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Costumer reactions to real out-of-stocks

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Abstract

The occurrence of stockouts remains an unsolved problem for retailers that provoke severe revenue and image losses, as well as greater customer dissatisfaction for both retailers and manufacturers. A literature review suggests a model of influential antecedents of consumers' reactions to product unavailability. A field study then provides insights into true stockout situations, unlike a hypothetical research setting. With these data, this study reveals that loyalty and the presence of product alternatives have the greatest impacts on customer reactions. This result has significant theoretical and managerial implications due to the fact that results based on hypothetical settings did not hold.

1. Introduction

In recent years, retailers have had to cope with severe competition, decreasing retailer margins and a mature market, even as customer behavior grows more hybridized and difficult to predict. Rising demands for lower prices, high quality standards and customer-friendly service place increasing pressures on retailers to achieve a strategic competitive advantage by offering the requested goods at the right time in the right place in the right quantity and quality. A specific and still unresolved problem is thus the existence of stockouts (Helm and Stoelzle 2007).

Although already widely discussed, ensuring sufficient product availability at the point of sale has not been established in practice. As several studies confirm, approximately five - ten percent of all goods are out of stock (OoS) at any particular time (Gruen et al. 2002). Various projects attempt to guarantee optimal shelf availability, but despite some improved logistics and the development of innovative measurement approaches (Papakiriakopoulos 2006, Hardgrave et al. 2005), consumers' perceptions and assessments of stockouts continue continue to be of high interest. They rank empty shelves highly in terms of causing consumer annoyance and dissatisfaction (Kelly et al. 2000). Furthermore, OoS induce several customer reactions, including product, category, brand, and store switching, as well as delaying or cancelling purchases (Sloot et al. 2005, Campo et al. 2000). Such customer reactions can result in substantial revenue losses for retailers and manufacturers; estimates suggest average sales losses of up to four percent (Gruen et al. 2002).

Empirical investigations also reveal that customer reactions differ across category (Zinszer and Lesser 1981, Emmelhainz et al. 1991, Gruen et al. 2002). Various studies have tried to develop an overall picture of the key determinants that influence customer behavior (Sloot et al. 2005, Zinn and Liu 2001, Campo et al. 2000, Verbeke et al. 1998), yet most concentrate on a limited number of product categories and retail formats. They also rely on an artificial research design, which has negative influences on the external validity of their empirical results.

In response to these concerns, we attempt to contribute to the literature in several ways. By using true stockout situations, we address some research gaps and verify some existing results. Furthermore, we aim to analyze customer reactions on the basis of preferably abstract influences, which offer generally useable findings. Because we investigate a greater variety of influences simultaneously, we also obtain insights into the relative influence of these factors, which we reinforce by the observation of different product categories.

The structure of our paper is as follows: First, we briefly discuss previous research concerning customer reactions and influencing factors on customer behavior. Second, we present our conceptual model and the underlying hypotheses. Third, we continue with a description of our research methodology and empirical results. Fourth, as our conclusion, we discuss general implications and indicate directions for further research.

2. Literature review

Consumer behavior in response to an OoS constitutes a long-standing marketing and retailing problem. The importance of the topic emerged in the 1960s (Peckham 1963), and immediately thereafter, studies mainly described various consumer reactions, without analyzing the process that led to those behaviors. They identified:

(a) Article switch: The consumer switches to another type of packaging but not another brand.

(b) Brand switch: The consumer purchases a different brand in the same product category.

(c) Store switch: The product gets purchased on the same day from a different store.

(d) Postponement: The product is purchased during the next regular shopping trip.

(e) Cancellation: No purchase takes place at all, or not until after a relatively long period.

In Table 1, we summarize the results of different studies, according to how stockout reactions differ by product category.

Authors	Stockout reactions				
	Article-switch	Brand-switch	Store-switch	Postpone-ment	Cancel-lation
Walter/Grabner 1975 (Wine, Spirits)	19.3%	64.1%	14.1%	2.5%	-
Schary/Christopher 1979 (Groceries)	4.8%	17.4%	47.9%	11.1%	18.7%
Emmelhainz/Emmelhainz/Stock 1991 (Groceries)	41.0%	32.0%	14.0%	13.0%	-
Verbeke/Farris/Thurik 1998 (Groceries)	65.0%*		25.0%	20.0%	-
Campo/Gijsbrechts/Nisol 2000 (Cereals)	44.0%*		3.3%	49.0%	3.7%
Campo/Gijsbrechts/Nisol 2000 (Margarine)	66.0%*		2,0%	30.0%	2.0%
Zinn/Liu 2001 (Furniture, Jewelry, White goods)	62.0%*		22.9%	15.1%	-
Gruen/Corsten/Bharadwaj 2002 (Meta-Analysis)	19.0%	26.0%	31.0%	15.0%	9.0%
Sloot/Verhoef/Franses 2005 (Groceries)	18.0%	36.0%	19.0%	23.0%	3.0%
Woensel/Donselaar/Broekmeulen/Fransoo 2007 (Bread)	84.0%*		10.0%	6.0%	

* Article and brand switch represent one category (substitution)

Table 1: Customer stockout reactions from existing research studies

These diverse reaction patterns might reflect divergent stockout definitions, the use of different stockout types (e.g., artificial, hypothetical, true), different research designs (survey at checkout, survey at the shelves), or the analysis of different product categories.

