

## The impact of brand and category characteristics on consumer stock-out reactions

Laurens Sloot, Peter C. Verhoef, Philip Hans Franses

ERIM REPORT SERIES <i>RESEARCH IN MANAGEMENT</i>	
ERIM Report Series reference number	ERS-2002-106-MKT
Publication	November 2002
Number of pages	47
Email address corresponding author	franses@few.eur.nl, verhoef@few.eur.nl, sloot@few.eur.nl
Address	Erasmus Research Institute of Management (ERIM) Rotterdam School of Management / Faculteit Bedrijfskunde Erasmus Universiteit Rotterdam P.O. Box 1738 3000 DR Rotterdam, The Netherlands Phone: +31 10 408 1182 Fax: +31 10 408 9640 Email: <a href="mailto:info@erim.eur.nl">info@erim.eur.nl</a> Internet: <a href="http://www.erim.eur.nl">www.erim.eur.nl</a>

Bibliographic data and classifications of all the ERIM reports are also available on the ERIM website:  
[www.erim.eur.nl](http://www.erim.eur.nl)

# ERASMUS RESEARCH INSTITUTE OF MANAGEMENT

## REPORT SERIES *RESEARCH IN MANAGEMENT*

BIBLIOGRAPHIC DATA AND CLASSIFICATIONS		
Abstract	We develop two models to test hypotheses on the specific impact of brand and category characteristics on consumer stock-out responses. Our empirical results show that both characteristics are important determinants. Consumers are more product loyal in hedonic product groups than in utilitarian product groups and consumers are more brand loyal to high equity brands than to low equity brands. Brand loyalty is especially strong for high equity brands in hedonic product groups. Our study also confirms findings from prior research on OOS reactions. Theoretical and managerial implications of the findings of the study are discussed.	
Library of Congress Classification (LCC)	5001-6182	Business
	5410-5417.5	Marketing
	HF 6161.B4	Brand name product Advertising
Journal of Economic Literature (JEL)	M	Business Administration and Business Economics
	M 31	Marketing
	C 44	Statistical Decision Theory
	M 39	Marketing and Advertising: Other
European Business Schools Library Group (EBSLG)	85 A	Business General
	280 G	Managing the marketing function
	255 A	Decision theory (general)
	280 N	Consumer behavior
Gemeenschappelijke Onderwerpsontsluiting (GOO)		
Classification GOO	85.00	Bedrijfskunde, Organisatiekunde: algemeen
	85.40	Marketing
	85.03	Methoden en technieken, operations research
	85.40	Marketing
Keywords GOO	Bedrijfskunde / Bedrijfseconomie	
	Marketing / Besliskunde	
	Merken, Consumentengedrag, Detailhandel	
Free keywords	brand management, retailing, fast moving consumer goods, consumers, marketing-models	

# **The impact of brand and category characteristics on consumer stock-out reactions<sup>1</sup>**

November 14, 2002

Laurens Sloot<sup>2</sup>

Erasmus Food Management Institute

Peter C. Verhoef

Erasmus University, Rotterdam

Philip Hans Franses

Erasmus University, Rotterdam

---

<sup>1</sup> The authors gratefully acknowledge the research assistance of Rocco Kellevink. The research has been supported by the Erasmus Food Management Institute. The helpful comments of Harry Commandeur, Ed Peelen, Marnik Dekimpe and Eline van Ketel are also acknowledged.

<sup>2</sup> Address of Correspondence: Laurens Sloot, Erasmus Food Management Institute, Erasmus University, Office H16-25, P.O. Box 1738, NL-3000 DR Rotterdam, The Netherlands; Phone +31 10 408 1307; Fax +31 10 408 9160; E-mail: sloot@few.eur.nl

# **The impact of brand and category characteristics on consumer stock-out reactions**

## **Abstract**

We develop two models to test hypotheses on the specific impact of brand and category characteristics on consumer stock-out responses. Our empirical results show that both characteristics are important determinants. Consumers are more product loyal in hedonic product groups than in utilitarian product groups and consumers are more brand loyal to high equity brands than to low equity brands. Brand loyalty is especially strong for high equity brands in hedonic product groups. Our study also confirms findings from prior research on OOS reactions. Theoretical and managerial implications of the findings of the study are discussed.

## INTRODUCTION

Out-of-Stock (OOS) is a regular phenomenon for grocery shoppers. Percentages seem to vary between 5% (The Netherlands) and 8% (US) on SKU level (Kooistra, 1999; Andersen Consulting, 1996). Although OOS is not rare, it still rates high on the shoppers' irritation list and cause a lower level of consumer satisfaction (CBL, 1989 and 2000; Fitzsimons, 2000). OOS may have impact on a retailer's financial result, because it might lead to a loss of sales as consumers decide to postpone or cancel the purchase or switch to another store. The resulting gross margin losses for retailers are estimated to lie between 7 and 12 billion dollar per year in the US (Andersen Consulting, 1996).

As a result some Efficient Consumer Response (ECR) projects focused on developing methods to improve the supply chain. An evaluation of projects in which Continuous Replenishment Planning has been applied led to the conclusion that OOS levels could decrease by 55% (Vergin and Barr, 1999). Although the ECR projects showed encouraging effects in decreasing OOS levels, a substantial decrease at a nationwide level has not yet been observed (EFMI, 2000). The tendency of extending assortments, combined with the fact that shelf space is often fixed in the short and mid term, leads to the conclusion that OOS is unlikely to disappear. Therefore, retailers need additional insights in the effects of OOS on consumer behavior. Especially knowledge about which types of OOS lead to high levels of store switching and postponement of purchases can be useful in prioritizing the OOS problem.

An important question in this respect concerns the product types and brand types for which OOS results in substantial sales losses. OOS is important for brand manufacturers as well, because high OOS levels for a specific brand may lead to losses of brand sales and decreasing brand loyalty. Besides the important financial consequences of OOS,

understanding consumers' OOS responses increases the insights of manufacturers about the importance of having a good weighted distribution and a good shelf position. In this respect, consumer OOS reactions may provide insights in the possible effects on brand loyalty when items of a brand or a complete brand range are delisted in a specific retail chain (Campo, Gijsbrechts and Nisol, 2002).

Within the (marketing) literature there has been a substantial interest in the topic of consumer reaction towards OOS since the 1960's (e.g. Peckham, 1963). The majority of the early studies on OOS mainly focussed on the definition and measurement of consumer OOS reactions (Peckham, 1963; Zinszer and Lesser, 1981; Gattorna, 1988; Emmelhainz, Stock and Emmelhainz, 1991) and the financial consequences of OOS (Walter and Grabner, 1981). Recently, researchers developed and tested theoretical based models to explain OOS reactions (e.g. Campo, Gijsbrechts and Nisol, 2000; Verbeke, Farris and Thurik, 1998; Zinn and Liu, 2001). Especially, the study of Campo, Gijsbrechts and Nisol (2000) is noteworthy, as it provides and tests a strong theoretical framework for explaining consumer OOS responses. In general, an important limitation of these studies is that OOS reactions are studied for a small number of product categories. Studies also often limit their attention to OOS reactions in one particular supermarket and/or retail format. Finally, most studies ignore the fact that OOS reactions might differ per considered brand. As a result, no theories are developed that may explain observed differences in reactions between product categories and brands. Moreover, the consideration of a single retail chain limits the external validity of the studies.

In this study we aim to fill in these research gaps. We follow the theoretical framework of Chandon, Wansink and Laurent (2000) who made a distinction between utilitarian and hedonic products (Batra and Ahtola, 1991; Dhar and Wertenbroch, 2000) and between low equity and high equity brands (Keller, 2002; Ailawadi, Lehman and Neslin,

2002). We use this distinction to explain differences in OOS responses across product categories and brands. To improve the generalizability and external validity of the results we study OOS responses of 749 consumers in 8 different product groups in 8 different retail chains.

Besides the theoretical contribution, our study helps managerial decision making on how to minimize the impact of OOS on the performance of both retailers and brand manufacturers. Our empirical results provide crucial insights for retailers and brand manufacturers in which product categories and for which type of brands they should increase their effort to reduce OOS. At the same time, the results also show in which product categories and for which brands, reducing OOS does not have top priority.

We continue this paper with a review of the prior literature on OOS. Next, we discuss our conceptual model and the underlying hypotheses. The research methodology and the empirical results are described subsequently. We end this paper with a discussion, managerial implications, research limitations and directions for future research.

## **LITERATURE REVIEW**

In this section we provide a literature review of prior studies on OOS reactions. We first discuss the objectives, methodology, and consumers' OOS reactions considered in these studies. Subsequently, the antecedents of OOS reactions are provided.

### *Objectives, Methodology and OOS reactions*

Table 1 provides an overview of published studies about consumer stock-out reactions within the marketing and business logistics literature. We particularly describe the objectives, the context, the considered OOS reactions and the methodology. OOS studies have a long

tradition within the marketing literature. Not surprisingly, most studies on OOS were executed in the context of grocery products. The objectives of the early studies on OOS were mainly on defining and measuring OOS reactions and their financial impact. The study of Schary and Christopher (1979) was the first study that also aimed to explain OOS reactions. In the beginning of the '90's, the research focusing on explaining OOS reactions continued with the study of Emmelhainz, Stock and Emmelhainz (1991).

