

## The impact of brand equity and the hedonic level of products on consumer stock-out reactions

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### Abstract

We investigate the impact of brand equity and the hedonic level of the product on consumer stock-out responses. We also examine whether the hedonic level of the product moderates the effect of brand equity. Using a sample of Dutch consumers divided over eight product groups and eight retail chains, we tested our hypotheses and found that consumers were more loyal to high-equity brands than to low-equity brands in the case of a stock-out situation. In hedonic product groups, consumers were more likely to switch to another store. Purchasers of high-equity brands in hedonic product groups were, compared to purchasers of high-equity brands in utilitarian product groups, less inclined to postpone the purchase but were more likely to switch to another item by that brand. In addition to these two main variables, we also investigate the effect of variables from prior research and some new variables, such as stockpiling and impulse buying. Finally, we discuss the theoretical and managerial implications of the findings.

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### Introduction

Out-of-stock (OOS) is a regular phenomenon for grocery shoppers. The percentages of OOS occurrences regularly vary among five percent (The Netherlands), seven percent (France), and eight percent (United States) of the total stock-keeping unit level of supermarkets (Andersen Consulting 1996; Kooistra 1999; Roland Berger Strategy Consultants 2002). This rather common temporary unavailability of items rates high on shoppers' irritation lists and causes a lower level of consumer satisfaction (CBL 2000; Fitzsimons 2000). An OOS occurrence may have a direct impact on a retailer's financial outcome, because it leads to a loss of category sales if consumers decide to switch stores or cancel their purchases completely. If consumers decide to switch stores, a loss of sales might result in a loss of sales in other categories as well. The resulting gross margin losses for retailers resulting

from OOS are estimated to lie between \$7 and \$12 billion per year in the United States (Andersen Consulting 1996).

In response, some efficient consumer response (ECR) projects have focused on developing methods to improve the supply chain. According to Vergin and Barr (1999), the application of continuous replenishment planning can decrease OOS levels by 55 percent. Although some ECR projects have showed encouraging decreases in OOS levels, a substantial decrease of OOS levels has not yet been observed in practice (EFMI 2000). Due to extensions in assortments and because shelf space is often fixed in the short and mid-terms, OOS occurrences likely will remain regular phenomena for shoppers. Therefore, retailers need additional insights into the effects of OOS on consumer behavior, particularly regarding which types of OOS situations lead to high levels of store switching, postponement or cancellation of purchases. Another important issue for retailers pertains to the product groups and brands for which OOS occurrences result in substantial sales losses.

For brand manufacturers, OOS is important as well, because high OOS levels for a specific brand may lead to losses

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in brand sales and decreased brand loyalty. In addition to the important financial consequences of OOS, understanding consumers' OOS responses improves manufacturers' insight into the importance of distribution and shelf space allocation. In this respect, consumer OOS reactions may provide valuable information about the possible effects of OOS when an item or a brand is permanently delisted (Campo, Gijsbrechts, & Nisol 2002).

In marketing literature, there has been substantial interest in the topic of consumer reactions to OOS since the 1960s (Peckham 1963). The majority of early studies on OOS mainly focused on the definition and measurement of consumer OOS reactions (Emmelhainz, Stock, & Emmelhainz 1991; Gattorna 1988; Peckham 1963; Zinszer & Lesser 1981) or the financial consequences of OOS (Walter & Grabner 1975). More recently, researchers developed and tested theory-based models to explain OOS reactions (Campo, Gijsbrechts, & Nisol 2000; Verbeke, Farris, & Thurik 1998; Zinn & Liu 2001). The study of Campo et al. (2000) study is particularly noteworthy, because it provides and tests a theoretical framework to explain consumer OOS responses. In general, these studies are limited in their consideration of only a small number of product categories. They also often limit their attention to one particular supermarket or retail format. Finally, most studies have not considered whether OOS reactions vary among product categories and brands. As a result, theories that may explain observed differences in reactions between product categories and brands are not well developed.

In this study, we aim to fill these research gaps. We develop a theoretical framework in which brand equity and the hedonic level of the product are the two main antecedents of consumer OOS reactions. The inclusion of these variables is based on the notion, common in marketing literature, that both brand equity and the hedonic nature of products affect how consumers react to certain marketing stimuli (Aaker 1990; Ailawadi, Lehman, & Neslin 2002; Batra & Ahtola 1991; Chandon, Wansink, & Laurent 2000; Dhar & Wertenbroch 2000; Hirschman & Holbrook 1982; Keller 1993, 2002).

We also consider how the hedonic level of the product moderates the effect of brand equity on these reactions. In doing so, we extend the current literature about antecedents of OOS reactions in the following ways: First, no studies have considered the impact of the hedonic nature of products on OOS reactions.<sup>1</sup> Second, though some studies have included consumer-based brand loyalty indicators as antecedents, no studies explicitly have tried to explain consumer OOS reactions from a brand equity perspective. As a corollary, we

investigate whether the effect of brand equity is moderated by the hedonic nature of a product. Third, in contrast to other explanatory studies, we study OOS responses in a modest number of product groups and retail chains, which improves the generalizability and external validity of our results.

In addition to its theoretical contribution, our study also provides a clear managerial framework. Using this framework, both retailing and manufacturing managers can set priorities regarding which product groups and brands for which OOS should be minimized.

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

## Literature review

In this section, we provide a literature review of prior studies on OOS reactions and discuss the objectives, research methodology, research setting, OOS reactions considered, and antecedents of OOS reactions. In Table 1, we provide an overview of the published studies about consumer stock-out reactions in marketing and business logistics literature.

### Objectives

The objectives of early studies on OOS were mainly to define and measure OOS reactions and their financial impact. In some of these studies, OOS reactions were explained in an explorative way (e.g., Peckham 1963). Schary and Christopher's (1979) study was the first to attempt to explain OOS reactions. In the early 1990s, Emmelhainz et al. (1991) continued to focus on explaining OOS reactions. Although their study is mainly descriptive in nature, they take some interesting product and situational variables into account to explain OOS reactions. Campo et al. (2000) were the first to explicitly build a theoretically based conceptual framework to explain consumer reactions to OOS.

### Research methodology

Most studies apply either a field experiment or a survey. In field experiments, true stock-outs are studied. Researchers either remove specific items or brands in advance of the research or ask consumers if they encountered an OOS situation during their shopping trip (quasi-experiments). Studies that apply exploratory designs (e.g., surveys) consider hypothetical stock-out situations. In these cases, respondents are asked how they would react if a purchased item or brand was unavailable. We expect that these differences in research design influence the OOS reactions of consumers. For example, the "cost" of switching stores is obviously lower in surveys, because consumers do not really have to perform this time-consuming activity.

<sup>1</sup> In this study, we specifically refer to the hedonic level of a product category. In many product categories in a supermarket, this hedonic level may be considered the opposite of the utilitarian level, as is supported by our empirical measurements of the variables. In the discussion of our hypotheses, we therefore also talk about hedonic versus utilitarian products. However, some categories (e.g., shampoo) can provide both utilitarian and hedonic benefits. These categories were not included in our study, which may be considered a limitation. Further research might include such categories.

Table 1  
Methodological overview of studies about consumer responses to OOS

Author(s)	Products included	Main objective(s) of study	Main OOS reactions measured	Study design	Stock-out type (true or hypothetical)	Range of OOS (item or brand)	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 OOS confrontations and describing consumer OOS behavior	Substitute brand bought (Y/N)	Quasi-experiment	True	Brand	Personal interviews in a supermarket setting after check-out ( $n = 1173$ , 24 percent experienced unavailability)	14	No information given	Many different retail chains and many stores (exact number not given)
Walter and Grabner (1975)	Liquor products	Describing consumer OOS 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, ten stores
Schary and Christopher (1979)	Grocery products (branded food items)	Describing and explaining consumer OOS responses from store- and product-related characteristics	Item switch Brand switch Product switch Store switch No buy Postpone	Quasi-experiment	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, two stores
Emmelhainz et al. (1991)	Grocery products	Identifying consumer OOS behavior and analyzing the impact of product and situation influences on consumer OOS behavior	Item switch Brand switch Product switch Delay purchase Different store Special trip	Field experiment	True	Item	Personal interviews ( $n = 2810$ , 375 effectively)	5	5 leading selling varieties	One retail chain (discount), one store
Verbeke et al. (1998)	Grocery products	Identifying consumer OOS reactions for high-selling brands and explaining OOS reactions by store-related and situational characteristics	Brand switch Store switch Postpone purchase	Field experiment	True	Brand	Interviews by telephone ( $n = 590$ )	5	5 high-share brands	One retail chain, eight stores

Table 1 (Continued)

Author(s)	Products included	Main objective(s) of study	Main OOS reactions measured	Study design	Stock-out type (true or hypothetical)	Range of OOS (item or brand)	Data collection method	Number of categories involved	Number of brand types involved	Number of retail chains and stores involved
Campo et al. (2000)	Grocery products (margarine and cereals)	Explaining consumer OOS reactions based on a conceptual framework with major determinants of consumer OOS 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, one store
Fitzsimons (2000)	All types of products	Explaining OOS effects (store switch, satisfaction) by cognition and attitude	Store switch Consumer satisfaction	Laboratory experiment	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 OOS 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	Quasi-experiment	True	Item	Written questionnaire, ( $n = 283$ )	Specific number not given	No information given	One retail chain (discount), four different stores

With respect to the research design, the type of OOS also is important. Generally, two types of OOS can be distinguished: item and brand. In the first case, a single item of a brand (e.g., regular Coca-Cola) is OOS, whereas in the second case, all items of a single brand in a product group (e.g., all Coca-Cola products) are OOS. As we might expect, the reported OOS reactions differ. Moreover, in the case of brand OOS, an item switch (e.g., purchasing diet Coca-Cola instead of regular Coca-Cola) is not possible. When different research designs are used, it is difficult to derive empirical generalizations about the determinants of OOS reactions.