However, because the descriptive findings cannot paint a complete picture of OoS phenomena and shed light only on heterogeneous consumer reactions (Kim 2004), more recent research has considered antecedents that might explain stockout behavior more explicitly (Verbeke et al. 1998, Campo et al. 2000, Zinn and Liu 2001, Sloot et al. 2005). In some cases, often based on a theoretical framework (Campo et al. 2000, Sloot et al. 2005), these studies distinguish among product-, store-, consumer-, and situation-specific variables. For their research methodology, the studies apply either a true (Verbeke et al. 1998, Zinn and Liu 2001) or hypothetical (Campo et al. 2000, Sloot et al. 2005) stockout scenario. In the first case, respondents encounter an empty shelf in the product category of interest, usually because the researcher has removed certain items in advance of the experiment (Verbeke et al. 1998). In the second case, respondents reveal how they would react if an item were unavailable. The obvious discrepancy between hypothetical and true behavior highlights the limited external validity of the hypothetical procedure (Van Woensel et al. 2007). Because

respondents do not perceive an actual OoS situation, these studies cannot rule out manipulated or untrue answers.

Therefore, we investigate the direction and magnitude of factors that might influence consumers' reactions in a true OoS situation. Existing studies with a true OoS design are somewhat limited in their research design; for example, Verbeke et al. (1998) incorporate only a few specific research questions (e.g., existence of competing stores, general store loyalty, temporary OoS versus assortment changes, amounts spent per shopping trip, total household spending). Zinn and Liu (2001) undertake separate explorations of store, situational, and consumer characteristics, and they include many demographical variables, none of which had a significant impact on customer behavior. However, their study features a limited number of product-related variables. Based on this idea, we investigate these antecedents that manufacturers and retailers can influence, which grants them important potential abilities to overcome negative stockout reactions.

3. Overall theoretical model

Our model attempts to identify the main antecedents of a true stockout scenario. From existing approaches to characterize the general conditions of a buying situation (Simonson 1999, Belk 1975) and prior OoS studies, we identify four main groups of antecedents, which are useful for specifying an existing stockout situation from a consumer's point of view. Our model includes product- and store-related factors, as well as personal and situational factors. If we combine these antecedents with possible consumer reactions, we derive the overall theoretical model in Figure 1. We describe the exact model design subsequently.

