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Analysis of Sales Promotion Effects on Household Purchase Behavior

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Analyse van de effecten van verkoopacties op het aankoopgedrag van huishoudens

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Voorwoord

Soms valt de appel echt niet ver van de boom. Wat is er nu leuker en uitdagender dan het gedrag wat je van jongs af aan in je eigen familie ervaren hebt op een wetenschappelijke manier te onderzoeken? Kasten vol met schoonmaakproducten, dozen vol met M&M's en de koelkast dusdanig vol met kaas dat er verder niets meer bij in past zijn typische voorbeelden. Het hoogtepunt was toch wel een actie voor toiletpapier. De hele schuur, kelder, en alle kasten zaten er mee vol. Zelfs nu, jaren later, komt er af en toe nog zo'n 12-rols pak tevoorschijn. Sommige wetenschappers en managers mogen dan beweren dat aanbiedingen voor grotere verpakkingen niet zo snel tot hamsteren leiden. Huize Teunter te Langerak is een levend voorbeeld dat het tegendeel bewijst. De mogelijke effecten van dit soort aanbiedingen zijn me dus met de paplepel ingegoten.

De interesse in het onderzoeken van deze effecten is gelukkig nog steeds aanwezig, zelfs na jaren dagelijks hier mee bezig te zijn geweest. De ene dag was het enthousiasme wat groter dan de andere, want op een zonnige dag is een boekje lezen op het balkon of lekker buiten tennissen of leuke uitstapjes maken toch ook wel erg aantrekkelijk. Maar dat deze interesse nog steeds volop aanwezig is, is niet alleen aan het thuisfront te danken. Goede begeleiding is een noodzakelijke voorwaarde voor het welslagen van een promotietraject. Ik wil dan ook bij deze mijn promotoren, Berend Wierenga en Teun Kloek heel hartelijk bedanken voor de talrijke vruchtbare besprekingen die we hebben gehad. Met vragen kon ik altijd terecht, hetgeen ik enorm heb gewaardeerd.

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Rotterdam 2002,
Linda Teunter

Contents

1 INTRODUCTION AND OVERVIEW

1.1 Introduction

When a consumer goes shopping, he or she implicitly, or explicitly, has to make four key decisions for each product category. Whether to buy in the category and, if so, where (which store), which brand, and what quantity. All four decisions may be influenced by consumer characteristics (e.g., income, family size, purchase frequency) and by the marketing environment (e.g., the prices and promotion activities of the various brands and stores). Marketing mix variables can affect these four decisions to differing degrees. For example, price might have a substantial influence on a consumer's brand choice decision but might not affect category purchase or timing decisions. Moreover, these effects are likely to vary across shoppers. For example, a price reduction might induce a segment of consumers to switch brands with no effect on purchase timing (incidence) and quantity, while encouraging another segment of brand-loyal consumers to buy early or stockpile the product. The different effects sales promotions can have on household purchase behavior (brand switching, store switching, purchase acceleration, repeat purchase, and category expansion) are known as the possible sales promotion reaction mechanisms (Blattberg and Neslin 1990).

The interest in the question how marketing mix variables affect consumers' purchase behavior is growing with the escalation of promotional expenditures. The expenditures on sales promotions in the USA and in many Western European countries have increased considerably over the last few years. In recent years, manufacturers and retailers have spent more and more of their marketing dollars on promotions and less on advertising. Between 1990 and 1995, 70% of all companies in the USA increased their promotional spending. The addictive power of promotion is such that manufacturers must devote ever larger proportions of their marketing budgets to this "short-term" fix (Kahn and McAlister 1997). At one point, 17% of all Proctor & Gamble products on average were being sold on deal, and in some categories even 100%. A CEO said: "You've lost control, and you don't know what it's costing you." Manufacturers are now spending more money

on promotions than on advertising (Blattberg, Briesch and Fox 1995). Furthermore, the issue of getting the most out of each promotional dollar has become an increasingly important one. However, some managers studies reveal that 80 percent of promotion users are, in fact, loyal customers who presumably would have bought the brand regardless of the promotion (Levine 1989).

The literature of marketing science has been enriched by a great number of publications on the subject of sales promotions. One explanation is the increased promotional budget of many manufacturers and retailers, as mentioned before. Another explanation for the great number of studies devoted to sales promotions is the development in scanning. In the early 1970s laser technology in conjunction with small computers first enabled retailers in the USA to record electronically or 'scan' the purchases made in their stores. Several years later, scanning was introduced in Europe. In 1987, only 3% of the supermarkets in the Netherlands used scanning at their checkouts. This percentage increased throughout the years. Nowadays, scanning services are present in almost all retail stores in the Netherlands. Scanning services are offered by companies such as Nielsen, GfK PanelServices Benelux, and Information Resources Inc. Infoscan (IRI). The computerized accumulation of point-of-sales information puts a library of accurate and detailed purchase records at the disposal of marketers and marketing researchers. There are two basic types of scanner data used to analyze sales promotions: (1) store-level and (2) household-level scanner data. Store data contains all sales in a given store or collection of stores over a period of time (mostly weekly periods). The data contains aggregate sales from all consumers shopping in that store/collection of stores. Household data provides information on individual household purchases. The unit of analysis of the data is the purchase occasion. Household data comprises more information than store data and is therefore potentially more useful for the analysis of sales promotion reactions of individual buyers (or households). The big advantage is that it represents actual behavior of consumers. It offers the opportunity to observe the longitudinal choice behavior of each panel member and a number of environmental variables. Specific issues, which can be addressed with household data, are for example: (1) sources of promotional volume (identifying the sales promotion reaction mechanisms), (2) heterogeneity in promotion response, (3) brand loyalty, (4) the potential to segment the market by demographic characteristics, etc. But, household data is also more 'noisy' than store data. Sales are

generally generated from a smaller sample size. Furthermore, it is difficult to start up and maintain a representative household panel.

Some of the pre-scanning research on consumer behavior focused on the micro (individual consumer or household) or segment-level (e.g., Webster 1965, Massy and Frank 1965, Blattberg and Sen 1974, Blattberg et al. 1978). In this study, we will make use of household-level scanner data for analyzing purchase behavior reactions to sales promotions at the individual household level. By doing so, we develop new insights into the 'why' and 'what' questions: 'Why do consumers react to sales promotions in their purchase behavior', and 'What are the effects of sales promotions on household purchase behavior'.

Numerous variables have been proposed to describe the relationship between sales promotions and consumer buying behavior. Household demographics (income, household size, children, etc.), household psychographics (household psychological characteristics such as deal proneness, variety seeking), and product category characteristics (volume, perishability, price) are just some examples. Findings of different studies are often conflicting with respect to the relationship between household variables and category variables with household promotional purchase behavior. For example, some researchers found that income has a positive influence on promotion response behavior (e.g., Urbany et al. 1996), whereas others found opposite results (e.g., Inman and Winer 1998). Based on an in-depth longitudinal analysis of household purchase behavior we try to identify drivers of household sales promotion response.

Blattberg, Briesch, and Fox (1995) summarized the key findings in the literature up to 1995. They provide research issues with conflicting empirical results, and also identify issues, which are not yet studied empirically. Some authors found that the majority of promotional volume comes from brand switchers (e.g., Totten and Block 1987, Gupta 1988, Bell et al. 1999). However, Chintagunta (1993) and Vilcassim and Chintagunta (1995) found that more promotional volume comes from category expansion, rather than from brand switching. By studying sales promotions at the individual household level, we can track these sources down. Opposite to most prior research, we apply an intertemporal analysis to uncover the sources of promotional household purchase behavior. Besides

investigating how households respond to promotions when they are present, also pre- and post-promotional household purchase behavior is taken into account.

Several researchers have spent considerable effort trying to identify and understand the 'deal prone' consumer. Unfortunately, different conceptualizations, definitions, and operationalizations of deal proneness led to conflicting insights. Furthermore, most researchers (e.g., Webster 1965, Montgomery 1971, Lichtenstein et al. 1995, 1997, Burton et al. 1999) used a behavioral or attitudinal outcome measure to operationalize deal proneness. But, deal proneness actually represents a psychological trait and can therefore not be directly measured as promotion response, neither within nor across different product categories. Ainslie and Rossi (1998) were among the first researchers who investigated similarities in brand choice behavior across product categories to get possible evidence for the notion that sensitivity to marketing mix variables is a consumer trait and not unique to specific product categories. The existence of deal proneness was not inferred directly from promotional behavior, but indirectly. Other possible causes were taken into account and the remaining, unexplained part of household purchase behavior was used to draw conclusions regarding deal proneness. Sensitivity was interpreted as brand choice marketing mix sensitivity. According to Ainslie and Rossi (1998), sensitivity to marketing mix variables is a consumer trait and is not unique to specific product categories. We will expand their work by incorporating not only brand choice, but also purchase quantity and purchase timing. We will investigate whether there are similarities across product categories in household promotion response behavior. We will further investigate whether these similarities result from household characteristics such as income, available time, children, etc., or if there really is something like an individual deal proneness trait. In this study, the different types of sales promotion incorporated are not all associated with a short-term price-cut. The term deal proneness therefore does not relate only to price-cuts, but also to the so-called promotional signals (e.g., Inman and McAlister 1993).

The key feature of our approach is the "microscopic" level of analysis. We will perform an analysis of individual household response behavior with respect to sales promotions. Our goal is to develop an approach that provides a decomposition of sales promotion response by sales promotion reaction mechanisms (store switching, brand

switching, purchase acceleration, category expansion, and repeat purchasing) within and across product categories and promotion types. Possible drivers of promotion response will be identified.

Our objective is to help researchers and practitioners reveal more of the effects of sales promotions on individual household purchase behavior. In contrast to most promotional research, we do not take the promotion as the point of departure. Instead, the central research object in this study is the purchase behavior of the individual household. In our approach, we are observing individual household purchase behavior over time, using a magnifying glass.

A side effect of gaining insights in individual household deal response is that it provides us with the opportunity to partly examine whether retailers' expenditures on sales promotions are rewarding. Are they affecting household purchase behavior in the alleged way? Or are the increasing concerns justified: do sales promotions only increase short-term sales through 'borrowed' expenditures?

1.2 Sales Promotions

Sales promotions are action-focused marketing events whose purpose is to have a direct impact on the behavior of the firm's customers. There are three major types of sales promotions: consumer promotions, retailer promotions, and trade promotions. Consumer promotions are promotions offered by manufacturers directly to consumers. Retailer promotions are promotions offered by retailers to consumers. Trade promotions are promotions offered by manufacturers to retailers or other trade entities (Blattberg and Neslin 1990). This thesis is focused on promotions offered to the consumer, therefore a combination of consumer and retailer promotions. Throughout the world, sales promotions offered to consumers are an integral part of the marketing mix for many consumer products. Marketing managers use price-oriented promotions, such as coupons, rebates, and price discounts to increase sales and market share, entice consumers to trial, and encourage them to switch brands or stores. Non-price promotions such as sweepstakes, 7frequent user clubs, and premiums add excitement and value to brands and may increase

brand attractiveness. In addition, consumers like promotions. They provide utilitarian benefits such as monetary savings, increased quality (higher quality products become attainable), and convenience, as well as hedonistic benefits such as entertainment, exploration, and self-expression (Huff and Alden 1998, Chandon et al. 2000).

Given the increasing importance of sales promotions as a percentage of the total advertising and promotional budget (growth from 58 percent in 1976 to 72 percent in 1992, and increasing at a rate of 12 percent per year over the last 10 years (Gardener and Treved 1998), studies that strive to understand the impact of sales promotions on consumers are very important. There are several reasons why advertising has become less effective. The growing diversity of the population of consumers makes it more difficult to reach a mass audience with a single message. Moreover, the cost of advertising media has grown faster than the rate of inflation, but its effectiveness has fallen as television channels, magazines, radio stations, and websites proliferate, and as consumers take control of their exposure to ads with VCRs and remote control devices. It has become increasingly expensive and difficult to build brand awareness and brand loyalty. According to Kahn and McAllister (1997), it has almost become impossible to build brand awareness and brand loyalty by advertising. Furthermore, a result of the overwhelming product proliferation is that the distinctions between brands have become blurred. These (and other) developments have driven manufacturers' and retailers' marketing mix expenditures towards sales promotions. Such a promotional pricing strategy is called a HILO strategy (e.g., Lal and Rao 1997, Bell and Lattin 1998)

A current, opposite trend is the Every Day Low Pricing (EDLP) strategy. This strategy differs from the promotional pricing strategy by not emphasizing price specials on individual goods but instead focusing consumer attention on good value on a regular basis (Lal and Rao 1997). Some research has been carried out on EDLP. Lal and Rao (1997) concluded that two types of stores (HILO and EDLP) both attract time constrained consumers and cherry pickers. Bell and Lattin (1998) investigated the relationship between grocery shopping behavior (size of the shopping basket) and store choice (EDLP versus HILO). They concluded that small basket shoppers prefer HILO stores and large basket shoppers prefer EDLP stores. Ailawadi et al. (2001) studied the reactions of consumers on a store pricing strategy change (from HILO to EDLP). They concluded that such a pricing

strategy change (decrease in promotional spending coupled with an increase in advertising spending) results in a decrease in market share for the company that instituted this strategy change.

