepper (2000), Boatwright & Nunes (2001), Chernev (2003), Borle et al. (2005), Oppewal & Koelemeijer (2005), Gourville & Soman (2005), and Sloot, Fok, & Verhoef (2006)
Long-term (PAR)	Item(s) / Brand(s)	Zhang & Krishna (2007)
Long-term (total market)	Brand(s)	Sivakumar & Cherian (1995)
Long-term (delisting)	Brand(s)	Sloot & Verhoef (2008)

Table 1: Overview of studies on unavailability, cf. Sloot & Verhoef, 2008

The studies mentioned above include key determinants (brand-, consumer-, store- and situation-related) to figure out the heterogeneity in OOS responses applying multinomial logit (MNL) model. Although they identify empirical associations, an appropriate theory to explain customer behavior in such situations has not been adopted. We claim that context theory will help to account for customer reactions when confronted with product unavailability and consequently can be applied to explain the impacts on choice shifts.

3 Theoretical Background – Context Theory

The existing published research primarily regards the OOS or PAR problem in the context of the classical decision theory, assuming that if the preferred item is not available, the buyer will switch to the second-best alternative, or if he has no time restriction and procurement costs, he will just change the store to buy the favored item. This is a common assumption; however, is it reasonable to assume that the preference rank ordering may remain stable if the first choice brand is not available for a longer period or, like in the PAR-situation, forever? The whole rank ordering of preferences may change and the attractiveness will be built on different reference criteria to compare the alternatives. A simple extension of the classical choice model is the assumption of relative utilities in the attraction model, where the evaluation is made by selected criteria of the alternatives. Hence, for our modeling approach, we may assume that when choosing a product, a consumer does not primarily consider the product attributes and the attribute levels of a single option but takes into consideration the attribute levels of the available and relevant alternatives (Sheng, Parker, & Nakamoto, 2005). Consequently, the choice probability of a product is affected by its own attractiveness in relation to the attractiveness of the other products in the consumer`s consideration set - the brands a consumer regards when he chooses one unit of the product class (Bettman, 1979; Howard & Sheth, 1969). Here, consumers' decisions may alter, depending on the availability and relevance of other products if they do not always pick the product with the highest utility.

In contrast to classical economic theory, which assumes fixed preferences and utility maximization, research on context effects for market entry states that consumers often do not have well-defined preferences and construct choice on the spot when they have to make a decision (Bettman, 1979; Bettman & Park, 1980; Payne, Bettman, & Johnson, 1992; Slovic, 1995; Tversky, Sattath, & Slovic, 1988). Instead, choices are dependent on the positions and the presence or absence of other alternatives, referred to as the specific set of alternatives in which an option is considered (e.g., Bhargava, Kim, & Srivastava, 2000; Huber et al. 1982; Simonson, 1989). As a result, the value of an option does not only depend on its own characteristics but also on the attribute levels of the other options in the choice set (Simonson & Tversky, 1992). Context effects represent a violation of some essential criteria of rational decision behavior. The principle of regularity claims that the choice probability of an alternative T cannot be raised by adding a new alternative to the choice set $\tilde{S}$ as the relative attractiveness of the existing products cannot be changed, i.e. if $T \in \tilde{S} \subseteq S, P(T,\tilde{S}) \geq P(T,S)$ (Huber et al., 1982). It is contained in the proportionality framework by Luce, which assumes that new alternatives take shares from existing alternatives in proportion to their previous shares (Luce, 1959). The principle of regularity and the proportionality framework are restated in the assumption of *Independence from Irrelevant Alternatives (IIA)*. Accordingly, the "[...] preference between options does not depend on the presence or absence of other options" (Tversky & Simonson, 1993, p. 1179), i.e. if $P(x,y) \neq 0,1$ for all x, $y \in T$, then for any $S \subset T$ such that x, $y \in S$, $\frac{P(x,y)}{P(x,y)} = \frac{P_S(x)}{P_S(y)}$ (Luce, 1959, p. 9). Thus, it is not possible to influence the relative attractiveness, and therefore the choice probability and relative choice shares of existing products, by adding new products. Translated into the delisting framework, these principles propose that after a delisting or elimination the remaining products cannot lose but gain choice share in proportion to their original choice probability. To account for the existence of context effects the principle of *IIA* has to be disproved.

The most robust phenomena, observed in context experiments and documented in behavioral research on market entry and measured by means of preference or choice data, are the *similarity effect* (Tversky, 1972), the *attraction effect* (Huber et al., 1982) and the *compromise effect* (Simonson, 1989). In our explanation, the implications of context effects for product delisting are derived from the theoretical framework and empirical results of essential experiments on product entry. The notation $P[A|\{A,B,C\}]$ denotes the probability of choosing option A from the set of options $\{A,B,C\}$. The three effects are visualized in Figure 1.

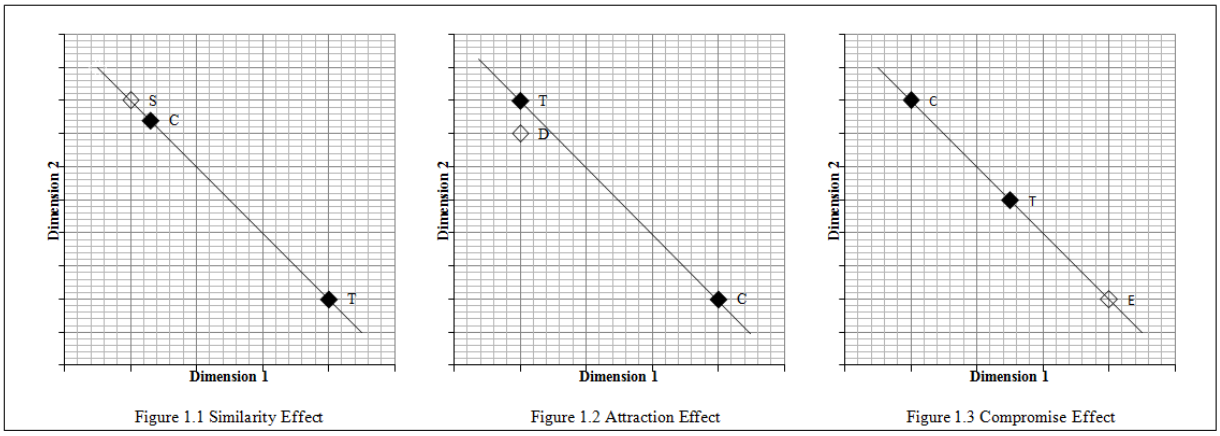

Figure 1: Similarity Effect, Attraction Effect and Compromise Effect

3.1 *Similarity Effect*

The phenomenon of an introduced alternative that takes disproportionately more choice share from similar than from dissimilar alternatives, is referred to as the *similarity effect* (Tversky, 1972). Let us assume the initial choice set consists of two options, *T* (=target) and *C* (=competitor), which differ on two equally important dimensions (e.g. price and quality) such that $P[T|\{T,C\}] \approx P[C|\{T,C\}]$. Subsequently, an option *S*, rather similar to *C*, is added to the choice set (see Figure 1.1).

The similarity effect shows that the similar options *C* and *S* hurt each other but do not hurt option *T*. The relative choice shares change in favor of the target alternative *T* when *S* is introduced. This choice behavior results in a violation of the *IIA* assumption, since $P[T|\{T,C,S\}] > P[C|\{T,C,S\}] \approx P[S|T,C,S\}]$ and $\dfrac{P[T|\{T,C,S\}]}{P[C|\{T,C,S\}]} > \dfrac{P[T|\{T,C\}]}{P[C|\{T,C\}]}$. For our research it is of major interest to consider the reversed case. In which way will consumers react if alternative *S* is removed from the choice set? Will *C* regain the entire lost choice share?