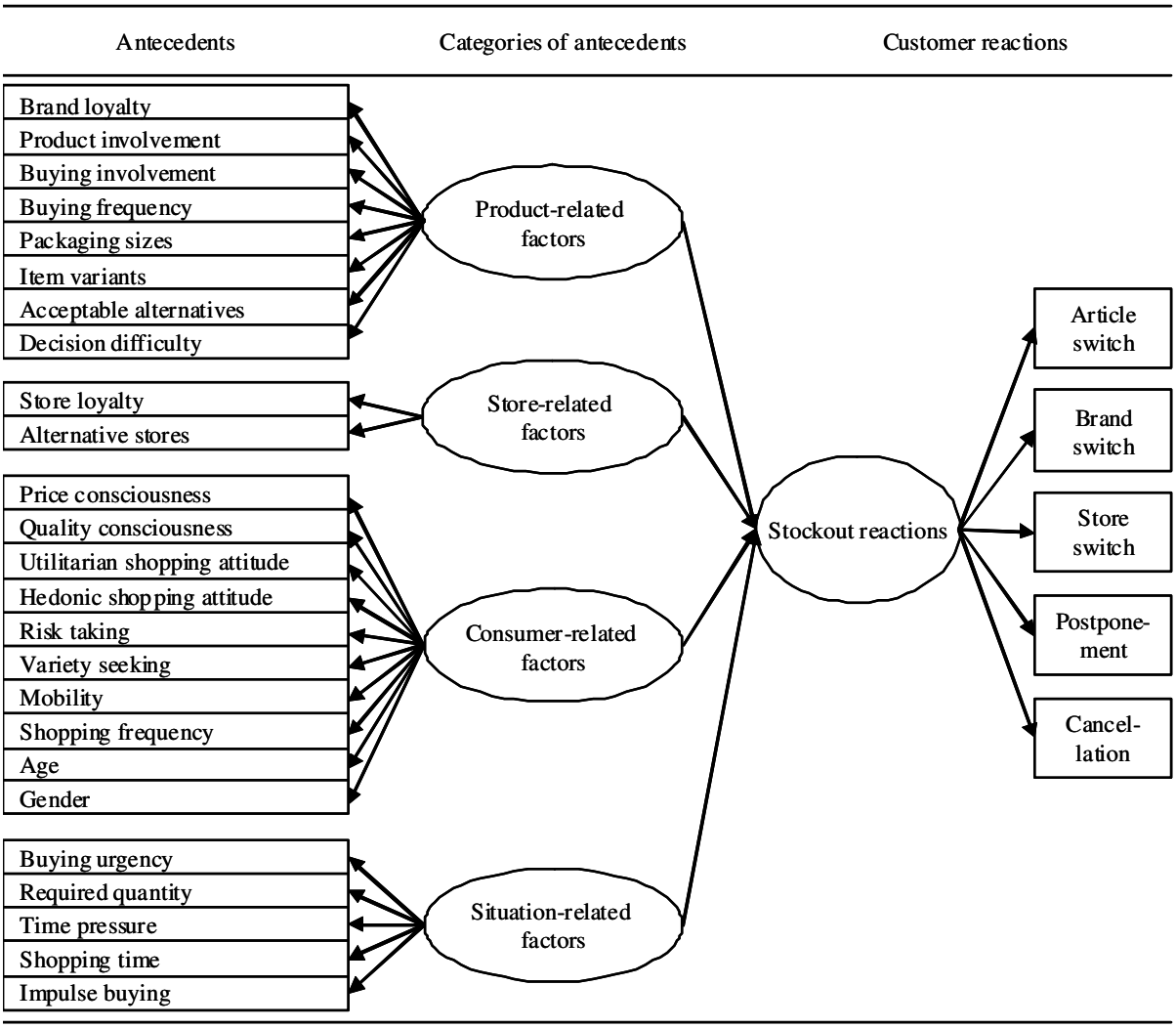

Figure 1: Model of antecedents and consequences of a stockout situation

Product-related variables

Product-related factors summarize all variables in direct reference to a product category purchased by the consumer, because consumers behave differently in different product categories. In particular, several studies have shown that increasing brand loyalty minimizes the likelihood of a brand switch (Emmelhainz et al. 1991, Campo et al. 2000, Zinn and Liu 2001, Sloot et al. 2005). Brand-loyal consumers thus are more likely to choose an alternative article, switch stores, or postpone their purchase (H_{1a}).

Involvement is another basic construct of marketing theory. Determinants related to product and buying involvement appear especially useful because of their close relation to the buying decision (Mittal 1989; Mittal and Lee 1989). Product involvement refers to perceived relevance of a product type to the consumer, as determined by the expected value of usage or consumption (Zaichkowsky 1986). The perceived risks and monetary/nonmonetary losses of a

poor decision summarize the concept of buying involvement. If a product is especially important, the consumer is less likely buy a substitute (H_{1b}), such that all other reactions are more probable. We predict similar results when the perceived risk of choosing a certain brand is high. Emmelhainz et al. (1991) note that in this case, brand switching is unlikely (H_{1c}); rather, customers likely postpone or find the brand in another store.

As a third variable, we include buying frequency. Customers with a high consumption rate, and therefore short intervals of repeating shopping trips, should be more likely to engage in an article, brand, or store switch (H_{1d}). These reaction categories raise the possibility of consuming a preferred product, whereas the likelihood of postponing or canceling the purchase is lesser.

We add the availability of substitute articles for several reasons. In the case of an OoS, additional options provide the consumer with better chances to find an equivalent article (H_{1e}). For the retailer, it offers an opportunity to mitigate the negative emotions connected with missing products and reestablish customer satisfaction (Kahn and Lehmann 1991; Oppewal and Koelemeijer 2005). Furthermore, we postulate that none of these alternatives should be influenced by arbitrariness by retailers or manufacturers; assortment decisions should reflect consumer preferences. The availability of acceptable alternatives improves chances for an article or brand switch (H_{1f}), which probably prevents retailers from losing revenues.

On the basis of prior literature on consumer confusion, we include decision difficulty as another characteristic (Chernev 2003; Dhar 1997). Large assortments can result in complex product selection processes, which lead to more perceived risks in making correct decisions. Therefore, we assume that in an OoS situation, decision difficulty negatively affects article and brand switching, but we expect a positive influence on intention to change stores (H_{1g}).