Thus, uncertainty exists about the effects of using or not using a promotional pricing strategy. Investigating the exact results from sales promotion expenditures on individual household purchase behavior is the mainspring of this study. Conflicting empirical results exist with respect to the causes of the promotional volume. As mentioned in the introduction, some researchers found that the majority of promotional volume comes from switchers, whereas others found opposite results. One possible explanation for these conflicting results is that sources of promotional volume are dependent on the characteristics of the product category (Blattberg and Wisniewski 1987). Instead of taking the promotion as the study object, we use the individual household as the point of departure. We do not investigate whether a certain promotion results in a sales increase; we investigate whether a certain household is influenced by a promotion it encounters during its shopping trip, and if so, in what way. The use of the term influence(d) deserves more attention. A possible criticism is that we cannot prove that a change observed in the individual household purchase behavior during a promotional period is actually a consequence of that promotion. There could be other causes for changes in purchase behavior. For example, if a specific household is organizing a large, fancy party, this might induce deviating purchasing behavior. An integrated promotional strategy (for example a price cut combined with advertising) might induce greater purchasing by a price-sensitive household than a price-cut in isolation would have caused. Furthermore, need for variety could be the cause of deviating purchase behavior, not the sales promotion present in the retail outlet. Our view is that this sort of phenomenon, while undoubtedly present, will have limited effects on our results. We study individual household purchase behavior over more than two years and for quite a large number of households, searching for general patterns. In addition, the influence of possible variety seeking behavior is accounted for. We therefore interpret the patterns found in changed purchase behavior during promotion periods as being caused by sales promotions. The degree to which a certain household is influenced by a promotion, is investigated for different types of promotions and a number of product classes. Are there households that respond to every sales promotion? Are there differences between households in the way they react to promotions, does one household

show consistent brand switch behavior, whereas a second household shows consistent purchase acceleration behavior? These are questions we want to answer with this study.

In spite of the pivotal role played by sales promotions both in practice and academia, research at the micro-level appears to offer little by way of generalizable conclusions. Despite the increase in the use and variety of sales promotions, much of the research on consumer response to promotion techniques has examined only one or two different types of promotions, not incorporating the product category effect. Many researchers conclude that price promotions cause short-term increases in sales, but whether these incremental sales are just 'borrowed' or real enlargements, still remains to be seen. In this dissertation, we will shed some light on the effects of sales promotions on individual household purchase behavior.

1.3 Research Questions

With respect to the effects of sales promotions we have formulated one central research question. *Under which conditions and in what way do sales promotions influence household purchase behavior?* We have investigated the impact of sales promotions on purchase behavior at the individual household level. Blattberg and Neslin (1990) stated that the influence of sales promotions could be exerted in many ways. The consumer can be influenced to change purchase timing or purchase quantity, switch brands, increase consumption of the product category, switch stores, or search for promotions. However, not all consumers are influenced in the same way. For example, some consumers might be influenced to switch brands but not change their purchase timing, while others might be influenced to change timing but not brands. Still others might be influenced in both ways. Blattberg and Neslin (1990) concluded that promotion response is therefore a multidimensional concept.

Most researchers simplify this situation by investigating the influence of one type of promotion, for example, couponing, on one type of behavior, for example, new product trial (Teel at al. 1980), for one product category. Henderson (1987) and Schneider and Currim (1991) are exceptions, studying and explicitly differentiating among several types

of promotions, or several types of reaction mechanisms. But, to our knowledge, we are the first to investigate the influence of one or more promotion types on several types of sales promotion reaction mechanisms for different product categories.

We agree with Blattberg and Neslin (1990) in the sense that promotion response can be exerted in many ways. There are so many factors that can influence a household's promotion purchase behavior. The following sub-questions have to be answered:

1. *Can we explain the observed household promotion response behavior by socio-economic, demographic, purchase, and psychographic household characteristics such as income, available time, household composition, variety seeking, purchase frequency in accordance with consumer behavior theory?*
2. *Can we decompose promotional household purchase behavior into different sales promotion reaction mechanisms (brand switching, store switching, purchase acceleration, repeat purchasing, and category expansion) in accordance with prior promotional sales decomposition research? To what degree do the different sales promotion reaction mechanisms occur? Are they related, for the same household, with each other or across product categories?*

Individual household purchase behavior within and across product categories, promotion types, and sales promotion reaction mechanisms, will be used to answer these two questions. Four dimensions are incorporated into one framework that describes the relation between sales promotions and observed promotion response behavior and the conditions necessary for promotion response behavior occurrence. These four dimensions are: (1) sales promotion reaction mechanism (brand switching, store switching, purchase acceleration, category expansion, and repeat purchasing), (2) promotion type (price cut, display, feature, or combinations of these three), (3) product category (coffee, soft drinks, fruit juice, pasta, candy bars, and chips), and (4) household characteristics (such as social class, size, presence of non-school age children, shopping frequency, deal proneness).

1.4 Scientific Contribution

A considerable amount of research has been undertaken in an attempt to identify and understand consumer promotion response. Different operationalizations and measures of promotion response have been developed and applied. This abundance hampers comparison and makes the prospect of building a cumulative tradition for promotion response elusive. Furthermore, a large part of the empirical work is not grounded on consumer behavior theory. We provide an integrated framework that describes the effects of sales promotion on household purchase behavior applying insights from consumer behavior theories. Furthermore, measures are developed for household sales promotion response. We investigate whether the observed magnitudes of the promotion response variables can be explained by observable household characteristics (such as social class, available time, size and composition), product category characteristics (such as average price level, number of brands), and promotion environment variables (which promotion types were present).

Furthermore, we will present an intertemporal decomposition of household promotion response to find out to what degree the different sales promotion reaction mechanisms are exhibited in household purchase behavior within and across categories. The intertemporal aspect means that besides effects during the promotion itself, also pre- and post-promotional effects are taken into account.

The microscopic level of research offers the opportunity to study (in)consistencies in household purchase behavior within and across different product categories to make a statement about the concept of deal proneness.

1.5 Managerial Relevance

The results and insights obtained concerning the promotion response will be used to infer conclusions about the effects of sales promotions. Do specific sales promotion types mainly lead to stockpiling behavior, therefore not really rewarding, or do some households really consume more (category expansion). What household characteristics and product category

characteristics are important in explaining the effects of sales promotions? Are some categories more attractive to promote than others?

The results on category expansion effects form an important indicator of retailer and manufacturer profitability. They could be used as a starting point for deriving estimates of these profitabilities, though that is outside the scope of this dissertation.

Currently, everyday low pricing (EDLP) is appearing in managerial circles. The change from a promotion-intensive environment (the so-called 'high-low' pricing) to an environment characterized by lower average prices and fewer promotions has interesting short- and long-run implications for brand choice, store choice, purchase acceleration, category expansion, and repeat purchasing. It is therefore interesting to know the percentage of households whose purchase behavior is influenced by promotions. Promotion shoppers could abandon EDLP stores and EDLP brands.

Furthermore, incorporating demographic variables in household purchase behavior models is conceptually appealing and has numerous managerial benefits. Retailers and brand managers can assess demographic variations in demand and marketing mix response in order to implement micromarketing strategies (Neslin et al. 1994, Kalyanam and Putler 1997). For example, a retailer planning to locate a new outlet can get some sense of the differences in demand patters and price and promotion sensitivities in the new trading area in order to make initial stocking, inventory, pricing, and promotion decisions.

1.6 Outline of the Thesis

The organization of this thesis is as follows: Part I (Chapters 2, 3, 4, and 5) contains the basic theories from consumer buying behavior as such and applied to the field of sales promotions, the hypotheses derived identifying possible drivers of household sales promotion response, and the design of the study. Chapter 2 starts with a brief introduction into the field of consumer behavior to offer some understanding of how and why people go about making decisions and choices in the market place. Subsequently, the theories and models of consumer behavior are applied to the field of sales promotions, along with the most important empirical findings thus far.

Chapter 3 provides a theoretical overview of possible household drivers of sales promotion response. Hypotheses are derived for both household characteristics (e.g., size, age, composition, education) and purchase process characteristics (e.g., purchase frequency, basket size).

Chapter 4 contains a theoretical overview of the sales promotion reaction mechanisms. These effects of sales promotions on households purchase behavior are dealt with in detail. Not response as such is studied, but the specific sales promotion reaction mechanisms that lie below. Measures are derived to study the intertemporal effects of sales promotions on household purchase behavior. Furthermore, product category characteristics that influence household promotional purchase behavior are dealt with.

The research model in Chapter 5 describes the multi-dimensional character of household promotion response. We consider promotion response to be related to a number of variables, varying from household characteristics, product class characteristics, promotional environment information, to household psychographics. The general framework derived describes the way sales promotions affect purchase behavior of individual households. The two-step research methodology applied to answer the research questions is presented along with the corresponding research models used.

Part II (Chapters 6, 7, 8, and 9) covers the empirical part of this thesis. In Chapter 6, the data used, its origin, strengths, and weaknesses are described. The representativeness of the set of households for the entire Dutch population of households is investigated. Some general descriptive statistics are provided to get some feeling for the data used in this study.

Chapter 7 contains the empirical results of testing the possible drivers of household sales promotion response. The results of the logistic regression analyses are dealt with, in which promotion response is linked to household characteristics and the promotional environment. This provides us with insight in the variables that are related to household promotion response. Furthermore, across category (in)consistencies are used to derive the nature of deal proneness.

Chapter 8 contains the empirical results regarding the sales promotion reaction mechanism analyses. The effects of sales promotions on households purchase behavior are studied in detail. Response as such is not studied, but the specific sales promotion reaction mechanisms that occur are. The sales promotion reaction mechanism measures derived in

Chapter 5 are applied to study the intertemporal effects of sales promotions on household purchase behavior for six product categories. Product category characteristics that influence household promotional purchase behavior are empirically investigated. Furthermore, the promotional bump itself is decomposed. Again, consistencies and/or inconsistencies are investigated.

Finally, in Chapter 9, the implications of the analyses are discussed. Based on the major findings of the study, we formulate conclusions on the effects of sales promotions on household purchase behavior. We further discuss the implications of our findings for the use of sales promotions in practice. The generalizability of our results on household promotion sensitivity and household promotional purchase behavior in a fast moving consumer good (FMCG) retailing context will be discussed. We end Chapter 9 with discussing the limitations of this study and the implications of our results for future research on the use and effects of sales promotions on household purchase behavior.

PART I

THEORY, HYPOTHESES AND DEVELOPMENT OF THE RESEARCH MODEL

2 THEORIES OF CONSUMER BUYING BEHAVIOR

2.1 Introduction

Why do people buy what they buy? How do people go about making decisions and choices in the market place and how can sales promotions influence these decisions and choices?

Marketing starts with the analysis of consumer behavior, which is defined by Blackwell et al. (2001) as those acts of individuals directly involved in obtaining, using, and disposing of economic goods and services, including the decision processes that precede and determine these acts. Knowledge of consumer behavior is an indispensable input to promotional mix decisions. This, in turn, is not confined to manufacturers but extends into the realms of the retailer and the nonprofit marketers.

Different fields of science are important when studying consumer behavior (Economics, Psychology, Sociology, Methodology, Statistics, etc.). Until 1950, the field of economics was the main contributor in explaining consumer behavior (Wierenga and van Raaij 1987). Theories regarding utility functions were developed that describe a consumer's allocation process of income across products to maximize utility. Especially effects of price and income changes could be studied using utility functions. Later on, marketers borrowed rather indiscriminately from social psychology, sociology, anthropology, or any other field of inquiry that might relate to consumer behavior in some way. During the 1960s the behavioral approach of consumer behavior emerged as a field of academic study. Section 2.2 contains some of the most frequently applied models in consumer behavior research. These theories are applied to the field of sales promotions in Section 2.3. This chapter ends with some concluding remarks about the relevance of these theories to the field of sales promotions.

2.2 Basic Models of Consumer Behavior

It is very difficult to identify the causes of consumer behavior. People buy things for many reasons. They seldom are aware of all their feelings and thought processes concerning

purchases, and many external forces, such as economic and social conditions, constrain their behavior. Scholars in marketing and the behavioral sciences have attempted to search for simplified, yet fundamental, aspects of consumption in order to better understand and predict at least a portion of behavior in the marketplace. Three outstanding models underlie most of the theories that scholars have advanced: the economic model, the stimulus-response model, and the stimulus-organism-response model (Bagozzi 1986).

2.2.1 Economic Model

Economists were the first to propose a formal theory of consumer behavior (Bagozzi 1986). Their model has led to the so-called vision of economic man, which basically builds on the following premises:

1 Consumers are rational in their behavior.
2 They attempt to maximize their satisfaction in exchanges using their limited resources.
3 They have complete information on alternatives to them in exchanges.
4 These exchanges are relatively free from external influences.

Actually, not every approach in economics is based on all four premises. Especially the second premise is the basis for the neoclassical economic theory of consumer behavior today. That theory assumes that the consumption of goods and services is motivated by the utility that these goods and services provide. Moreover, it assumes that the choices of the consumer will be constrained by his or her resources.

The economic model hypothesizes that quantity bought (an observable phenomenon) will be a function of income, prices, and tastes (which, with the possible exception of tastes, are also observable). The mechanism or theory behind the prediction lies in the implied decision process. It is assumed that the consumer attempts to maximize his or her utility, subject to budget constraints. Utility is believed to be unobservable. As a consequence, economists have concentrated primarily on the relationship of easily measured variables, such as income and prices, on quantity bought and have not

systematically explored the decision criteria consumers might use to make choices. Although there has been a lot of empirical research applying the economic model (e.g., Allen and Bowley 1935, Wold 1952, Koyck et al. 1956), most of these studies focused on commodities or on product categories (instead of branded products), and on price and income elasticities.