### Research setting

Studies about OOS reactions have been executed in a variety of product categories. As a result of their methodology, studies that consider actual OOS experiences (quasi-experiments) usually measure reactions for most categories in the store. With respect to the type of brands studied, our review reveals that some studies only consider high-share brands (e.g., Verbeke et al. 1998), whereas others consider manufacturer brands and private labels (e.g., Schary & Christopher 1979). However, despite the consideration of a broad range of brands, OOS studies usually do not regard the type of brand as an explanatory variable for OOS response. Finally, our review of the research setting shows that studies are usually executed within stores of a single retail chain, which limits the generalizability of their results.

### Consumer OOS reactions

To define and measure OOS reactions, six main behavioral consumer responses usually are distinguished. Ranked from relatively high to relatively low brand loyalty, these reactions are as follows:

- (1) Store switch: going to another store on the same day to buy the item that 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 completely or postponing it for a longer period of time;
- (5) Category switch: buying a substitute product from another product category; and
- (6) Brand switch: buying another brand within the same product category.

Studies of OOS reactions typically do not consider these six reactions simultaneously. For example, Verbeke et al. (1998) only focus on reactions 1, 3, and 6, whereas Campo et al. (2000) do not explicitly consider reactions 5 or 6. In addition, different definitions and measurement approaches are used by different researchers. For example, Campo et al. (2000) include a brand switch within the item switch reaction, though they differ significantly. Buying another item of the

same brand can be considered an indication of brand loyalty; buying an item of another brand indicates the opposite.

Prior studies also show that the frequency of cancel and category switch reactions is very small. In our empirical study, which we present subsequently, we also find small frequencies. Therefore, we focus on the four most common reactions—store, item, and brand switches and postponement—in our discussion of the antecedents of OOS reactions and the hypotheses that underlie our empirical model.

### Antecedents of OOS response

In Table 2, we provide an overview of the empirical evidence regarding the effect of possible determinants of OOS reactions. In line with prior research (Campo et al. 2000; Zinn & Liu 2001), we distinguish among the following clusters of antecedents: (1) product-related variables, (2) store-related variables, (3) situation-related variables, and (4) consumer-related variables.

#### Product-related variables

The first group of variables relates to the specific product category, including the brands, for which the stock-out appears. Several studies have claimed that the perceived availability of acceptable alternatives is an important determinant of consumer response to OOS occurrences. For example, Campo et al. (2000) show that the availability of acceptable alternatives is negatively related to store switching and positively related to brand switching, and Emmelhainz et al. (1991) report that the risk consumers perceive with respect to the substitutes offered negatively affects brand switching.

A second important characteristic is brand loyalty. Several studies have shown that the more loyal a consumer is to a specific brand (in terms of attitude or behavior), the less likely he or she is to switch to another brand in the case of an OOS occurrence. Furthermore, brand-loyal consumers are more likely to buy the OOS item or brand in another store (Campo et al. 2000; Emmelhainz et al. 1991; Peckham 1963; Verbeke et al. 1998).

A third variable is the level of safety stock consumers generally maintain before they make a new purchase (Campo et al. 2000; Narasimhan, Neslin, & Sen 1996). Some perishable products, such as milk or sour cream, are unlikely to be stockpiled. Consumers tend to buy these products to consume them within a few days. Therefore, for such products, it is less likely that consumers will postpone their purchase if the preferred item is OOS.

A fourth variable is the type of brand that is unavailable. Schary and Christopher (1979) find a significant effect of the type of brand on OOS reactions. National brand buyers have a greater tendency to switch stores in the case of OOS than do private label buyers. This effect may be caused by the limited distribution level of private labels compared with national brands. As a consequence, it is relatively more inconvenient

Table 2  
Methodological overview of explaining variables for consumer stock-out reactions (significance  $p < .05$ )

Antecedents	Description of characteristic	Variable	Brand switch	Store switch	Item switch	Postponement
Product-related variables	Variables related to the specific product category or brand in which the (hypothetical or factual) stock-out appears	Availability of acceptable alternatives (Campo et al. 2000) <sup>a</sup>	+	–	+	–
		Perceived attractiveness of alternatives (Fitzsimons 2000)	–	–	–	+
		Perceived risk of switching to an alternative (Emmelhainz et al. 1991)	–			
		Stock-out item is in consideration set (Fitzsimons 2000)		+		
		Brand loyalty (Campo et al. 2000)			+	
		Repeat purchases (Emmelhainz et al. 1991)	–			
		Private label (Schary & Christopher 1979)			–	
Store-related variables	Variables related to the store or retail chain in which the stock-out occurs	Store loyalty in general (Campo et al. 2000)	+	–	+	+
		Percentage of shopping trips at survey store (Campo et al. 2000)	+	–	+	+
		Store loyalty (Emmelhainz et al. 1991)			–	+
		Store loyalty: large (Verbeke et al. 1998)			+	
		Required purchase quantity (Campo et al. 2000)	+	–	+	– and +
Situation-related variables	Variables related to the specific shopping trip in which the stock-out appears	Urgency (Zinn & Liu 2001)				–
		Available shopping time (Campo et al. 2000)	+	–	+	+
		Time pressure (Campo et al. 2000)	+	– and +	+	– and +
		Major shopping trip (Campo et al. 2000)	+ and –	+	+ and –	– and +
Consumer-related variables	Variables related to the consumer (shopper) who is confronted with the stock-out	Shopping attitude (Campo et al. 2000)	–	+	–	– and +
		Complexity of decision-making process set (Fitzsimons 2000)			–	
		Amount of purchase: small vs. large (Verbeke et al. 1998)	+	+		–

<sup>a</sup> Campo et al. (2000) define variety switch (another stock-keeping unit of same brand) and brand switch as item switch and pay separate attention to size switch. In most other studies about consumer reactions to stock-outs, size and variety switch within the same brand are defined as item switch, whereas a brand switch is measured as a separate switching reaction.

for private label buyers to obtain their favorite item if it is OOS than for national brand buyers.

*Store-related variables*

Store-related antecedents pertain to variables that are related to the store or retail chain in which the OOS occurs. Several studies include store loyalty (attitudinal and behavioral) as an antecedent of OOS reactions. Not surprisingly, most report a positive effect of store loyalty on item switching, brand switching, and postponement of the purchase. Store-loyal consumers are less likely to switch to another store in the case of an OOS occurrence (Campo et al. 2000; Emmelhainz et al. 1991).

Some studies also have considered the availability of alternative stores in the vicinity of the store in which the OOS appears. Not only the number of alternative stores, but also the acceptability of these stores, plays an important role in shoppers' decision to switch stores. For example, attributes such as the available parking space, price level, and service level of alternative stores may influence the decision to switch stores in the case of an OOS occurrence. Theoretically, consumers with many acceptable alternative stores within a reasonable distance are more likely to switch to another store and less likely to buy a substitute (item or brand switch) or postpone the purchase. Although this expectation seems logical, no studies have supported this effect (e.g., Verbeke et al. 1998).

*Situation-related variables*

Situation-related variables pertain to antecedents that focus on the specific conditions of the consumers’ shopping trip. Several studies have suggested that buying urgency is an important determinant of OOS response (Campo et al. 2000; Emmelhainz et al. 1991; Zinn & Liu 2001). When a specific product is needed immediately, consumers cannot postpone the purchase. Therefore, they are more likely to buy a substitute or switch stores to buy the needed item.

Campo et al. (2000) also consider the type of shopping trip as an antecedent of OOS reactions. Consumers who visit the store for a major shopping trip are less likely to switch to another store and more likely to buy a substitute. The underlying rationale for this effect is that a major shopping trip is very time consuming, and consumers are therefore reluctant to spend additional time shopping in another store.

*Consumer-related variables*

Consumer-related variables consist of those variables related to the consumer who faces the OOS occurrence. One such characteristic is shopping attitude. Consumers with a positive shopping attitude are more likely to switch stores in the case of an OOS because they value visiting different stores (Campo et al. 2000). Another characteristic is shopping frequency. Consumers who shop frequently are more likely to postpone a purchase, because the chance of being without the product at home is smaller than for consumers who shop less frequently. However, there is no empirical evidence for such an effect (Campo et al. 2000). The time constraint or time pressure also may be an explanatory variable. Campo et al. (2000) show that consumers who have less time to shop are less likely to switch stores and more likely to buy a substitute. Related to time constraint is the age of the consumer.

Peckham (1963) reports that age is negatively related to substitute buying. A possible reason for this relationship may be that older people have more spare time to shop; therefore, they have fewer time constraints against switching stores.

**Conceptual model and hypotheses**

In Fig. 1, we show our conceptual model. In the main model, we focus on the effect of brand equity, the hedonic level of the product, and the moderating effect of the hedonic level of the product on the effect of brand equity. In the full model, we also include variables that could be important determinants of OOS reactions according to the literature. These variables are classified according to the four categories: product-, store-, situation-, and consumer-related.

*Brand equity*

In defining brand equity, Chandon et al. (2000) make a distinction between high- and low-equity brands. A brand has high customer-based brand equity when consumers react more favorably to a product when the brand is identified than when it is not (Keller 2002). In general, consumers value high-equity brands more than low-equity brands. Compared with high-equity brands, low-equity brands do not provide as many benefits and are bought mainly because of their lower price (Chandon et al. 2000). Therefore, some researchers suggest that the difference in price level between a national brand and a private label is a good indicator of brand equity (Kamakura & Russell 1993). A theoretical advantage of using brand equity as an antecedent of OOS reactions is that both manufacturer and retailer brands (i.e., private labels) can be classified according to this criterion (Ailawadi et al. 2002).