Store-related variables

Following Sloot et al. (2005), we mainly address two variables. First, store loyalty, in an attitudinal and behavioral sense (e.g., Verbeke et al. 1998; Campo et al. 2000; Sloot et al. 2005), likely has a negative influence on store switching (H_{2a}). Furthermore, store-loyal consumers are more likely to substitute, postpone, or cancel their purchase. Second, we consider the availability of acceptable alternative stores. In theory, the availability of acceptable stores should increase the chances that customers prefer to switch stores (H_{2b}).

Consumer-related variables

Consumer-related variables influence the way consumers assimilate information and make decisions based on that information. In addition to typical behavioral patterns, they contain stable customer characteristics over a fixed period. In line with Sloot et al. (2005), we add price and quality consciousness. By focusing on one or both dimensions, retailers hope to promote their competitive profile. To reduce their utility loss in a stockout situation, price-conscious consumers prefer other articles or brands at a similar price level (H_{3a}). In addition, we assume that such customers usually select shops with low prices, such as discount markets. As only one or a few shops enable consumers to realize low prices in all categories over an extended period, therefore, the chance of a store switch becomes less likely. Quality-oriented consumers instead choose a substitute that can meet their preferred quality demands (H_{3b}). If such an article is not available, the consumer is likely to switch stores or postpone the purchase. Because it is more difficult to compare brands by quality than by price, we expect a quality-oriented shopper to be less likely to switch brands (Sloot et al. 2005).

Another variable pertains to shopping attitude, a construct that comprises two dimensions (Batra and Ahtola 1991; Babin et al. 1994). First, utilitarian value refers to the task orientation of shopping, such that shopping is perceived as work that needs to be finished in the most effective way. When confronted with an OoS, customers must expend additional substitution and transaction costs, which increases the likelihood of article or brand switches (H_{3c}). Conversely, the attraction of a store switch decreases. Second, a hedonic shopping attitude implies that fun and enjoyment goes along with the shopping process. Customers have a positive attitude toward shopping and are likely to switch stores to find a certain article (H_{3d}).

In reference to the concept of optimal stimulation (Leuba 1955), we include several new variables in our model. We posit that every person favors an optimal level of stimulation, which constitutes a relatively stable preference for a certain degree of arousal from incoming external stimuli. If the optimum level is not reached, different behaviors work to regulate the stimulation level. According to Baumgartner and Steenkamp (1996), risk taking and variety seeking, which represent exploratory acquisitions of products, are the main exploration categories. People more liable to risk taking tend to try new and unknown products (McAlister and Pessemier 1982; Steenkamp and Baumgartner 1992), and when they confront an OoS situation, they are more likely to search for an alternative item or brand (H_{3e}). When people look for variety, they also engage in label-based variety seeking. Similar to the risk takers, variety seekers should prefer article and brand switching when faced with an OoS (H_{3f}).

We further presume a connection between mobility and customer stockout reactions. Unlike public transport, ownership of a car allows for more flexible reactions to an empty shelf. Especially store switching can be managed with less effort (H_{3g}).

Shopping frequency, or store visits by the consumer, also influences the possibility of repeat buying (Sloot et al. 2005; Van Woensel et al. 2007). Consumers who shop more frequently are more likely postpone a purchase because they would need to go less time without the article (H_{3h}).

Finally, we include two demographic characteristics, age and gender. With their decreased mobility, older shoppers should favor an article switch (H_{3i}), and their lower risk tendencies should minimize willingness to choose alternative items. In terms of gender, we assume that female shoppers are more likely to switch articles or brands because of their traditional role and knowledge about for shopping groceries (H_{3j}). However, no study has supported this effect so far.

Situation-related variables

Finally, we consider situation-related variables. To do so, we examine shopping decisions from a time perspective, because those decisions may depend heavily on the moment of purchase. A particularly important variable seems to be buying urgency, which appears in much prior research (Campo et al. 2000; Zinn and Liu 2002; Sloot et al. 2005). If they need the article immediately, consumers likely choose a substitute or switch stores instead of postponing or cancelling their purchase (H_{4a}). Similar reaction patterns might be anticipated if the customer requires a specific quantity of an article. In the case of an OoS, customers run the risk of restraining their consumption patterns until the next shopping trip. Therefore, we expect a positive connection with substitution behavior and store switching but a negative influence on postponement and cancellation (H_{4b}).

If the customer suffers time restrictions on a specific shopping trip, purchase decisions still can be further influenced by an existing stockout situation. In our model, we concentrate on the specific time constraint, because of its close connection with the underlying buying situation, and exclude general time constraints. Different activities compete for customers' time, so those under time pressures cannot invest more time in a shopping trip. Accordingly, customers with less time are more likely to search for an alternative article (same or different brand) and less likely to switch stores (H_{4c}).