3.2 *Attraction Effect*

The *attraction effect* (Huber & Puto, 1983) denotes the situation when the introduction of an asymmetrically dominated decoy (*D*) increases the choice probability of the dominating target (*T*) (see Figure 1.2). For instance, in the initial choice set a consumer considers options *T* and *C* with $P[T|\{T,C\}] \approx P[C|\{T,C\}]$. Then, an option *D* is added which is similar to *T*, but dominated by *T*. The addition of a decoy to the choice set enhances the probability of choosing the dominating option *T*, since decision makers` preferences for *T* are increased. One argument that could explain the induced shift in choice share is the facilitation of choice strategies by the use of the dominance heuristic. Choosing the dominating alternative avoids having to make difficult trade-offs (Wedell, 1991) and simplifies the justification of the decision (Simonson, 1989). Further substantiated explanations are *loss aversion*, *range-frequency theory* (Parducci, 1974) and *context-dependent weighting* of dimensions (Tversky et al., 1988). The attraction effect violates the fundamental "regularity" principle of choice behavior which claims that after adding an option to the choice set, the probability of choosing *T* or *C* should either stay equal (when *D* is not chosen) or should decrease (when *D* is sometimes chosen). But in the described case $P[T|\{T,C\}] < P[T|\{T,C,D\}]$. Accordingly, the *IIA* assumption is violated, since *D* alters the *T*-to-*C* preference ratio: ($\frac{P[T|\{T,C,D\}]}{P[C|\{T,C,D\}]} > \frac{P[T|\{T,C\}]}{P[C|\{T,C\}]}$).

Typically, research on the attraction effect has looked at the introduction of a new alternative into a choice set. There are only a few studies on the attraction effect and market exit, e.g. Sivakumar and Cherian (1995). In a manipulated experiment, they revealed that brand exit could also produce the attraction effect. The magnitude of the attraction effect (for product exit) turned out to be significantly smaller than for product entry. This implies that the introduction of an asymmetrically dominated decoy that increases the sales of T can be removed from the market again and the positive effect of the former introduction will partly be maintained (Sivakumar & Cherian, 1995).

3.3 *Compromise Effect*

The compromise effect describes the ability of an extreme alternative (*E*) to increase the target`s choice probability by changing its relative position towards an intermediate option (Simonson, 1989). The relative preference of the target which exhibited an extreme position is enhanced by the entry of an even more extreme option (*E*). Suppose in the initial situation two options *T* and *C* are presented with $P[T|\{T,C\}] \approx P[C|\{T,C\}]$. Then, an extreme option *E* is added (see Figure 1.3). Option *T* is turned into a compromise option and hence, the probability of choosing it is augmented, since *T*`s choice has become easier to justify

(Simonson, 1989). $P[T|\{T,C,E\}]>P[E|\{T,C,E\}]$ and $P[T|\{T,C,E\}]>P[C|\{T,C,E\}]$ result again in a violation of the *IIA* assumption as $\frac{P[T|\{T,C,E\}]}{P[C|\{T,C,E\}]} > \frac{P[T|\{T,C\}]}{P[C|\{T,C\}]}$.

If brands are delisted or exit a market, consumers who have been buying these products for years are faced with a new set of alternatives. The context has changed. Their familiar brand is no longer available at their frequently visited store. The elimination from the consideration set alters the decision context of the customer and thus, may also have an influence on the consumer's preference and accordingly choice. Consequently, the importance of the theory on context effects for our research on the prediction of brand delisting effects is evident. Context effects have substantial relevance for predicting consumer brand choice (Van Heerde, Mela, & Manchanda, 2004).

4 Research Objectives and Hypotheses

In the following studies, we are primarily interested in the effects of permanent unavailability of a brand on customer reactions and consequently, store and brand sales. Furthermore, we investigate the underlying decision process by employing research hypotheses derived from context theory. Findings should demonstrate the existence and strength of choice effects in the case of brand elimination and in real world situations. The results of this analysis may help retailers to enhance their decision-making when they consider eliminating items from their assortments or to improve buying conditions in negotiating with manufacturers. Insights on the severity of such a threat are of great value for brand manufacturers. We use the results of previous research on context effects for market entry documented in behavioral research to develop a system of hypotheses, especially similarity, attraction and compromise effect. We use an inverse formulation for the estimation of choice probabilities.

<u>Hypotheses:</u>

Studies on the *similarity effect* have revealed that similar alternatives lose more market share when a new alternative is introduced (Tversky, 1972). Consequently, for the removal of a brand, we expect that a similar brand will regain more market share than a dissimilar alternative (*negative similarity effect*):

***H1**: If an alternative S is removed, the probability of choosing the similar alternative C will increase disproportionately, i.e.*

$$P[C|\{T,C\}] > P[C|\{T,C,S\}] \text{ or } \frac{P[C|\{T,C\}]}{P[T|\{T,C\}]} > \frac{P[C|\{T,C,S\}]}{P[T|\{T,C,S\}]}.$$

With regard to the widely discussed *attraction effect*, a decoy alternative has the ability to increase the attractiveness of the target relative to a competitor when the new product is dominated by the target and not by the competitor (Huber & Puto, 1983). It has been found that the target tends to be selected more often when the decoy is present (Malaviya & Sivakumar, 1998). Accordingly, for market exit, the target brand will lose its dominant position and will be considered less attractive if a dominated or relatively inferior alternative disappears (*negative attraction effect*):

***H2**: If a dominated alternative is removed, the probability of choosing the previously dominating alternative T will not rise or only rise disproportionately, i.e.*

$$P[T|\{T,C\}] < P[T|\{T,C,D\}] \text{ or } \frac{P[T|\{T,C\}]}{P[C|\{T,C\}]} < \frac{P[T|\{T,C,D\}]}{P[C|\{T,C,D\}]}.$$

The *compromise effect* denotes the increase in a brand`s choice share when it becomes an intermediate option in the choice set (Simonson, 1989). If a brand loses its “compromise” position as a consequence of a removal of another brand, we hypothesize that it will be perceived less attractive and accordingly, will lose choice share (*negative compromise effect*):

***H3**: If an alternative is removed from a choice set, the probability of choosing a previously intermediate alternative will not rise or only rise disproportionately.*

$$P[T|\{T,C\}] < P[T|\{T,C,E\}] \text{ or } \frac{P[T|\{T,C\}]}{P[C|\{T,C\}]} < \frac{P[T|\{T,C,E\}]}{P[C|\{T,C,E\}]}.$$

The violation of the proportionality hypothesis underlying classical economic theory is used as an indicator of context effects. To address our research objectives and to test the formulated hypotheses, two empirical studies are conducted. It will be shown if the predicted *negativ*e context effects prove true for market exit and which factors dictate customers’ reaction.

5 Empirical Studies

5.1 *Study 1*

The first study, based on data from a real-life quasi-experiment involves a major European retail chain that decided to delist a leading brand of a main European manufacturer company. In the spring of 2009, the retailing chain started to restructure its product line in the food category by eliminating one of the leading brands in the frozen pizza category. The fundamental goal of our research is to investigate customers` reactions on the modified assortment and to find out if the decision to delist one preeminent brand has certain effects on the market share of alternative brands and if context theory can be used to predict choice behavior. Especially, we were interested in the question of whether delisting hurts the retailer or the manufacturer more. It is of major interest to measure if, on the basis of postulated context effects, it is possible to explicate choices after the removal of a brand and accordingly, changes in choice shares. Furthermore, a multivariate logit analysis is performed to investigate the drivers of the different reaction patterns more intensely.

Before the delisting, there were four substantial brands available in the studied frozen foods assortment at the examined discounter; two brands A and B from the same food manufacturer, one competitor brand C and a store brand D were offered. In spring 2009 the discount chain decided to delist brand A. A preliminary analysis will reveal the competition in the concerned frozen foods market before delisting. Afterwards, specified hypotheses are deduced and tested.