Overall, the economic model has several attractive features. First of all, it has proven to be an important descriptive tool. The economic model provides answers that are mathematically rigorous, yet simple and intuitive. Furthermore, it has aided in the forecast of the quantity bought. On the other hand, the economic model suffers from a number of drawbacks. First of all, it is oversimplified. It fails to consider many real psychological, social, and cultural determinants of this quantity bought. Second, the model provides only limited guidance for managers. For example, marketers know that, in addition to income and prices, advertising, promotion, product characteristics, and distribution policies influence consumption, but the economic model provides little guidance in this regard. Third, the economic model takes the utility function as given, ignoring the mental decision processes underlying it.

Preferences are another facet of the economic model toward which economists have been ambivalent. Some economists (e.g., Marshall 1938) have incorporated them in their work, but most economists have ignored them. Marshall (1938) acknowledged that households can have different utility functions. Purchases were dealt with at the household level. Differences between for example poor and rich households were discussed. But, the mainstream of economists did not make use of these insights. They drifted back to abstract, technical discussions of purchase behavior. Marketers, however, were especially intrigued by this individual approach, which led to the development of stimulus-response models, as discussed in the next sub-section. Such a model does take the individual level into account. It places considerable emphasis on marketing mix elements and the effects they have on consumer actions. However, it does not specify how the marketing mix produces responses. The stimulus-organism-response model, as discussed in section 2.2.3, strives to delineate the structures and processes internal to the consumer, which actually regulate choices.

2.2.2 Stimulus-Response Model

Marketing managers have found the economic model particularly lacking in its ability to suggest specific actions for influencing consumption or for anticipating specific demands of consumers (unless resulting from price actions). A firm or organization has quite an extensive marketing mix repertoire. For instance, a firm can vary prices, discounts allowances, wholesale and retail locations, and a whole host of other tactics. Individual marketing mix variables can lead to more than one response on the part of the consumer with varying degrees of success. Most firms need guidelines that will indicate how their actions actually influence trial and repeat purchases by consumers. Consumers' actions or their reactions to marketing mix stimuli include increased awareness of, interest in, and desire for a product, in addition to actual purchase of the product. In the stimulus-response model (Figure 2.1), stimuli are assumed to operate through or upon unknown consumer processes, which remain unmodeled intervening processes (Bagozzi 1986).

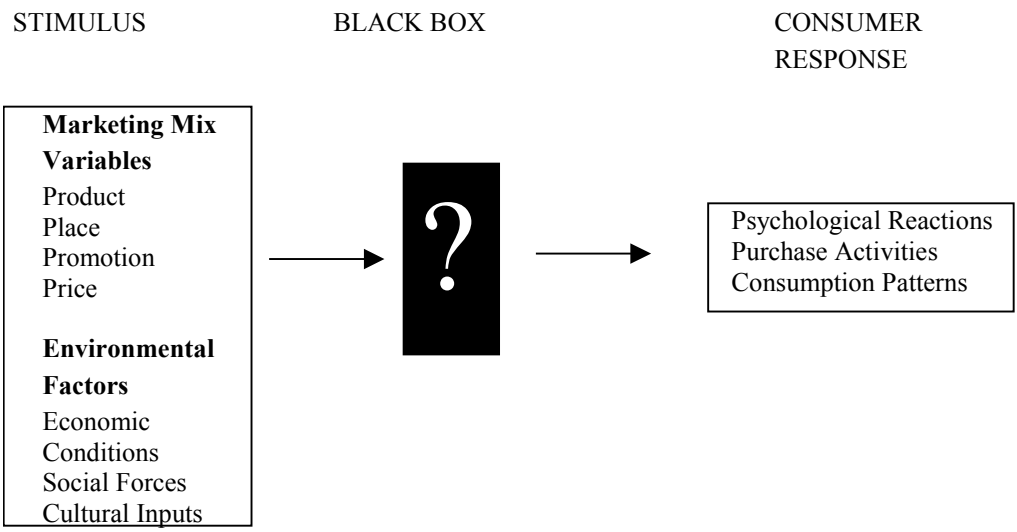


Figure 2.1: Stimulus-response model (Bagozzi 1986)

The processes inside the black box are regarded as being unknown; no attempt is made to model their nature in the stimulus-response model. Rather, only their outcomes are monitored. The marketing mix variables are not the only stimuli producing a response on

the part of the consumer. Many forces not under the direct control of firms also influence consumer behavior. These are labeled environmental factors and include economic conditions, social determinants, and cultural influences. Marketers have little or no control over these, but they do try to anticipate and forecast their effects.

Katona (1951) was one of the first researchers that focused the attention on psychological and sociological factors, in order to explain the large variability in expenditures on durable goods. This development was a reaction to the economic model, which Katona (1951) claimed missed a number of important details.

By use of a stimulus-response approach, marketers can discover the reactions of consumers to different advertising appeals, package designs, and prices, to name a few stimuli. The stimulus-response model is an appealing model. First of all, it is simple, which makes it easy to understand and communicate to others. Second, it is a highly useful managerial tool and it has been found to work well in the past. On the other hand, the stimulus-response model falls short on one very important and far-reaching criterion: it omits the processes through which stimuli induce responses. Marketers need to now how their actions bring about responses so that they can more effectively and efficiently design and target their stimuli. Another limitation is that it fails to allow for the possibility that some purchase behaviors are self-generated and (almost) uninfluenced by external stimuli. The stimulus-response model, by definition, ignores the origin and determination of buying intentions. People are represented as being buffeted by stimuli rather than freely discovering their needs and choosing among alternatives. Consumers, of course, make purchases in both ways, depending on the circumstances, and marketers need theory rich enough to capture the dynamics.

Recognizing the need to examine how stimuli actually influence responses, marketers have increasingly turned to approaches representing the psychological and psychological processes governing behavior. The general form that these efforts take is dealt with in the next section.

2.2.3 Stimulus-Organism-Response Model

Figure 2.2 illustrates the general form of the stimulus-organism response system where the organism stands for a constellation of internal processes and structures intervening between stimuli external to the person and the final actions, reactions, or responses emitted (Bagozzi 1986).

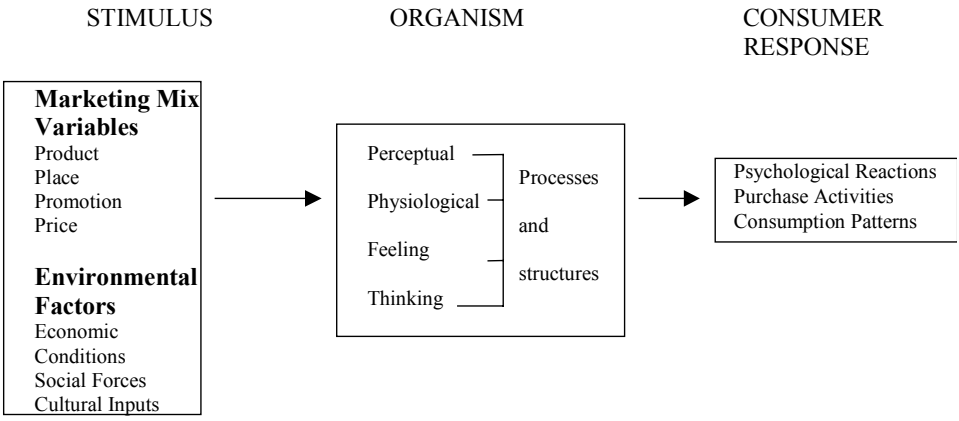


Figure 2.2: Stimulus-organism-response model (Bagozzi 1986)

It is noticed that the intervening processes and structures consist of perceptual, physiological, feeling, and thinking activities (for example needs and preferences). Obviously, these are complex, multifaceted aspects of human behavior. In reality, consumer decision-making processes are quite complex and are influenced by many forces both within and around the individual. Fortunately, it is possible to identify a relatively small number of elements common to most everyday consumption decisions. The general model of consumer behavior is an abstraction designed to symbolically represent most of the major elements and processes in all consumer choice decisions. Figure 2.3 is one example of such a general consumer behavior model (Blackwell et al. 2001). This is already the 9th edition of this book (the first version was published in 1968, with a different composition of the authors), but the consumer behavior model has not undergone any dramatic metamorphoses. In each edition, some variables were renamed, and, very rarely, variables were added.

As mentioned before, Figure 2.3 is one possible representation of the extended problem-solving process. All variables shown are usually functioning in one way or another in extended problem solving. This is because of the influences of involvement, differentiation, and absence of time pressure. When these influences are not present, however, some stages such as external search are skipped altogether, and alternative evaluations take an alternative form, known as limited problem solving.

The consumption process appears to begin with an external stimulus striking the consumer's information processing. In reality, there are at least three ways an act of consumption is initiated: (1) an external stimulus (e.g., display) is detected and acted upon; (2) a physiological agitation within the consumer presses for equilibrium (e.g., hunger); or (3) a psychological imbalance strives for resolution (e.g., desire for novelty). The last two ways are both internal forces that may drive purchase behavior.

This model will not be dealt with in depth, but we have to note that not every element or process within the model comes into play in every real-world decision. At this time in the development of our knowledge of consumer behavior, three frequently occurring sub-processes can be identified: impulse buying, habitual purchase behavior, or consumption problem solving (Bagozzi 1986). When we buy things on impulse, it is generally because an external (e.g., display) or internal (e.g., deprivation) stimulus has caught our attention, and the product is easy to acquire. Not many thoughts occur. Rather, emotional or motivational processes are primarily at work. These, however, may occur below the level of self-awareness.

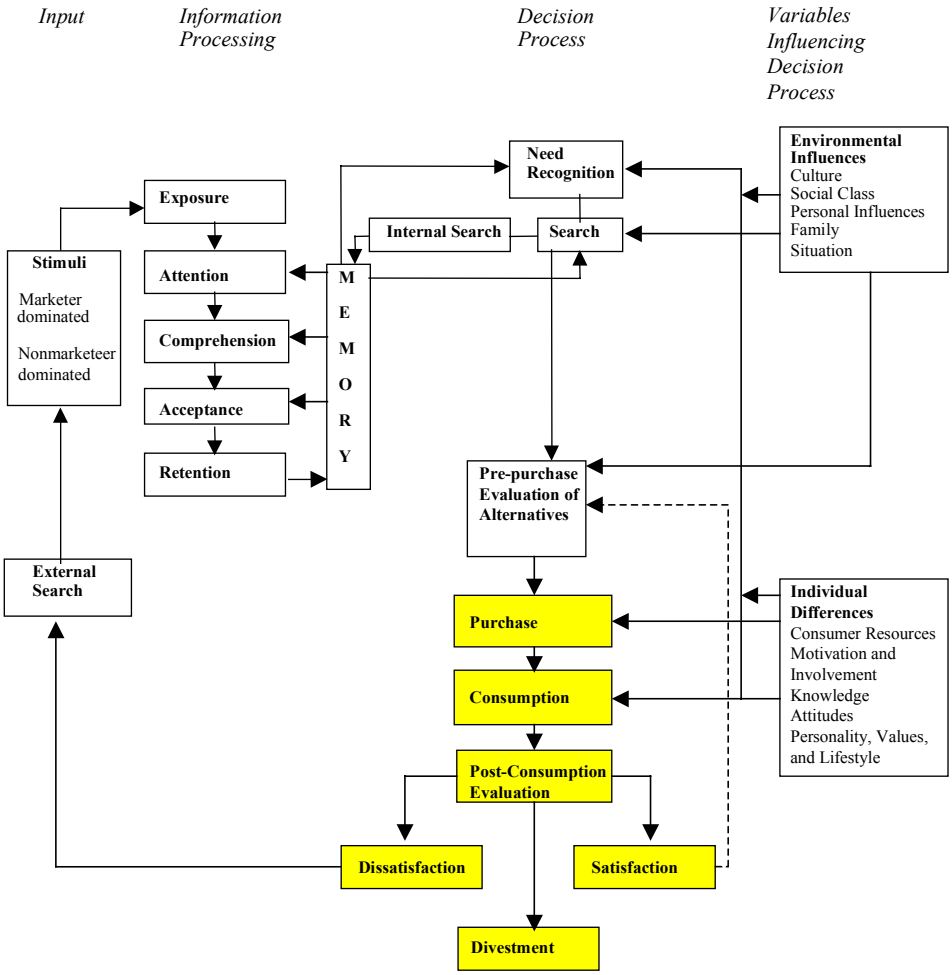


Figure 2.3: A decision process model (Blackwell et al. 2001)

Under habitual purchase behavior, prior learning is crucial. Although consumer needs usually initiate the purchase in such instances, cognitive processes predominate and include the execution of action sequences and the evaluation of limited decision criteria. Consumption problem solving involves extensive search, processing of information, and interaction with the control unit. Cognitive processes and affective responses may both play important roles in consumption problem solving. The attitude model is a frequently applied example of a model that represents consumption problem solving. The attitude model hypothesizes that the consumer's beliefs about product attributes or the consequences of

product use coupled with the importance of affective content of the attributes or consequences of product use determine one's intentions to purchase or not.

As said before, the decision model in Figure 2.3 shows an extended picture of consumer decision-making. But, depending on the circumstances, not necessarily all elements of the model take part in each purchase decision. In-store promotions (e.g., display), for example, could lead to impulse buying, skipping the more cognitive part of decision-making.