-- Insert Table 1 about here --

In the literature on the definition and measurement of OOS reactions usually six main behavioral consumer responses are distinguished. Ranked from relatively high to relatively low brand loyalty these reactions are:

- (1) Store switch: going the same day to another store to buy the item which is OOS
- (2) Item switch: switching to another format or variety of the same brand;
- (3) Postponement: postponing the intended buy until the next regular trip to the supermarket
- (4) Cancel: dropping the intended purchase at all or postponing it for a longer period of time
- (5) Category switch: buying a substitute product from another product category
- (6) Brand switch: buying another brand within the same product category

Studies on OOS reactions typically do not consider these 6 reactions simultaneously. For example, Verbeke, Farris and Thurik (1998) only focused on (1), (3) and (6), while Campo, Gijbrecchts and Nisol (2000) did not explicitly consider (5) and (6).



Another important issue with respect to the studied OOS reactions is that studies use different definitions and measurement approaches. For example, Zinn and Liu (2001) consider leaving the store as a reaction, which might be an indication of both store switch or purchase cancellation/postponement. Campo, Gijsbrechts and Nisol (2000) consider the reaction “brand switch” as part of the reaction “item switch”, although these reactions basically can be very different. Buying another item of the same brand can be considered as an indication for strong brand loyalty, while buying another item of another brand indicates just the opposite.

Most studies usually apply one of two different research designs: (1) field experiment and (2) survey. In the field experiments, true stock-outs are used. In some experiments specific items or brands were taken OOS in advance of the research (quasi experiments), while in other experiments consumers were asked if they encountered an OOS during their shopping trip (natural experiments). Studies applying survey designs mainly considered hypothetical stock-out situations. In that case the respondent is asked, how (s)he would have reacted when a purchased item or brand was OOS. Due to these differences in research designs it is difficult to get a clear insight in the most common OOS reactions. For example, in survey designs with hypothetical OOS, the reported store switch percentages are generally higher than in experimental designs.

With respect to the design, also the type of OOS is important. Generally, two types of OOS are distinguished: (1) item OOS and (2) brand OOS. In the first case, a single item of a brand (for example the 2 liter bottle of Coca Cola or the Coca Cola light variety) is OOS, while in the second case all items of a single brand in a product category are OOS. As might be expected the reported OOS reactions will differ. Moreover, in the case of brand OOS, an item switch is not possible by definition. Note that an important implication of the use of

different research designs is that it is difficult to derive empirical generalizations on the determinants of OOS reactions.

The sample sizes of available studies vary between 300 and 1500 respondents approximately. Studies have been executed in a number of different product categories. Due to their methodology, studies considering experienced OOS usually measure reactions for most categories in the store. However, none of the studies explicitly considers how reactions differ across categories. If differences across categories are reported, researchers usually speculate on the explanations (e.g. Campo, Gijsbrechts and Nisol, 2000). With respect to the type of brands studied, our review reveals that some studies only looked at high-share brands (e.g. Verbeke, Farris and Thurik, 1998), while others consider high- and low-share brands and private labels (e.g. Campo, Gijsbrechts and Nisol, 2000). Note, however, that despite the consideration of a broad range of brands, OOS studies usually do not consider the type of brand as an explanatory variable for OOS response. Finally, our review also shows that studies are usually executed within stores of a single retail chain. As a result, the external validity of these studies might be limited to that single retail chain.

From this broad literature review we derive one general conclusion concerning explaining consumer stock-out responses. The findings about explanatory variables for OOS responses are based on data which are restricted by (1) the type of brands that are studied, (2) the type of product categories that are studied or (3) the type of stores considered. Therefore, it is difficult to derive empirical generalizations about OOS reactions in general and specifically about the role of product type and brand type on consumer OOS responses.

#### *Overview of antecedents of stock-out response*

In Table 2 we provide an overview of the empirical evidence on the effect of a number of possible determinants of OOS reactions. These all concern variables, which are measured at

the consumer level. In line with prior research, we distinguish the following clusters of antecedents: (1) product-related characteristics, (2) store-related characteristics, (3) situation-related characteristics and (4) consumer-related characteristics.

-- Insert Table 2 about here --

### Product-related characteristics

The first group of characteristics is related to the specific product category, including the brands, for which the stock-out appears. Several studies claim that the *perceived availability of acceptable alternatives* is an important determinant of consumers response to OOS. Campo, Gijsbrechts and Nisol (2000) show that the availability of acceptable alternatives is negatively related to store switching, while Emmelhainz, Stock and Emmelhainz (1991) report a negative effect of perceived availability of alternatives on brand switch.

A second important characteristic is *brand loyalty*. Several studies showed that the more loyal a consumer is towards a specific brand (in terms of attitude or behavior), the less likely a consumer will switch to another brand in case of OOS. Furthermore, brand loyal consumers are more likely to buy the OOS item or OOS brand in another store (Campo, Gijsbrechts and Nisol, 2000; Emmelhainz, Stock and Emmelhainz, 1991; Peckham, 1963; Verbeke, Farris and Thurik, 1998).

A third variable is the type of brand which is OOS. Schary and Christopher (1979) found a significant effect of *brand type* on OOS reactions. National brand buyers have a higher tendency to switch store in case of OOS. This can be an indication that the equity of the OOS brand is an important variable in explaining consumer OOS responses.

### Store-related characteristics

Store-related antecedents concern variables that are related to the store or retail chain in which the OOS occurs. In several studies, store loyalty (attitudinal and behavioral) is included as an antecedent of OOS reactions. Not surprisingly, most studies report a positive effect of store loyalty on item switch, brand switch, cancellation of purchase, and postponement of the purchase. Store-loyal consumers are less likely to switch to another store in case of an OOS (Campo, Gijsbrechts and Nisol, 2000; Emmelhainz, Stock and Emmelhainz, 1991).

A number of studies considered the availability of competing stores in the vicinity of the store with the OOS. Theoretically, it is expected that consumers with good alternative stores in the same area will be less likely to buy a substitute (item switch, brand switch or product switch) and that they will be more likely to switch to another store (e.g. Verbeke, Farris and Thurik, 1998). However, there are no studies supporting this effect.

### Situation-related characteristics

Situation related characteristics concern variables that focus on the specific situation of the consumers' shopping trip. Several studies mentioned *buying urgency* as an important determinant of OOS response (Campo, Gijsbrechts and Nisol, 2000; Emmelhainz, Stock and Emmelhainz, 1991; Zinn and Liu, 2001). When a specific product is needed in a short period of time, consumers cannot easily postpone or cancel the purchase. Hence, they will be more likely to buy a substitute or switch to another store to buy the needed item. The *required purchase quantity* is related to buying urgency. If consumers have almost no stock of a certain product or brand at home, they need a large quantity rather soon. As a result, they will be more willing to buy a substitute or to switch to another store (Campo, Gijsbrechts and Nisol, 2000).

Campo, Gijsbrechts and Nisol (2000) also considered the *type of shopping trip* as an antecedent of OOS reactions. They found that consumers who visit the store for a major shopping trip are less likely to switch to another store, while they are more likely to buy a substitute. The underlying rationale for this effect is that a major shopping trip is very time consuming and that consumers are therefore reluctant to spend additional time for shopping.

### Consumer-related characteristics

Consumer-related characteristics concern variables which are related to the consumer who faces the OOS. One such characteristic is shopping attitude. Consumers with a positive *shopping attitude* are more likely to switch stores in case of an OOS (Campo, Gijsbrechts and Nisol, 2000), because these customers value visiting different stores. Another characteristic is *shopping frequency*. It can be argued that consumers who shop very frequently are more likely to postpone a purchase, because the chance of running out-of-stock at home is smaller than for consumers who shop less frequently. However, there is no empirical evidence for such an effect (Campo, Gijsbrechts and Nisol, 2000). *Time constraint* or time pressure is also considered as an explaining variable. Campo, Gijsbrechts and Nisol (2000) showed that consumers who have less time for shopping are less likely to switch stores and are more likely to buy a substitute. Related to time constraint is the age of the consumer. Peckham (1963) reported that age is negatively related to substitute buying. One reason for this relation may be that older people have more spare time to shop and therefore have less time constraints to go to another store to buy the intended OOS item or brand.

## CONCEPTUAL MODEL AND HYPOTHESES

In Figure 1 we show our conceptual model. In this model the main focus is on the effect of product type and brand type. However, we also include variables in our model that could be important determinants of OOS reactions according to the above overview. As we consider multiple brands and multiple product groups, our study is an important test for the generalizability of these prior results.