5.1.1 Method

Given that the considered product is one of the major dishes of young people, 329 individuals, primarily students at a large German university, were recruited to participate in an online survey. Earlier studies on context effects have also employed student samples as a valuable resource of information (cf. Huber et al., 1982). As the product category is related very strongly to students’ consumption, we do not see any problems of validity. In addition, respondents who did not complete the questionnaire were excluded from the analysis. Furthermore, the current study required familiarity with the studied product category. That is why we only selected respondents who usually buy frozen food for their household. The final sample included 216 respondents with a mean age of 26.8, 64 percent of them were female, the average household consisted of 2.1 people and students accounted for about 73 percent of all participants (for the investigated product category students apparently represented an important target group).

5.1.2 Principal Components Analysis and Concretized Hypotheses

Initially, a principal component analysis is performed to gain insights into important dimensions and the competition in the studied frozen goods market based on the evaluation of the product attributes. To obtain data for the analysis, respondents were asked to judge each of the four brands on twelve different attributes on a five-point Likert scale ranging from 1 (do not agree at all) to 5 (totally agree). In addition to product name and pricing information, a picture of the product packaging was presented to enhance realism. All checked criteria (MSA= .895, Barlett`s test of sphericity, p-value < .000) supported the applicability of the analysis. The common principles (e.g. Kaiser-criterion) are employed to identify the number of extracted factors. Further investigation of the factor loadings after Varimax rotation enables the interpretation of three extracted dimensions: *quality & taste* (component 1), *balanced diet* (component 2) and *price* (component 3). Subsequently, mean factor scores were computed for each brand and are used to illustrate the positions of the brands in a three-dimensional space which reveals the initial competition in the market (see Figure 2).

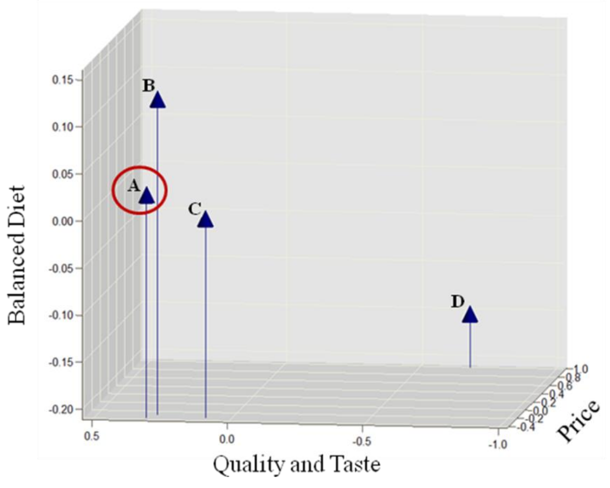

Figure 2: Competition before delisting (Study 1)

The detected positions show that two groups of competitors can be determined: Brand C appears to be the main competitor of brand A. This implies that the two brands are perceived to be the most similar with regard to the included attributes.

The first hypothesis about shifts in market share according to the similarity hypothesis can now be formulated more specifically. Since for the market entry scenario context theory predicts that a similar alternative looses more market share than a dissimilar option, we assume for the inverse setting that the choice share of brand C will rise disproportionately if brand A is delisted, in other words:

***H1**: If alternative A is removed, the probability of choosing the similar alternative C will rise disproportionately, i.e.*

$$\frac{P[C|\{B,C,D\}]}{P[J|\{B,C,D\}]} > \frac{P[C|\{A,B,C,D\}]}{P[J|\{A,B,C,D\}]}, J=\{B,D\}$$

Additionally, consistent with extensive research on the attraction effect, brand A can be considered a relatively inferior alternative ("decoy") to the "target" brand B based on the included attributes (Huber & Puto, 1983). Hence, the market share of brand B should decrease or only increase less than proportionally. H2 finally claims that the market share of brand B will not rise or only rise less than proportionally when brand A is delisted:

***H2**: If the "dominated" alternative A is removed, the probability of choosing alternative B will not rise or only rise disproportionately, i.e.*

$$\frac{P[B|\{B,C,D\}]}{P[J|\{B,C,D\}]} < \frac{P[B|\{A,B,C,D\}]}{P[J|\{A,B,C,D\}]}, J=\{C,D\}$$

The second part of the study permits a test of the generated hypotheses and of the effects of deleting an alternative from the four-item core set, within subjects. To measure the reactions and shifts in choice shares, participants were presented a first choice set including the four alternatives (A, B, C and D) available at the examined discounter and had to make a selection. After answering some general questions about nutrition and buying behavior, respondents were confronted with the reduced choice set which contained the three remaining brands (B, C and D) and the additional options to switch stores or cancel purchase completely (deduced from previous research on OOS responses, see section 2.1). They had to choose again.

5.1.3 Results

The observed relative frequencies of each choice scenario are reported in Table 2. In the first decision situation 27.32 percent of the respondents picked brand A, 31.94 percent brand B, 12.50 percent brand C and 28.24 percent selected the store brand D. In the second choice scenario (after delisting), brand B was chosen by 39.81 percent, 24.08 percent of the respondents decided to select brand C and 33.33 percent picked brand D. Store switching was only selected by two participants (0.93 percent) and only four respondents (1.85 percent) decided not to purchase at all. The very low rate of store switching may have been caused by the method used to collect the data. The small portion of respondents who intended to drop their entire purchase is a distinctive observation for fast moving consumer goods (FMCG)-categories. This outcome is in line with previous research on OOS reactions (cf. Campo et al., 2000). These small portions are hereafter neglected in order to test our hypotheses.

	Before delisting	**After delisting**
Brand A	27.32%	
Brand B	31.94%	39.81%
Brand C	12.50%	24.08%
Brand D	28.24%	33.33%
(Switch store)		(0.93%)
(Cancel purchase)		(1.85%)

Table 2: Relative frequencies of choice options before and after delisting (study 1)

Traditional utility theory and choice models would predict choice shares[3] as follows: if an alternative is deleted from the choice set (brand A), the *IIA* assumption implies a proportional distribution on the remaining brands (brand B, C and D) (Luce, 1959), i.e.

[3] If we assume that the research sample is representative for the market, the choice share would be identical with the market share we utilize in the abbreviation of market share (*MS*).

$$MS_{i,2} = \frac{MS_{i,1}}{\sum_{i=B,i\neq A}^{D} MS_{i,1}} \cdot MS_{A,1} + MS_{i,1}$$

with

$MS_{i,2}$ = market (choice) share of the remaining brands (i={B, C, D} after delisting,
$MS_{A,1}$ = market (choice) share of the delisted brand A before delisting (period 1).

In Table 3 actual ($\Delta MS_{observed}$) and postulated (ΔMS_{IIA}) choice shifts are compared to discover disproportionate movements of market shares. That means that we have to compare the market share expected by using the traditional choice approach and the results of the brand delisting experiment under context specific assumptions.

Brand i	$MS_{i,1}$	$MS_{i,2}$	***Context-dependent*** $\Delta MS_{i,observed}$	***Classical Theory*** $\Delta MS_{i,IIA}$	***Difference***
Brand B	32.38%	40.95%	**+8.57%**^{ns}	+11.77%	-3.20%
Brand C	12.86%	24.76%	**+11.90%*****	+4.68%	+7.23%
Brand D	28.10%	34.29%	**+6.19%**^{ns}	+10.22%	-4.03%

$MS_{i,1}$: market share of brand i before delisting, $MS_{i,2}$: market share of brand i after delisting
*** significant deviation of $\Delta MS_{i,IIA}$, p≤0.01
^{ns} deviation not significant, p>0.05

Table 3: Shifts in choice shares (study 1)

If brand A is delisted, the choice share of brand C is almost doubled. More precisely, the increase in market share (ΔMS_C = +11.90 percent) is significantly higher than postulated by *IIA* ($\Delta MS_{C,IIA}$ = +4.68 percent) with χ^2=7.597, d.f.=1, sig.=.006. This means that $\frac{P[C|\{B,C,D\}]}{P[J|\{B,C,D\}]} > \frac{P[C|\{A,B,C,D\}]}{P[J|\{A,B,C,D\}]}, J = \{B,D\}$. Consequently, keeping with hypothesis 1, a *negative similarity effect* is also prevalent for a removal of a product. We found strong support for hypothesis 1.