Before the three basic models of consumer behavior discussed above will be applied to the topic of sales promotions in Section 2.3, a theory of another order is discussed. Prior research on sales promotion effects often makes use of trait theory (e.g., deal proneness, variety seeking). Where the three basic models of consumer behavior discussed above can be used as tools to understand consumer behavior under certain conditions, in certain situations, trait theory claims that some types of behavior are consistent across different conditions or situations.

2.2.4 Trait Theory

Trait theory represents a quantitative approach to the study of personality (Blackwell et al. 2001). This theory postulates that an individual's personality is composed of definite predispositional attributes called traits. It is assumed that traits are common to many individuals and vary in absolute amounts between individuals (Mischel 1968). It is further assumed that these traits are relatively stable and exert fairly universal effects on behavior regardless of the environmental situation (Sanford 1970). The final assumption asserts that traits can be inferred from the measurement of behavioral indicators. Some well-known examples of traits are aggressiveness, dominance, friendliness, sociability, extroversion, empathy, innovativeness, deal proneness, variety seeking, etc.

One of the questions we started this chapter with was the following: "How do people go about making decisions and choices in the market place and how can sales promotions influence these decisions and choices?" The theories and models mentioned thus far (economic theory, stimulus-response model, stimulus-organism-response model,

trait theory) provide some insights in the first part of this question. In the next section, these consumer behavior theories are applied to the field of sales promotions to answer the second part of the question.

2.3 Theories of Consumer Behavior Applied to Sales Promotions

Sales promotions set in motion a complex interaction of management decisions and consumer behavior. If managers are ever to assume the "driver's seat" in this interaction, they must understand not only how but also why consumers respond to promotions (Blattberg and Neslin 1990). The field of consumer behavior provides a rich collection of concepts and theories that shed light on this question. In this section, we have selected the topics from consumer behavior that are most applicable to sales promotions. In accordance with the theories of consumer behavior discussed in the previous section, we discuss the relevant topics for each of these theories for the field of sales promotions.

2.3.1 Economic Model Applied to Sales Promotions

The relevance of the economic theory for the field of sales promotions is quite straightforward. Temporary price reductions for certain products mean relaxations of the budget constraint, i.e. the possibility to purchase more of the same product. Economic theory would also imply that households with low storage costs and transaction costs are more inclined to buy on promotion. However, as discussed before in section 2.2, the economic model represents a quite oversimplified model of consumer behavior, neglecting, for example, consumers' mental decision-making, tastes, etc. It therefore provides us with general knowledge about consumer reactions to price and income changes, but no insights in how other types of sales promotions influence consumer decisions.

2.3.2 Stimulus-Response Model Applied to Sales Promotions

In this section, we describe some specific theories and concepts that concentrate on the consumer's environment and behavior, but that do not consider the inner cognitive processing the consumer might undertake, therefore falling within the class of stimulus-response models. The theories discussed are the so-called behavioral learning theories.

Behavior is primarily made in response to a change in environmental stimuli (Mowen 1995). Behavioral learning may be defined as a process in which experience with the environment leads to a relative change in behavior or the potential for a change in behavior. Because sales promotions are an element of the environment of the consumers, these theories could be very useful in explaining how and why sales promotions affect consumer behavior. Researchers have identified three major approaches to behavioral learning: classical conditioning, operant conditioning, and vicarious learning (Mowen 1995). This last approach of learning, vicarious learning, occurs when individuals observe the actions of others and model or imitate those actions. New product adoption may be based in part on vicarious learning, but we do not believe that this approach is applicable to the field of sales promotions. Therefore vicarious learning will not be dealt with in detail. Classical and operant conditioning are dealt with more in-depth in the next two subsections.

2.3.2.1 Classical Conditioning

In classical conditioning, behavior is influenced by a stimulus that occurs prior to the behavior and elicits it in a manner that has the appearance of being a reflex. In the process of classical conditioning, a neutral stimulus is paired with a stimulus that elicits a response. Through a repetition of the pairing, the neutral stimulus takes on the ability to elicit the response. Pavlov discovered the phenomenon when he was working with dogs. The dogs had the messy propensity to begin salivating profusely (the response) each time meat powder (the stimulus) was presented to them. The stimulus of meat powder reflexively elicited the response of salivation. The reflexive response elicited by the stimulus is called

the unconditioned response; the stimulus that causes the unconditional response is called the unconditioned stimulus. When classical conditioning occurs, a previously neutral stimulus (called the conditional stimulus) is repeatedly paired with the unconditioned stimulus. After a number of such pairings, the ability to elicit a response is transferred to the conditioned stimulus. In the experiments of Pavlov, the presence of the meat powder was preceded in time by the ringing of a bell. After a number of such pairings, the mere ringing of the bell would elicit the conditioned response of salivation.

Consumer researchers have shown that (through advertising) products may become conditioned stimuli and elicit a positive emotional response in consumers' increased attention (this phenomenon is called sign tracking). A premium or prize serves as an unconditioned stimulus; it naturally elicits a response of excitement. By frequently coupling the premium with a particular brand, the brand itself eventually becomes a conditioned stimulus. Special displays or feature advertising, even if not accompanied by a price discount, can elicit strong sales effects. Since these activities are often associated with price discounts, which do naturally elicit a strong response, they become conditioned stimuli. A display is like the ringing of Pavlov's bell: it automatically makes the consumer salivate in anticipation of a sale. The idea of promotions serving as conditioned or unconditioned stimuli has a certain logical appeal. One has only to observe consumers in a local supermarket snatching up coffee from a special display to be struck by the apparently automatic nature of the response.

There is some mixed evidence from prior research. Shimp and Dyer (1976) found that children were more likely to want to purchase a cereal that included a premium, but this did not translate into positive feelings for the cereal itself. Blair and Landon (1981) found consumers inferred that advertised prices were lower than regular prices, for durable goods, even if no regular price was stated in the advertisement. Inman and McAlister (1993) found that promotional signals work. There is also some strong evidence on the applicability of classical conditioning to the effects of advertising.

2.3.2.2 Operant Conditioning

In operant conditioning, current behavior is influenced by the consequences of previous behavior. The basic purport of operant conditioning is that reinforced behavior is more likely to persist. A reinforcer is anything that occurs after a behavior and changed the likelihood that it will be emitted again. Once the reinforcement is stopped, the so-called extinction effect might change behavior back to as it was before. Purchasing the brand is the behavior we want to teach consumers, and a promotion could serve as the reinforcement (for example an in-pack coupon). The goal is to use promotions to build up purchase frequency, but to do this in a way so as to mitigate the extinction effect (when the promotion is withdrawn, we want the behavior to continue).

The distinction between classical conditioning and operant conditioning can be understood most easily as a difference in sequence. In classical conditioning, a stimulus occurs first, and a response is elicited. Classical conditioning can thus be called a stimulus-response theory. In operant conditioning, the response is first emitted and then reinforced. Operant conditioning can thus be called a response-reinforcement theory.

An example of a model, which incorporates the idea of operant conditioning, is the so-called linear learning model (e.g., Bush and Mosteller 1955, Wierenga 1974, Lilien 1974, Leeflang and Boonstra 1982). In this model, the probability P_n that some specific brand will be purchased on the n-th purchase occasion depends linearly on the probability that it was purchased at the previous occasion and on whether or not it was actually bought at that occasion. That is, if we let I_n denote the indicator function that is 1 if the brand was purchased on occasion n and 0 otherwise, $P_n = \alpha + \beta I_{n-1} + \lambda P_{n-1}$, where $\alpha, \beta, \lambda \geq 0$ and $(\alpha+\beta+\lambda) \leq 1$. Normally it is assumed that there is a positive learning effect ($\beta>0$). Sales promotions can induce consumers to switch brands, which, according to the linear learning model, would lead to an increase in repeat purchase probability for that specific brand the consumers switched toward. But, it could also be the case that the β coefficient in this case is smaller than had the brand been purchased not on promotion.

A major concern associated with both the operant and classical conditioning viewpoint is their explicit exclusion of attitude and mental processes. Applying the

stimulus-response-organism model (see next section) might provide a solution to these concerns. However, although the behaviorist tradition of the stimulus-response model is no longer as popular as it once was, some of its key ideas are still regarded as useful and make intuitive sense. The stimulus-response model seems especially useful in explaining the effects of promotions on purchase behavior. And the marketing world has not yet been able to come up with (convincing) alternative explanations. One might conjecture that many consumers are not highly involved in their purchase decisions. Under low-involvement decision-making, one would expect little cognitive activity on the part of the consumer, making him or her more susceptible to behavioral conditioning.

2.3.3 Stimulus-Response-Organism Model Applied to Sales Promotions

In this section, we describe some specific theories and concepts that are mainly concerned with the inner cognitive processing of the consumer. Many of those processes are about the consumers' perception of the environment (attribution, price perception, perceived risk, and prospect theory). But processes related to the translation of those perceptions into actual choices (attitude and consumer decision-making models) are therefore of the stimulus-response-organism type.

2.3.3.1 Attribution Theory

Attribution theory describes how consumers explain the causes of events. These explanations are called "attributions." Attributions cause a change in attitude rather than a change in behavior. Attribution theory does not formally address the behavioral consequences of a consumer's attributions. However, to the extent that attitudes are the antecedents of behavior, the theory is relevant. Suppose that brand X is promoted. Questions could be: 'why is brand X being promoted?' A possible attribution could be: 'brand X is being promoted because they can't sell it at its regular price.' It's probably a low-quality product', or brand X is being promoted because the store manager knows brand

X is very popular that it will bring in more customers into the store.' This example illustrates that there can be more than one attribution associated with a certain event.

Three types of attribution theories can be distinguished that differ in the object of attribution: self-perception ("why did I buy"), object-perception ("why is brand X on promotion"), and person-perception ("why did the salesperson talk more about brand Y, when brand X was on sale").

According to the self-perception theory, individuals form their attitudes by trying to be consistent with their past behavior. The key question individuals ask themselves is whether the action they take is due to external causes (e.g., a promotion) or internal causes (e.g., favorable brand attitude). For example, if strong external causes are present, the individual invokes the "discounting principle," whereby internal causes are disregarded. As a result, brand attitude (e.g., the repeat purchase probability) does not necessarily change.

Another application of self-perception theory to promotions is the "foot-in-the-door" technique. This technique of selling is to induce the consumer with a more long-term behavior (e.g., use a sample) in the hope that the consumer will then be more likely to engage in more complex behavior (e.g., purchase the brand at full price).

Object-perception theory considers three factors that affect the attribution: (1) the distinctiveness of the event involving the object, (2) the consistency of that event over time or situation, and (3) the way others react. Consider the case of judging the quality of a brand based on the event that it is being promoted. If only this brand or a small subset of brands promotes, this event is relatively distinct. If, in addition the promotion occurs often, and at all stores, it is consistent over time and situation. It thus becomes easier for the consumer to draw an attribution about the brand ("this brand must be low quality-they're trying to give it away"). If a neighbor encounters the same events and begins to form the same opinion, the attribution becomes even more solid. An implication of object-perception theory to the current retailing environment for fast moving consumer goods (FMCG) is that promotion will not degrade most brand's images, because almost all brands promote often.

Person-perception theory is not very relevant for sales promotion research and will therefore not be dealt with more in-depth.

It is important to remark that dissonance theory underlies many of the attribution theories. The theory is based on the notion that behavior often causes inconsistency or dissonance, which can be resolved by changing the belief that is dissonant with the other belief. For example, if a consumer buys a brand on promotion and finds the brand unsatisfactory, this contradiction can be resolved by ascribing the purchase to the promotion.

We end this section by reviewing the attempts that have been made to apply attribution theory in a promotion context. Most of these focus on self-perception theory and the conditions under which the consumer will attribute behavior to an external cause (a promotional incentive). Scott (1976) used self-perception theory to test two hypotheses: first, that participants contacted for an initial small request will be more likely to agree to a subsequent large request (this is the "foot-in-the-door approach"). Second, that those asked to comply with the initial request are more willing to comply with a subsequent request if the initial request was not accompanied by an incentive (the larger the incentive, the more likely to discount the internal causes and the smaller the compliance). She determined the relative effectiveness of the foot-in-the-door technique when various levels of incentive were used. She concluded that trial per se did not enhance the likelihood of a repeat purchase, the results depending on the type and level of incentive. Moderate incentives gave the highest repeat purchase probabilities, providing only equivocal support for self-perception theory.

Influenced strongly by Scott's work, Dodson et al. (1978) applied self-perception theory to predict repeat rates associated with dealing. Self-perception theory orders the effects of deal retraction on repeat purchase. In accord with the theory, the retraction of both high economic value, moderate effort, media-distributed coupons and moderate economic value, low effort, cents-off deals resulted in significantly less loyalty than when no deal was offered. The retraction of low economic value, high effort, package coupons did not undermine loyalty in relation to the deal. The theory was also supported by the finding that retraction of media-distributed coupons resulted in less loyalty than retraction of either cents-off deals or package coupons. Their data provided additional evidence for the efficacy of economic theory in ordering the effects of deals on brand switching. Brand switching increased as the magnitude of the incentive associated with the deal increased.