-- Insert Figure 1 ---

### *Effect of Brand Type*

In defining brand types, Chandon, Wansink and Laurent (2000) made a distinction between high and low equity brands. A brand is said to have positive customer-based brand equity when consumers react more favorably to a product and to the way it is marketed when the brand is identified, than when it is not (Keller, 2002). A theoretical advantage of using the brand equity level as an explanatory variable for OOS reactions is that both manufacturer and retailer brands (private labels) can be classified by this criterion (Ailawadi, Lehmann and Neslin, 2002).

In general, consumers value high equity brands more than low equity brands. As a result many consumers are willing to pay a price premium for brands with a high level of brand equity (Ailawadi, Lehmann and Neslin, 2002). Chandon, Wansink and Laurent (2000) used this price premium to distinguish between low and high equity brands. Of course, one could argue that according to the brand equity literature also other classification variables, such as brand preference, brand awareness and brand associations, could be used to distinguish between high and low equity brands (e.g. Aaker, 1990; Keller, 2002; Rust,

Zeithaml and Lemon, 2000). However, Ailawadi, Lehmann and Neslin (2002) showed that the paid price premium is a good predictor of brand equity. Moreover, important advantages of price premium as a classification variable are its objectivity and the fact that it is a simple way to classify brands.

As noted, consumers value high equity brands above low equity brands. As a result, they are willing to exercise more effort to get the favorite brand. Hence, it might be expected that they will more inclined to switch to another store to purchase the brand. At the same time, high-equity brand buyers will probably be less likely to buy a substitute brand. This follows work of Ehrenberg, Goodhart and Barwise (1990), who showed that small share brands, which are often low equity brands, have a lower brand loyalty in terms of average purchase rates than high-share brands.

Verbeke, Farris and Thurik (1998) provided some preliminary evidence for this hypothesis, as they showed a store-switching percentage of 34% for the Coca Cola brand, which is considered as the strongest and most valuable brand in the world (Business Week, 2002). This percentage is much larger than store switching percentages reported in the same study for less strong brands. Thus, we expect that the level of brand equity of the brand, of which an item is OOS is positively related to store switch, item switch, postponement and cancellation of intended purchase and negatively related to brand switch.

We hypothesize for OOS situations that:

H<sub>1a</sub>: *Brand switch* is lower for high equity brands than for low equity brands

H<sub>1b</sub>: *Store switch* is higher for high equity brands than for low equity brands

H<sub>1c</sub>: *Item switch* is higher for high equity brands than for low equity brands

H<sub>1d</sub>: *Postponement* is higher for high equity brands than for low equity brands

### *Effect of product type*

Several studies suggest that the type of product is an important variable in explaining stock-out behavior or at least that the type of product should be taken into account in future research (Campo, Gijsbrechts and Nisol 2000, Emmelhainz, Stock and Emmelhainz, 1991; Schary and Christopher, 1979). Several characteristics can be used to classify grocery product groups (i.e., buying frequency, food or non-food, promotional intensity or the main benefit they fulfill). With respect to the product type, we focus on the main benefit, and hence we distinguish utilitarian and hedonic products. In general hedonic products provide more experiential consumption, fun, pleasure and excitement, whereas utilitarian products are primarily instrumental and functional (Dhar and Wertenbroch, 2000, Batra and Ahtola, 1991). Initially, grocery products were seen as typical utilitarian products (Hirschman and Holbrook, 1982). However, grocery products may differ in the basic need they fulfill for consumers. Products like chocolate, ice cream, chips and beer will be more appealing to one's hedonic needs than more functional grocery products like toilet paper, laundry detergent and milk.

The different nature of utilitarian and hedonic products might affect the buying process as well. The buying process of utilitarian products will be mainly driven by functional and rational motives, while in the buying process of hedonic products also emotional motives may play an important role. This might also affect OOS responses. The unavailability of utilitarian products, such as detergent, margarine and toilet paper, may impact the "functioning" of the household. Hence, consumers will be less likely to postpone or cancel a purchase in the case of utilitarian products, while they will be more likely to buy a substitute.

In contrast, hedonic products are defined to provide more emotional value to the consumer. For example, when a consumer planned to purchase beer, ice cream or salty



snacks and to consume it in the evening, s/he will be very disappointed about not being able to purchase the wanted product (Fitzsimons, 2000). This is supported by findings of Dhar and Wertenbroch (2000) who found that consumers are very reluctant to accept a cut on hedonic dimensions of a service offer, resulting in higher dissatisfaction levels. This increased dissatisfaction might lead to higher store switching in hedonic product categories. However, the expected high emotional value might also lead to the fact that consumers are also less likely to postpone or cancel the purchase, and that instead, they will buy a substitute. To summarize, we have two contrasting theories on the effect of product type on OOS responses. An overview of the available results in the literature indicates that substitute buying is somewhat higher for utilitarian products (detergent, tooth paste, margarine, rice) than for hedonic products (cola, soft drinks, cigarettes). This supports the first theoretical explanation. We note, however, that these studies did not consider the interaction effect between brand type and product type.

We adopt the first theoretical explanation in our hypotheses by expecting that item switch and brand switch will be higher in utilitarian product categories, while cancel or postponement of purchase will be lower for utilitarian product categories. Following Dhar and Wertenbroch (2000), we expect that store-switch in OOS situations will be higher for hedonic products.

Following the above reasoning, we hypothesize for OOS situations that:

- H2<sub>a</sub>: *Brand switch* is lower for hedonic products than for utilitarian products
- H2<sub>b</sub>: *Store switch* is higher for hedonic products than for utilitarian products
- H2<sub>c</sub>: *Item switch* is lower for hedonic products than for utilitarian products
- H2<sub>d</sub>: *Postponement* is higher for hedonic products than for utilitarian products

### *Interaction effect between brand type and product type*

In general it can be said that hedonic products offer more opportunities to differentiate a brand in the consumers' mind than utilitarian products (Rossiter and Percy, 1997; Keller, 2002). In utilitarian product groups brands mainly differentiate on product quality. In hedonic product groups, emotional aspects also play an important role in positioning the brand. Especially the "large and mythical" brands in hedonic product groups like Coca Cola, Marlboro and Heineken have built dominant and relevant association networks in the consumers' mind. For example, the Marlboro man in Marlboro country is well known all over the world and tells the story of freedom and adventure, while a super premium brand as Heineken is positioned as a status beer. Both cases show that the main brand values are not directly related to the product itself but to intangible aspects with a high emotional or symbolic character.

In sum, we hypothesize that consumers are extra loyal to their favorite brand if the brand is a high equity brand in a hedonic product group. In case of item-OOS of a high equity brand in a hedonic product group, this implies that consumers are less willing to switch brands or to postpone the purchase and are more willing to switch to another item of the same brand or to switch store. This leads to the following hypotheses for OOS situations:

H3<sub>a</sub>: *Brand switch* is lower for high equity brands in hedonic product groups

H3<sub>b</sub>: *Store switch* is higher for high equity brands in hedonic product groups

H3<sub>c</sub>: *Item switch* is higher for high equity brands in hedonic product groups

H3<sub>d</sub>: *Postponement* is lower for high equity brands in hedonic product groups

### *Other Explanatory Variables*

Based on our literature overview, we selected the important explanatory variables in prior research, which we also include as antecedents of OOS responses. The included variables are:

availability of alternatives, attitudinal brand loyalty, availability of alternative stores, attitudinal store loyalty, buying urgency, shopping trip, shopping attitude, general time constraint and age. In doing so, we aim to gain insight whether the effects of product type and brand type are relevant. We also aim to provide a more general test for the effect of the variables as found in previous research, as we study OOS responses in several product groups and different retail chains. We also add two variables for exploratory purposes. The first variable added is *buying frequency*. There are several arguments why this variable is added. First, it tells something about the level of habitual buying in the category. It might be argued that if a product is purchased very frequently, buying behavior is partially driven by routine behavior and that the consumer therefore is less willing to switch to other brands. Buying frequency also indicates the importance of the product for the household. For example, heavy users will probably be more inclined to buy the product and be less willing to postpone or cancel the purchase. An additional exploratory variable is the *part of the week* in which the purchase was done. In general, it can be expected that if a purchase trip is made early in the week, that a shopper will be more likely to postpone a purchase, than when a shopping trip is done at the end of the week.

## **RESEARCH METHODOLOGY**

### *Data collection*

Data on consumer OOS responses and antecedents were collected by means of a structured questionnaire. This data collection procedure is used in several other research studies on stock-out reactions (Emmelhainz et al, 1991, Campo et al, 2000). This method offers good opportunities to collect data about consumer OOS responses and antecedents for these responses, which are not directly observable. For example, if a consumer decides not to buy

another brand or item, this can mean that the consumer does not buy the product at all, buys a product of another category or goes to another store to buy the product. A notable drawback of our approach is that we recorded intended instead of true behavioral OOS responses. On the other hand, the major advantage of the chosen research method is that it offers the opportunity to study OOS responses for a wide range of brands and product groups. In this research, we selected eight product groups: eggs, margarine, milk, detergents, beer, chips, cigarettes and cola. These product categories include both hedonic and utilitarian products.