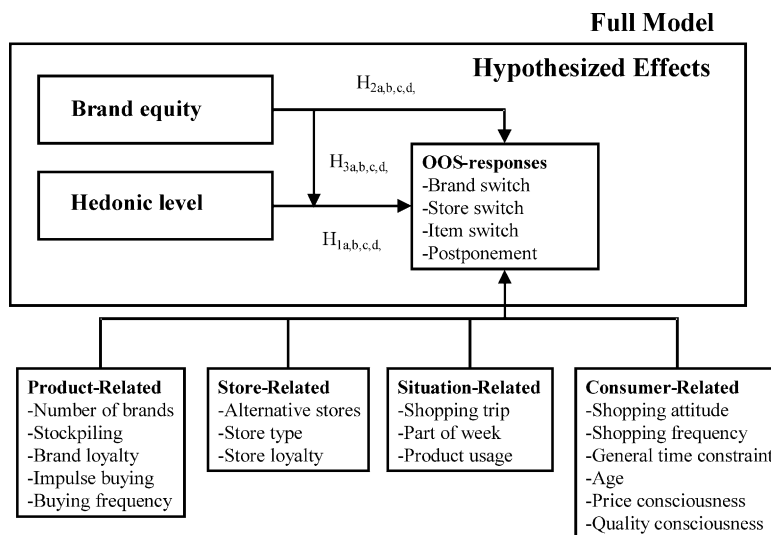


Fig. 1. Conceptual model of stock-out responses.

As noted, consumers generally prefer high-equity brands and therefore are willing to exercise more effort to obtain their favorite high-equity brand. Furthermore, high-equity brands tend to have a greater distribution level than low-equity brands, which often consist of private labels, regional brands, and price brands. From the perspective of both brand loyalty and brand availability, consumers who are confronted with an OOS situation for an item of a high-equity brand will be more inclined to switch to another store to purchase the preferred item. Schary and Christopher (1979) provide some preliminary evidence for this hypothesis by showing that national brand buyers are more likely to switch to another store than are private label buyers in case of a stock-out situation.

Therefore, we expect that the level of brand equity is positively related to store switching, item switching, and postponement of the intended purchase and negatively related to brand switching. We hypothesize that for OOS situations,

H<sub>1a</sub>: Brand equity negatively affects the probability of brand switching.

H<sub>1b</sub>: Brand equity positively affects the probability of store switching.

H<sub>1c</sub>: Brand equity positively affects the probability of item switching.

H<sub>1d</sub>: Brand equity positively affects the probability of postponing.

### *Hedonic level*

Several studies have suggested that the type of product is an important variable in explaining OOS behavior and that this variable should be taken into account (Campo et al. 2000; Emmelhainz et al. 1991; Schary & Christopher 1979). However, products can be classified according to various dimensions. For example, in explaining promotional elasticity, Narasimhan et al. (1996) use dimensions such as stockpiling, impulse buying, and number of brands in the category to classify product groups. Although we take many of these product-related variables into account in our full model, in our theoretical framework, we specifically focus on the basic benefits that a product provides to consumers. These benefits can be utilitarian and/or hedonic. Products with hedonic benefits like ice cream and salty snacks, provide more experiential consumption, fun, pleasure, and excitement, whereas products with utilitarian benefits (hereafter referred to as utilitarian products) like detergent and toilet paper, are primarily instrumental and functional (Batra & Ahtola 1991; Dhar & Wertenbroch 2000). Some products may offer both utilitarian and hedonic benefits to consumers. Shampoo, for example, combines a utilitarian benefit (cleaning hair) with a hedonic benefit (nice smell). Moreover, even products that are bought mainly out of utilitarian motives may provide some hedonic benefits. For example, consumers may perceive a product such as milk, which is often bought for its nutritional value (utilitarian benefit), as very tasty (hedonic benefit).

The different nature of utilitarian and hedonic products may affect the buying process, in that the buying process of utilitarian products will be driven mainly by rational buying motives. In the buying process of hedonic products, in contrast, emotional motives also play an important role, which may affect OOS responses. The unavailability of utilitarian products, such as detergent, margarine, or toilet paper, may influence the functioning of the household. Therefore, consumers will be less likely to postpone a purchase and more likely to buy a substitute in the case of utilitarian products.

In contrast, hedonic products provide more emotional value to the consumer. For example, when a consumer plans to purchase beer, ice cream, or salty snacks and consume it that evening, he or she will be very disappointed if unable to purchase the desired product (Fitzsimons 2000). This reasoning is supported by Dhar and Wertenbroch (2000), who find that consumers are less satisfied if they experience a problem in the hedonic dimensions of a service and that consumers bond more to hedonic benefits. This trend may lead to more store switching for hedonic products in comparison with utilitarian products. The personal bond to the hedonic benefits of a product also might lead to the lower probability that consumers postpone the purchase.

Thus, we find two contrasting theories regarding the effect of the hedonic nature of the product on OOS responses. In general, we adopt the first theoretical explanation in our hypotheses. We expect that item switching and brand switching will be lower in product categories with a high hedonic level, whereas a postponement of purchase will occur more frequently for hedonic product categories. Following Dhar and Wertenbroch (2000), we expect that store switching behavior in OOS situations will be greater for hedonic products.

H<sub>2a</sub>: The hedonic level of a product negatively affects the probability of brand switching.

H<sub>2b</sub>: The hedonic level of a product positively affects the probability of store switching.

H<sub>2c</sub>: The hedonic level of a product negatively affects the probability of item switching.

H<sub>2d</sub>: The hedonic level of a product positively affects the probability of postponing.

### *The interaction of hedonic level and brand equity on OOS reactions*

Two main rationales exist for a moderating effect of the hedonic level of a product on the effect of brand equity in OOS reactions. First, hedonic products offer more opportunities to differentiate the brand in consumers' minds than do utilitarian products (Keller 2002; Rossiter & Percy 1997). In utilitarian product groups, brands mainly are differentiated by product quality. In hedonic product groups, however, emotional and symbolic aspects play an important role in positioning the brand. Strong hedonic brands, such as Coca-Cola,

Budweiser, and Marlboro, have built dominant and relevant association networks in many consumers' minds. Due to the stronger position of high-equity brands in hedonic product categories, the effect of brand equity on brand switching or store switching should be greater in hedonic categories than in utilitarian categories.

Second, high-equity brands in hedonic categories usually provide more items on the shelf relative to high equity brands in utilitarian categories. For example, in a utilitarian category like milk, there are only a few items for the leading brand, whereas consumers may choose among many sizes and flavors (e.g., regular, vanilla, cherry) of leading brands in a hedonic product group like cola. This provides the consumer with more switching alternatives of the same brand, which may lead to increased item switching. In addition, consumers have a greater need for variety in hedonic categories than in utilitarian categories (Van Trijp, Hoyer, & Inman 1996) and therefore may be more willing to switch to another size or flavor. Thus, the probability that consumers will switch items is higher for high-equity brands in hedonic product groups than for high-equity brands in utilitarian product groups. In the same fashion, the greater availability of items of the same brand leads to less postponement for high-equity brands in hedonic product groups than for high-equity brands in utilitarian product groups.

H<sub>3a</sub>: The hedonic level of a product group increases the negative effect of brand equity on the probability of brand switching.

H<sub>3b</sub>: The hedonic level of a product group increases the positive effect of brand equity on the probability of store switching.

H<sub>3c</sub>: The hedonic level of a product group increases the positive effect of brand equity on the probability of item switching.

H<sub>3d</sub>: The hedonic level of a product group decreases the positive effect of brand equity on the probability of postponing.

#### *Other explanatory variables*

On the basis of our review of OOS-oriented literature, we selected explanatory variables that have been shown to be antecedents of consumer stock-out reactions (see section "Antecedents of OOS response"). Through the inclusion of these variables, we aim to gain insight into whether the hedonic level of a product and brand equity are important antecedents of OOS reactions. We also aim to provide a more general test of the significance of antecedents found in previous research, in that we study OOS responses in several product groups and retail chains.

On the basis of literature on switching behavior from a category perspective, we also include new variables (e.g., Narasimhan et al. 1996; Van Trijp et al. 1996).<sup>2</sup> These vari-

ables also can be classified according to our four types. On the basis of research by Narasimhan et al. (1996) and Beatty and Ferrell (1998), we include impulse buying as a product-related antecedent for stock-out reactions. These studies show that impulse buying is important to explain consumer responses to promotions, in that, in the case of an impulse purchase, a consumer does not plan to buy the product in advance. Therefore, in these situations, consumers are less inclined to purchase the specific product if it is unavailable. We also include buying frequency, a product-related antecedent, for several reasons. First, if a product is purchased frequently, consumers must live with the consequences of buying a less preferred item for only a limited period of time (Bawa & Shoemaker 1987). Second, heavy users generally use a wider variety of brands than do light users. Therefore, we propose that buying frequency is negatively related to postponement and store switching and positively related to brand and item switching.

As a store-related explanatory variable, we add the type of store. We distinguish between stores with relatively limited assortments (less than 10,000 grocery items) and stores with relatively extended assortments (greater than 15,000 grocery items). If a retailer offers many different items in the same category, it may be easier for consumers to find an acceptable alternative if the preferred item or brand is OOS. This antecedent also might shed some light on the importance of conducting studies such as this in supermarkets that belong to different retail chains.

The part of the week and personal usage are added as situation-related variables. The part of the week pertains to the point in the week when the purchase takes place. In countries and areas where stores are closed for part of the weekend, this variable may be especially relevant. For example, supermarkets are usually closed on Sundays in The Netherlands. Therefore, if a purchase trip is made early in the week, the consumer will be more likely to postpone purchase than if he or she shops at the end of the week, or just before the day the supermarket is closed. Personal usage refers to whether the consumer bought the product for his or her own use or for the use of other persons in the household or visitors. It may be more difficult to switch to another brand or item if the buyer is not the user, because the buyer does not want to disappoint other persons. The effect of this variable also may be affected by the specific user and/or type of product. For example, the effect might differ among products bought for visitors (e.g., wine), other adults in the household (e.g., beer), or children (e.g., diapers).