Shopping time is another characteristic. Several studies show that days at the end of the week (i.e., Friday, Saturday) are critical in an OoS context (Gruen et al. 2002; Helm and

Stoelzle 2007). Customers might not be able to postpone the purchase to a Sunday, so they probably choose a different article or brand or switch stores (H_{4d}).

Finally, we follow Fitzsimons (2000), who argues that consumer responses to stockouts are moderated by whether the article is a previously considered alternative. Many purchase decisions today take place at the point of sale, such that impulse buying is becoming an increasingly important consumer behavior variable. If a purchase were not planned in advance, consumers are more likely to postpone that purchase and less likely to switch stores (H_{4e}).

In Table 2, we summarize all our hypotheses.

	Dependent variables	Stockout-reactions: Article switch	Brand switch	Store switch	Postponement	Cancellation
Product	Brand loyalty (H_{1a})	+	-	+	+	
	Product involvement (H_{1b})	-	-	+	+	+
	Buying involvement (H_{1c})		-	+	+	
	Buying frequency (H_{1d})	+	+	+	-	-
	Availability of substitutes (H_{1e})	+				
	Acceptable alternatives (H_{1f})	+	+			
	Decision difficulty (H_{1g})	-	-	+		
Store	Store loyalty (H_{2a})	+	+	-	+	
	Alternative stores (H_{2b})			+		
Consumer	Price consciousness (H_{3a})	+	+	-		
	Quality consciousness (H_{3b})	+	-	+	+	
	Utilitarian shopping attitude (H_{3c})	+	+	-		
	Hedonic shopping attitude (H_{3d})			+		
	Risk taking (H_{3e})	+	+			
	Variety seeking (H_{3f})	+	+			
	Mobility (H_{3g})			+		
	Shopping frequency (H_{3h})				+	
	Age (H_{3i})	+	-			
	Gender (H3j)	+	+			
Situation	Buying urgency (H_{4a})	+	+	+	-	-
	Required quantity (H_{4b})	+	+	+	-	-
	Time pressure (H_{4c})	+	+	-		
	Shopping time (H_{4d})	+	+	+	-	
	Impulse buying (H_{4e})			-	+	

Table 2: Customer reactions to stockouts and hypotheses

4. Research methodology

4.1 Data collection

For the data collection, we developed a standardized questionnaire that combined an oral section, to detect customer reactions, with written parts, to measure the antecedents. We conducted the survey at the checkout area of participating supermarkets, because interviews immediately after a shopping trip improve answer quality. Respondents can easily remember the stockout situations they encountered, which guarantees more accurate answers and higher validity.

We collected these data across several stores of three different retail chains in Germany and Switzerland. After excluding respondents with missing values, we collected 205 questionnaires that mentioned a true stockout situation. The sample contained eighteen product categories, spanning both commodities and consumer products. By including a relatively large number of categories, we acknowledge the difficulty of measuring true OoS and the related financial and personal limitations on collecting sufficient questionnaires. The sample also includes household products (15.1 percent) and toys/stationery items (12.2 percent).

4.2 Dependent variable

With regard to existing studies, we included five types of possible consumer responses to an OoS: article switch, brand switch, store switch, postponement, and cancellation. To measure the response categories, we proceeded as follows: Respondents first indicated whether they had experienced a true OoS during their shopping trip. If they had, they detailed how they had reacted (Peckham 1963). To avoid information overload, we only differentiated among substitution, store switch, postponement, and cancellation in the first step. If the consumer chose a substitute, we also asked about the type of substitute: brand, size, or type.

4.3 Independent variables

For most of the independent variables, we used self-reported Likert-type scales. To keep the interview time within an acceptable scope and avoid respondent fatigue, we selected several items from existing scales (Campo et al. 2000). The selected items had satisfactory reliability in previous research, as supported in our study over all (Peterson 1994 recommends the acceptance of values below .7 when the construct consists of only a few items). In

Appendix A, we present all the explanatory variables, their underlying concepts, and the related measurement instrument.

4.4 Analysis

Because our study uses a categorical dependent variable and several metric and nominal independent variables, we need a method that can cope with these varied kinds of original data. Therefore, we used a multinomial logit model (Aldrich and Nelson 1984; Cramer 1991) and estimated the parameters with a maximum likelihood procedure. We calculated the marginal effects between the choice categories, which show the effect and the direction of all antecedents on a certain dependent variable (Campo et al. 2000; Sloot et al. 2005).

5. Empirical Results

5.1 Preliminary findings regarding dependent variables

Regarding the frequencies with which we observed each of the OoS responses, we find that the most common was store switching (41.5 percent), followed by postponement (22 percent), article switch (18.1 percent), and cancellation (12.2 percent). Brand switch (6.3 percent) came last.