The data were collected by means of personal interviews with respondents who just visited the supermarket. To prevent major influences of the local retail situation, the interviews were held in twelve different supermarkets of eight different retail chains. The respondents were interviewed in the store, directly after the checkouts. First, a short basket analysis was made to determine what the consumer had purchased. If the consumer purchased at least one item out of the eight selected product groups the consumer was asked to participate in the study. This item was taken out of the basket and questions concerning OOS responses were asked with reference to the purchased item. The advantage of interviewing shoppers shortly after their shopping trip is that the questions about the OOS responses are asked almost immediately after the purchase decision took place. Hence, an OOS situation is more salient for the consumer, which improves the validity of the answers. A quota system was used to get enough responses in relatively less frequently purchased groups. In total 749 different respondents were interviewed. Responses per product group varied between 74 (detergent buyers) to 102 (beer and margarine buyers).

#### *Measurement Dependent variable*

In the first part of the questionnaire the specific reaction to the hypothesized OOS was measured using a range of questions. Based on the prior literature, we defined six different

types of OOS responses; (1) Store switch, (2) Item switch, (3) Postponement, (4) Cancel, (5) Category switch and (6) Brand switch. In general the OOS response “Brand switch” was most common among the respondents (34%), followed by postponement of purchase (23%), store switch (19%) and item switch (18%). Respondent mention the specific OOS reactions “cancel purchase” (3%) and “category switch” (2%) less frequently. These OOS responses are roughly in line with the OOS responses measured in a field experiment by Emmelhainz, Stock and Emmelhainz (1991), who considered five leading selling items of five different product groups.

#### *Measurement Brand Type and Product Type*

In our main model we distinguish two main antecedents for OOS responses: brand type and product type. Experts in the field of fast moving consumer goods classified the brand type (low or high brand equity) of the OOS item. To make a distinction between low and high equity brands, we asked 17 senior managers of brand manufacturers and food retailers to evaluate all researched brands (n > 100 different brands) on perceived price level. In this, we follow brand equity measures proposed by Chandon, Wansink and Laurent (2000) and Ailawadi, Lehman and Neslin (2002). Based on the scores, each brand was classified as a low or high equity brand. In general the high equity brands are the market leaders or challenger brands, while low equity brands in general are the store brands, regional brands and fancy labels.

The product groups involved in the OOS study were classified in advance as utilitarian or as hedonic using judgments of twenty managers of brand manufacturers and food retailers and twenty academics. In total, twenty pre-selected product groups were evaluated on their utilitarian and hedonic level. Based on the outcomes of these evaluations 4 product groups were selected who could be clearly defined as ‘typically utilitarian’ and 4

product groups were selected as ‘typically hedonic’. The average hedonic and utilitarian scores of each category are given in table 3.

-- Insert Table 3 about here --

#### *Measurement other Independent variables*

As noted, we also consider variables from prior research as well as buying frequency and part of the week. Appendix 1 provides an overview of all the explaining variables used, the measurement method and the source. The attitudinal variables brand loyalty, store loyalty, shopping attitude and availability of acceptable alternatives were based on adopted versions of generally accepted multiple item scales of the Likert type. A self-report scale for buying urgency was developed to measure the perceived importance to buy the product in a short period of time. In total five self-report scales were used for eight different product groups. Because of limitations in length of the interview most scales consist of three or four items. Of the 40 accounted Cronbach’s Alpha scores, one third lack a sufficient reliability ( $\alpha < 0,6$ ), while the other two third has a sufficient or good reliability (Nunally, 1978, Rossiter, 2002) (see Table 4). Appendix 2 summarizes the self-report scales.

-- Insert Table 4 about here --

#### *Analysis*

The dependent variable in our research is categorical with six different categories. However, the OOS responses “cancel purchase” and “category switch” are very uncommon. The small number of these responses does not allow us to reliably estimate parameters for these choice categories. Therefore we added the category “cancel purchase” to the rather similar category

“postponement”. The OOS response “category switch” is not similar to one of the other categories. Therefore, we do not consider this OOS reaction in our model. As a consequence our valid number of cases drop from 749 to 734. After this procedure, the dependent variable is categorical with four different choice categories: (1) store switch, (2) item switch, (3) postponement/cancel and (4) brand switch. As these categories are unordered, standard regression models or ordered regression models cannot be used. We therefore use the multinomial logit model to test our hypotheses (Franses and Paap, 2001). The parameters of this model are estimated using the statistical software package Limdep 7.0 (Greene, 1998). The parameters in this model are estimated using Maximum Likelihood. We note, that the multinomial logit model was also used in previous OOS studies (e.g., Campo, Gijsbrechts and Nisol, 2000; Zinn and Liu, 2001).

In a multinomial logit model  $k-1$  ( $k$  being the number of categories) equations are estimated. These equations are useful for prediction purposes. They are however not suited for hypothesis testing, as the interpretation of the coefficients and the respective standard errors is not straightforward (Franses and Paap, 2001). Therefore we calculate the so-called marginal effects (Greene, 1998). These marginal effects show the effect of a predictor variable  $X$  on a choice category. In our model the missing values of the self-reported independent (i.e. attitudinal brand loyalty, store loyalty) variables were replaced by averages (Hair et al., 1998).

## **EMPIRICAL RESULTS**

### *Descriptive analysis*

We explore differences in stock-out reactions per product type and brand type using cross-tabulations (see table 5). Our analysis shows that buyers of low equity brands show a much

higher percentage of brand switch (45%) than buyers of high equity brands (26%). On the OOS response “item switch” and “postponement/cancel” percentages do not vary much across brand types. However, the percentage of store switch is a much more common reaction on item OOS for high equity brands than low equity brands. A  $\chi^2$  test reveals a significant association between brand type and OOS reaction ( $\chi^2 = 33.467$ ,  $p = 0.000$ ).

In both utilitarian and hedonic product groups the most common reaction to OOS is brand switch. However, the percentage “brand switch” in general is higher in utilitarian product groups (39% versus 31% for hedonic products). The percentage of store switch in OOS situations is much higher in hedonic product groups (26% versus 13% for utilitarian products). Again the  $\chi^2$  test shows a significant association between product type and OOS reactions ( $\chi^2 = 22.581$ ,  $p = 0.000$ ). We note that OOS responses not only vary across product types, they also vary across product groups within the same product type. For example, in the utilitarian product group milk 51% of the buyers said to switch brand in case of OOS, while this percentage for detergent is 24% and for margarine 20%.

-- Insert Table 5 about here --

### *Results Multinomial Logit Model*

In our modelling approach we first estimate the full model in which we include the effect of brand type, product type the variables from prior research, see Appendix 3. To assess whether the new variables product type and brand type adds to the models available from prior research, we estimate a model with variables from prior research. Using a Wald test we compare the fit of both models. This Wald test reveals a significant improvement in model fit, when brand type and product type are included in the model ( $\Delta\chi^2 = 32.02$ , degrees of



freedom =3, p=0.000). Hence, the addition of product type and brand type adds to our understanding of OOS responses. In order to understand the effect of brand type and product type, we discuss our empirical results as follows. We first discuss a model (1a) that only includes the main effects of brand type and product type. Subsequently, we describe the estimation results of a model in which the interaction effect between brand type and product type is included (1b). Finally, we discuss the already noted full model (2).

### Model 1a

The marginal effects of model 1a and 1b are provided in Table 6. The parameters of Model 1a are jointly significant with a  $\chi^2$  of 46.49 (degrees of freedom =6, p=0.00). We find an expected significant negative effect of brand type on brand switch. This supports H<sub>1a</sub>. However, no effect of product type is found. Both product type and brand type have a positive effect on store switch. Hence, H<sub>1b</sub> and H<sub>2b</sub> are both supported. With respect to item switch, no significant predictor variables are found. As a result our model results do not support H<sub>1c</sub> and H<sub>2c</sub>, which both hypothesised a positive effect of product type and brand type. With respect to postponement/cancel, we find an unexpected significant negative effect of product type and an expected significant positive effect of brand type. Thus, these results only support H<sub>1d</sub>.

-- Insert Table 6 about here --

### Model 1b

The inclusion of the interaction between brand type and product type improves the model fit substantially ( $\Delta\chi^2 = 13.6$ , degrees of freedom =3, p=0.00). The model remains significant with a  $\chi^2$  of 60.1 (degrees of freedom =9, p=0.00). The addition of the interaction effect does

change the parameters and accompanying significance levels of the main effects of product- and brand-type to some extent. This especially holds for item switch and cancel/postponement. With respect to brand switch, the negative effect of brand type is smaller, but it remains significant. In line with H<sub>3a</sub>, we find a significant negative effect of the interaction term. With respect to store switch, the main effects remain significant, while our estimation results do not reveal a significant interaction effect. Hence, no support is provided for H<sub>3b</sub>. For item switch, the main effects of product type and brand type become both significant. For brand type the negative sign contrasts our hypothesis 1c. The negative sign for product type is in line with our hypothesis. Thus, H<sub>2c</sub> is supported. The interaction term is also significant and it has an expected positive sign. Hence, H<sub>3c</sub> is supported. The addition of the interaction term results in a non-significant effect of product type postponement/cancel. The positive effect of brand type on postponement/cancel remains significant. Note that product type had the unexpected sign in model 1a. The interaction term is not significant in this model. Hence, no support is provided for H<sub>3d</sub>.