But, in contrast, economic theory cannot explain why the retraction of substantial incentives reduces the likelihood of behavioral persistence. A strict interpretation of economic theory implies that retraction of an incentive will cause the utility of a brand to fall in its pre-incentive level, not below it (or it is assumed that the utility function has changed, but arguments for this change are not provided). This is also an illustration of the shortcomings of economic theory in explaining the effects of sales promotions regarding consumer behavior. Their data supported the external validity of self-perception theory in marketing settings. Neslin and Shoemaker (1989) indicated that there is an alternative explanation for the lower aggregate repeat rates observed (as found, for example, in Dodson et al. 1978). Their explanation is based on statistical aggregation and they showed that even when each consumer's purchase probabilities drops to the same level as before the promotion, not below, the average rate after a promotion purchase is lower. The explanation is that the promotion temporarily attracts a disproportionate number of households with low purchase probabilities. When the repeat rates of these households are averaged with the repeat rates of those that would have bought the brand even without a promotion, the average rate is lower. Davis et al. (1992) provided additional disconfirming evidence. They reject the hypothesis that overall evaluations of promoted brands decrease.

Empirical research in this area therefore suggests that promotions can have either positive or negative effects on brand attitudes, depending on the promotion itself, the purchase environment, or the internal state of the consumer prior to using the promotion. This line of research is very important for possible medium- and long-term effects of promotions.

2.3.3.2 Theories of Price Perception

In order to determine the appropriate size and presentation of a price reduction, it is important to gain insight into the consumers' price perception processes. Three theories have particular relevance: threshold theory (Weber's law), adaptation-level theory, and assimilation-contract theory.

Weber's law is concerned with the question of how much of a stimulus change is necessary in order for it to be noticed, some sort of *threshold theory*. Kalwani and Yim (1992) found evidence that there is a region of price insensitivity around a brand's expected price within which price changes do not significantly affect purchase probabilities. Price differences outside that region, in contrast, were found to have a significant impact on consumer brand purchase probabilities. The findings imply that price changes of 5 % or less of the brand's average non-promotional price do not result in significant changes.

Adaptation-level theory proposes that perceptions of new stimuli are formed relatively to a standard or "adaptation level." The adaptation level is determined by previous and current stimuli to which a person has been exposed. It thus changes over time as a person is exposed to new stimuli. The adaptation level for judging the price of a particular item is called the "reference price." A consumer's reference price might be based on previous prices paid for the item or similar items, previous prices observed, prices for comparable items available at the time of purchase, etc. Researchers have thought of the reference price as an expected price. There is some evidence that reference prices do exist and play a role in product choice. But the question "how do various promotions affect reference prices?" is still unsolved.

Assimilation-contrast theory provides one conceptualization of how reference prices might change. The key notion here is that the degree of change in an individual's initial belief depends on the discrepancy between the initial belief and the position advocated by a newly observed communication. In the case of reference prices, the consumer's perceived reference price can be considered the initial belief, while the newly observed or advertised price is new information. The discrepancy between reference price and observed price might be very small, moderate, or very large. Only if the discrepancy is moderate will the consumer's reference price change. If the discrepancy is small, it may be seen as a slight aberration. If the discrepancy is large, the consumer might see the observed price as an exception. In either case the consumer's current perceived reference price will barely change.

These three theories provide a rich framework for establishing the perceptual consequences of price promotions. Key to that framework is that a price promotion is

compared to a perceived benchmark – a reference price – and that comparison yields consumer perceptions of saving. The general notion is that consumer judgments are made relative to some base case. This notion is the foundation of prospect theory (Kahneman and Tversky 1979). Prospect theory proposes that consumer decisions are based on how they value the potential gains or losses. Applying prospect theory in the context of prices, consumers would compare the observed point-of-purchase price with the reference price. An unanticipated nonzero difference would affect purchase probabilities for brands, with losses having greater effect on purchase probabilities than equally sized gains.

Kalwani and Yim (1992) empirically revealed that different price promotion schedules have different impacts on brands' expected prices. Mayhew and Winer (1992) tested the hypotheses that both internal (prices stored in memory on the basis of perceptions of actual, fair, or other price concepts) and external reference prices (provided by observed stimuli in the purchase environment, i.e. shelf tags containing information about the suggested retail price) will influence the probability of purchase.

2.3.3.3 Attitude Models

Attitude models specify the link between consumer beliefs and behavior (e.g., Fishbein and Ajzen 1975). We mention just a small number of complex processes identified in these attitude models. The consumer decision process (CDP) as described in these types of models comprise of several interacting, complex processes taking place within the consumer (therefore falling within the category of stimulus-organism-response models). Although attitude models and economic utility arise from very different theoretical bases, attitude models are often indistinguishable from economic utility theory (both assuming rationality of consumer decision-making). One distinctive characteristic of attitude models, however, is the explicit attention to views of relevant others. This is a factor generally unrelated to the intrinsic utility of the product. A second philosophical difference between attitude models and economic utility models is that in the former, price is considered to be another attribute, no different from quality, reliability, or effectiveness, whereas in economic models, price is given an explicit role in a budget constraint and seen as a critical

yardstick for determining how much of certain attributes will be purchased by the consumer. Attitude models provide a potentially valuable basis for understanding the various factors that influence the consumer's decisions to use promotions. The model contrasts markedly with behavioral learning theory, which ignores all internal 'rational' processes.

A number of comprehensive consumer behavior models have been developed that attempt to integrate all aspects of how and why consumers arrive at a particular decision. One of the processes taking place is that of problem recognition. A consumer must first recognize that he or she has a problem that could be resolved by purchasing a certain product. Then a consumer goes through the processes of choosing, using, and evaluating a product. An important feature in consumer decision-making is involvement. The concept of involvement is a significant theme underlying much research in the consumer behavior area in both high-involvement (e.g., cars) and low-involvement (e.g., cookies and soft drinks) products. A promotion such as a display can trigger problem recognition. The display reminds the consumer that he or she wants the promoted product or perhaps stimulates latent demand for the product category. This may explain why displays for items such as soft drinks or cookies can be particularly effective. Problem recognition can be triggered in both high- and low-involvement situations; however, the sales effect for low-involvement will be more immediate. In the high-involvement case, problem recognition triggered by an attractive rebate would more likely result in search for information rather than an immediate purchase.

Petty and Cacioppo (1981, 1986) demonstrated that there are several ways in which choice attitudes can change as a result of exposure to e.g., a promotion. The Elaboration Likelihood Model (ELM) posits a continuum of ways these choice attitudes might change. At one end of the continuum, termed the central route to persuasion, the consumer diligently, actively, and cognitively evaluates information central to the particular evaluation. At the other end of the continuum, termed the peripheral route to persuasion, simple inferences or cues in the persuasion context are given more weight in the consumer's final judgment than is the consideration of actual product attributes or message arguments. Many individual variables might be expected to moderate the cognitive route taken (e.g., need for cognition, involvement, time available).

High need-for-cognition (NFC) individuals are intrinsically motivated to engage in cognitive endeavors. They are more likely to process additional issue-relevant information than are individuals who are low in NFC. Thus, high NFC individuals are more likely to take the central route and low NFC individuals are more likely to take the peripheral route. Petty and Cacioppo (1986) demonstrated the interaction between NFC and the cognitive route taken. High-involvement consumers are active information seekers and processors, whereas low-involvement consumers rarely seek information, and process it passively when provided. High-involvement consumers evaluate brands in detail before purchasing and then assess their satisfaction with the product afterwards. Low-involvement consumers buy first and then may or may not evaluate the product after use.

Promotions can influence both high and low-involvement decision-making. Low involvement consumers may go to the store with the knowledge that he or she needs to purchase from the product category, but an in-store promotion will then determine which of several acceptable brands is bought (Desphande et al. 1982). The central route is more time consuming than the peripheral route. Therefore, time available moderates the cognitive route taken.

Another important process that takes place in consumer decision-making is the relationship between intention and choice. There is a difference between the intention to buy a product and the actual purchase. A promotion can act as an unanticipated circumstance and cause a different brand to be purchased than intended. On the other hand, a promotion can make it more convenient for a consumer to follow through on intentions.

This research is focused on household purchase behavior within FMCG. Low-involvement purchase decisions resulting in a peripheral decision-making process point out that the role of sales promotions is quite powerful. Promotions can serve as time-saving decision-making tools.

2.3.4 Deal Proneness

A lot of sales promotion research makes use of trait theory, assuming that promotion response is general across different environmental situations (i.e., across time and product

categories). The concept of deal proneness (the psychological promotion sensitivity trait) is dealt with more in depth in this section. More specifically, this section deals with deal proneness as a construct, and the different ways of defining and applying the construct in prior research.

2.3.4.1 The Concept

Managers and researchers alike have spent considerable effort trying to identify and understand the 'deal-prone' consumer. Blattberg and Neslin (1990) proposed the following definition for deal proneness, drawing from previous work:

Deal proneness is the degree to which a consumer is influenced by sales promotion, in terms of behaviors such as purchase timing, brand choice, purchase quantity, category consumption, store choice, or search behavior.

Equivocal and haphazard application of this concept is inevitable using terms as "influenced" and "degree". Prior studies have adopted different conceptualizations, definitions and operationalizations of deal prone buyers, which hampers comparison. Characterization of the deal-prone consumer will contribute to the understanding of consumer behavior in general (Webster 1965). Comparing different operationalizations and measures of deal proneness may provide refined insights in, and understanding of the influence of sales promotions on consumer purchase behavior. These insights become more and more important, given the fact that in recent years, consumer sales promotions have played an increasingly important role in the promotional strategy of many businesses. As mentioned before, high levels of advertising clutter and rising media costs have prompted many businesses to allocate larger shares of their promotional budgets away from advertising and toward consumer sales promotions (Shimp 1990). Because of this trend, a considerable amount of research has been undertaken in an attempt to identify and understand the deal-prone consumer (e.g., Lichtenstein et al. 1990, 1995, Schneider and Currim 1991). However, results of deal proneness studies have been modest and conflicting (Henderson 1987).

2.3.4.2 Literature Overview

Our review of the literature identified several articles discussing deal proneness and related topics. Webster (1965) conducted one of the first deal proneness studies. Deal proneness was described as a function of both consumers' buying behavior and the frequency with which a given brand is sold on deal. This study consisted of two phases. The first step was the development of a measure of consumer deal proneness. The second step was an attempt to correlate this measure of deal proneness with families' demographic, socioeconomic, and purchasing characteristics. Webster developed a relatively sophisticated formula for calculating deal proneness (Blattberg and Neslin 1990), adjusting for how often each of the brands the consumer bought was on promotion and for consumer preference. The deal proneness index reflects a family's propensity to deal more or less than expected. But, the measure has some drawbacks. Webster did not distinguish different types of sales promotions, different product classes, nor did he distinguish the different types of sales promotion reaction mechanisms. Although the measure is easily adjustable to the first two drawbacks, distinguishing sales promotion reaction mechanisms is not possible using Webster's measure. Furthermore, deal proneness is used as some sort of outcome variable instead of a psychological input trait.

Webster's pioneering work led to a number of studies dedicated to deal proneness and consumer choice segments. Montgomery (1971) examined possible relationships between a housewife's dealing activity in a product class and some social-psychological and purchasing characteristics. Dealing activity was defined as the proportion of a household's purchases made on a deal. Blattberg and Sen (1974) segmented consumers using the following variables: brand loyalty (loyal to one brand, loyal to the last purchased brand, or loyal to more brands), type of brand preferred (national, national and private label, or private label), and deal proneness (price sensitivity and number of purchases on deal were used to determine deal proneness). Blattberg et al. (1978) elaborated upon the Blattberg and Sen (1974) article. The authors showed in this article that it is possible to identify a deal prone household (according to the 1974 definition) by using demographic variables, and they showed that the effect of these variables is substantive. Several product categories were

studied. McAlister (1986) extended these segments, adding a stockpiler variable to differentiate between those who do and do not accelerate their product purchases because of a promotion. She distinguished between brand-loyal and brand-switching segments, and investigated deal proneness and stock piling behavior.

Cotton and Babb (1978) reported results from a study that measured the response of consumers to promotional deals for dairy products. The percentage increase in consumption during a deal period was applied as the standard to measure the responsiveness. A distinction was made between different deal-types (types of sales promotions). Cotton and Babb found that promotional deals resulted in substantial increases in the level of purchase. Hackleman and Duker (1980) built on this result. They defined deal proneness as the propensity of some consumer to purchase products when they are offered on a "deal" basis. The authors constructed three measures of "dealing" for each household. The first measure calculates the percentage of deal purchases relative to the total number of purchases. Their second measure represents the relative total expenditures on deal purchases. The third measures the relative number of items purchased on a deal basis. These three measures are rather limited but the joint consideration offers some insights in a household's deal proneness.

Bawa and Shoemaker (1987) have probed the assumption that households who are deal prone in one product class will tend to be deal prone in other product classes in a coupon setting. A household is considered to be coupon-prone to the extent that the proportion of purchases made with a coupon is above average across many product classes. Although prior studies suggested that individual households do not engage in highly consistent behavior when purchasing in different classes (e.g., Cunningham 1956, Massy et al. 1968, Wind and Frank 1969), households were found to be more consistent in their use of coupons across product classes than would be expected if their purchase behavior were independent across classes. The authors mention some compelling theoretical reasons for consistency in using coupons. The two segments (using coupons above and below average) are subsequently related to household characteristics and aspects of purchase behavior. Wierenga (1974) found significant correlation coefficients between deal proneness (operationalized as the percentage of purchases bought on promotion) of households across product classes. He did not distinguish different types of deals.