Compared with previous results (Table 1) in mostly hypothetical research settings, we note some key differences, especially the changes between store and article switch and the higher percentages for cancellation. In terms of lost sales for retailers and/or manufacturers, it seems that true OoS intensify negative customer reactions such as store switching or cancellation, though we also recognize the need for caution in these comparisons. As mentioned previously, customer reactions depend on the product categories. In our case, 60–70 percent of all store switchers and cancellations involve commodity goods, whereas most hypothetical studies used grocery products. A direct contrast of hypothetical and true stockout reactions thus is not useful.

Overall, we found a stockout rate of ten percent, such that one of every ten customers reported that they did not find the product they wanted.

5.2 Multinomial regression

The results of the likelihood ratio test indicated an adequate model fit, with an absolute deviation of 112.746 ($p < .1$). In addition, all the R^2 statistics were satisfactory. The indices recommended by McFadden (.229), Cox and Snell (.444), and Nagelkerke (.481) exceeded

the minimum size of .2. Furthermore, 57.8 percent of all cases could be classified correctly, an improvement of 27.3 percent over a random classification. In summary, we find an appropriate model fit.

5.3 Estimation results

On the basis of this good model fit, we report in Table 3 all parameter results for the variables with significant impacts on OoS consumer responses. We excluded the category of brand switching, because the number of cases did not allow for a reliable parameter estimation.

	Stockout-reactions	Article switch (A) n = 37			Store switch (S) n = 85			Postponement (P) n = 45			Cancellation (C) n = 25		
	Reference category	S	P	C	A	P	C	A	S	C	A	S	P
Product	Buying frequency			1.94*			2.16**				-1.94*	-2.16**	
	Acceptable alternatives	1.71*		1.97**	-1.71*						-1.97**		
Store	Store loyalty #	2.01**			-2.01**	-2.45**	-2.35**		2.45**			2.35**	
Consumer	Hedonic shopping attitude #									1.66*			-1.66*
	Mobility						1.80**					-1.80**	
	Age#	2.33**			-2.33**	-1.55*	-1.79*		1.55*			1.79*	
Situation	Buying urgency		2.21*			2.52**		-2.21**	-2.52**	-2.00*			2.00*
	Required quantity					-1.84**			1.84**				
	Shopping time#	2.10**			-2.10**	-1.78**	-1.79*		1.78**			1.79*	
	Impulse buying						-1.69*					1.69*	

Table shows direction and effect (Wald-Rest):

**$p < 0.05$ * $p < 0.10$

Variable is significant according to the Likelihood-Ratio-Test ($p < 0.10$)

Empty cells signal missing significant results.

Table 3: Influence factors on consumer reactions in true OoS

With a Wald test, we found three significant product-related antecedent variables. Buying frequency has a positive influence on article and store switch instead of on cancellation, in line with our hypotheses. If the supermarket offers acceptable alternatives for the OoS item, consumers switch articles. With additional alternatives, store switching and cancellation become less attractive as well.

Yet we found no significant results for brand loyalty, in contrast with previous research (Campo et al. 2000; Zinn Liu 2001). The reason for this difference may be the product categories, which differ considerably from those in other studies. The missing brand switch category, and thus the closely connected brand loyalty variable, may provide further explanation. The antecedents of involvement, package sizes, item variants, and decision difficulty do not indicate any significant effects.

For store-related variables, we only found significant effects for store loyalty. In line with our hypotheses, store loyalty has a strong negative effect on store switching and positive effects on article switch, postponement, and cancellation. Our research shows no significant effect for the existence of alternative supermarkets nearby.

With respect to consumer-related variables and hedonic shopping attitude, we found no positive effect on store switching, as we proposed. Instead, the significant effects relate to postponement and cancellation, which is in line with prior research (Campo et al. 2000). No significant results emerge for utilitarian shopping habits, perhaps because of the non-negligible number of commodity goods in the chosen product categories. The economic life of these products is longer than that for consumer goods, so the shopping process likely includes more exploratory aspects, which implies a hedonic buying attitude. Consumers with more mobility are more likely to switch stores than cancel their purchase. Finally, in contrast with our prediction, elderly respondents tend to switch to an alternative article or postpone and cancel the purchase. It is possible that elderly people do not want to deal with trips of ever-increasing length and prefer a supermarket nearby with a well-known assortment. In line with Campo et al. (2000) and Sloot et al. (2005), we find no significant effects of shopping frequency.