### Model 2

The  $\chi^2$  of this model 2 is 325.84 (degree of freedom=36, p=0.00). The addition of variables from prior research also leads to better in-sample predictions. Where in model 1b 37.7% of the reactions were correctly predicted, the hit rate is 52.3% in model 2. The marginal effects of model 2 are displayed in Appendix 3.

The marginal effects of product type, brand type and the interaction between product type and brand type change when the other variables are included. This mainly holds for the effect of brand type, which is no significant predictor of all the four reactions. This might be explained by the fact that attitudinal brand loyalty is of course strongly correlated with brand type. However, note that the interaction effects of product type and brand type remain significant predictors of brand switch and item switch. It is rather surprising that we find a

positive significant effect of product type on brand switch. Thus, in hedonic product categories consumers are more inclined to switch to another brand, at least for low-equity brands. This contrast our hypothesis 2a.

With respect to the variables from prior research, our results confirm previous results that attitudinal brand loyalty is an important explanatory variable for all OOS reactions. The effect is negative for brand switch and item switch, while it has a positive effect on store switch. The perceived availability of acceptable alternative brands has a positive significant effect on brand switch, while it has a significant negative effect on store switch. No significant effect of the availability of alternative stores is found. This result contrasts prior research from Campo, Gijsbrechts and Nisol (2000) and Verbeke, Farris and Thurik (1998). Our estimation results reveal a significant negative effect of store loyalty on store switch and a significant negative effect on delay/postponement. These results are pretty much in line with prior research. Buying urgency is a significant positive predictor of brand switch and item switch. No significant effect of shopping trip is found. In contrast with Campo, Gijsbrechts and Nisol (2000), no effects of both shopping attitude and general time constraint are found. However, a significant positive effect of age on store switch is found. Thus, older consumers are more inclined to switch to another store when their desired brand is OOS.

With respect to our additional variables buying frequency and part of the week our results are as follows. We find a positive significant effect of buying frequency on brand switch, while a negative effect on cancel/postponement is found. Hence, frequent buyers are more inclined to switch to another brand, while they are less inclined to cancel or postpone the purchase. With respect to part of the week, our results show that consumers shopping at the end of week are significantly more inclined to switch to another brand and less inclined to postpone or cancel the purchase.

## DISCUSSION

### *Conclusions*

In this study we investigated the effect of product type and brand type on OOS responses. Moreover, we also considered the effect of previously studied variables, such as buying urgency and shopping attitude, on OOS responses. As we study these responses in eight product categories in different retail chains, our study provides an important test for the role of these variables in OOS.

In general we conclude that product type and brand type are important variables for the explanation of stock-out responses. The effect of brand equity on consumer stock-out behavior is in line with the overwhelming number of studies that emphasize the relation between brand equity and brand loyalty. Our research shows that for high equity brands brand switch percentages are lower and store switch are higher than for low equity brands. A very interesting finding is that the effect of brand equity is moderated by product type. In hedonistic product categories the effect of brand equity is stronger than in utilitarian product groups. However, we also found a main effect of product type. In hedonic product groups we found higher store switch percentages and brand switch percentages, while item switch percentages are lower. This seems to suggest that consumers are also product loyal in these categories. They highly value their needed product and thus they are more inclined to buy the product. Hence, there is something like a '*double loyalty*' of consumers in hedonic product categories. They are not only more brand loyal, but also they are also more product loyal.

With respect to the prior researched variables our results confirm some of the results of prior research. Especially, we find support for the fact that the availability of acceptable alternatives, attitudinal brand loyalty, attitudinal store loyalty, buying urgency and age are important variables for the explanation of OOS. However, our results do not support that the

availability of alternative stores, the type of shopping trip, shopping attitude and the perceived general time constraint are determinants of OOS responses. Furthermore, in our exploration of the effect of buying frequency and part of week, our results were as follows. Buying frequency positively affects brand switch, while it negatively affects cancel or postponement. Brand switching occurs more often at the end of the week, while cancel or postponement occurs less frequent at the end of the week.

#### *Management implications*

Our findings are very useful for retailers as well as for brand manufacturers. An important implication for retailers who want to reduce OOS is that it makes sense to set priorities. In general OOS should be minimized for high equity brands and particularly for high equity brands in hedonic product categories. This might be in contradiction with current managerial practices. Nowadays, many retailers favor their private label in their shelf space allocation decisions. This practice leads to a relative under allocation of high equity brands and enhance OOS for these type of brands. This might lead to store switching and postponement and consequently a loss of opportunity sales for the retailer.

An important implication for brand manufacturers is that investing in building brand equity leads to more favorable OOS response (i.e. store switching). In an era in which retailers are rationalizing their assortments this might be a very important asset in preserving distribution and shelf positions. Thus building brand equity may not only affect the perceived value of the brand, it may also affect the power balance in the channel. An implication for both manufacturers and retailers is that it might be wise to offer and stock additional line extensions for high equity brands in hedonic product categories. For these brands consumers show a high level of product and brand loyalty and offering additional items of these brands may decrease the impact of item OOS.

### *Limitations and future research*

Like all research our study has some important limitations. These limitations might provide interesting opportunities for future research. First, the findings about the role of product type are based on data is limited to eight product groups. The descriptive analyses already showed heterogeneity in OOS reaction patterns between product groups of the same type. Thus, the selected product groups might have affected our results. To test the robustness of our findings, future research should take other and/or more product groups into account. A second limitation is that we used hypothetical OOS situations to measure consumer OOS responses instead of true OOS situations. This obviously affects the validity of the OOS responses given by consumers. Therefore, measuring OOS response with consumer household panel data combined with a panel survey can provide more valid information about true OOS reactions and the effect of brand and product type as antecedents for consumer OOS response. A third limitation is the use of self-report scales in these type of studies. There might be carry-over and backfire effects between the measured consumer OOS response and the perception scales (i.e., brand loyalty). This might have inflated our regression coefficients (Bickart, 1993). Note, however that this does not affect the role of brand type and product type in explaining OOS responses. Finally, the results of OOS studies can be extended to other retail decisions. In this respect one could also consider this effect on permanent out-of-stocks or brand delisting.

## REFERENCES

- Aaker, D. (1990), *Managing Brand Equity: Capitalizing on the Value of a Brand Name*, New York: The Free Press.
- Batra R. & Ahtola O.T. (1991). Measuring the hedonic and utilitarian sources of consumer attitudes, *Marketing Letters*, 2 (2), 159-170.
- Ailawadi K.L, Lehmann D.R., & Neslin S.A.(2002). *A Product-Market-Based Measure of Brand Equity*, Cambridge, Working Paper, Marketing Science Institute.
- Andersen Consulting (1996), *Where to look for incremental sales gains: the retail problem of out-of-stock merchandise*, Coca-Cola Retailing Research Council.
- Babin, B. J., Darden W. R., Griffin M. (1994). Work and/or fun: Measuring hedonic and utilitarian shopping, *Journal of Consumer Research*, 20 (4), 644-656.
- Baumgartner, H. and Steenkamp J.B.E.M. (1996). Exploratory consumer buying behavior: Conceptualization and measurement, *International Journal of Research in Marketing*, 13 (2), 121-137.
- Bickart, B.A. (1993), Carry-over and backfire effects in marketing research, *Journal of Marketing Research*, 30 (10), 52-62.
- Business Week (2002), The best global brands, *Business Week*, 3798 (september 9), 14.
- CBL (1989), *CBL Consumententrends (Central Bureau for Food Retail Trade, Consumer Trends) 1989*, Leidschendam: CBL.
- CBL (2000), *CBL Consumententrends (Central Bureau for Food Retail Trade, Consumer Trends) 2000*, Leidschendam: CBL.
- Campo, K., Gijsbrechts, E., & Nisol, P. (2000). Towards understanding consumer response to stockouts, *Journal of Retailing*, 76 (2), 219-242.