The previously described research has measured the deal proneness construct only in behavioral terms (i.e., households who are more responsive to coupon promotions are coupon prone). Frank et al. (1972) recognized that much of the behavior we are interested in is a complex of many factors, it is multidimensional in character. We often sidestep this complexity by picking some one-dimensional attribute, which we assume to be an indicator of the more complex phenomena we seek to understand. This line of reasoning applies to deal proneness. Deal proneness should not be conceptualized as isomorphic with actualized deal-responsiveness purchasing behavior, but should be conceptualized and measured at a psychological level as a construct that affects the actualized purchasing behavior (Lichtenstein et al. 1990). These authors define deal proneness as an increased propensity to respond to a purchase offer because the form of the purchase offer positively affects purchase evaluation.

Schneider and Currim (1991) divided deal proneness in two dimensions: active and passive. Active deal proneness is defined as the sensitivity to features and coupons. Passive deal-proneness is defined as sensitivity to in-store displays. In this study, it turned out that households exhibit a general tendency toward one type of deal-proneness.

The studies performed by Lichtenstein et al. (1995, 1997) addressed both the theoretical and practical issues of deal proneness and led to important insights. Lichtenstein et al. (1995) addressed the question of domain specificity of deal proneness. The authors investigated whether deal proneness is best conceptualized at (1) a general level, (2) a deal-type specific level, or (3) an intermediate level (e.g., active versus passive deal-proneness). They employed both multi-item measurement scales and three measures of marketplace behavior: (1) the quantity of products purchased that were in the weekly sale ad, (2) the total amount of money spent on items in the weekly sale ad, and (3) the amount saved by purchasing items in the weekly ad. The parameters of their structural equation models were estimated using the multi-item measurement scales and validated using marketplace behavior. Their results supported the idea that deal proneness should be dealt with as deal-type domain specific, meaning that there is a need to differentiate between alternative forms of deals. Lichtenstein et al. (1995) did not find significant effects associated with cents-off. One reason for this lack of empirical significance could be the research design applied. In their study, they based their conclusions on self-report data (among others recall measures), using marketplace behavior only for validation purposes. Lichtenstein et al. (1997) applied another methodology

to the same data. Instead of addressing the relationship between different constructs, similarities between consumers were assessed. The authors examined whether there are segments of consumers consistently prone to deals across different sales promotion types, or, given some conceptual differences across deal-types, segments existing at a more deal-specific level. Multi-item measures were used for eight deal-types across product classes. Cluster analysis was performed on the average item scores for the eight deal-type measures. The results showed evidence of a generalized deal proneness segment (ranging from 24% to 49% of the sample). Consumers within this segment are sensitive towards all different deal types incorporated in the study. Strong support for the nomological validity of theses segment-based findings was found using marketplace behavior data from one single shopping trip (across product classes). In both studies, self-report data was used to draw conclusions (marketplace behavior was used only for validation purposes).

Bawa et al. (1997) recognized the deal-type specific character of deal proneness and therefore focused on one specific promotion-type, coupons. This is one of the most of the most important promotional vehicles used today in the United States. They studied coupons use by considering the joint effects of coupon attractiveness and coupon proneness on redemption and estimated this at the product category level, taking varying coupon redemption behavior across categories into account. Respondents' redemption intentions with respect to coupons for two grocery categories (coffee and detergent) and two service categories (beauty salon/barber shop and oil change for automobiles) were measured using questionnaires. Results underlined the importance of product category level estimation. Non-category specific coupon proneness measures have low predictive power and perform poor in explaining using coupons in a specific category. One limitation of this study was that the analyses were conducted on redemption intentions rather than on redemption behavior.

There are many skeptics who believe that responses to hypothetical scenarios (cf. the self-report data used by Lichtenstein et al. (1995), the redemption intention data used by Bawa et al. (1997)) are quite unreliable (Hensher et al. 1988). Individuals' stated preferences might not correspond closely to their actual preferences (Wardman 1988). People may not necessarily do what they say. It is known from other marketing research sources that people in the western world do tend to overestimate their responses under experimental conditions (Kroes and Sheldon 1988). Of course, focusing on actual marketplace purchase behavior also

has its deficiencies. Any purchase behavior may be motivated by multiple constructs, and inferring proneness from behavior does not account for the fact that many unobservable traits and situational variables may influence this purchase behavior. But, taking other traits into account and observing marketplace behavior over a long period minimizes this deficiency. Another reason to use actual purchase data instead of self-report data is that (product) managers are not interested in how consumers think there marketplace behavior will be, e.g., their responsiveness towards sales promotions, but in their actual purchase behavior. That means that we will focus on individual household purchase behavior and use this information as a measure for deal proneness research, using self-report data for face validity purposes. We adopt the 'behavioral approach', instead of the 'attitudinal approach'. A household's degree of deal proneness is inferred from its observed purchase behavior.

There are two other limitations of Lichtenstein et al.'s studies (1995, 1997). First, they are based on across category multi-item measures and marketplace behaviors. Deal proneness is thus assumed to be general across product categories. Second, Lichtenstein et al. did not make a distinction between possible sales promotion reaction mechanisms.

Ainslie and Rossi (1998) chose one specific sales promotion reaction mechanism (brand choice) and investigated similarities in marketing mix sensitivities across several product classes. They used actual purchase data to investigate similarities in choice behavior across product categories, to get some evidence for the notion that sensitivity to marketing mix variables is a consumer trait and not unique to specific product categories. The empirical results provided evidence for treating deal-type specific deal proneness as an individual household trait. They found similarities in brand choice behavior within deal-type across product category, more than could be explained by socio-economic variables. Their study is a valuable contribution to the field of sales promotion research, being one of the first studies integrating deal proneness and reaction mechanisms and providing empirical support for a possible latent nature of deal proneness. But, the research limits itself to one specific type of reaction mechanism, namely brand choice.

2.3.4.3 Gaps in the Deal Proneness Literature

From the wide range of definitions and operationalizations of deal proneness, two aspects are selected that are used as starting points in prior deal proneness research. These aspects are promotion type and product category. With respect to both aspects, prior research led to conflicting findings.

Regarding promotion type, Blattberg and Neslin (1990) suggested a need to distinguish among consumer response to type of deal. Henderson (1987) contended that an undifferentiated view of consumers with respect to promotional attitudes and responses seems both naïve and conflicting with empirical evidence that suggests that sensitivities to promotions differ across consumers and promotional types. Mayhew and Winer (1992) presented results showing one segment of households that was more likely to use coupons, but less likely to respond to sale prices than a second household segment. Schneider and Currim (1991) found support for their hypothesis that consumers have a tendency to react primarily to active or passive promotion types, but few consumers behave equally to both types. These results would lead to the rationale that deal proneness is promotion-type specific. On the other hand, Lichtenstein et al. (1997) found empirical support for the existence of a consumer segment that reflects generalized deal proneness across promotion-types. Thus, conflicting findings leading to uncertainty about the domain specificity of deal proneness regarding deal-type.

Regarding product category, Cunningham (1956), Massy et al. (1968), and Wind Frank (1969) found empirical support for product class specific deal proneness. Bawa et al. (1997) found support for product class specific coupon proneness. Ainslie and Rossi (1998), on the other hand, provided evidence of substantial correlations, validating, in part, the notion that sensitivity to marketing mix variables is a consumer trait and is not unique to specific product categories. So with respect to product class deal proneness domain specificity, prior research has lead to conflicting findings.

In addition, most research thus far set deal proneness equal to promotion utilization either using actual behavior (e.g., Webster 1965, Blattberg et al. 1978, Schneider and Currim 1991) or attitudes (Lichtenstein et al. 1995,1997, Bawa et al. 1997, Burton et al. 1999,

Chandon et al. 2000). But deal proneness should not be conceptualized as isomorphic with actualized promotion-responsiveness purchasing behavior. Instead, it should be conceptualized at a psychological level as a construct that affects the actualized purchasing behavior (Lichtenstein et al. 1990). Deal proneness actually represents a psychological trait and can therefore not be directly measured as promotion utilization, neither within nor across different product categories. Ainslie and Rossi (1998) are among the first researchers who investigated similarities in brand choice behavior across product categories to get possible evidence for the notion that sensitivity to marketing mix variables is a consumer trait and not unique to specific product categories. The existence of deal proneness was not inferred directly from promotional behavior, but indirectly. Other possible causes were taken into account and the remaining, unexplained part of household purchase behavior was used to draw conclusions regarding deal proneness. Sensitivity was interpreted as brand choice marketing mix sensitivity. According to Ainslie and Rossi (1998), sensitivity to marketing mix variables is a consumer trait and is not unique to specific product categories.

In this research, we especially elaborate on the work performed by Ainslie and Rossi (1998). The existence of deal proneness is derived indirectly from household purchase behavior. After taking other possible causes into account, the unexplained part of household purchase behavior is used to draw conclusions regarding the existence of deal proneness. Instead of focusing on one reaction mechanism (e.g., Ainslie and Rossi 1998), we extend the deal proneness study by incorporating brand choice, but also purchase quantity, purchase timing, and category expansion. Purchase behavior will be studied at the individual household level within and across product category, promotion type, and sales promotion reaction mechanism, to gain insights in the promotion response behavior of households. We expect that some households will tend to react to a sales promotion through brand switching, other households might show purchase acceleration, whereas a third type of household might have a tendency towards category expansion. A high incidence of one type of reaction mechanism is not necessarily correlated with a high incidence of another type of mechanism. We will investigate the degree of similarity across product categories in household promotion response behavior. Furthermore, we will analyze whether these similarities can

be fully explained by household characteristics such as income, available time, children, etc., or if there really is something like an individual deal proneness trait.

2.3.5 Variety Seeking

Besides deal proneness, also variety seeking (intrinsic desire for variety) is recognized as an important trait that influences consumer choice behavior (e.g., McAlister and Pessemier 1982). The construct of variety seeking has been the center of the same debate as innovativeness and deal proneness in this and earlier research (e.g., Ainslie and Rossi 1998, Lichtenstein 1995; Schneider and Currim 1991). Is it just overt behavior or does it represent some underlying predisposition? The discussion has resulted in conceptualizing variety seeking as an underlying product category-specific individual trait (e.g., Pessemier and Handelsman 1984, van Trijp et al. 1996, van Trijp and Steenkamp 1992). We will refrain from that discussion, and only use the implications for possible switch behavior (brands and stores). Variety seeking tendency can result in switch behavior even without a promotional incentive. In analyzing the data and estimating promotional brand switching behavior, it is therefore of utmost importance to keep in mind that overt brand and/or store switch behavior is not necessarily caused by promotional activity, it could also be the result of variety seeking behavior. Variety seeking research recently has been emphasizing the need to separate true variety seeking behavior (which results from intrinsic motivations) from derived varied behavior (which is extrinsically motivated). Van Trijp et al. (1996) argued that variety seeking and switching research would benefit greatly by isolating those brand switches that are of the variety seeking type from those that are extrinsically motivated before estimating parameters associated with these behaviors. Malhotra et al. (1999) summarized the state of the art in marketing research by reviewing articles during 1987-1997 published in the Journal of Marketing Research. One of the outcomes is the need to distinguish between true variety seeking behavior (i.e., intrinsically motivated) and derived varied behavior (i.e., extrinsically motivated). We therefore have to correct for this kind of intrinsic variety seeking behavior, at least take this into account when studying overt promotion response in general and brand switch behavior specifically.

2.4 Concluding Remarks Regarding the Relevance of Different Consumer Behavior Theories to the Field of Sales Promotions

There is no paucity of consumer behavior theories. Four frequently applied basic models of consumer behavior have been treated in this chapter: the economic model, the stimulus-response model, the stimulus-organism-response model, and trait theory. Subsequently, these four models have been applied to the field of sales promotions. But what is the value of the consumer behavior theories discussed in this chapter? As mentioned before, all of them have their merits, but also their limitations.

Economic theories provide us with general knowledge about consumer reactions to price and income changes. But due to restrictive assumptions and the omitting of many psychological, social, and cultural determinants of consumer behavior, these theories turn out to be inadequate in describing the effects of sales promotions on household purchase behavior. The effects of income and storage space on household sales promotion response can be predicted using economic theories. But, economic theory cannot explain the effects of sales promotions without an economic advantage attached to them (promotional signals). These promotional signaling effects are found to have influence household purchase behavior (e.g., Inman et al. 1990, Inman and McAlister 1993).

The stimulus-response models described in this chapter can be seen as input-output models. Using the presence of sales promotions as input and the reactions of consumers as the output variable, they are very useful for answering the question what the effects of sales promotions are from a quantitative perspective (i.e. how consumers behave). But the processes that take place within the consumer remain unclear, the attitudinal, more qualitative side remains underexposed.

The stimulus-organism-response models described in this chapter focus on what happens within the consumer, what does he or she think, feel, etc. The attitudinal aspect is the focal point of analysis. These models can be used as possible explanations for what is found in the two other models (economic model and stimulus-response model). Qualitative, attitudinal research is necessary to validate these possible explanations.

Thus the three models of consumer behavior treated in this chapter focus on different aspects of consumer behavior. Interesting to notice is that these theories can predict the same, but also different effects of promotions. It is interesting to mention that two theories that do predict a similar promotional effect often use entirely different arguments. Take, for example, the effect of price promotions in the long run. Self-perception theory (based on the stimulus-organism-response model) suggests that repeat purchase probabilities of a brand after a promotional purchase are lower than the corresponding values after a non-promotional purchase. At the same time, consumers form expectations of a brand's price on the basis of, among other things, its past prices and the frequency with which it is price promoted (reference pricing, prospect theory, both based on the stimulus-organism-response model)), which would also lead to lower repeat purchase rates after deal retraction. Both self-perception theory and reference pricing theory would therefore predict the same consequences of a promotion on purchase probabilities, but based on different arguments.