When A is delisted, the same-manufacturer brand B can only adopt a small part of former buyers of brand A. Compared to the predicted shift in market share ($\Delta MS_{B,IIA}$ = 11.77 percent), the increase in market share is only 8.57 percent, though the difference is not significant (χ^2=0.876, d.f.=1, Sig.=.349). However, the choice share rises less than proportionally

($\frac{P[B|\{B,C,D\}]}{P[J|\{B,C,D\}]} < \frac{P[B|\{A,B,C,D\}]}{P[J|\{A,B,C,D\}]}, J = \{C,D\}$). Therefore, it can be concluded that for market exit a negative attraction effect also exists; hypothesis 2 is partially confirmed.

The store brand D could also attract some of the previous customers of brand A. However, this increase in market share is smaller than anticipated by *IIA* (χ^2=1.439, d.f.=1, sig.=.230).

5.1.4 *Discussion*

These results can be used to summarize the impacts on both manufacturers and retailers. The food manufacturer of brands A and B loses a remarkable portion of its customers (-18.31 percent) because many respondents decided to switch brands rather than sub-brands. In the second choice scenario, only 8.57 percent of previous buyers of brand A selected brand B (from the same food company), indicating loyalty to the company. In order to evaluate the impacts on retailer`s return further information on realized margins would be needed. However, we can conclude that sales are not so highly affected since nearly all subjects decided in favor of substitution rather than switching stores. In addition, the store brand D could attract some of the previous customers of the removed brand; hence, private-label range is augmented. In the studied example, the competitor brand (C) benefits most from the removal of brand A. It adopted the major portion of recent buyers of brand A and also kept its own customers. Summing up, both retailers and manufacturers should pay heed to the competition environment and employ consolidated findings on context effects when deciding and negotiating on the deletion of product offerings. By dint of the presented study, we succeeded in providing evidence of the existence of two major *negative context effects* for brand exit. However, the third hypothesis on a *negative compromise effect* cannot be tested by means of the discussed experiment, since none of the included brands was considered a “compromise” option. Therefore, the results of a second experiment are presented hereafter.

5.2 *Study 2*

The aim of the second survey is to analyze brand choice for MP3 players (which differed on two attributes, memory in GB and battery in hours) and the effects of a hypothetical removal on shifts in choice shares. Subsequently, we only consider one part of the survey covering the compromise effect and present the major results. For our analysis we kept 260 respondents who showed the demanded familiarity with the product in order to measure preference. A pretest-posttest design was employed to consider customers` reactions on unavailability. Constructed experimental choice scenarios consist of different three-brand choice sets including a compromise option (T) (comparable to Figure 1.3) and reduced two-brand choice sets (an example of the choice set manipulation is presented below).

	Set 1			**Set 2**	
Attribute	**C**	**T**	**E**	**C**	**T**
Memory (in GB)	1	2	4	1	2
Battery (in hours)	9	6	3	9	6

Figure 3: Choice set manipulation (example, study 2)

To test whether a *negative compromise effect* can be detected, we compare choice shares predicted by *IIA* with actual choices (within-subjects) on an aggregated level. If *IIA* holds, market shares of C and T should rise proportionately if alternative E disappears. Table 4 displays selected results.

	MS_1	MS_2	*Context-dependent* $\Delta MS_{observed}$	*Classical Theory* ΔMS_{IIA}	*Difference*
C (1GB, 2h)	12,31%	16,92%	**+4,62%**^{ns}	+1,43%	+3,19%
T (2GB, 6h)	77,31%	83,08%	**+5,77%**^{ns}	+8,96%	-3,19%

Table 4: Shifts in choice shares (study 2)

Comparing the computed expected market share with the observed shares, we can conclude that the previous "compromise" alternative T is selected less often than predicted by IIA. Since T loses its intermediate position, it is perceived less attractive. The increase in market share is, however, not significantly lower (χ^2=2,238, d.f.=1, Sig.=.135). Accordingly, hypothesis 3 is only partially supported. Nevertheless, the finding empirically documents the relevancy of context theory to explain preference shifts when an extreme alternative is removed from the market and choice set respectively.

Negative context effect		Hypothesis	Support	
Negative similarity effect	H1	$\frac{P[C \mid \{T,C\}]}{P[T \mid \{T,C\}]} > \frac{P[C \mid \{T,C,S\}]}{P[T \mid \{T,C,S\}]}$	Study 1	✓
Negative attraction effect	H2	$\frac{P[T \mid \{T,C\}]}{P[C \mid \{T,C\}]} < \frac{P[T \mid \{T,C,D\}]}{P[C \mid \{T,C,D\}]}$	Study 1	✓
Negative compromise effect	H3	$\frac{P[T \mid \{T,C\}]}{P[C \mid \{T,C\}]} < \frac{P[T \mid \{T,C,E\}]}{P[C \mid \{T,C,E\}]}$	Study 2	(✓)

Table 5: Summary of results on negative context effects

Summing up, support for H1, H2 and H3 indicates that the three major context effects, so far verified for market entry, emerge also when items are removed from the market. By considering a real-life example, our results make context effects and negative context effects more relevant to managers. They should take these effects into account when deciding on the reduction of their assortments and brand portfolios, respectively. The provided evidence of the existence of negative context effects demonstrates that eliminating “dominated”, “similar” or “extreme” options affects the market share of the remaining brands in a theoretically predictable way.

5.3 *Determinants of Customers` Reactions*

In a third step, it is of major interest to detect factors that influence customers` decisions when their preferred brand is removed from the shelf. Identifying the key determinants of reactions in delisting situations can provide valuable insights for management. Which antecedents ascertain whether customers either act brand loyal or decide to switch brands? Which variables result in a higher probability to act brand loyal?

To answer these questions, we used data from study 1, kept all respondents representing previous buyers of brand A (n_A=57) and analyzed their behavior in the second choice setting. The research design is given by Figure 4. We are interested in finding an appropriate combination of predictor variables to help explain the binary outcome. The structure of the model can be explained as in Figure 4 and will be explained in detail in the next paragraph. A binary logistic regression is applied. Maximum likelihood estimation is employed to estimate the parameters and to get the indicators for significance testing.

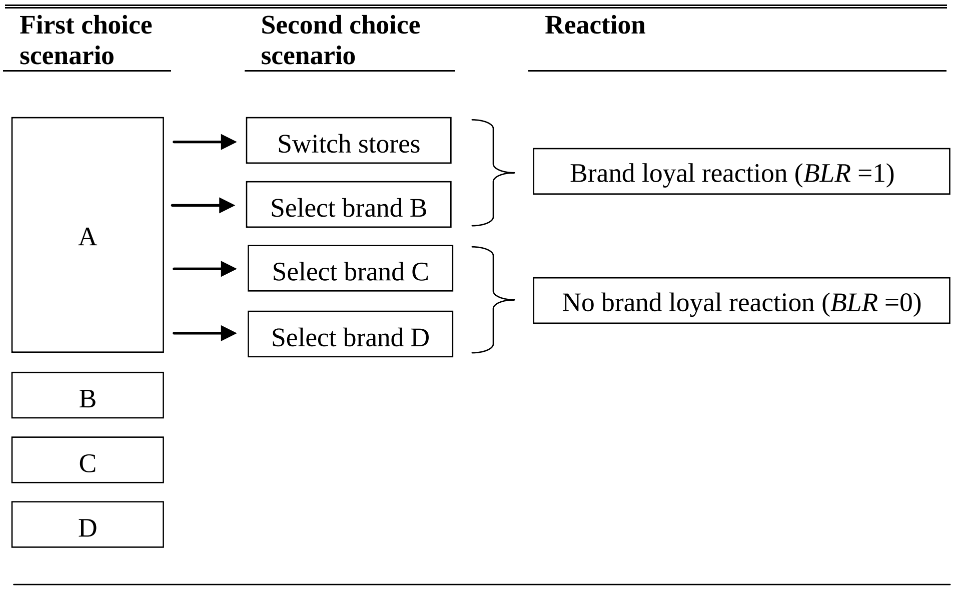

Figure 4: Framework for classifying respondents in terms of brand loyalty of their reaction

5.3.1 Dependent Variable of the Model

In the survey (see 5.1), we measured hypothetical choice before and after delisting. The binary dependent variable ("*brand loyal reaction (BLR)*" with {1, 0} = {"yes", "no"}) is composed of respondents` initial brand choice (A) and their switching behavior. If participants chose to switch to brand B (same-manufacturer brand) or decided to switch stores, their reaction is classified *brand loyal* (*BLR*=1). Switching to brand C or brand D is assigned to a *no brand loyal reaction* (*BLR*=0) (see Figure 4). Table 6 reports the descriptive results.