In shopping-related literature, price and quality consciousness are regarded as important variables (Lichtenstein, Ridgway, & Netemeyer 1993). Many retailer merchandising strategies focus on attracting price- or quality-sensitive consumers. In the United Kingdom, for example, the supermarket chain Sainsbury is known for its high-quality offers in terms of assortment and service, whereas Wal-Mart in the United States attracts many consumers through its guarantee of everyday low prices. For a price-conscious shop-

<sup>2</sup> Some of these variables were recommended by the reviewers.

per, loyalty is not directed to a specific brand but to a certain price range. Therefore, price consciousness may be related positively to substitute buying (brand or item switching) and negatively to store switching and postponement. In the same fashion, quality-conscious shoppers are loyal to a specific quality range, and though consumers can easily compare different prices of different brands, it is more difficult to compare brands according to their quality level. Therefore, it may be more difficult for a quality-conscious shopper to switch to another brand or item if the preferred item is OOS. Such shoppers may be more inclined to switch stores to obtain the preferred item or postpone purchase if they do not want to or cannot spend extra time shopping.

## Research methodology

### Data collection

The data collection took place in Dutch supermarkets. Data on consumer OOS responses and antecedents were collected using a structured questionnaire, which offers good opportunities to collect data about consumer OOS responses, as well as about a variety of antecedents of such responses. In our research setting, we work with hypothetical OOS situations instead of real ones, which has been used in previous explanatory studies (e.g., Campo et al. 2000). A possible drawback of this design is that people do not always act in the same way they claim that they would or sometimes have difficulties imagining what action they would actually take. This limitation might lower the external validity of reported OOS behavior. However, the major advantage of working with hypothetical stock-outs is that it enables us to study OOS behavior for different products groups and brands with varying brand equity levels. In light of the objectives in this study we use hypothetical OOS situations.

Data were collected by means of personal interviews with respondents who had just visited a supermarket by a team of three to four experienced interviewers of a research agency. The interviews took place in twelve different supermarkets of eight retail chains. Through visual inspection of their shopping baskets at the check-out lanes, the interviewers preselected consumers who purchased the product groups of interest. After leaving the check-out area, the preselected consumers were asked to participate in a study about shopping behavior. Approximately two-thirds of the preselected consumers agreed to participate. A basket analysis then was conducted to highlight the item of interest, and questions pertaining to OOS responses were asked with reference to this purchased item. The advantage of interviewing shoppers shortly after their shopping trip is that consumers can recall more easily their real decision-making situation. We believe this data collection procedure enhanced the realism of the OOS situation and, therefore, the validity of the OOS reactions.

To select the product groups of interest, we created a shortlist of twenty product groups. Then, 40 food experts (managers and academics) classified the preselected product groups as utilitarian or hedonic. On the basis of these evaluations, we selected four product groups with a clear utilitarian nature (eggs, milk, margarine, and detergent) and four with a clear hedonic nature (cigarettes, salty snacks, beer, and cola).

A quota system was used to gather enough responses in those product groups with a relatively low purchase frequency (e.g., detergent). Actual responses per product group varied between 74 (detergent buyers) and 102 (beer and margarine buyers). Interviews took place throughout the week to control for the part of the week variable and were spread throughout the day (8:00 a.m.–12:00 p.m. 35 percent, 12:00–3:00 p.m. 29 percent, and 3:00–6:00 p.m. 36 percent). In total, 793 respondents participated in the study. In the data screening process respondents with missing values for the dependent variable or with two or more missing values for independent variables were excluded. Some additional respondents were deleted because the interviewer noted that they had difficulty understanding several questions. After data screening 749 cases (95 percent) were selected for further analyses. Compared with general information about the background of regular Dutch shoppers, our sample of 749 cases is in line with the profile of regular shoppers (see Table 3).

### Dependent variable

On the basis of prior literature, we define six types of OOS responses: store switch, item switch, postponement, cancel, category switch, and brand switch. To measure the dependent variable, we used the following procedure: After selecting the item of interest, the interviewer asked the consumer what he or she probably would have done if the selected item had

Table 3  
Sociodemographic characteristics

Demographic variable	Regular Dutch shoppers (CBL 2000)	Our sample
Sample size ( <i>n</i> )	2045	749
Sex		
Female (%)	78	77
Male (%)	22	23
Age		
34 or below (%)	28	32
35 till 54 (%)	45	40
55 or older (%)	27	28
Household size		
1–2 persons (%)	54	59
3–4 persons (%)	37	32
5 or more persons (%)	9	9
Education (based on Dutch system)		
Lower (%)	23	27
Middle (%)	51	42
Higher (%)	24	30
Doesn't say (%)	2	2

been OOS during the shopping trip. Consumers could choose between the following responses: (1) buy a substitute item in this store, (2) go to another store today to buy the preferred item, (3) postpone the purchase until the next shopping trip, (4) cancel the purchase, or (5) don't know/other. Respondents who reported that they would buy a substitute were asked if this substitute item would be of the same or a different product group. If the respondents claimed they would buy a substitute item of the same product group, they were asked if they would buy an item of the same brand or switch to another brand.

In the studied product groups, the brand switch OOS response was the most common among the respondents (34 percent), followed by postponement (23 percent), store switch (19 percent), and item switch (18 percent). Respondents mentioned the specific OOS reactions of canceling the purchase (3 percent) and switching categories (2 percent) less frequently. These results are roughly in line with the results of a field experiment conducted by Emmelhainz et al. (1991), who created OOS situations in five different product groups by removing the top-selling item of the market leader in each group. The OOS reactions they reported were as follows: item switch (41 percent), brand switch (32 percent), store switch (14 percent), and postponement or cancellation of purchase (13 percent). Note that the relatively high percentage of item switch behavior in their study may be due to the relatively high variety of alternatives often offered by market leader brands.

#### *Main independent variables*

In our main model, we distinguish two main antecedents for OOS responses: brand equity and the hedonic level of a product. These variables were measured independently by food experts. A group of seventeen senior managers participating in a senior food executive program of the Erasmus University evaluated all researched brands ( $n = 124$ ) on three brand equity indicators: perceived price level, perceived quality, and perceived consumer preference (see Chandon et al. 2000). The managers used a 7-point Likert scale to rate each brand on each of the three brand equity indicators (1 = low, 7 = high). The alpha score of this three-item brand equity scale was 0.85. To check the external validity of the brand equity scale, we calculated the average level of brand equity for the market leader brands, the market challenger brands (ranked 2–4 in the category), and the market follower brands (ranked 5 or lower). Market leaders scored an average of 6.1 on the brand equity scale, market challenger brands scored 5.1, and market follower brands scored an average of 4.4 ( $F = 221.8, p < .01$ ). Thus, our brand equity measure seems valid.

The product groups involved in the OOS study were prior to the survey classified as utilitarian or hedonic using the judgments of 40 food experts (practitioners and academics), who evaluated each preselected product group on two 7-point scales (hedonic level: 1 = not hedonic, 7 = very hedonic; util-

itarian level: 1 = not utilitarian, 7 = very utilitarian). In the survey, utilitarian and hedonic benefits were explained using [Batra and Ahtola's \(1991\)](#) definitions. For example, a key utilitarian benefit is considered “useful,” whereas “attractive” and “enjoyment” are typical hedonic benefits. Our results reveal a very strong negative correlation between the hedonic and utilitarian levels of products ( $r = -.94; p = .00$ ), in which the hedonic level of a product can be considered a continuum from very utilitarian (not hedonic) to very hedonic (not utilitarian). Note, that we selected typical utilitarian or typical hedonic categories for our research. This may partly explain the high negative correlation between the utilitarian and hedonic item.

On the basis of these empirical results, we sum the two items to form a measure of the hedonic level of our selected product categories, which increases the reliability of this measure.<sup>3</sup> The hedonic and utilitarian scores of each category are given in [Table 4](#).

#### *Other independent variables*

Because stock-out reactions and most of our antecedents are measured in the same instrument, we specifically pay attention to common-method variance ([Bickart 1993](#)), particularly the widely used self-reported Likert scales, which seem to encourage respondents to give socially desirable, and thereby “logical,” answers. For example, in a situation in which a respondent tells the interviewer that he or she would probably go to another supermarket to buy the desired item, the measurement item: “I think of myself as a loyal customer of my supermarket” provides an obvious clue that the questions are related to the OOS reaction. To decrease the influence of common-method variance, we implemented more straightforward measures ([Rossiter 2002](#)). For example, to measure store loyalty and brand loyalty, we used a behavioral measure (primary store no/yes, primary brand no/yes) instead of a self-reported Likert-type item (e.g., “I consider myself loyal to this brand”). To measure impulse buying, we asked if buying the product was planned in advance (no/yes). For stockpiling, food experts ( $n = 15$ ) rated each of the eight product groups on the level of safety stock (low, medium, high) that consumers usually maintain at home before they go to the supermarket to buy the product (e.g., [Campo et al. 2000; Narasimhan et al. 1996](#)). We also used objective criteria to measure antecedents. For example, as an indication of the availability of alternative stores, we used the number of supermarkets with a more or less similar merchandising strategy within a radius of 250 m and/or 4 min of walking of the supermarket of interest. For other antecedents, we used self-reported scales if there was no direct relation with the dependent variable. For example, we used self-reported scales to measure shopping attitude, price consciousness, quality consciousness, and general time constraint. In [Appendix A](#),

<sup>3</sup> We thank an anonymous reviewer for suggesting the inclusion of these scores instead of dichotomous variables.