- Campo, K., Gijsbrechts E., & Nisol P. (2002). Dynamics in Consumer Response to Product Unavailability: Do Stock-out Reactions Signal Response to Permanent Assortment Reductions?, *Journal of Business Research*, forthcoming.
- Chandon, P., Wansink, B., & Laurent, G. (2000). A benefit congruence framework of sales promotion effectiveness, *Journal of Marketing*, 64 (4), 65-81.
- Dhar, R., & Wertenbroch, K. (2000). Consumer choice between hedonic and utilitarian goods, *Journal of Marketing Research*, 37 (1), 60-71.
- Ehrenberg, A., Goodhardt G. & Barwise P. (1990). Double Jeopardy Revisited, *Journal of Marketing*, 54, 82-90.
- Emmelhainz, M., Stock, J., & Emmelhainz, M. (1991). Consumer responses to retail stock-outs, *Journal of Retailing*, 67 (2), 138-147.
- Erasmus Food Management Institute (2000). *Out-of-Stock, Out-of-Business?*, Rotterdam: EFMI.
- Fitzsimons, G.J. (2000). Consumer response to stockouts, *Journal of Consumer Research*, 27 (2), 249-266.
- Franses, P. H., & Paap, R. (2001). *Quantitative Models in Marketing Research*, Cambridge: Cambridge University Press.
- Gattorna, J. (1988). Effective logistics management, *International Journal of Physical Distribution & Materials Management*, 18 (2,3), 4-92.
- Greene, W. H. (1998). *LIMDEP Version 7.0 User's Manual Revised Edition*, New York: Eonometric Software.
- Hair, J.F., Anderson R.E., Tatham R.L. & Black W.C. (1998), *Multivariate Data Analysis*, Upper Saddle River New Jersey: Prentice Hall.
- Hirschman, E.C., & Holbrook, M.B. (1982). Hedonic consumption: Emerging concepts, methods and propositions, *Journal of Marketing Research*, 46 (summer), 92-101.



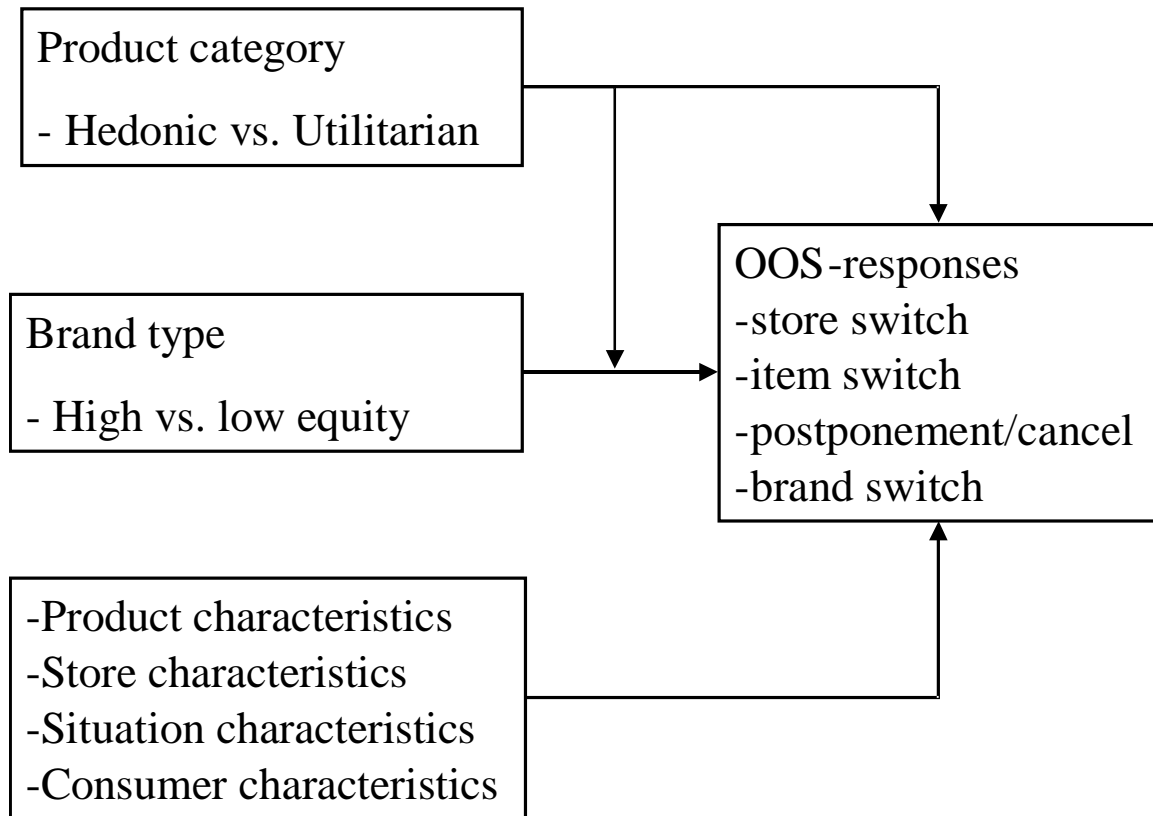
- Keller K.L. (2002). *Building, Measuring, and Managing Brand Equity*, New Jersey, Pearson Education.
- Kooistra, A., (1999). De vreselijke verspilling (The huge waste), *Foodmagazine*, 55 (5), 20-25.
- Peckham, J.O. (1963). The consumer speaks, *Journal of Marketing*, 27 (4), 21-26.
- Rossiter, J.R. (2002), The C-OAR-SE procedure for scale development in marketing, *International Journal of Research in Marketing*, forthcoming
- Rossiter, J.R. & Percy L. (1997), *Advertising Communications & Promotion Management*, Boston: Irwin McGraw Hill.
- Rust, R.T., Zeithaml V.A. & Lemon K.N. (2000), *Driving Customer Equity: How Customer Lifetime Value is Reshaping Corporate Strategy*, New York: The Free Press.
- Schary, P. & Christopher, M. (1979). The anatomy of a stock-out, *Journal of Retailing*, 55 (2), 59-70.
- Sproles E.K., & Sproles G.B. (1990). Consumer Decision-Making Styles as a Function of Individual Learning Styles, *Journal of Consumer Affairs*, 24, 134-137
- Sujan M. & Bettman J.R. (1989). The Effects of Brand Positioning Strategies on Consumers' Brand and Category Perceptions: Some Insights from Schema Research, *Journal of Marketing Research*, 26 (November), 454-467
- 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.
- Vergin, R.C., & Barr, K. (1999). Building competitiveness in grocery supply through continuous replenishment planning: Insights from the field, *Industrial Marketing Management*, 28 (2), 145-153.
- Walter, C.K., & Grabner, J.R. (1981). Stockout Cost Models: Empirical Tests in a Retail Situation, *Journal of Marketing*, volume 39, 56-68.

Zinn, W., & Liu, P.C. (2001). Consumer response to retail stockouts, *Journal of Business Logistics*, 22 (1), 49-72.

Zinszer, P.H., & Lesser, J.A. (1981). An empirical evaluation of the role of stock-out on shopper patronage processes, *Advances in Consumer Research*, 8, 221-224.

**Figure 1:**

Conceptual Model Stock-Out Responses



**Table 1:**  
Methodological overview of studies about consumer response towards stock-outs

Author(s)	Product type	Main objective(s) of study	Main stock-out reactions measured	Study design	Stock-out type (hypothetical of true)	Range of stock-outs (item or brand stock-out)	Data collection method	Number of categories involved	Number of brand types involved	Number of retail chains and stores involved
Peckham (1963)	Grocery products	Determining the level of consumer out-of-stock confrontations and describing consumer stock-out behavior	Substitute brand bought (Y/N)	Field experiment (quasi)	True	Brand	Personal interviews in a supermarket setting (after check-out) (n = 1173, 24% experience unavailability)	14	No information given	Many different retail chains and many stores (exact number not given)
Walter & Grabner (1975)	Liquor products	Describing consumer stock-out behavior and determining the economic costs of stock-outs to retailers	Store switch Brand Switch Item switch Defer	Survey	Hypothetical	Item	Written survey, distributed by the cashier (n= 1433)	Specific number not given	No information given	One retail chain, 10 stores
Schary and Christopher (1979)	Grocery products (branded food items)	Describing consumer stock-out response and explaining stock-out reactions from store and product related characteristics	Item switch Brand switch Product switch Store switch No buy Postpone	Field experiment (quasi)	True	Item	Personal interviews with shoppers just leaving the check-out area (n=1167, 343 effectively)	Specific number not given	No information given	One retail chain, 2 stores
Emmelhainz, Stock and Emmelhainz (1991)	Grocery products	Identifying consumer stock-out behavior and analyzing the impact of product and situation influences on consumer stock-out behavior	Item switch Brand switch Product switch Delay purchase Different store Special trip	Field experiment (natural)	True	Item	Personal interviews (n=2810, 375 effectively)	5	5 leading selling variety's	One retail chain (discount), 1 store
Verbeke, Farris and Thurik (1998)	Grocery products	Identifying consumer stock-out reactions for high selling brands and explaining stock-out reactions by store related and situational characteristics	Brand switch Store switch Postpone purchase	Field experiment (natural)	True	Brand	Interviews by telephone (n = 590)	5	5 high share brands	One retail chain, 8 stores
Campo, Gijsbrechts and Nisol (2000)	Grocery products (margarine and cereals)	Explaining consumer stock-out reactions based on a conceptual framework with major determinants of consumer stock-out reactions	Size switch Item switch Store switch Defer Cancel	Survey	Hypothetical	Item	Personal interviews in the supermarket (n=993 cases, margarine 544, cereals 449)	2	3 (generics, private labels and national brands)	One retail chain, 1 store
Fitzsimons (2000)	All types of products	Explaining stock-out effects (store switch, satisfaction) by cognition and attitudinal	Store switching Consumer satisfaction	Laboratory experiments	Hypothetical	Hypothetical items	Four experiments with written surveys.	Specific number not given	No information given	No real retail outlet context
Zinn and Liu (2001)	Small appliances, home decoration items, furniture and jewelry	Explaining consumer stock-out reactions from a consumer psychology context (consideration set, commitment, attractiveness of alternatives and perceived complexity of choice process)	Substitute item Delay purchase Leave the store	Field experiment (quasi)	True	Item	Written questionnaire, (n=283)	Specific number not given	No information given	One retail chain (discount), 4 different stores