Reaction	**Frequency**	**n**	**Dependent Variable**
Switch to brand B	21	22	brand loyal reaction (*BLR*=1)
Switch stores	1		
Switch to brand C	23	35	no brand loyal reaction (*BLR*=0)
Switch to brand D	12		

Table 6: Frequency distribution of customer reactions when their preferred brand is delisted

The objective of the subsequent logistic regression is to discover the specific characteristics of both groups of respondents and to specify the differences between the two segments. The determinants contained in the model are described in the subsequent paragraph.

5.3.2 Independent Variables of the Model

We included a set of predictors and a set of control variables in the model to explain the brand loyal reaction. We assume that *BLR* is affected by (1) attitudinal variables, (2) choice set related factors and (3) sociodemographic characteristics (control variables). Attitudinal variables cover positive or negative judgments about different eating habits (*"Addiction to fast food", "Importance of the pizza base", "Importance of variety")* as well as customer specific views of general shopping habits (*"Preference of buying branded products", "Preference of buying high-quality products"*). Choice set related variables pertain to variables that are linked to the composition of available alternatives, such as *"Consideration set size"* and *"Preference strength of buying products from the same manufacturer"* (maker of A and B). The latter is obtained by adding up the points for the preferred brand A and for B provided by the preference ratings on a constant sum scale in the first choice scenario divided by 100.[4] The included sociodemographics that might influence the reaction on delisting consist of *"Age of the respondent"* and *"Sex of the respondent"*. Table 7 summarizes the considered consumer and choice set related factors. The third column indicates the predicted direction of the determinants` effects on the brand loyal reaction chosen by the respondents (*BLR*=1 or *BLR*=0). An increase (or a reduction) in the likelihood of reacting in a brand loyal way is specified by a "+" (or a "-"). For instance, *"Preference of buying branded products"* implies a very brand-conscious behavior, making a brand loyal reaction more likely (presented by a "+" in column three of Table 7). The illustrated hypotheses are derived in the following way:

Hypothesis 4 states that *"Addiction to fast food"* is likely to decrease a brand loyal reaction. If people frequently consume fast food, they are probably habituated to different brands within different product categories. That is why they might switch brands when faced with a delisting (H4: -). Greater *"Importance of variety"* may be associated with a higher probability of a brand loyal response in the case of a manufacturer that offers a huge mixture in its product-line. As the examined company provides reasonable diversity, we expect a positive coefficient (H5: +). If participants consider the pizza base very important, it is assumed that the base is the selection criterion of major significance. Consequently, after the removal of brand A, a pizza with a broadly similar base will be chosen with increasing frequency. In our

[4] The instruction for the constant sum scale task was: "Based on your preference, please distribute 100 points among the brands, giving most points to the brand you prefer most. Make sure the points add up to 100." (Hauser & Shugan, 1980)

example case, B (the same-manufacturer brand) possesses a very different type of base. Therefore, we predict that subjects who attach a lot of importance to the pizza base will be more likely to select C or D in the second choice setting (H6: -). A higher *“Preference of buying branded products”* may obviously be related to a higher chance of a brand loyal behavior (H7: +). If customers prefer buying high-quality products, a brand loyal answer is in turn less likely provided that further brands of high quality are available (H8: -). Moreover, choice set related variables might influence the reaction significantly. We include the predictor *“Consideration set size”* into our model and suggest that a smaller consideration set will induce a notably higher likelihood of a brand loyal reaction (H9: +). This predictor is measured by counting respondents` reported brands of frozen pizza with which they are acquainted. In addition, a stronger *“Preference strength of buying products from the same manufacturer”* is obviously linked to a higher probability of a brand loyal reaction (H10: +). With regard to sociodemographics, a significant influence is presumed for respondents` age and gender. Firstly, elderly people do usually have a favorite brand and are not fond of trying new brands. This is restated in our eleventh hypothesis (H11: +). Secondly, the categorical variable *“Sex of the respondent”* could affect the reaction. Typically, women are responsible for grocery shopping; hence, they are more familiar with grocery brands which often result in a distinctive preference for specific brands (H12: -).

Determinant	**Variable**	**Hypothesis: effect of determinant on BLR**	
	attitudinal variables		
“Addiction to fast food”	FAST_FOOD	H4:	-
“Importance of variety”	IMP_VAR	H5:	+
“Importance of the pizza base”	IMP_BASE	H6:	-
“Preference of buying branded products”	PREF_BRANDS	H7:	+
“Preference of buying high-quality”	PREF_QUALITY	H8:	-
	choice set related variables		
“Consideration set size”	SIZE_CS	H9:	-
“Preference strength of buying products from the same manufacturer”	PREF_A_B	H10:	+
	sociodemographics		
“Age of the respondent”	AGE	H11:	+
“Sex of the respondent”	SEX (1-female, 2-male)	H12:	-

Table 7: Hypotheses on the impact of consumer and choice set related factors

The measurement models of the multiple-item concepts and the measures of the single-item scales are presented in Appendix 1.

5.3.3 The Model

To test the derived hypotheses (H4 to H12), we estimate a binary logit model explaining the choice probability of a brand loyal reaction as a function of the discussed consumer and choice set related factors. In our study, a participant can either select a brand loyal reaction (*BLR*=1) or a non brand loyal reaction (*BLR*=0). The goal of binary logistic regression is to correctly predict the category of outcome (*BLR*=1 and *BLR*=0, respectively) for individual cases using the most parsimonious model. Parameter estimates are recovered that most suitably predict the probability of both outcomes:

$$\pi_k(BLR_k) = \begin{cases} \left(\dfrac{1}{1+\exp\left[-\left(\alpha + \sum_{j=1}^{J} \beta_j x_{jk}\right)\right]} \right) & \text{for } BLR_k = 1 \\ \left(1 - \dfrac{1}{1+\exp\left[-\left(\alpha + \sum_{j=1}^{J} \beta_j x_{jk}\right)\right]} \right) & \text{for } BLR_k = 0 \end{cases} \tag{1}$$

Then the logistic regression model for the log odds of a brand loyal reaction is

$$\ln\left[\frac{\pi_k(BLR_k = 1)}{1-\pi_k\left(BLR_k = 1\right)}\right] = \alpha + \sum_{j=1}^{J} \beta_j x_{jk} \; . \tag{2}$$

Where: $\pi_k(BLR)$ = probability that respondent *k* chooses the brand loyal reaction (if BLR_k = 1) and probability that respondent *k* chooses the non brand loyal reaction (if BLR_k = 0), respectively; α = intercept; x_{jk} = consumer or choice set related characteristic *j*, as perceived by consumer *k*; β_j = coefficient for variable *j*; *J* = Set of consumer or choice set related characteristics expected to affect the way of reaction and

$$\begin{aligned} \alpha + \sum_{j=1}^{J} \beta_j x_{jk} = {} & \alpha + \beta_1 \cdot FAST\_FOOD_k + \beta_2 \cdot IMP\_BASE_k + \beta_3 \cdot IMP\_VAR_k \\ & + \beta_4 \cdot PREF\_BRANDS_k + \beta_5 \cdot PREF\_QUAL_k + \beta_6 \cdot SIZE\_CS_k \\ & + \beta_7 \cdot PREF\_A\_B_k + \beta_8 \cdot AGE_k + \beta_9 \cdot SEX_k \end{aligned} \tag{3}$$

Estimation proceeds by finding parameter estimate betas that maximize the resulting likelihood function. For given values of x_j the expected probability for any respondent k to belong to the brand loyal segment $BLR = 1$ is given by

$$\pi_k(BLR = 1) = \frac{\exp(\alpha + \sum_{j=1}^{J} \beta_j x_{jk})}{1 + \exp(\alpha + \sum_{j=1}^{J} \beta_j x_{jk})} \quad . \tag{4}$$

We employ the software package SAS 9.2, the maximum-likelihood algorithm and the iterative Fisher`s scoring method to estimate the regression parameters.