An example of theories predicting different effects of promotions is the following. Self-perception theory implies that consumers who buy on promotion are likely to attribute their behavior to the presence of the promotion and not to their personal preference for the brand. Therefore, after retraction of the promotion, leading to lower repeat purchase probabilities. Learning theory (based on the stimulus-response-model) suggests that promotions can help a brand through increased familiarity and experience, which would lead to bigger repeat purchase probabilities. Economic theory, on the other hand, would predict that the repeat purchase probabilities (after promotion) would return to the same level as before the promotion. The utility of the brand is the same as before the promotion.

There can also be interplay between the theories mentioned above. For example, purchase acceleration is most commonly explained by economic models focusing on household inventory and resource variables. The consumer decision-making framework explains purchase acceleration as resulting from the timely stimulation of problem recognition. There may even be a deeper psychological explanation of why consumers are willing to accelerate purchases.

The fourth type of theory dealt with in this chapter is trait theory. Where the three other models of consumer behavior (economic model, stimulus-response model, and

stimulus-organism-response model) can be used as tools to understand consumer behavior under certain conditions, in certain situations, trait theory claims that some types of behavior are consistent across different conditions and situations, i.e. can be considered a consumer trait. The question whether households show consistent promotional purchase behavior across different product categories is very relevant for both practitioners and scientists, but still unanswered.

Concluding, we can say that although there is certainly no paucity of theories, the lack of empirical findings to support them, together with the fact that they sometimes point in different directions, still leaves the question how and why sales promotions influence household purchase behavior unanswered.

In the next chapter, we use the theories and concepts mentioned in the preceding sections to provide a theoretical and empirical basis for the hypothesized relationships derived between promotion response and household characteristics and purchase process characteristics.

3 HOUSEHOLD CHARACTERISTICS RELATED TO PROMOTION RESPONSE

3.1 Introduction

The widespread use of retail promotions has motivated researchers to identify the factors associated with promotion response (e.g., Blattberg et al. 1978; Montgomery 1971; Narasimhan 1984; Webster 1965). Researchers have suggested that a household's response to promotions is partly determined by household characteristics such as household income, education, and family size. However, prior research has led to conflicting findings. A clear, unequivocal relationship between demographics and household response to promotions has not yet been found. Of the demographic variables that have been examined, the positive relationship between promotion response and household size is the most consistent (Mittal 1994).

In this chapter, we derive hypotheses dealing with the possible drivers of promotion response. We investigate the relationship between promotion response and household demographics (for example household size, age, and profession) and household purchase characteristics (for example shopping frequency, store loyalty, and size of the shopping basket). Section 3.2 contains an overview or prior research findings regarding household characteristics and their relationship with promotion response, leading to hypotheses about the drivers of promotion response. Interaction effects are also dealt with. Household purchase characteristics are discussed in Section 3.3 as possible drivers of promotion response, also leading to hypotheses regarding their influence on promotion response.

3.2 Overview Promotion Response Findings Household Characteristics

Since the 1960s, managers and researchers have tried to identify the characteristics of those households that are responsive to sales promotions (e.g., Webster 1965, Massy and Frank 1965, Blattberg and Sen 1974, Blattberg et al., 1978, Cotton and Babb 1978, Bawa and

Shoemaker 1987). Several factors have been identified. Income, size of the household, composition of the household, education, and type of housing are just some examples of household characteristics used to predict whether a household is likely to buy on deal or not. Besides household characteristics, also psychographic variables (such as variety seeking) have been used. Prior studies have come up with conflicting findings regarding the drivers of promotion response. For example, some researchers found that income has a negative influence on promotion response (e.g., Ainslie and Rossi 1998), whereas others have found no effects (e.g., Webster 1965), non-linear effects (e.g., Narasimhan 1984), or positive effects (e.g., Inman and Winer 1998). The following subsections each deal with one specific possible driver of promotion response. Findings from prior research that incorporated that specific relationship are discussed and tabulated, along with the hypothesis derived. Arguments for specific shapes and signs of the relationship between promotion response and a particular driver are mentioned. Possible interaction effects are also discussed.

3.2.1 Income

Based on economic theory, it would be expected that households with lower income (and therefore more limited shopping budgets) would be more price promotion responsive, resulting in a negative relationship between income and promotion response (e.g., Urbany, Dickson, and Kalapurakal 1996). On the other hand, households with higher income are less restricted in their budget, which increases the probability of acting on impulse (e.g., Inman and Winer 1998), and therefore in-store promotion response. Bawa and Gosh (1999) concluded that higher income households spend more during a shopping trip, which, in turn, would result in a larger probability to buy on promotion. A third line of reasoning is the following: income is expected to be positively related with education. Higher income households therefore would have better information processing capabilities. They are better able to judge a sales promotion offered to them, possibly leading to stronger promotion response (Robertson et al. 1984, Caplovitz 1963). Narasimhan (1984) found that middle-income groups use coupon promotions the most. Webster (1965) and Blattberg et al.

(1978) did not find a significant linear relationship between income and promotion response. Table 3.1 shows a summary of empirical findings regarding the relationship between income and promotion response.

Table 3.1: Summary of studies relating income with promotion response

Sign Relationship	Study
+	Inman and Winer (1998)
	Robertson et al. (1984)
	Caplovitz (1963)
	Jeon (1990)
	Beatty and Ferrell (1998)
	Bawa and Shoemaker (1987)
	Bawa and Gosh (1999)
-	Ailawadi et al. (2000)
	Urbany et al. (1996)
	Ainslie and Rossi (1998)
Inverse U-shaped	Narasimhan (1984)
0	Webster (1965)
	Blattberg et al. (1978)
Hypothesis	*H_1: Income and promotion response are positively related.*

Thus, most prior research provides empirical evidence of either a positive or a negative relationship between income and promotion response. These conflicting findings could be the results of studying different ranges of income. Based on the arguments as described above, in general we would expect low and high-income households to exhibit stronger promotion response, which would then be explained by a non-linear, U-shaped relationship between income and promotion response. Narasimhan (1984) could not find evidence for such a relation in case of coupon promotions, but we consider more passive types of promotions. Higher income households are not expected to react to active promotions, such as coupons. But they are expected to react to promotions that induce impulse purchasing,

such as display promotions. Although we expect a U-shaped relation between income and promotion response in theory, we expect to find primarily a simpler relation for our sample of households. The reason for that is the absence of (really) low-income households. The standard of living is relatively high in the Netherlands and hence in our sample as well. The negative part of the relationship, i.e. for low-income households will probably not be found for households living in The Netherlands. Opposite, we expect the positive effect for higher income households to be present. The growing conviction that the percentage of purchase decisions made in-store is increasing (Khan 2000) further strengthens this expectation. Overall we therefore hypothesize that the relationship between income and promotion response is positive.

Information on household income is difficult to obtain. People seem to feel some sort of natural reservation regarding disclosure of the height of their income. Posing income-related questions in interviews or questionnaires is therefore not common. Income questions could even be a reason for respondents not to participate in a certain research. Some interviewers try to solve this problem by categorizing the income range. But, people still seem to have problems with answering these types of questions. Another solution would be to use indicators of income instead of income itself. It goes without saying that social class comes to mind. If we replace income by social class, our hypothesis from Table 3.1 would become: *H_2: social class and promotion response are positively related*. In this study, social class is defined using education and occupation of the breadwinner (see Table A3.1, the A refers to the Appendix, the 3 refers to the corresponding chapter, and the 1 refers to the order of appearance in the Appendix).

If we extend the argument that higher social class households are less restricted in their shopping budget and could therefore shop in a more impulse driven manner, we would expect that households from higher social classes are more sensitive to in-store promotions than to out-of-store promotions. We therefore hypothesize that*: the positive relationship between social class and promotion response is stronger for in-store promotions than for out-of-store promotions (H_{2a}).*

3.2.2 Household Size

As mentioned in the introduction, of the demographic variables that have been examined, the positive relationship between promotion response and household size is the most consistently found (Mittal 1994). A larger household means more mouths to be fed and therefore a greater burden on the shopping budget (economic theory). Bawa and Gosh (1999) concluded that household grocery expenditures increased with family size. Larger families are more price-focused (Krishna et al. 1991) and they have the opportunity to recognize more needs than consumers who are shopping for themselves (Inman and Winer 1998, Cobb and Hoyer 1986). Manchanda et al. (1999) found that large families are more price sensitive. Narasimhan (1984) hypothesized a log-linear relationship between using coupons and family size (decreasing marginal returns), but this was not empirically confirmed. Table 3.2 shows a summary of empirical findings regarding the relationship between household size and promotion response. In this study it is hypothesized that promotion response and size of the household are positively related.

Table 3.2: Summary of studies relating household size with promotion response

Sign Relationship	Study
+	Inman and Winer (1998) Cobb and Hoyer (1986) Bawa and Shoemaker (1987) Krishna et al. (1991) Manchanda et al. (1999) Urbany et al. (1996) Ainslie and Rossi (1998) Bawa and Gosh (1999)
Hypothesis	*H_3: Household size and promotion response are positively related.*

3.2.3 Type of residence

Type of residence is related to inventory holding possibilities. Having sufficient storage space makes it easier for consumers to respond to sales promotions (Blattberg et al. 1978). This is true for space-demanding promotions or space-demanding sales promotion reaction mechanisms (for example purchase acceleration) but not promotional response effects such as brand switching or store switching. Ailawadi et al. (2000) found that people who live in a house instead of an apartment perceive that they have more storage space. Table 3.3 shows a summary of empirical findings regarding the relationship between storage space and promotion response. We therefore hypothesize that households living in a larger house (not in an apartment) are more promotion responsive.

Table 3.3: Summary of studies relating storage space with promotion response

Sign Relationship	Study
+	Blattberg et al. (1978) Ailawadi et al. (2000)
Hypothesis	*H_4: Households living in a larger house (not in an apartment) are more promotion responsive.*

One could imagine that storage space plays a more important role in household promotional purchase decisions when dealing with impulse purchases due to in-store promotions. We therefore hypothesize that *size of the house is more important for in-store promotions than for out-of-store promotions (H_{4a}).*

3.2.4 Age

Bellenger et al. (1978) suggested that the age distribution of impulse purchasers is bimodal. That is, both young and old adults have shown a tendency to purchase on impulse. Younger consumers have greater motivation to process in-store stimuli, and will make more decisions at the point of purchase (Inman and Winer 1998).

Older shoppers are more likely to seek their entertainment in shopping and be mavens (e.g., Raju 1980, Urbany, Dickson and Kalapurakal 1996), though they are less likely to seek variety. They have less time constraints and therefore shop more often (Bawa and Gosh 1999). Table 3.4 shows a summary of empirical findings regarding the relationship between age and promotion response.

Based on these considerations and the mixed bag of results found, we do not expect to find a linear relationship between age of the shopping responsible person in the household and promotion response. The hypothesized relationship is U-shaped, younger and older consumers being more promotion focused.

Table 3.4: Summary of studies relating age with promotion response

Sign Relationship	Study
+	Lichtenstein et al. (1997)
	Urbany et al. (1996)
	Webster (1965)
	Burton et al.(1999)
-	Bawa and Shoemaker (1987)
	Lichtenstein et al. (1997)
	Inman and Winer (1998)
	Bell et al. (1999)
U-shaped	Bellenger et al. (1978)
Hypothesis	*H_5: Age and promotion response are U-shaped related.*

Type of promotion could be interacting with the relationship between age and promotional response. Young shoppers are expected to be especially in-store promotion responsive whereas older shoppers are expected to be both (less time restraints and being mavens). It is therefore hypothesized that *young shoppers are relatively more in-store promotion responsive whereas older shoppers are relatively more out-of-store promotion responsive (H_{5a})*.

3.2.5 Education

Education links to thinking costs, but also to search costs (e.g., Raju 1980, Narasimhan 1984, Urbany et al. 1996). More educated people may be less likely to be mavens (Feick and Price 1987), more pressured for time (Narasimhan 1984), and more likely to seek variety (Raju 1980). The general assumption is that with experience (reflected in age, female gender and better education), consumers are more efficient and have greater capability to engage in search (Urbany et al. 1996). On the other hand, Lichtenstein et al. (1997) found that consumers with less education are more likely to be deal prone. Table 3.5 shows the results that have been found in prior studies. A positive relation between education and promotion response is expected, as the majority of the results found and theories presented point in that direction.

Table 3.5: Summary of studies relating education with promotion response

Sign Relationship	Study
+	Narasimhan (1984)
	Bawa and Shoemaker (1987)
	Bell et al. (1999)
	Robertson et al. (1984)
-	Lichtenstein et al. (1997)
Hypothesis	*H_6: Education and promotion response are positively related.*

Promotion type could be interacting with the relationship between education and promotion response. Out-of-store promotions need more search behavior, which could be carried out more efficiently by higher educated households. We therefore hypothesize that *the positive relationship between education and promotion response is stronger for out-of-store promotions than for in-store promotions (H_{6a}).*

3.2.6 Employment Situation

Retired households and households living on welfare have more time to go shopping than other households, and less money to spend (in general). One would therefore expect those households to be more promotion responsive, especially for out-of-store promotions because of the extra available time. On the other hand, Caplovitz (1963) claimed that the poor pay more, preferring to rely more on brand names instead of their own judgment. The work of Caplovitz (1963) focused on purchases of major durables. If this is also applicable to FMCG purchases, it could be the case that poor people rely on brand names, therefore purchasing for example national brands instead of store brands. Perhaps poor people use promotions less as a purchase decisive attribute. They need a national brand name to rely on.