Table 4  
Utilitarian and hedonic levels of selected product groups ( $n = 40$ )

Product	Average utilitarian level (UL) (1 = low, 7 = high)	Average hedonic level (HL) (1 = low, 7 = high)	$t$ test (two-tailed) ( $p$ value)	Classification
Eggs	5.0	2.8	0.00	Utilitarian
Margarine	5.2	2.8	0.00	Utilitarian
Milk	5.3	3.2	0.00	Utilitarian
Detergent	6.2	2.5	0.00	Utilitarian
Beer	3.0	5.9	0.00	Hedonic
Chips	2.7	5.5	0.00	Hedonic
Cigarettes	2.0	5.4	0.00	Hedonic
Cola	3.3	5.2	0.00	Hedonic

we provide an overview of the explanatory variables, their measurement method, and their source.

### Analysis

As already noted in our literature review, the cancellation and category switch OOS responses are uncommon, which does not enable us to reliably estimate parameters for these choice categories. Therefore, we added cancellation to the rather similar postponement category. However, the category switch response is not similar to any of the other categories and therefore is not considered in our model. As a consequence, our number of valid cases drops from 749 to 734. After this procedure, the dependent variable consists of four different choice categories: (1) brand switch, (2) store switch, (3) item switch, and (4) postponement. Because these categories are unordered, we use a multinomial logit model (Franses & Paap 2001; Guadagni & Little 1983), whose parameters are estimated using the statistical software package Limdep 7.0 (Greene 1998) for the maximum likelihood procedure, to test our hypotheses. We calculate the marginal effects and their accompanying standard errors and significance levels (Campo et al. 2000; Greene 1998), which show the effect and direction of a predictor variable  $X$  on a choice category.

The mathematical formulation of the multinomial logit model states that the probability ( $P$ ) of choosing OOS reaction  $j$  by consumer  $i$  is given by:

$$P_{j,i} = \frac{\exp(V_{j,i})}{\sum_{j=1}^4 \exp(V_{j,i})} \quad (1)$$

The model in which we include brand equity (BE), the hedonic level of the product (HL), the interaction effect (BE  $\times$  HL) and  $K$  other variables ( $X$ ) (see Appendix A for

examples) is defined as follows:

$$V_{j,i} = \sum_j \alpha_{0,j} + \alpha_{1,j} \times BE_i + \alpha_{2,j} \times HL_i + \alpha_{3,j} \times BE_i \times HL_i + \sum_{k=1}^K \gamma_{k,j} \times X_{k,i} \quad (2)$$

The inclusion of an interaction effect between brand equity and the hedonic level of the product may affect our estimation results. We therefore standardize brand equity and hedonic level and include the standardized scores in our model (Aiken & West 1991). Thus, the interaction effect is included as the multiplication of the two standardized variables (see Eq. (2)).

## Empirical results

### Descriptive analysis

We explore differences in OOS reactions according to the nature of the product (utilitarian vs. hedonic) and the level of brand equity (low vs. high) using cross tabulations (see Table 5). Our analysis shows that buyers of low-equity brands are much more likely to switch brands (51 percent) than are buyers of high-equity brands (26 percent). Buyers of high-equity brands are more likely to switch stores (25 percent) than are buyers of low-equity brands (ten percent), as well as switch items (21 percent vs. fourteen percent, respectively). A  $\chi^2$  test reveals a significant association between brand equity and OOS reaction ( $\chi^2 = 54.622, p = .000$ ).

In both utilitarian and hedonic product groups, the most common reaction to an OOS occurrence is brand switching. However, the percentage of brand switching is higher for utilitarian product groups (39 percent) than for hedonic product

Table 5  
Descriptive analysis of stock-out response per brand equity type and hedonic level

	Brand equity ( $n = 734$ )			Hedonic level ( $n = 734$ )		
	Low (equity level < 5.00) ( $n = 261$ ) (%)	High (equity level $\geq$ 5.00) ( $n = 473$ ) (%)	$t$ test (two-tailed) ( $p$ value)	Low (hedonic level < 4.00) ( $n = 360$ ) (%)	High (hedonic level $\geq$ 4.00) ( $n = 374$ ) (%)	$t$ test (two-tailed) ( $p$ value)
Brand switch	51	26	0.000	39	31	0.020
Store switch	10	25	0.000	13	26	0.000
Item switch	14	21	0.012	19	18	NS
Postpone	26	27	NS	29	25	NS

groups (31 percent). In contrast, store switching occurs more frequently in hedonic product groups (26 percent) than in utilitarian product groups (thirteen percent). Again, the  $\chi^2$  test shows a significant association between product type (utilitarian or hedonic) and OOS reactions ( $\chi^2 = 22.581, p = .000$ ).

#### *Multinomial logit model*

Prior to estimating the multinomial logit model for Eq. (2), we assess whether multicollinearity might cause severe problems in our data by considering the correlation among the independent variables. The correlation matrix, displayed in Table 6, shows that correlation between independent variables in general is low and that multicollinearity will not affect our estimation results significantly (Leeflang, Wittink, Wedel, & Naert 2000).

Due to the addition of product related, store related, situation related and consumer related variables, the valid case number drops from 734 to 681. The estimation results of the multinomial logit model (Eq. (2)) appear in Table 7. The  $\chi^2$  of the multinomial logit model is 235.24 ( $df = 60, p = .00$ ).

#### *Hypothesized effects*

We find the expected significant negative effect of brand equity on brand switching, in support of  $H_{1a}$ . However, no effect of the hedonic level of a product on brand switching is found, so  $H_{2a}$  is not supported. In addition, the univariate descriptive analysis shows a significant relationship between the hedonic level of a product and the percentage of brand switching. A possible explanation for this discrepancy may be that brands in hedonic product groups generally have a higher level of brand equity. This is supported by the positive correlation between the hedonic level of a product and brand equity ( $r = .30, p < .01$ , see Table 6). Also, no significant interaction effect between the hedonic level of a product and brand equity on brand switching is found. Therefore,  $H_{3a}$  is not supported.

Both brand equity and the hedonic level of a product have a positive significant effect on store switching, in support of  $H_{1b}$  and  $H_{2b}$ . However, the effect of brand equity on store switching is not moderated by the hedonic level of the product, so  $H_{3b}$  is not supported.

With respect to item switching, we find significant effects for two of the three main variables. Brand equity and the interaction between brand equity and hedonic level are positively related to item switching. No significant effect is found between hedonic level of a product and item switch. These results support  $H_{1c}$  and  $H_{3c}$ .

No significant effects for either the hedonic level of a product or brand equity are found on postponement. Thus,  $H_{1d}$  and  $H_{2d}$  are not supported. Note that  $H_{1d}$  approaches significance in the opposite direction as hypothesized as the  $p$  value is .11. The interaction between brand equity and the hedonic level of a product is negative and marginally significant ( $p = .07$ ), in partial support of  $H_{3d}$ .

The results show that our main variables brand equity and hedonic level of a product are relevant explanatory variables for OOS responses, particularly for the responses brand switch, store switch and item switch. However, the postponement response is poorly explained by the three main variables, though it may be better explained by our other explanatory variables.

#### *Other explanatory variables*

For product-related variables, we find that the number of brands has a negative significant effect on brand switching and a positive significant effect on store switching. These effects seem counterintuitive and contrast with results of previous studies, which indicate that the availability of acceptable alternatives has a positive effect on brand switching. One possible explanation for this finding may be that some product groups carry more brands than others because of the many market segments in a particular product group, which provide ample room for brands with different intrinsic and extrinsic values (Narasimhan et al. 1996). Stockpiling has a negative significant effect on store and item switching, though it has a positive significant effect on postponement. This result has not been found in prior research (e.g., Campo et al. 2000). In line with previous research, we find that brand-loyal consumers are significantly less likely to switch to another brand and significantly more likely to postpone purchase. We also find significant effects for impulse buying. If the purchase was not planned in advance, consumers are less likely to switch stores and more likely to postpone the purchase. No significant effects are found for buying frequency.

The store-related variables seem somewhat less important in explaining OOS behavior. Store loyalty is positively related to brand switching (not significant) and item switching ( $p = .05$ ) and negatively related to store switching ( $p = .09$ ) and postponement ( $p = .13$ ). Although this variable is not strongly significant, the expected signs are logical. Consumers who are more loyal to a store tend to be more inclined to find a substitute in their primary store. The number of alternative stores in the vicinity of the store has a positive effect on store switching and a negative effect on postponement. However, the store type variable is not significantly related to any of the studied OOS responses; that is, customers of stores with relatively extended assortments tend to behave in the same way as those of stores with relatively limited assortments.

With respect to the situation-related variables, the variable part of the week has a significant effect, which may be of particular interest for countries or states where supermarkets are closed on Sundays. The results show that if shopping takes place in the first part of the week (Monday–Wednesday), consumers are more likely to postpone. Although the findings are not or only marginally significant, consumers also are more likely to switch brands ( $p = .20$ ), switch items ( $p = .10$ ), or switch stores ( $p = .12$ ) during the second part of the week.