**TABLE 2:**Methodological overview of explaining variables for consumer stock-out reactions (significance  $p < 0.05$ )

Factor	Description of characteristic	Variable	Substitute bought	Item switch (1)	Brand switch (1)	Category switch	Store switch	Cancel	Postpone	
Product and brand related characteristics	These variables are related to the specific product category or brand in which the (hypothetical or factual) stock-out appears	Availability of acceptable alternatives (Campo, Gijsbrechts and Nisol, 2000)		+	+		-	-	-	
		Perceived attractiveness of alternatives (Fitsz西蒙斯, 2000)		-	-		-	+	+	
		Perceived risk of switching to an alternative (Emmelhainz, Stock and Emmelhainz, 1991)				-				
		Stock out is in consideration set (Fitsz西蒙斯, 2000)					+			
		Brand loyalty (Campo, Gijsbrechts and Nisol, 2000)					+			
		Repeat purchases (Emmelhainz, Stock and Emmelhainz, 1991)				-				
Store related characteristics	These variables are related to the store or retail chain in which the stock-out occurs	Private label (Scharly and Christopher, 1979)					-	+	+	
		Store loyalty general (Campo, Gijsbrechts and Nisol, 2000)		+	+		-	+	+	
		% shopping trips at survey store (Campo, Gijsbrechts and Nisol, 2000)		+	+		-	+	+	
		Store loyalty (Emmelhainz, Stock and Emmelhainz, 1991)					-		+	
		Store loyalty large (Verbeke, Farris and Thurik, 1998)					+			
Situation related characteristics	These variables are related to the specific shopping trip in which the stock-out appears	Required purchase quantity (Campo, Gijsbrechts and Nisol, 2000)		+	+		-	+ and -	-	
		Urgency (Zinn and Liu, 2001)							-	
		Urgency (need to use the same day) (Emmelhainz, Stock and Emmelhainz, 1991)	+							
		Time pressure (Campo, Gijsbrechts and Nisol, 2000)		+	+		- and +	+	-	
Consumer related characteristics	These variables are related to the consumer (shopper) who is confronted with the stock-out	Shopping attitude (Campo, Gijsbrechts and Nisol, 2000)		-	-		+	-	+	
		Major shopping trip (Campo, Gijsbrechts and Nisol, 2000)		+ and -	+ and -		+	+	-	
		Available shopping time (Campo, Gijsbrechts and Nisol, 2000)		+	+		-	+	+	
		Complexity of decision making process set (Fitsz西蒙斯, 2000)					-			
		Amount of purchase small versus large (Verbeke, Farris and Thurik, 1998)				+		+		-

- 1) Campo, Gijsbrechts and Nisol (2000) define variety switch (other SKU of same brand) and brand switch as item switch and pay separate attention to size switch. In most other studies about consumer reactions towards stock-outs size and variety switch within the same brand are defined as item switch, while a brand switch is measured as a separate switching reaction.

**Table 3:**

Utilitarian and hedonic level of selected product groups (n=40)

Product	Utilitarian level (1 = low, 7 = high)	Hedonic level (1 = low, 7 = high)	Classification
Eggs	5,0	2,8	Utilitarian product
Margarine	5,2	2,8	Utilitarian product
Milk	5,3	3,2	Utilitarian product
Detergent	6,2	2,5	Utilitarian product
Beer	3,0	5,9	Hedonic product
Chips	2,7	5,5	Hedonic product
Cigarettes	2,0	5,4	Hedonic product
Cola	3,3	5,2	Hedonic product

**Table 4:**

Cronbach-alpha per product group for multi-item self-report scales

<b>Product group</b>	<b>Availability of acceptable alternatives</b>	<b>Brand loyalty</b>	<b>Shopping attitude</b>	<b>Store loyalty</b>	<b>Buying urgency</b>
<b>Utilitarian products</b>					
1. Detergent	0,48	0,66	0,82	0,73	0,52
2. Eggs	0,61	0,68	0,80	0,76	0,64
3. Margarine	0,60	0,75	0,81	0,67	0,55
4. Milk	0,52	0,60	0,80	0,75	0,34
<b>Hedonic products</b>					
5. Beer	0,40	0,48	0,77	0,72	0,63
6. Cigarettes	0,53	0,67	0,78	0,71	0,59
7. Cola	0,67	0,71	0,82	0,72	0,54
8. Salty snacks	0,48	0,53	0,69	0,73	0,48
<b>Average unweighted Cronbach-alpha</b>	<b>0,54</b>	<b>0,64</b>	<b>0,79</b>	<b>0,72</b>	<b>0,54</b>

**Table 5:**

Descriptive analysis stock-out response per brand type and per product type

	Brand type (n=734)		Product type (n=734)	
	Low equity (n=356)	High equity (n=378)	Utilitarian (n=360)	Hedonic (n=374)
Store switch	13%	25%	13%	26%
Item switch	18%	20%	19%	18%
Postpone or cancel	24%	29%	29%	25%
Brand switch	45%	26%	39%	31%



**Table 6:**

Marginal Effects (p-value) Model 1a and 1b (N=734)

	<b>Store Switch</b>	<b>Item Switch</b>	<b>Cancel/ Post- ponement</b>	<b>Brand Switch</b>
<b>Model 1a</b>				
Constant	<b>-0.16 (0.00)</b>	<b>-0.059 (0.00)</b>	0.11 (0.68)	<b>0.21 (0.00)</b>
Brand type (0=low equity, 1 = high equity)	<b>0.083 (0.01)</b>	0.029 (0.91)	<b>0.068 (0.06)</b>	<b>-0.18 (0.00)</b>
Product type (0=utilitarian, 1 = hedonic)	<b>0.11 (0.00)</b>	0.026(0.41)	<b>-0.062 (0.08)</b>	-0.019 (0.63)
<b>Model 1b</b>				
Constant	<b>-0.17 (0.00)</b>	-0.025 (0.27)	0.001 (0.97)	<b>0.19 (0.00)</b>
Brand type (0=low equity, 1 = high equity)	<b>0.091 (0.06)</b>	<b>-0.079 (0.09)</b>	<b>0.093 (0.06)</b>	<b>-0.10 (0.05)</b>
Product type (0=utilitarian, 1 = hedonic)	<b>0.12 (0.01)</b>	<b>-0.16 (0.00)</b>	-0.016 (0.76)	0.055 (0.30)
Product type * Brand Type	-0.018 (0.77)	<b>0.24 (0.00)</b>	-0.067 (0.35)	<b>-0.16 (0.04)</b>

## Appendix 1:

### Overview and Definition of Independent Variables

OOS determinant		Concept	Measurement instrument
<b>Main variables</b>			
Brand equity	BE	Strength of brand in terms of price level, awareness and quality	Judgement by experts. Dummy variable, 0 for low equity brands, 1 for high equity brands
Product type	PT	Type of product	Dummy variable, 1 for hedonic products, 0 for utilitarian products
<b>Product related characteristic</b>			
SRS: Availability of acceptability alternatives	AAA	Perceived differentiation of brands within category X, perceived risk of switching to another brand	Self-report scale (based on Sujan and Bettman, 1989 and Campo, Gijsbrechts and Nisol, 2000)
SRS: Brand loyalty (attitude)	BLAT	Tendency to be loyal towards one specific brand within category X	Self-report scale (based on Sproles and Sproles, 1990 and Baumgartner and Steenkamp, 1996)
<b>Store related characteristics</b>			
SRS: Store loyalty (attitude)	SLAT	Tendency to be loyal to store X	Self-report scale (based on Campo, Gijsbrechts and Nisol, 2000)
Perceived acceptable alternative stores	PAAS	Perceived number of alternative supermarkets in same area	5-point scale which measures the perception of the number of alternative stores
<b>Situation related characteristics</b>			
SRS: Buying urgency	BU	The level of importance for the shopper to buy category X within a short period of time	Self-report scale
Type of shopping trip	TRIP	Distinction between minor and major shopping trips	Dummy variable, equal to 1 for major shopping trips and 0 for minor shopping trips
Shopping moment	END	Distinction between the part of the week when the shopping trip took place	Dummy variable, equal to 1 for trips at the end of the week (Thursday to Saturday) and 0 for trips at the first part of the week (Monday to Wednesday)
<b>Consumer related characteristics</b>			
SRS: Shopping attitude	SHAT	Perception of shopping as a necessary task, or as an activity which brings enjoyment	Self-report scale (based on Sproles and Sproles, 1990 and Babin, Darden and Griffin, 1994)
Shopping frequency	SHFR	Average shopping frequency	Average number of shopping trips per week
Buying frequency	BUFR	Average buying frequency	Number of times a product is bought on a monthly basis
General time constraint	GTC	Time constraint in general for grocery shopping	Time constraint for grocery shopping on 5-point scale
Age	AGE	Age of respondent	Age in number of years