5.3.4 Results

Prior to estimating the binary logit model, we checked whether multicollinearity might cause methodological problems. The correlation matrix illustrates very low correlation coefficients between the independent variables (see Appendix 2). Therefore, the condition of independency is satisfied and the estimators will not be affected significantly (Leeflang, Wittnik, Wedel, & Neart, 2000). The results of the estimated binary logit models are presented in Table 8. We estimated the different models stepwise in order to reveal potential moderating effects of choice set or demographic variables. By comparing the results, an underlying cause of the control variables can be excluded (see Table 8). Accordingly, the subsequent interpretation and discussion of the estimation outcomes is focused on the most exhaustive model 3. The model`s χ^2 statistic is 28.064 (with d.f.=9, p=.001). Hence, we can conclude that at least one of the betas in equation (6) is nonzero. The computed goodness-of-fit measures indicate an adequate fit of the statistical model.

	Model 1			Model 2			Model 3		
	χ^2=14.0556 (df=5, p=.015)			χ^2=21.5977 (df=7, p=.003)			χ^2=28.064 (df=9, p=.001)		
Parameter	Coefficient (std.error)	Wald	Odds Ratio	Coefficient (std.error)	Wald	Odds Ratio	Coefficient (std.error)	Wald	Odds Ratio
Intercept	0.8624 (1.5819)	0.2972		-4.5013 (2.7440)	2.6908		-10.6485 (4.7509)	50.237	
FAST_FOOD	-0.6530* (0.3565)	3.3560	0.520	-0.6446* (0.3822)	2.8452	0.525	-0.2823 (0.3988)	0.5013	0.754
IMP_VAR	0.3288 (0.2170)	2.2960	1.389	0.3274 (0.2347)	1.9452	1.387	0.4444* (0.2675)	27.597	1.560
IMP_BASE	-0.3869* (0.2100)	3.3941	0.679	-0.4624* (0.2641)	3.0649	0.630	-0.6625** (0.3119)	45.129	0.516
PREF_BRANDS	0.3259 (0.3108)	1.0995	1.385	0.5717 (0.3589)	2.5371	1.771	0.5050 (0.3941)	16.416	1.657
PREF_QUAL	-0.4878 (0.3039)	2.5767	0.614	-0.9023** (0.4039)	4.9913	0.406	-1.2656** (0.5120)	61.098	0.282
SIZE_CS				0.5506 (0.3912)	1.9812	1.734	0.9473* (0.5021)	35.596	2.579
PREF_A_B				7.0157** (3.1521)	4.9537	>999.9	7.9481*** (3.5584)	49.889	>999.9
AGE							0.2185* (0.1235)	31.296	1.244
SEX							0.4883 (0.9802)	0.2482	1.630
Model Fit									
-2 Log likelihood	61.972			54.430			47.963		
AIC	73.972			70.430			67.963		
SC	86.230			86.774			88.394		
Nagelkerke-R^2	0.2967			0.4282			0.5279		
Cox & Snell-R^2	0.2185			0.3154			0.3888		
Hosmer-Lemeshow Goodness-of-Fit Test	4.7451 (df=8, p=.7844)			182.237 (df=8, p=.0196)			40.283 (df=8, p=.8546)		

*p<0.1, ** p<0.05, *** p<0.01

Table 8: Results of binary logistic regression

We find some of the expected effects, some hypotheses are rejected and some predictors turned out not to be significant. Participants` *“Addiction to fast food”* revealed no significant effect (no support of H4). In contrast, the *“Importance of variety”* offered by a frozen food manufacturer has a significant effect. The impact on participant`s probability to react in a brand loyal way is positive if he favors variety, consistent with hypothesis 5. If companies offer a diversified portfolio, it might be easier to switch to another kind of pizza by sticking to the same manufacturer. Thus, food companies facing the threat of being delisted should sell other sub-brands at the same store to keep customers. Moreover, customers who perceive the pizza base to be very important will be less likely to select the brand loyal reaction (*BLR*=1). This is in line with hypothesis 6. If their favorite brand is not available, they will select a pizza with a comparable base. In the studied example, the additional pizza of the same manufacturer (B) does not represent an acceptable option, since the type of base differs a lot. The predictor *"Preference of buying branded products"* has no significant effect on the probability of a brand loyal response; therefore hypothesis 7 is not confirmed. In contrast, the negative coefficient of the predictor variable *"Preference of buying high-quality products"* coincides with the assumption that customers who are especially aware of high-quality products do not hesitate to switch brands if both provide high quality. While hypothesis 8 is supported, hypothesis 9 is rejected. The positive parameter of the predictor *"Consideration set size"* indicates an increase in the probability of the brand loyal outcome (*BLR*=1) when respondents have larger consideration sets. A possible explanation for this result might be that participants who are acquainted with more brands of frozen pizzas are normally more familiar with the product category and accordingly, appreciate most the manufacturer brand. Aditionally, hypothesis 10 is corroborated. The "*Preference of buying a product from the same manufacturer"* significantly influences the binary outcome of *BLR*. As expected, a higher preference for A and B augments the chance of being brand loyal after the removal of A. Another significant explanatory variable is the *"Age of the respondent"*. The outcome reflects the prevalent opinion that, in general, brand loyalty is higher for elderly people because they are more likely to have one favorite brand. In addition, older people experiment less with new brands. Finally, the effect of *"Sex of the respondent"* is not significant, implying no confirmation of hypothesis 12. Table 9 combines the discussed findings.

Determinant	**Variable**	**Hypothesized effect**	**Result binary model**
		attitudinal variables	
"Addiction to fast food"	FAST_FOOD	H4: -	n.s.
"Importance of the variety"	IMP_VAR	H5: +	✓
"Importance of the pizza base"	IMP_BASE	H6: -	✓
"Preference of buying branded products"	PREF_BRANDS	H7: +	n.s.
"Preference of buying high-quality"	PREF_QUALITY	H8: -	✓
		choice set related variables	
"Consideration set size"	SIZE_CS	H9: -	×
"Preference of buying a product from the same manufacturer."	PREF_A_B	H10: +	✓
		sociodemographics	
"Age of the respondent"	AGE	H11: +	✓
"Sex of the respondent"	SEX	H12: -	n.s.

Table 9: Summary of hypotheses and results

6 Discussion and Implications

The purpose of this paper is to investigate how customers react when restrictions are imposed on product offerings. The first part of the study proves that the widely discussed context effects for an expansion of the choice set are also present in situations when the expected product offering is reduced. In particular, the meaningful impact of unavailable options on preferences and consequently choice is shown. Rational principles of choice are violated. The paper provides evidence that removing “dominated”, “similar” or “extreme” alternatives from the shelf impacts choice shares of the remaining brands in a theory-based predictable way. The results of study 1 illustrate that delisting can harm the manufacturer and indicate the influence of context on customers` reactions. Most of the customers (39 percent) of the delisted brand A switch to the main competitor brand C in the second choice situation. The concerned food company can only keep a smaller part of the previous customers of brand A (35 percent). In contrast, the retailer faces a negligible loss of customers in our sample; store switching is only selected by two respondents. This delivers valuable input for retailer-manufacturer negotiations. They have to incorporate the specific positions of the involved products when negotiating prices and shelf spaces. Indeed, we have managed to verify three substantial context effects for choice set reduction, the *negative* substitution effect, the *negative* attraction effect and the *negative* compromise effect, which makes context theory more important for managers. Our findings contribute to marketing literature on context effects by empirically documenting the impact of choice set reduction on preference shifts. In fact, context matters when a brand is delisted.