Table 6  
Correlation matrix dependent and independent variables ( $n = 681$ )\*\*\*

	BS	SS	IS	PP	BE	HL	NB	SP	BL	IB	BF	SL	AS	ST	TR	WK	PU	SA	SF	TC	AG	PC	QC	
BS	<b>1.00</b>																							
SS	<b>-.36</b>	1.00																						
IS	<b>-.36</b>	<b>-.23</b>	1.00																					
PP	<b>-.45</b>	<b>-.29</b>	<b>-.29</b>	1.00																				
BE	<b>-.19</b>	<b>.15</b>	<b>.11</b>	<b>-.03</b>	1.00																			
HL	<b>-.06</b>	<b>.18</b>	<b>-.03</b>	<b>-.06</b>	<b>.30</b>	1.00																		
NB	<b>-.16</b>	<b>.18</b>	<b>.01</b>	<b>-.07</b>	<b>-.09</b>	<b>.12</b>	1.00																	
SP	<b>.02</b>	<b>-.10</b>	<b>-.10</b>	<b>.15</b>	<b>.02</b>	<b>.33</b>	<b>.07</b>	1.00																
BL	<b>-.26</b>	<b>.16</b>	<b>.01</b>	<b>.13</b>	<b>.20</b>	<b>.10</b>	<b>.05</b>	<b>-.05</b>	1.00															
IB	<b>-.01</b>	<b>-.13</b>	<b>.00</b>	<b>.12</b>	<b>.03</b>	<b>-.00</b>	<b>-.06</b>	<b>.02</b>	<b>-.13</b>	1.00														
BF	<b>.01</b>	<b>.13</b>	<b>-.01</b>	<b>-.11</b>	<b>.11</b>	<b>.31</b>	<b>-.14</b>	<b>-.23</b>	<b>.16</b>	<b>-.08</b>	1.00													
SL	<b>.02</b>	<b>-.07</b>	<b>.06</b>	<b>-.02</b>	<b>-.06</b>	<b>-.06</b>	<b>-.05</b>	<b>-.03</b>	<b>.14</b>	<b>-.04</b>	<b>.11</b>	1.00												
AS	<b>-.04</b>	<b>.06</b>	<b>-.02</b>	<b>.01</b>	<b>.02</b>	<b>-.01</b>	<b>.01</b>	<b>-.03</b>	<b>-.06</b>	<b>.02</b>	<b>.03</b>	<b>-.07</b>	1.00											
ST	<b>-.04</b>	<b>.03</b>	<b>.02</b>	<b>.00</b>	<b>.09</b>	<b>-.01</b>	<b>-.04</b>	<b>-.07</b>	<b>.01</b>	<b>.03</b>	<b>.04</b>	<b>-.10</b>	<b>.51</b>	1.00										
TR	<b>.03</b>	<b>-.06</b>	<b>.04</b>	<b>-.01</b>	<b>-.12</b>	<b>-.03</b>	<b>.01</b>	<b>.06</b>	<b>.05</b>	<b>-.10</b>	<b>-.09</b>	<b>.12</b>	<b>-.16</b>	<b>-.15</b>	1.00									
WK	<b>.06</b>	<b>.00</b>	<b>.07</b>	<b>-.13</b>	<b>-.06</b>	<b>.01</b>	<b>.03</b>	<b>-.01</b>	<b>-.11</b>	<b>-.01</b>	<b>-.06</b>	<b>-.05</b>	<b>-.48</b>	<b>-.00</b>	<b>.14</b>	1.00								
PU	<b>-.02</b>	<b>.01</b>	<b>.04</b>	<b>-.03</b>	<b>-.07</b>	<b>-.18</b>	<b>.16</b>	<b>-.19</b>	<b>-.06</b>	<b>-.01</b>	<b>.04</b>	<b>.04</b>	<b>-.06</b>	<b>-.12</b>	<b>.06</b>	<b>.06</b>	1.00							
SA	<b>-.01</b>	<b>.02</b>	<b>.04</b>	<b>-.05</b>	<b>-.01</b>	<b>-.03</b>	<b>-.05</b>	<b>-.01</b>	<b>-.08</b>	<b>.03</b>	<b>.03</b>	<b>-.09</b>	<b>-.00</b>	<b>-.02</b>	<b>-.07</b>	<b>.06</b>	<b>.01</b>	1.00						
SF	<b>-.01</b>	<b>.08</b>	<b>-.02</b>	<b>-.05</b>	<b>.04</b>	<b>.07</b>	<b>.08</b>	<b>-.02</b>	<b>.04</b>	<b>-.02</b>	<b>.12</b>	<b>-.03</b>	<b>.06</b>	<b>.04</b>	<b>-.34</b>	<b>.01</b>	<b>-.07</b>	<b>.13</b>	1.00					
TC	<b>-.01</b>	<b>-.01</b>	<b>.00</b>	<b>.01</b>	<b>.09</b>	<b>.10</b>	<b>.05</b>	<b>.06</b>	<b>-.03</b>	<b>.08</b>	<b>-.03</b>	<b>-.10</b>	<b>.00</b>	<b>.07</b>	<b>-.04</b>	<b>-.00</b>	<b>-.01</b>	<b>-.35</b>	<b>-.19</b>	1.00				
AG	<b>-.07</b>	<b>.06</b>	<b>-.02</b>	<b>.04</b>	<b>-.10</b>	<b>-.20</b>	<b>.01</b>	<b>-.07</b>	<b>.06</b>	<b>-.13</b>	<b>.00</b>	<b>.14</b>	<b>.08</b>	<b>.09</b>	<b>.06</b>	<b>-.05</b>	<b>.02</b>	<b>.07</b>	<b>.01</b>	<b>-.23</b>	1.00			
PC	<b>-.09</b>	<b>-.16</b>	<b>-.05</b>	<b>.09</b>	<b>-.28</b>	<b>-.21</b>	<b>-.03</b>	<b>.06</b>	<b>-.13</b>	<b>.01</b>	<b>-.14</b>	<b>.04</b>	<b>.10</b>	<b>.05</b>	<b>-.05</b>	<b>-.04</b>	<b>-.02</b>	<b>.09</b>	<b>.00</b>	<b>-.08</b>	<b>.11</b>	1.00		
QC	<b>-.11</b>	<b>.04</b>	<b>.01</b>	<b>.09</b>	<b>.04</b>	<b>-.04</b>	<b>.00</b>	<b>.01</b>	<b>.16</b>	<b>.05</b>	<b>-.03</b>	<b>.03</b>	<b>.02</b>	<b>.05</b>	<b>.05</b>	<b>.03</b>	<b>-.04</b>	<b>-.01</b>	<b>.03</b>	<b>-.09</b>	<b>.16</b>	<b>.15</b>	1.00	

\* Dependent variables are dummy variables (no/yes). BS, brand switch; SS, store switch; IS, item switch; PP, postponement/cancel. \*\* Independent variables: see Appendix A for abbreviations and measurement.

\*\*\* Significant relations ( $p < .05$ ) are in bold.

Table 7  
Marginal effects of full model (*p* value) (*n* = 681)

	Brand switch	Store switch	Item switch	Postponement
Constant	.62 (.01)	−.37 (.02)	.04 (.83)	−.29 (.14)
Brand equity	−.09 (.00)	.04 (.05)	.09 (.00)	−.03 (.11)
Hedonic level	.01 (.71)	.05 (.02)	−.03 (.25)	−.03 (.24)
Brand equity × hedonic level	−.02 (.51)	−.01 (.76)	.06 (.01)	−.04 (.07)
Product-related				
Number of brands	−.03 (.00)	.02 (.00)	.11 (.12)	−.02 (.81)
Stockpiling	.03 (.61)	−.10 (.02)	−.17 (.00)	.24 (.00)
Brand loyalty	−.26 (.00)	.09 (.03)	−.03 (.38)	.21 (.00)
Impulse buying	−.03 (.63)	−.17 (.00)	.00 (.93)	.20 (.00)
Buying frequency	.02 (.22)	.01 (.49)	−.01 (.42)	−.02 (.19)
Store-related				
Store loyalty	.05 (.39)	−.06 (.09)	.08 (.05)	−.07 (.13)
Availability of alternative stores	.01 (.67)	.05 (.05)	.01 (.65)	−.07 (.02)
Store type	−.04 (.46)	−.04 (.27)	.01 (.75)	.07 (.17)
Situation-related				
Shopping trip (0 = minor; 1 = major)	.04 (.41)	−.05 (.16)	.03 (.39)	−.02 (.60)
Part of the week (0 = beginning; 1 = end)	.08 (.20)	.07 (.12)	.08 (.10)	−.23 (.00)
Personal usage	−.03 (.58)	−.01 (.78)	.01 (.73)	.02 (.60)
Consumer-related				
Shopping attitude	−.03 (.23)	.01 (.38)	.03 (.13)	−.01 (.52)
Shopping frequency	.01 (.48)	.00 (.90)	.00 (.99)	−.01 (.38)
General time constraint	−.01 (.56)	.00 (.79)	.01 (.56)	−.00 (.96)
Age/100 <sup>a</sup>	−.29 (.04)	.25 (.01)	−.05 (.62)	.09 (.46)
Price consciousness	.02 (.27)	−.03 (.01)	−.01 (.44)	.02 (.13)
Quality consciousness	−.04 (.04)	.01 (.41)	.00 (.86)	.03 (.15)

<sup>a</sup> We also tested for the significance of a variable indicating whether a consumer was older than 65 years. We found no significant effect of this variable and therefore did not include it in our model.

A possible explanation for this finding may be that some consumers may have weekly planning cycles for their grocery shopping. If consumers face an OOS of a desired item early in the week, they may already know that their next shopping trip will be within a few days and thus be more inclined to postpone the purchase. The shopping trip (minor or major trip) and personal usage variables do not display significant effects.

With respect to the consumer-related variables, our results show no significant effect for general time constraints, inconsistent with Campo et al. (2000), who find this variable significant in their research to explain OOS responses. Part of the lack of effect in our research may be caused by the inclusion of age as explanatory variable. Because age is negatively related to general time constraints ( $r = -.23, p = .00$ ), it may function as a proxy for general time constraints. For example, older, “empty nester” shoppers, who have a great deal of spare time, have fewer time constraints. The results, which show that age has a significant positive effect on store switching and a negative effect on brand switching, support this theory. In line with Campo et al. (2000), we find no significant effects of shopping frequency. Finally, we find some significant effects for price and quality consciousness. Price consciousness is negatively related to store switching; quality consciousness is negatively related to brand switching.