Situation-related variables seem important, according to the number of significant results in the likelihood ratio test and Wald test. If they urgently need an article, customers search for a substitute in the same supermarket or switch stores. A postponement until the next shopping trip is unlikely. In contrast with our hypotheses, we find a positive influence of purchase urgency on cancellation, perhaps due the irritation caused by the OoS. Our hypotheses about the required quantity also must be rejected: We find no significant result for article switching or cancellation, but we find converse outcomes regarding store switching and postponement. If customers purchase at the end of the week, they are less likely to switch stores and more likely to choose a substitute in the same market, postpone, or cancel the purchase. If the

purchase was planned beforehand, consumers opt to cancel instead of switching stores, in line with Sloot et al.'s (2005) results. We find no significant effects for time pressure.

The effects for each category of the dependent variable and the related proof of the hypotheses appear in Table 4. Non-significant variables are not listed; their related hypotheses must be rejected.

	Dependent variables	Stockout-reactions							
		Article switch		Store switch		Postponement		Cancellation	
		Postu-lated effect	Detec-ted effect	Postu-lated effect	Detec-ted effect	Postu-lated effect	Detec-ted effect	Postu-lated effect	Detec-ted effect
Product	Buying frequency (H_{1d})	+	✓	+	✓	-	×	-	✓
	Acceptable alternatives (H_{1f})	+	✓						
St.	Store loyalty (H_{2a})	+	✓	-	✓	+	✓		
Consumer	Hedonic shopping attitude (H_{3d})			+	×				
	Mobility (H_{3g})			+	✓				
	Age (H_{3i})	+	✓						
Situation	Buying urgency (H_{4a})	+	✓	+	✓	-	✓	-	×
	Required quantity (H_{4b})	+	×	+	×	-	×	-	×
	Shopping time (H_{4d})	+	✓	+	×	-	×		
	Impulse buying (H_{4e})			-	✓	+	×		

✓ Hypothesis rejected × Hypothesis confirmed

Table 4: Final check of hypotheses

6. Discussion

6.1 Conclusion and managerial implications

In the modern competitive environment, retailers and manufacturers must focus on optimizing their cross-company processes. A specific and long-standing problem relates to the occurrence of OoS situations. Although various approaches have been proposed, efforts to manage stockouts have not reached the point of making it acceptable for all market protagonists. Beyond logistical questions, the management of stockout scenarios is relevant from a marketing perspective and constitutes the focus of our study.

Our model of underlying antecedents of consumer reactions in an OoS situation is based mainly on a literature review (Campo et al. 2000; Sloot et al. 2005). We extend research into product-related antecedents, which can be influenced by retailers and/or manufacturers. With respect to marketing literature, we have included product and buying involvement, as well as aspects from optimal stimulation theory, and highlighted the availability of acceptable alternatives. For the consumer- and situation-related variables, we made only selected modifications. As requested by several researchers (Campo et al. 2000; Sloot et al. 2005), we also have conducted our analysis using true stockout situations.

Our results show that offering acceptable alternative products prevents customers from choosing certain reaction patterns, such as store switching and cancellation, which are disadvantageous for retailers and manufacturers in terms of revenue losses. Yet we cannot advise that sellers expand their product portfolios arbitrarily. Although not significant in our model, increasing choice can cause consumer confusion and lead to consumer dissatisfaction (Malhotra 1984). Our study points to the underlying potential of an appropriate assortment adaption. From a customer point of view, it is not the number of articles on the shelf that is crucial but the assortment diversity that determines the buy or no-buy decision. Retailers and manufacturers should conduct further analyses within specific product categories to uncover the attribute structure of an assortment in combination with financial calculations if an article gets added or eliminated.

We surprisingly find no empirical effects for brand loyalty or involvement, which might reflect the true OoS situation compared to most previous studies or our heterogeneous product categories.

Among the store-related characteristics, it is clear that store loyalty contributes significantly to separate categories of consumer reactions, especially with regard to the reduced chance of store switching in response to an OoS. Loyal customers will excuse a unique and not recurrent OoS, which means retailers can prevent customer churn to a competitor.

Hedonic shopping attitude, mobility, and age represent the three consumer characteristics with significant effects on how customers react to an OoS situation. From a managerial point of view, these variables provide only minimal insight into possible strategies and therefore have only theoretical implications.

Finally, we find that situational factors, especially buying urgency and shopping time, seem extremely important in a true stockout environment. An urgent purchase cannot be

predicted by retailers, but empty shelves at the end of the week are a well-known problem for store managers. Although consumers may be less likely to switch stores, our results show evidence of postponement or cancellation, which implies delayed revenues or even customer loss in the long run. Through cooperation among retailers, manufacturers, and logistics partners, sellers should ensure and optimize product availability on critical days to reduce revenue losses.

6.2 Limitations and areas for further research

Although we have studied an existing OoS situation and thus obviated external validity problems, our study suffers some limitations of its own. In particular, unlike hypothetical designs, our real-life setting makes it more difficult to achieve an appropriate sample, due to the higher time demands and costs. The few brand switchers among our respondents required us to eliminate that category from consideration, which represents a restriction on our results. Further studies might enlarge the sample or use an artificial research design but still attain a true research design by exploiting planned eliminations of products. Retailers' concerns about losing revenue, customer loyalty, and image might be addressed through incentives and an elucidation of the (unreal) OoS situation after the inquiry.