The second part of the empirical application detects important characteristics of brand loyal customers. The influence of some key determinants on subjects` reaction is studied by employing a logistic regression. The utilization of this type of model is determined by the nature of the dichotomous dependent variable, describing a brand loyal vs. a non brand loyal reaction. Results suggest that both consumer and choice set related determinants significantly affect customer reaction. Elderly respondents with a larger consideration set who prefer variety and buying brands from the same manufacturer but do not consider the pizza base to be important exhibit a higher probability of a brand loyal reaction. Taking into account the initial competition, these predictors may have an influence on the magnitude of the *negative* attraction effect. Since the same-manufacturer brand B is perceived slightly superior to A on the included dimensions, the reaction classified as brand loyal decreases the proposed *negative* attraction effect. The presented results reveal important determinants of a brand loyal reaction that should be considered by multi-brand companies when deciding on or negotiating about the removal of brands.

A major limitation of our research is that the results are based only on reported delisting responses and attitudinal data. Despite the fact that data collection by means of a questionnaire can be criticized in different ways, a substantial advantage of questionnaires over real choices represents the possibility to differentiate clearly between the potential reactions. In addition, surveys allow collecting supplementary information which can be utilized to explain stated behavior. In our study, respondents face a hypothetical delisting situation which shows that people do not always act in the same way they pretend they would. Sometimes, subjects have difficulties to imagine a situation such as the one with which they were confronted, which altogether may lower the external validity. However, the questionnaire allows us to collect relevant information necessary to address the specific research objective and there is broad support in the literature that hypothetical and real choices can lead to the same results (Kühberger, Schulte-Mecklenbeck, & Perner, 2002; Wiseman & Levin, 1996). Furthermore, the hypotheses in the first part of the study are tested by means of aggregated data. The boundaries of our research generate opportunities for future research. The analysis covers only two product categories, particularly; choice in both experiments was limited to four and three alternatives, respectively. Further research has to generalize the findings by examining more categories in a real-world shopping situation. Scanner panel data across stores could enable the development of a tool to determine consequences and practical implications for manufacturers and retailers prior to brand delistings. Developing effective strategies to manage dissatisfaction due to delistings would be another useful and interesting area to be explored. For instance, is suggesting an available alternative a positive or negative approach? Should retailers communicate that a brand is going to be delisted? Should they offer an equivalent store brand? Besides this operational objective, additional moderators should be included when analyzing the outcome of an entire delisting strategy. A causal model can be used to cover complex relationships between major antecedents and constructs.

Overall, the results of the study demonstrate that consumer preferences and responses to delisting are strongly influenced by the composition and framing of the choice set. Retailers and manufacturers should derive advantages from insights on context theory when deciding on items to delist.

Appendix 1: measurement models of multi-item concepts and measures of the single-item scales

Determinant	Variable	Concept	Measure
		attitudinal variables	
multi-item scale			
Addiction to fast food	FAST_FOOD (Cronbach`s α = 0,71)		
		"I often eat fast-food."	1-I totally disagree, 5-I totally agree
		"I prefer to cook dishes that do not take much time."	1-I totally disagree, 5-I totally agree
		"I often eat out."	1-I totally disagree, 5-I totally agree
		"At home we often cook our own food." *	1-I totally disagree, 5-I totally agree
single-item scales			
Importance of the variety	IMP_VAR	"When buying frozen pizza, how important do you consider a great variety of pizza?"	1-not at all important, 7-very important
Importance of the pizza base	IMP_BASE	"When buying frozen pizza, how important do you consider the pizza base?"	1-not at all important, 7-very important
Preference of buying branded products	PREF_BRANDS	"Groceries from well-known brands are better than those from unknown brands."	1-I totally disagree, 5-I totally agree
Preference of buying high-quality products	PREF_QUALITY	"When buying groceries, I especially take heed of quality."	1-I totally disagree, 5-I totally agree
		choice set related variables	
Consideration set size	SIZE_CS	Number of named brands (consideration set)	"Please name all the brands of pizza that you are acquainted with."
Preference Strength of buying products from the same manufacturer	PREF_A_B	Points for the preferred brand A and brand B are added up provided by the preference ratings on a constant sum scale in the first choice scenario divided by 100.	"Based on your preference, please distribute 100 points among the brands, giving most points to the brand you prefer most. Make sure the points add up to 100."
		sociodemographics	
Age of the respondent	AGE	Age of the respondent	in years
Sex of the respondent	SEX	Sex of the respondent	1-female, 2-male

* Scores of statements that measure the opposite of the indicated characteristics were recoded.

Appendix 2: Correlation Matrix

	FAST_FOOD	IMP_VAR	IMP_BASE	PREF_BRANDS	PREF_QUALITY	SIZE_CS	PREF_A_B	AGE	SEX
FAST_FOOD	1								
IMP_VAR	-.116	1							
IMP_BASE	-.099	.024	1						
PREF_BRANDS	.008	.230	-.119	1					
PREF_QUALITY	-.098	.114	.171	.139	1				
SIZE_CS	-0.119	-0.055	0.243	-0.153	-0.00081	1			
PREF_A_B	-0.136	0.204	-0.158	-0.025	0.302	-0.015	1		
AGE	-0.379	0.142	0.182	0.195	0.151	-0.119	0.119	1	
SEX	0.126	-0.086	-0.202	0.129	0.242	-0.079	-0.008	0.178	1

References

Anupindi, R., Dada, M., & Gupta, S. (1998). Estimation of Consumer Demand with Stock-Out Based Substitution: An Application to Vending Machine Products. *Marketing Science, 17(4),* 406-423.

Bettman, J.R. (1979). An Information Processing Theory of Consumer Choice. Reading, Mass: Addison- Wesley Publishing.

Bettman, J.R. & Park, C.W. (1980). Effects of Prior Knowledge and Experience and Phase of the Choice Process on Consumer Decision Processes: A Protocol Analysis. *Journal of Consumer Research, 7(3),* 234-248.

Bettman, J.R, Luce, M.F., & Payne, J.W. (1998). Constructive Consumer Choice Processes. *Journal of Consumer Research, 25(3),* 187-217.

Bhargava, M., Kim, J., & Srivastava, R.K. (2000). Explaining Context Effects on Choice Using a Model of Comparative Judgment. *Journal of Consumer Psychology, 9(3),* 167-177.

Boatwright, P. & Nunes, J.C. (2001). Reducing Assortment: An Attribute-Based Approach. Journal *of Marketing, 65(3),* 50–63.

Borle, S., Boatwright, P., Kadane, J.B., Nunes, J.C., & Shmueli, G. (2005). The Effect of Product Assortment Changes on Customer Retention. *Marketing Science 24(4),* 616–622.

Broniarczyk, S.M., Hoyer, W.D., & McAlister, L. (1998). Consumers' Perceptions of the Assortment Offered in a Grocery Category: The Impact of Item Reduction. *Journal of Marketing Research, 35(2),* 166-176.

Campo, K., Gijsbrechts, E., & Nisol, P. (2000). Towards Understanding Consumer Response to Stock-Outs. *Journal of Retailing, 76(2),* 219–242.

Campo, K., Gijsbrechts, E., & Nisol, P. (2003). The impact of retailer stockouts on whether, how much, and what to buy. *International Journal of Research in Marketing, 20(3),* 273–286.

Campo, K., Gijsbrechts, E., & Nisol, P. (2004). Dynamics in consumer response to product unavailability: do stock-out reactions signal response to permanent assortment reductions? *Journal of Business Research, 57(2),* 834– 843.

Chernev, A. (2003). When More Is Less and Less Is More: The Role of Ideal Point Availability and Assortment in Consumer Choice. *Journal of Consumer Research, 30(2),* 170-183.