## Discussion

In this study, we investigate the effect of brand equity and the hedonic level of a product on OOS responses, as well as the moderating effect of the hedonic level of the product on the effect of brand equity. In addition, we examine the effect of prior researched and additional product-, store-, situation-, and consumer-related variables. Because we have tested our model using eight product groups and eight retail chains, our study provides an important discussion of the role of these variables in OOS situations.

In Table 8, we provide a summary of our hypotheses results. In our full model, six of our twelve hypotheses are supported. Although further confirmation of these results in other studies are needed this indicates that the main variables are important in explaining OOS responses. None of the twenty antecedents in our full model is significantly related to all four different OOS responses. We therefore conclude that OOS responses can be explained in a reasonable way only through the use of comprehensive models. Models with too few antecedents may suggest significant relationships that would not be significant if more antecedents were included. However, as further support for the relevance of our main variables, we note that the effects of our main variables are approximately the same in both the basic and the full model.

Table 8  
Summary of hypotheses and results

Independent variables	Hypothesized relationship to stock-out reaction	Result multinomial model (Eq. (2))
Effect on brand switch		
H <sub>1a</sub> : Brand equity	–	Supported
H <sub>2a</sub> : Hedonic level	–	Not supported
H <sub>3a</sub> : Brand equity × hedonic level	–	Not supported
Effect on store switch		
H <sub>1b</sub> : Brand equity	+	Supported
H <sub>2b</sub> : Hedonic level	+	Supported
H <sub>3b</sub> : Brand equity × hedonic level	+	Not supported
Effect on item switch		
H <sub>1c</sub> : Brand equity	+	Supported
H <sub>2c</sub> : Hedonic level	–	Not supported
H <sub>3c</sub> : Brand equity × hedonic level	+	Supported
Effect on postponement		
H <sub>1d</sub> : Brand equity	+	Not supported
H <sub>2d</sub> : Hedonic level	+	Not supported
H <sub>3d</sub> : Brand equity × hedonic level	–	Supported

That is, though we included many other explanatory variables, the effects of brand equity and the hedonic level of the product remain significant.

#### *Effect of brand equity and hedonic level of the product*

Brand equity and the hedonic level of a product are important variables to explain OOS responses. Keller (2002) argues that consumers of brands that have positive customer-based brand equity react more favorably to the brand. We show that this also holds true in OOS situations. Our results also show that purchasers of high-equity brands are less inclined to switch brands, more inclined to switch stores, and more inclined to postpone the purchase. The first two reactions can be explained by brand equity literature. The impact of brand equity on postponement shows that the preference for high-equity brands, in many cases, is not only brand directed, but also item directed. For example, a consumer who prefers regular Coca-Cola may be loyal to Coca-Cola in general and to the regular variety specifically. If regular Coca-Cola is not available, that consumer might postpone his or her intended purchase until the next visit to the supermarket, at which point the consumer will purchase regular Coca-Cola.

Our results also reveal a positive main effect of the hedonic level of a product on store switching. In hedonic product groups, consumers are more likely to switch to another store. We find two significant moderating effects of the hedonic level of a product on the effect of brand equity. In hedonic product groups, purchasers of high-equity brands are relatively more inclined to switch to another item, whereas they

are less likely to postpone. Consumers value the brand more in hedonic categories and are less inclined to postpone the purchase because they feel a relatively strong urgency to purchase the preferred brand immediately. One solution for the consumer is to purchase another item of the same brand.

#### *Effect of other explanatory variables*

With respect to the other explanatory variables, our results confirm some prior research and put forward some new variables as antecedents of OOS reactions. In particular, we confirm prior findings that brand loyalty is an important variable for the explanation of OOS. However, our results do not show that buying frequency, the type of shopping trip, shopping attitude, or general time constraints are important determinants of OOS responses.

Following the literature on promotion responsiveness (e.g., Narasimhan et al. 1996), we included impulse buying and stockpiling as antecedents. Our results show that these variables are important antecedents of OOS responses. In the case of impulse purchases, consumers are less likely to switch to another store and more likely to postpone the purchase because the need to buy a product impulsively is less strong if the preferred item in the category is not available. When consumers stockpile products at home, they do not need the product immediately; thus, stockpiling negatively affects store and item switching and positively affects postponement.

Shopping frequency, similar to our results for buying frequency, is not related to OOS responses. However, brand and item switching occurs more often at the end of the week, whereas postponement occurs less frequently at the end of the week. In addition, no effect of store type was found, and OOS reactions do not differ significantly between supermarkets that offer less or more variety. Finally, our results indicate that price-conscious consumers are less likely to switch stores, whereas quality-conscious consumers are less likely to switch brands. One of several plausible explanations for this finding may be that price-conscious shoppers are more loyal to a specific price range instead of a specific brand or item; quality-conscious shoppers may be more inclined to buy a certain quality level that is embodied by the brand they prefer.

In summary, we conclude that product- and brand-related antecedents (including the three main variables) appear particularly important for explaining OOS responses. In our study, store-, situation-, and consumer-related variables affected OOS reactions to a much lesser extent. Furthermore, the full model shows that there are many antecedents for OOS responses. Of the 20 explanatory variables in our full model, thirteen show significant relations to one or more specific OOS responses. Compared with the main model, the full model sheds particular light on the antecedents of purchase postponement. Although this OOS response is not well explained by our main model, variables such as stockpiling, brand loyalty, impulse buying, and the part of the week appear highly related to postponement.

**Managerial implications**

Our research provides some clear guidelines for how retailers and manufacturers should handle OOS occurrences. On the basis of our two main variables—brand equity and the hedonic level of the product—the assortment of supermarkets can be classified in four segments. For each segment, we provide managerial directions for retailers and manufacturers with regard to how they can handle the OOS problem (see Table 9).

*Implications for retailers*

A retailer should maintain an active policy to reduce OOS occurrences, because a stock-out can result in store switching, postponement or cancellation of purchase. However, the damage of OOS occurrences for a retailer varies according to the product group and brand. Retailers should consider this finding when they attempt to decrease their OOS problems and pay special attention to the segment of high-equity brands in hedonic categories. In this segment, retailers should try to minimize OOS occurrences, for example, by allocating more shelf space to such items at the expense of items in the low-equity brands, utilitarian segment. Furthermore, retailers should consider to minimize the breadth of their assortment in utilitarian product groups and increase the number of items per brand for high-equity brands.

We also believe that consumer OOS reactions provide insights into the short-term reactions of consumers in the case of permanent unavailability. If retailers notice many complaints or a strong drop in product group sales when certain items in

certain product groups are OOS, they should be careful about permanently delisting those items.

*Implications for manufacturers*

Table 9 also includes guidelines for manufactures. If a manufacturer faces high OOS levels for its own brand, it will lose sales, even if the brand is a high-equity brand in a hedonic product group. Therefore, all manufacturers should try to help retailers to lower OOS levels, especially because research shows that OOS levels between five percent and ten percent are common. Particularly, manufacturers of low-equity brands in utilitarian categories can suffer severe damage of OOS occurrences; in many cases, consumers will simply switch to items of another brand. For these manufacturers the necessity to lower OOS levels is relatively more important than for other manufacturers because it may not be a high priority for the retailer. The objectives for retailers and manufacturers with regard to OOS management often are contradictory. For retailers, item switching does not present a significant problem, because retailers tend to focus instead on OOS situations in which consumers do not buy a substitute. Therefore, retailers will focus to lower OOS for brands and product groups where it hurts the most. Particularly, these are the high-equity brands in the hedonic product groups. In addition to this, many of the manufacturers with low-equity brands will probably not have state-of-the-art knowledge in the area of category management and supply chain management. These manufacturers will not be first in line to cooperate with retailers to solve the OOS problem. Therefore, we recommend that manufacturers of low-equity brands

Table 9  
Managerial implications for OOS management

	Utilitarian products	Hedonic products
Low-equity brands	<p><i>Implications for retailers:</i></p> <ul style="list-style-type: none"> <li>– low priority in reducing OOS occurrences</li> <li>– simplify assortment of low-equity brands</li> </ul> <p><i>Implications for manufacturers:</i></p> <ul style="list-style-type: none"> <li>– high priority in reducing OOS occurrences for own items</li> <li>– invest in retail relations and trade conditions to improve shelf space allocation of own items</li> </ul>	<p><i>Implications for retailers:</i></p> <ul style="list-style-type: none"> <li>– medium priority in reducing OOS</li> <li>– stock the main items of a wide variety of low-equity brands</li> </ul> <p><i>Implications for manufacturers:</i></p> <ul style="list-style-type: none"> <li>– high priority in reducing OOS for own items</li> <li>– invest in trade conditions to maintain or improve shelf position (short term)</li> <li>– build brand equity by investing in product innovation and build brand image by advertising (long term)</li> </ul>
High-equity brands	<p><i>Implications for retailers:</i></p> <ul style="list-style-type: none"> <li>– high priority in reducing OOS</li> <li>– simplify assortment by gradually reducing the number of listed high-equity brands</li> <li>– extend the number of items of “surviving” high-equity brands</li> </ul> <p><i>Implications for manufacturers:</i></p> <ul style="list-style-type: none"> <li>– medium priority in reducing OOS of own items relative to manufacturers of low-equity brands</li> <li>– keep brand equity at a high level</li> <li>– gain shelf space by introducing line extensions</li> <li>– invest in category management projects to limit the assortment of competing items in category</li> </ul>	<p><i>Implications for retailers:</i></p> <ul style="list-style-type: none"> <li>– top priority in reducing OOS</li> <li>– seek cooperation with main brand manufacturers to reduce OOS levels</li> <li>– use caution in reducing allocated space and listed items for high-equity brands</li> </ul> <p><i>Implications for manufacturers:</i></p> <ul style="list-style-type: none"> <li>– medium priority in reducing OOS of own items relative to manufacturers of low-equity brands</li> <li>– keep brand equity at a high level</li> <li>– gain shelf space by introducing line extensions</li> <li>– seek participation with retailers to lower OOS levels on a category basis and improve position as category captain</li> </ul>

focus on holding their shelf space, for example, through short-term-oriented trade allowances. In contrast, manufacturers of high-equity brands could attempt to remedy retailers' OOS problems by participating in category management projects that focus on reducing OOS levels. In doing so, these high-equity brand manufacturers demonstrate their category management capabilities and improve their relationship with retailers.