## Appendix 2:

### Measurement of Self-report Scales

#### *Availability of acceptable alternatives*

- 1 To my opinion the other brands in (category) are not as good as the brand I just bought
- 2 There is little difference across brands of (category) (r)
- 3 If I would have to buy another brand of (category), I probably would be less satisfied

#### *Brand loyalty (towards test brand)*

1. It does not matter to me which brand (category) I buy (r)
2. I think of myself as a loyal buyer of (brand) when I buy (category)
3. I never try other brands of (category)

#### *Shopping attitude*

1. Shopping is truly a joy
2. I certainly do not dislike shopping
3. I always try to save time if I am shopping (r)
4. I do not like to spent much time for shopping (r)

#### *Shopping time constraint*

- 1 In general I do not have much time left for shopping

#### *Store loyalty (attitude towards test supermarket)*

1. I think of myself as a loyal customer of this supermarket
2. I have a strong preference for this supermarket
3. I would be very disappointed if this supermarket would disappear
4. I am very satisfied with this supermarket

#### *Perceived alternative stores*

1. There are many other supermarkets I can choose for in this area

#### *Buying urgency*

1. It is important that I can buy (category) today
2. I bought (category) because I really needed it
3. It is no problem if I can not buy (category) today (r)

### Appendix 3:

Marginal Effects of Model 2 (N=734)

	<b>Store Switch</b>	<b>Item Switch</b>	<b>Cancel/ Post- ponement</b>	<b>Brand Switch</b>
Constant	<b>-0.72 (0.00)</b>	-0.16 (0.25)	0.23 (0.14)	<b>0.65 (0.00)</b>
Brand type (0=low equity, 1 = high equity)	0.048 (0.32)	-0.082 (0.13)	0.065 (0.22)	-0.032(0.60)
Product type (0=utilitarian, 1 = hedonic)	<b>0.11 (0.03)</b>	<b>-0.16 (0.01)</b>	-0.071 (0.24)	<b>0.12 (0.06)</b>
Product type * Brand Type	-0.023 (0.71)	<b>0.25 (0.00)</b>	-0.019(0.82)	<b>-0.20 (0.02)</b>
<b>Variable from prior research</b>				
<b>Product related</b>				
Availability of Acceptable Alternatives	<b>-0.051 (0.02)</b>	-0.024 (0.32)	-0.024 (0.36)	<b>0.10 (0.00)</b>
Attitudinal Brand Loyalty	<b>0.11 (0.00)</b>	-0.032 (0.11)	<b>0.190 (0.00)</b>	<b>-0.18 (0.00)</b>
Buying Frequency	0.01 (0.42)	-0.002 (0.88)	<b>-0.04 (0.01)</b>	<b>0.03 (0.06)</b>
<b>Store related</b>				
Perceived Acceptable Alternative Stores <sup>a</sup>	0.0038 (0.74)	-0.02 (0.12)	0.001 (0.93)	0.015 (0.34)
Attitudinal Store Loyalty	<b>-0.052 (0.01)</b>	-0.004 (0.85)	0.038 (0.15)	0.009 (0.74)
<b>Situation related</b>				
Buying Urgency	0.005 (0.75)	<b>0.069 (0.00)</b>	<b>-0.18 (0.00)</b>	<b>0.10 (0.00)</b>
Shopping Trip (0=minor; 1= major)	-0.022 (0.48)	0.026 (0.47)	-0.073 (0.13)	0.057 (0.19)
Part of Week (0=beginning; 1 =end)	-0.035 (0.92)	0.052 (0.20)	<b>-0.14 (0.01)</b>	<b>0.08 (0.09)</b>
<b>Consumer related</b>				
Shopping Attitude	0.022 (0.19)	0.024 (0.20)	-0.022 (0.30)	-0.024 (0.30)
General Time Constraint	-0.006 (0.64)	-0.006 (0.64)	0.001 (0.96)	-0.012 (0.49)
Age/100	<b>0.31 (0.00)</b>	-0.09 (0.38)	0.01 (0.92)	-0.22 (0.10)

<sup>a</sup> Instead of a perceptual measure for available alternative stores, we also included an objective measure. The marginal effects for this predictor variable were also not significant.

## Publications in the Report Series Research\* in Management

ERIM Research Program: "Marketing"

2002

*Suboptimality of Sales Promotions and Improvement through Channel Coordination*

Berend Wierenga & Han Soethoudt

ERS-2002-10-MKT

*The Role of Schema Saliency in Ad Processing and Evaluation*

Joost Loef, Gerrit Antonides & W. Fred van Raaij

ERS-2002-15-MKT

*The Shape of Utility Functions and Organizational Behavior*

Joost M.E. Pennings & Ale Smidts

ERS-2002-18-MKT

*Competitive Reactions and the Cross-Sales Effects of Advertising and Promotion*

Jan-Benedict E.M. Steenkamp, Vincent R. Nijs, Dominique M. Hanssens & Marnik G. Dekimpe

ERS-2002-20-MKT

*Do promotions benefit manufacturers, retailers or both?*

Shuba Srinivasan, Koen Pauwels, Dominique M. Hanssens & Marnik G. Dekimpe

ERS-2002-21-MKT

*How cannibalistic is the internet channel?*

Barbara Deleersnyder, Inge Geyskens, Katrijn Gielens & Marnik G. Dekimpe

ERS-2002-22-MKT

*Evaluating Direct Marketing Campaigns; Recent Findings and Future Research Topics*

Jedid-Jah Jonker, Philip Hans Franses & Nanda Piersma

ERS-2002-26-MKT

*The Joint Effect of Relationship Perceptions, Loyalty Program and Direct Mailings on Customer Share Development*

Peter C. Verhoef

ERS-2002-27-MKT

*Estimated parameters do not get the "wrong sign" due to collinearity across included variables*

Philip Hans Franses & Christiaan Hey

ERS-2002-31-MKT

*Dynamic Effects of Trust and Cognitive Social Structures on Information Transfer Relationships*

David Dekker, David Krackhardt & Philip Hans Franses

ERS-2002-33-MKT

*Means-end relations: hierarchies or networks? An inquiry into the (a)symmetry of means-end relations.*

Johan van Rekom & Berend Wierenga

ERS-2002-36-MKT

---

\* A complete overview of the ERIM Report Series Research in Management:

<http://www.ers.erim.eur.nl>

ERIM Research Programs:

LIS Business Processes, Logistics and Information Systems

ORG Organizing for Performance

MKT Marketing

F&A Finance and Accounting

STR Strategy and Entrepreneurship

*Cognitive and Affective Consequences of Two Types of Incongruent Advertising*

Joost Loef & Peeter W.J. Verlegh

ERS-2002-42-MKT

*The Effects of Self-Reinforcing Mechanisms on Firm Performance*

Erik den Hartigh, Fred Langerak & Harry R. Commandeur

ERS-2002-46-MKT

*Modeling Generational Transitions from Aggregate Data*

Philip Hans Franses & Stefan Stremersch

ERS-2002-49-MKT

*Sales Models For Many Items Using Attribute Data*

Erjen Nierop, Dennis Fok, Philip Hans Franses

ERS-2002-65-MKT

*The Econometrics Of The Bass Diffusion Model*

H. Peter Boswijk, Philip Hans Franses

ERS-2002-66-MKT

*How the Impact of Integration of Marketing and R&D Differs Depending on a Firm's Resources and its Strategic Scope*

Mark A.A.M. Leenders, Berend Wierenga

ERS-2002-68-MKT

*The Theoretical Underpinnings of Customer Asset Management: A Framework and Propositions for Future Research*

Ruth N. Bolton, Katherine N. Lemon, Peter C. Verhoef

ERS-2002-80-MKT

*Further Thoughts on CRM: Strategically Embedding Customer Relationship Management in Organizations*

Peter C. Verhoef, Fred Langerak

ERS-2002-83-MKT

*Building Stronger Channel Relationships through Information Sharing. An Experimental Study*

Willem Smit, Gerrit H. van Bruggen, Berend Wierenga

ERS-2002-84-MKT

*What is the Predictive Power of Market Orientation?*

Fred Langerak

ERS-2002-88-MKT

*Service Processes as a Sequence of Events: An Application to Service Calls*

Peter C. Verhoef, Gerrit Antonides, Arnoud N. de Hoog

ERS-2002-105-MKT

*The Impact of Brand and Category Characteristics on Consumer Stock-out Reactions*

Laurens Sloot, Peter C. Verhoef, Philip Hans Franses

ERS-2002-106-MKT