Corsten, D. & Gruen, T. (2003). Desperately seeking shelf availability: an examination of the extent, the causes, and the efforts to address retail out-of-stocks. *International Journal of Retail & Distribution Management, 31(12),* 605-617.

Corsten, D. & Gruen, T. (2004). Stock-outs cause walkouts. *Harvard Business Review, 85(2),*26-28.

Dhar, R. & Glazer, R. (1996). Similarity in Context: Cognitive Representation and Violation of Preference and Perceptual Invariance in Consumer Choice. *Organizational Behavior and Human Decision Processes, 67(3),* 280–293.

Drèze, X., Hoch, S.J., & Purk, M.E. (1994). Shelf Management and Space Elasticity. *Journal of Retailing, 70(4),* 301–326.

ECR Europe & Roland Berger (2003): ECR – Optimal Shelf Availability – Increasing Shopper Satisfaction at the Moment of Truth.

Emmelhainz, M., Stock, J.R., & Emmelhainz, L.W. (1991). Consumer Responses to Retail Stock-Outs. *Journal of Retailing, 67(2),* 138-147.

Fitzsimons, G.J. (2000). Consumer Response to Stockouts. *Journal of Consumer Research, 27(2),* 249-266.

Gourville, J. T. & Soman, D. (2005). Overchoice and assortment type: When and why variety backfires. *Marketing Science, 24(3),* 367–381.

Hauser, J.R. & Shugan, S.M. (1980). Intensity Measures of Consumer Preference. *Operation Research, 28(2),* 278-320.

Hegenbart, T. (2009). Kundenverhalten bei Nichtverfügbarkeit von Artikeln im Einzelhandel – Einflussfaktoren, Konsequenzen und Implikationen. Lohmar: JOSEF EUL VERLAG.

Hoch, S.J., Bradlow, E.T., & Wansink, B. (1999). The Variety of an Assortment. *Marketing Science, 18(4),* 527-546.

Howard, J.A. & Sheth, J.N. (1969). The Theory of Buyer Behavior. New York: John Wiley & Sons.

Huber, J., Payne, J.W., & Puto, C. (1982). Adding Asymmetrically Dominated Alternatives: Violations of Regularity and the Similarity Hypothesis. *Journal of Consumer Research, 9(1)*, 90-98.

Huber, J. & Puto, C. (1983). Market Boundaries and Product Choice: Illustrating Attraction and Substitution Effects. *Journal of Consumer Research, 10(1),* 31-44.

Iyengar, S. S. & Lepper, M. R. (2000). When choice is demotivating: Can one desire too much of a good thing? *Journal of Personality and Social Psychology, 79(6)*, 995– 1006.

Kalyanam, K., Borle, S., & Boatwright, P. (2007). Deconstructing Each Item's Category Contribution. *Marketing Science, 26 (3),* 327-341.

Kivetz, R., Netzer, O., & Srinivasan, V. (2004). Alternative Models for Capturing the Compromise Effect. *Journal of Marketing Research, 41(3),* 237–257.

Kühberger, A., Schulte-Mecklenbeck, M., & Perner, J. (2002). Framing decisions: Hypothetical and real. *Organizational Behavior and Human Decision Processes, 89(2),* 1162-1175.

Leeflang, P. S. H., Wittink, D. R., Wedel, M., & Naert, P. A. (2000). Building models for marketing decisions. Dordrecht: Kluwer Academic Publishers.

Luce, R.D. (1959). Individual Choice Behavior – A Theoretical Analysis. New York: John Wiley & Sons.

Malaviya, P. & Sivakumar, K. (1998). The moderating effect of Product Category Knowledge and Attribute Importance on the Attraction Effect. *Marketing Letters, 9(1),* 93-106.

Messinger, P. R. & Narasimhan, C. (1997). A model of retail formats based on consumers' economizing on shopping time. *Marketing Science, 16(1),* 1- 23.

Oppewal, H. & Koelemeijer, K. (2005). More choice is better: Effects of assortment size and composition on assortment evaluation. *International Journal of Research in Marketing, 22(1),* 45–60.

Pan, Y. & Lehman, D.R. (1993). The Influence of New Brand Entry on Subjective Brand Judgments. *Journal of Consumer Research, 20(1),* 76-86.

Parducci, A. (1974). Contextual effects: A range-frequency analysis. In E.C. Carterette & M.P. Freidman (Eds.) *Handbook of perception*. New York: Academic Press.

Payne, J.W., Bettman, J.R., & Johnson, E.J. (1992). Behavioral decision research: A constructive processing perspective. *Annual Review of Psychology, 43,* 87-131.

Peckham, J. (1963). The Consumer speaks. *Journal of Marketing, 27(4),* 21–26.

Schary, P.B. & Christopher, M. (1979). The Anatomy of a Stock-Out. *Journal of Retailing, 55(2),* 59-70.

Schwartz B. (2004). The paradox of choice: Why more is less. New York, NY: Collins.

Simonson, I. (1989). Choice based on Reasons: The Case of Attraction and Compromise Effects. *Journal of Consumer Research, 16(2),*158-174.

Simonson, I. & Tversky, A. (1992). Choice in Context: Tradeoff Contrast and Extremeness Aversion. *Journal of Marketing Research, 29(3),* 281-295.

Sivakumar, K. & Cherian, J. (1995). Role of Product Entry and Exit on the Attraction Effect. *Marketing Letters, 6(1),* 45-51.

Sheng, S., Parker, A.M., & Nakamoto, K. (2005). Understanding the Mechanism and Determinants of Compromise Effects. *Psychology & Marketing, 22(7),* 591–609.

Sloot, L.M. & Verhoef, P.C. (2008). The Impact of Brand Delisting on Store Switching and Brand Switching Intentions. *Journal of Retailing, 84(3),* 281–296.

Sloot, L.M., Verhoef, P.C., & Franses, P.H. (2005). The impact of brand equity and the hedonic level of products on consumer stock-out reactions. *Journal of Retailing, 81(1),* 15–34.

Sloot, L.M., Fok, D., & Verhoef, P.C. (2006). The Short- and Long-term Impact of an Assortment Reduction on Category Sales, *Journal of Marketing Research, 43(4),* 536–548.

Slovic, P. (1995). The construction of preference. *American Psychologist, 50(5),* 364-371.

Steenkamp, J.B.E.M. & Wedel, M. (1991). Segmenting retail markets on store image using a consumer-based methodology. *Journal of Retailing, 67(3),* 300–320.

Tversky, A. (1972). Elimination by Aspects: A Theory of Choice. *Psychological Review, 79(4),* 281-299.

Tversky, A. & Simonson, I. (1993). Context-Dependent Preferences. *Management Science, 39(10),* 1179-1189.

Tversky, A., Sattath, S., & Slovic, P. (1988). Contingent Weighting in Judgment and Choice. *Psychological Review, 95(3),* 371-384.

Van Heerde, Mela, & Manchanda, (2004). The Dynamic Effect of Innovation on Market Structure. *Journal of Marketing Research, 41(2)*, 166–183.

Verbeke, W., Farris, P., & Thurik, R. (1998). Consumer response to the preferred brand out-of-stock situation. *European Journal of Marketing, 32(11,12),* 1008-1028.

Walter, C.K. & Grabner, J.R. (1975). Stockout Cost Models: Empirical Tests in a Retail Situation. *Journal of Marketing, 39(3),* 56-68.

Wedell, D.H. (1991). Distinguishing among models of contextually induced preference reversals. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 17(4),* 767-778.

Wiseman, D.B. & Levin, I.P. (1996). Comparing Risky Decision Making Under Conditions of Real and Hypothetical Consequences. *Organizational Behavior and Human Decision Processes, 66(3),* 241-250.

Zhang, J. & Krishna, A. (2007). Brand-level effects of stockkeeping unit reductions. *Journal of Marketing Research, 44(4),* 545–559.

Zinn, W. & Liu, P.C. (2001). Consumer Response to Retail Stockouts. *Journal of Business Logistics, 22(1)*, 49-71.

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