We also had to consider some challenges with regard to operationalization. With our complex model, we included a limited number of items from the original measurement scales, which might have influenced the reliability of our measurement procedure. We also faced problems in our measurement of optimal stimulation, involvement, and price/quality perception. New studies might limit the number of exploratory variables to those with demonstrated significant effects in most existing research.

We also do not consider specific product categories, because we wanted to obtain more general conclusions. We leave this issue for further investigation. We expect differences and therefore suggest a separation of consumer and commodity goods. An extension to the service sector (e.g., restaurants) or textile retailers could be worthwhile too. The latter would be especially interesting in terms of the long-term consequences of OoS, because seasonality and the limited listing of irregular sizes can lead to empty shelves over a longer period for retailers that experience quick turnover. In turn, it would be interesting to compare different retail formats. Stockouts may prompt different reactions among shoppers at discount stores versus quality-oriented retailers.

This study has focused on analyzing customer reactions across separate OoS situations. It also would be interesting to include cumulative effects, which likely have implications for

reaction categories such as store switching or cancellation, which negatively influence both retailers and manufacturers.

Finally, we find remarkable promise in research into an OoS for promoted articles. If consumers plan to shop for promoted articles, they probably experience more disappointment in response to an empty shelf than they would in a “normal” buying situation. In that context, what result does an intended (i.e. planned) unavailability have on customer reactions and satisfaction (Hess and Gerstner 1998)?

Appendix A

Antecedents	Concept	Measurement instrument
Product-related variables		
Brand loyalty	Strength of general brand loyalty and item related loyalty	Three-item self-reported scale (based on Baumgartner Steenkamp 1996, Campo et al. 2000, Raju 1980) (Expl. Var. = .72, Alpha = .604)
Product/Buying involvement	Importance of a product category, Perceived risk in choosing a certa in item	Three-item self-reported scale (based on Mittal Lee 1989, Schneider Rodgers 1996) (Expl. Var. = .60, Alpha = .648)
Buying frequency	Average buying frequency	Number of items bought on a weekly/monthly basis
Availability of substitutes	Perceived item variants in a product category	Degree of perceived item variants
Acceptable alternatives	Differences between the required item and an acceptable alternative	Degree of perceived difference (based on Sujan Bettman 1989)
Decision difficulty	Difficulties when choosing from a large assortment	Degree of perceived difficulty (based on Sproles Kendall 1986)
Store-related variables		
Store loyalty	General and specific loyalty towards a certa in store when shopping for groceries	Five-item self-reported scale (based on Baumgartner Steenkamp 1996, Campo et al. 2002) (Expl.. Var. = .52, Alpha = .675)
Alternative stores	Competing stores in the same shopping area	Perceived alternatives stores (based on Sloot et al. 2002)

Antecedents	Concept	Measurement instrument
Consumer-related variables		
Price consciousness	Focus on price level when shopping for groceries	Dummy variable, equal to 1 if the buyer is price consciousness
Quality consciousness	Focus on quality when shopping for groceries	Dummy variable, equal to 1 if the buyer is price consciousness
Utilitarian shopping attitude	Perception of grocery shopping as a necessary task	Self-reported scale (based on Babin et al. 1994)
Hedonic shopping attitude	Perception of grocery shopping as an activity that brings enjoyment	Self-reported scale (based on Babin et al. 1994)
Exploratory acquisition of products	Willingness to accept risks when trying new products, Need for variety	Four-item self-reported scale (based on Raju 1980) (Expl. Var. = .55, Alpha = .589)
Mobility	Transportation mode used for shopping	Dummy variable: Car = 1, other = 0
Shopping frequency	Average shopping frequency	Average number of shopping trips per week
Age	Age of respondent	Age in number of years
Gender	Gender of respondent	Dummy variable: Female = 1, male = 0
Situation-related variables		
Buying urgency	Level of importance for the shopper to buy a certain category within a short period of time	Self-reported scale (based on Sloot et al. 2002)
Required quantity	Importance to buy a certain quantity of a product category	Self-reported scale
Time pressure	Specific time constraint for grocery shopping	Degree of perceived time pressure on self-reported scale
Shopping time	Part of the week when the shopping trip took place	Dummy variable, equal to 1 for trips at the end of the week (Thursday or Saturday) and 0 for trips at the beginning of the week (Monday to Wednesday)
Impulse buying	Distinction between unplanned and planned purchases	Dummy variable, equal to 1 if the item purchase was planned in advance

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