### Limitations and further research

Our study has several important limitations that may provide interesting opportunities for further research. First, the findings regarding the role of the hedonic level of the product are based on data about only eight product groups. To test the robustness of our findings, additional research should take other and/or more product groups into account. Second, we used hypothetical OOS situations to measure consumer OOS responses instead of real OOS situations, which could affect the validity of the reported OOS responses. Therefore, measuring OOS responses with consumer household panel data, combined with a panel survey, might provide more valid information about true OOS reactions and the effect of brand equity and the hedonic level of the product. Furthermore, a household panel might shed additional light on the role of the number of brands and changes in this number on OOS responses (Campo et al. 2003). Third, our study does not measure the specific effect of promotional buying on OOS reactions. Consumers may become frustrated if a highly valued promotion is OOS, especially if the promotion was the main reason for the consumer to visit to the store. Further studies on OOS reactions might include promotional buying as an

antecedent for OOS reaction. Fourth, we only interviewed consumers who bought items in one of the eight selected product groups. Therefore, consumers who actually encountered an OOS and decided to cancel, postpone, or switch stores were not interviewed. This limitation should not affect the validity of the significant findings, but it may have minimized the significance of some hypotheses that were not confirmed in our study. Fifth, available items in the total store were used as a proxy for the availability of substitutes in a specific product category. A better measure might use both the number of items of preferred and other brands in the product category, which would enable a better separation of the effects of brand and item switching. We leave this as an issue for additional research. Sixth and finally, we recommend studies that focus on illuminating the relationship between consumer reactions to temporary assortment unavailability (OOS) and permanent assortment availability (item or brand delisting). This work may help retailers make more sound listing and delisting decisions.

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### Appendix A. Overview and definition of independent variables

	Concept	Measurement instrument
<b>Main variables</b>		
Brand equity (BE)	Strength of brand in terms of price level, awareness, and quality	Brands are rated by food experts on a three-item, 7-point scale. Coefficient alpha = .85
Hedonic level (HL)	Hedonic level of product category	Categories are rated by food experts on a two-item, 7-point scale. Correlation = 0.94.
<b>Product-related variables</b>		
Number of brands (NB)	Number of national brands in category <i>X</i> with a market share $\geq$ three percent	Market share within product category. Based on retail scanner data from AC Nielsen
Brand loyalty (BL)	Loyalty toward brand <i>Y</i> in category <i>X</i>	Dummy variable, equal to 1 if the hypothesized stock-out brand is the primary brand for the consumer in category <i>X</i>
Stockpiling (SP)	The level of safety stock consumers usually have in their homes before they restock the product	Categories are rated by food experts on regular stockpiling level before consumers restock (low, medium, high). Based on Campo et al. (2000) and Narasimhan et al. (1996)
Impulse buying (IB)	Distinction between unplanned and planned purchases	Dummy variable, equal to 1 if product and brand was not planned in advance.
Buying frequency (BF)	Average buying frequency	Number of times a product is bought on a monthly basis

## Appendix A (Continued)

	Concept	Measurement instrument
Store-related variables		
Store loyalty (SL)	Loyalty towards store Z when shopping for groceries	Dummy variable, equal to 1 if the supermarket with the hypothesized stock-out is the primary supermarket for the consumer
Availability of alternative stores (AS)	Number of competing supermarkets in the same shopping area	Number of supermarkets with a similar merchandising strategy within a radius of approximately 250 meters and/or 4 min walking of the supermarket where the OOS occurs. Based on general information about supermarket locations in the Netherlands (Levensmiddelenkrant 2002)
Store type (ST)	The number of items the supermarket offers to the consumer	Dummy variable, equal to 1 if the assortment of the supermarket is relatively wide and deep and 0 if the assortment is relatively limited. Based on real assortment levels of supermarkets (internal company sources)
Situation-related variables		
Shopping trip (TR)	Distinction between minor and major shopping trips	Dummy variable, equal to 1 for major shopping trips and 0 for minor shopping trips
Part of the week (WK)	Distinction of 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–Saturday) and 0 for trips during the first part of the week (Monday–Wednesday)
Personal usage (PU)	Product is bought for own usage	Dummy variable, equal to 1 if the buyer is (one of the) users
Consumer-related variables		
Shopping attitude (SA)	Perception of shopping as a necessary task or an activity that brings enjoyment	Four-item self-reported scale (based on Sproles & Sproles 1990; Babin, Darden, & Griffin 1994) (coefficient alpha = .79) Example: “Shopping is truly a joy”
Shopping frequency (SF)	Average shopping frequency	Average number of shopping trips per week
General time constraint (TC)	Time constraint in general for grocery shopping	Degree of perceived spare time for grocery shopping on 5-point scale Example: “In general, I do not have much spare time for shopping”
Age (AG)	Age of respondent	Age in number of years
Price consciousness (PC)	Focus on price level when shopping for groceries	Degree of price focus on 5-point scale (based on Lichtenstein et al. 1993) Example: “I always focus on the price when I am shopping for groceries”
Quality consciousness (QC)	Focus on quality level of products when shopping for groceries	Degree of quality focus on 5-point scale Example: “I always focus on the quality of products when I am shopping for groceries”

## References

- Aaker, D. A. (1990). *Managing brand equity: Capitalizing on the value of a brand name*. New York: The Free Press.
- Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Thousand Oaks, CA: Sage.
- 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.
- Batra, R., & Ahtola, O. T. (1991). Measuring the hedonic and utilitarian sources of consumer attitudes. *Marketing Letters*, 2(2), 159–170.
- Bawa, K., & Shoemaker, R. W. (1987). The coupon-prone consumer: Some findings based on purchase behavior across product classes. *Journal of Marketing*, 51(4), 99–110.
- Beatty, S. E., & Ferrell, M. E. (1998). Impulse buying: Modeling its precursors. *Journal of Retailing*, 74(2), 169–191.
- Bickart, B. A. (1993). Carry-over and backfire effects in marketing research. *Journal of Marketing Research*, 30(10), 52–62.
- 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*, 5856, 1–10.

- Campo, K., Gijsbrechts, E., & Nisol, P. (2003). The impact of retailer stockouts on whether, how much, and what to buy. *International Journal of Research in Marketing*, 20(3), 273–286.
- CBL. (2000). *CBL consumententrends (CBL consumer trends) 2000*. Leidschendam: CBL.
- 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.
- Emmelhainz, M. A., Stock, J. R., & Emmelhainz, L. W. (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 ed.). New York: Eonometric Software.
- Guadagni, P. M., & Little, J. D. C. (1983). A logit model of brand choice calibrated on scanner data. *Marketing Science*, 2(3), 203–238.
- Hirschman, E. C., & Holbrook, M. B. (1982). Hedonic consumption: Emerging concepts, methods and propositions. *Journal of Marketing*, 46(3), 92–101.
- Kamakura, W. A., & Russell, G. J. (1993). Measuring brand value with scanner data. *International Journal of Research in Marketing*, 10(1), 9–22.
- Keller, K. L. (1993). Conceptualizing, measuring, and managing customer-based brand equity. *Journal of Marketing*, 57(1), 1–22.
- Keller, K. L. (2002). *Building, measuring, and managing brand equity*. Upper Saddle River, NJ: Pearson Education.
- Kooistra, A. (1999). The huge waste. *Foodmagazine*, 55(5), 20–25.
- Leeflang, P. S. H., Wittink, D. R., Wedel, M., & Naert, P. A. (2000). *Building models for marketing decisions*. Dordrecht: Kluwer Academic Publishers.
- Levensmiddelenkrant. (2002). *Supermarktguides, 12*. Ter Aar: De Ondernemerspers Nederland.
- Lichtenstein, D. R., Ridgway, N. M., & Netemeyer, R. G. (1993). Price perceptions and consumer shopping behavior: A field study. *Journal of Marketing Research*, 30(2), 234–245.
- Narasimhan, C., Neslin, S. A., & Sen, S. K. (1996). Promotional elasticities and characteristics. *Journal of Marketing*, 60(2), 17–30.
- Peckham, J. O. (1963). The consumer speaks. *Journal of Marketing*, 27(4), 21–26.
- Roland Berger Strategy Consultants. (2002). Optimal shelf availability. Presentation held at *ECR Europe Conference, Barcelona*.
- Rossiter, J. R. (2002). The C-OAR-SE procedure for scale development in marketing. *International Journal of Research in Marketing*, 19(4), 305.
- Rossiter, J. R., & Percy, L. (1997). *Advertising communications & promotion management*. Boston: Irwin McGraw Hill.
- Schary, P. B., & Christopher, M. (1979). The anatomy of a stock-out. *Journal of Retailing*, 55(2), 59–70.
- Sproles, E. L. K., & Sproles, G. B. (1990). Consumer decision-making styles as a function of individual learning styles. *Journal of Consumer Affairs*, 24, 134–137.
- Van Trijp, H. C. M., Hoyer, W. D., & Inman, J. Jeffrey. (1996). Why switch? Product category-level explanations for true variety-seeking behavior. *Journal of Marketing Research*, 33(3), 281–292.
- 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. (1975). Stockout cost models: Empirical tests in a retail situation. *Journal of Marketing*, 39(3), 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. (1981). An empirical evaluation of the role of stock-out on shopper patronage processes. *Advances in Consumer Research*, 8, 221–224.