But, most findings by other researchers point in the direction that households living on welfare and retired households are more promotion responsive (e.g., Blattberg et al. 1978). We therefore hypothesize that *retired households or households living on welfare are more promotion responsive, especially for out-of-store promotions* (H_7, H_{7a}).

Taking only the time-constraining influence of working into consideration, Ailawadi et al. (2000) argued that consumers under time pressure may use in-store promotions to save time, as they provide easily recognizable cues for simplifying the buying process. Therefore, time pressure could be negatively related to out-of-store promotion response and positively related to in-store promotion response. Iyer (1989) on the other hand found that time pressure reduces unplanned purchases. Consumers with more available time will browse longer. This was confirmed by Beatty and Ferrell (1998) and Inman and Winer (1998). Narasimhan (1984) found that using coupons (coupons being out-of-store sales promotions) was lower for households with an employed wife. Prior research thus agrees on the effect of working women on out-of-store promotions (negative), but differs in their arguments and findings for in-store promotions. Table 3.6 shows a summary of empirical findings regarding the relationship between employment situation of the hopping responsible person and promotion response. We assume that Dutch shoppers are prone to economic advantages in general. Shoppers with relatively less time to look for

these advantages therefore could be more focused on in-store promotion cues. We therefore hypothesize that *households with working women are less out-of-store promotion responsive, but that they are not less in-store promotion responsive* (H_8, H_{8a}).

Table 3.6: Summary of studies relating employment situation with promotion response

Sign Relationship	Study
Retired/Welfare	
+	Inman and Winer (1998)
	Robertson et al. (1984)
	Caplovitz (1963)
	Jeon (1990)
	Beatty and Ferrell (1998)
	Bawa and Shoemaker (1987)
-	Ailawadi et al. (2000)
	Urbany et al. (1996)
	Ainslie and Rossi (1998)
Hypothesis	*H_7: Retired households and households living on welfare are more promotion responsive.*
	H_{7a}: Retired households and households living on welfare are more promotion responsive, especially for out-of-store promotions.
Working	
-	Narasimhan (1984), out-of-store promotions
Hypothesis	*H_8: Households where the shopping responsible person has a paid job are less promotion responsive.*
	H_{8a}: Households where the shopping responsible person has a paid job are less out-of-store promotion responsive, but not less in-store promotion responsive.

3.2.7 Presence of Non-school Age Children

The presence of children (especially non-school age children) is related to search costs. Non-school age children require special attention and a great deal of time that might otherwise be allocated to shopping activities (Urbany et al. 1996). As mentioned before, consumers under time pressure will be deterred from using out-of-store promotions. Table 3.7 shows a short overview of prior findings regarding the relationship between non-school age children and promotion response. We expect time pressure therefore to be negatively related with out-of-store promotion use.

Table 3.7: Summary of studies relating the presence of non-school age children with promotion response

Sign Relationship	Study
-	Blattberg et al. (1978) Narasimhan (1984) Bawa and Shoemaker (1987) Urbany et al. (1996)
Hypothesis	*H_9: The presence of non-school age children in the household and promotion response are negatively related.* *H_{9a}: The presence of non-school age children in the household and promotion response are negatively related, especially for out-of-store promotions.*

3.2.8 Variety Seeking

Researchers have different opinions about the relationship between the variety seeking trait and promotion response. Some say that variety seeking should be positively associated with deal response since deals encourage product trial (e.g., Montgomery 1971, Ailawadi et al. 2000). On the other hand, there are several studies that argue it is the other way around. Older people, for instance, may be more likely to enjoy shopping (Urbany et al. 1996), but

less likely to seek variety. More educated people may be less likely to be mavens (Feick and Price 1987), more pressured for time (Narasimhan 1984), and more likely to seek variety (Raju 1980).

Van Trijp et al. (1996) explicitly separated intrinsically and extrinsically motivated variety seeking. Intrinsic variety seeking refers to variety seeking behavior that is intrinsically motivated, there are no external factors that caused the variety seek behavior. Extrinsic variety seeking behavior refers to externally motivated variety seeking behavior, for example driven by sales promotions. One of the aspects of extrinsic motivation that was incorporated in the study by Van Trijp et al. (1996) was whether the new brand was on sale. It was pointed out that variety seeking and promotion response do not have to be related at all. Table 3.8 shows a summary of empirical findings regarding the relationship between variety seeking and promotion response.

Based on the mixed bag of results found, we propose a priori that there is no relationship between intrinsic variety seeking and observed (extrinsic) promotion response.

Table 3.8: Summary of studies relating variety seeking with promotion response

Sign Relationship	Study
+	Montgomery (1971)
	Ailawadi et al. (2000)
-	Urbany et al. (1996)
0	Van Trijp et al. (1996)
Hypothesis	H_{10}: *Intrinsic variety seeking and promotion response are not related.*

The possible drivers of promotion response discussed so far relate to household characteristics. But, as mentioned in the introduction, household purchase characteristics can also influence promotion response. Brand loyalty is one of the purchase characteristics that is often said to be related with promotion response. But, in this research, brand loyalty itself is not incorporated as a possible driver of promotion response, because of its close negative inter-relatedness with variety seeking (see also Steenkamp et al. 1996). Kahn et al. (1986)

considered brand loyalty to be the deliberate tendency to stay with the brand bought on the last one or more occasions. Variety seeking is viewed as the deliberate tendency to switch away from the brand purchased on the last one or more occasions. Brand loyalty is therefore used as an inverse indicator of variety seeking. Other household purchase characteristics that possibly drive promotion response are discussed in the next section.

3.3 Overview Promotion Response Findings Household Purchase Characteristics

Besides brand loyalty as discussed in the preceding section, other household purchase characteristics (such as store loyalty, shopping frequency, basket size) can influence promotion response. The ones we consider will be discussed separately in the following three subsections. Note that household purchase characteristics influence promotion response at another level than household demographics. The purchase characteristics itself could be dependent on the demographic variables. Household demographics could therefore be directly related with sales promotion response, but at the same time indirectly related with sales promotion response through the household purchase characteristics. This distinction between direct and indirect relations is not incorporated in this study. Furthermore, one possible criticism of the use of shopping behavior variables as explanatory variables is that there could be a circularity problem, since shopping patterns can be influenced by promotional activities. For example, if fruit juice is heavily promoted during the period of data collection, this might induce greater purchasing by a price-sensitive consumer. In this example, category intensity becomes a proxy for price sensitivity. Our view is that this sort of phenomenon, while undoubtedly present, will have limited effect on our results. These household purchase characteristics are computed as long-run averages of shopping behavior in which bursts of promotional activities will be averaged out, resulting in good indicators for the structural household purchase characteristics.

3.3.1 Store Loyalty

Store loyalty should be negatively related with out-of-store promotion response, because these promotions often require store switching (Bawa and Shoemaker 1987). There is evidence that store loyal people are less price sensitive (Bucklin and Lattin 1991, Kim et al. 1999), thus also suggesting a negative relationship. Table 3.9 shows a summary of prior empirical findings regarding the relationship between store loyalty and promotion response. We hypothesize that store loyalty and promotion response are negatively related.

Table 3.9: Summary of studies relating store loyalty with promotion response

Sign Relationship	Study
+	Sirohi et al. (1998)
-	Bawa and Shoemaker (1978)
	Kim et al. (1999)
Hypothesis	*H_{11}: Store loyalty and promotion response are negatively related.*
	H_{11a}: Store loyalty and promotion response are negatively related, especially for out-of-store promotions.

3.3.2 Basket Size

On a given trip, the large basket shopper purchases in many product categories, and therefore fulfills a relatively large percentage of his total needs on a single visit. This implies that out-of-store promotions for a wide array of categories offer good opportunities to save money. But these shoppers lack flexibility to take advantage of occasional price deals (Bell and Lattin 1998). Small basket size shoppers, on the other hand, can benefit from price variation in the store. The total consumption needs are divided into many smaller baskets. Buying more categories when the prices are relatively low, and deferring purchases when prices are high. This seems to indicate that large basket shoppers are more focused on out-of-store sales promotions, whereas small basket shoppers are more responsive towards in-store promotions.

Webster (1965) found that promotion response tends to decrease when the total number of units purchased increases, indicating a negative relationship between basket size and promotion response.

Inman and Winer (1998) found empirical evidence that small basket customers make a smaller proportion of unplanned purchases. This would mean that smaller basket shoppers are less in-store promotion sensitive.

Ainslie and Rossi (1998) concluded that households with larger basket sizes are less price sensitive, confirming the view of Bell and Lattin (1998). Large basket size shoppers tend to be both less price sensitive and less display sensitive. Table 3.10 shows a summary of empirical findings regarding the relationship between basket size and promotion response.

The arguments and research mentioned above led to conflicting findings. We therefore do not propose an a priori hypothesis about the sign of the relationship.

Table 3.10: Summary of studies relating basket size with promotion response

Sign Relationship	Study
+	Bell and Lattin (1998) out-of-store
	Inman and Winer (1998), in-store
-	Bell and Lattin (1998) in-store
	Webster (1965)
	Ainslie and Rossi (1998)
Hypothesis	

3.3.3 Shopping Frequency

Obviously, shopping frequency and basket size are strongly negatively correlated (see also Bell and Lattin 1998). So most of the findings that were discussed in the previous section are also relevant for explaining the relation between shopping frequency and promotion response. Recall that those findings were mixed and inconclusive. Additional research that focused especially on shopping frequency also led to different and often opposite conclusions. Empirical results of Inman and Winer (1998) show that consumers who shop

more often (probably on a per-meal basis) are more likely to plan their purchases in advance and are hence less in-store promotion responsive. But both Manchanda et al. (1999) and Ainslie and Rossi (1998) concluded that families that make more shopping trips are more price sensitive.

We conclude from these previous findings (which can be found in Table 3.11) that shopping frequency and promotion response are probably related, but it is not clear in what way. We therefore do not derive a hypothesis about the relationship between shopping frequency and promotion response.

Table 3.11: Summary of studies relating shopping frequency with promotion response

Sign Relationship	Study
+	Bell and Lattin (1998) in-store
	Manchanda et al. (1998)
	Ainslie and Rossi (1998)
-	Bell and Lattin (1998) out-of-store
	Inman and Winer (1998) in-store
Hypothesis	

In this and the preceding section, drivers of promotion response (and possible interacting variables) were identified, and hypotheses regarding their specific effects on promotion response where derived. Table 3.12 presents an overview of these hypotheses. Two hypotheses (H_3, H_9) were incorporated for validation purposes. Prior research has led to consistent findings for these two drivers of promotion response. The empirical outcomes of testing these two hypotheses will be used to validate the empirical approach applied. The remaining hypotheses try to provide new insights into possible drivers of household promotion response. This is done, either by trying to end the equivocality of prior empirical findings, by using possible non-linear relations, or by taking possible interaction effects with type of promotion into account (in-store versus out-of-store promotions).

Table 3.12: Overview hypotheses derived regarding drivers of promotion response

Hypothesis	
H_1:	Income and promotion response are positively related.
H_2:	Social class and promotion response are positively related.
H_{2a}:	The positive relationship between social class and promotion response is stronger for in-store promotions than for out-of-store promotions.
H_3:	Household size and promotion response are positively related.
H_4:	Households living in a larger house (not in an apartment) are more promotion responsive.
H_{4a}:	Size of the house is more important for in-store promotions than for out-of-store promotions.
H_5:	Age and promotion response are U-shaped related.
H_{5a}:	Young shoppers are relatively more in-store promotion responsive whereas older shoppers are relatively more out-of-store promotion responsive.
H_6:	Education and promotion response are positively related.
H_{6a}:	The positive relationship between education and promotion response is stronger for out-of-store promotions than for in-store promotions.
H_7:	Retired households and households living on welfare are more promotion responsive.
H_{7a}:	Retired households and households living on welfare are more promotion responsive, especially for out-of-store promotions.
H_8:	Households where the shopping responsible person has a paid job are less promotion responsive.
H_{8a}:	Households where the shopping responsible person has a paid job are less out-of-store promotion responsive, but not less in-store promotion responsive.
H_9:	The presence of non-school age children in the household and promotion response are negatively related.

continued

Table 3.12 continued

Hypothesis	
H_{9a}:	The presence of non-school age children in the household and promotion response are negatively related, especially for out-of-store promotions.
H_{10}:	Intrinsic variety seeking and promotion response are not related.
H_{11}:	Store loyalty and promotion response are negatively related.
H_{11a}:	Store loyalty and promotion response are negatively related, especially for out-of-store promotions.

In addition, promotion response can also be studied from a different angle, not only considering whether a household responded to the promotion, but looking at the specific result of the sales promotion was on the household's purchase behavior. Did the promotion accelerate the purchase within that specific category, or was a different brand bought? The next chapter deals with the possible effects sales promotions can have on household purchase behavior, to so-called sales promotion reaction mechanisms.

4 DECOMPOSING PROMOTION RESPONSE INTO SALES PROMOTION REACTION MECHANISMS

4.1 Introduction

Drivers of promotional response were identified in the previous chapter. Hypotheses, based on prior research, were derived describing possible relationships between household characteristics (demographics, socio-economics, psychographics, and purchase process characteristics) and promotion response. But, in addition, the possible effects of promotions on household purchase behavior can also be discussed in detail. Instead of investigating what household characteristics influence promotion response, the specific result can be of interest. Does a promotion result in a brand switch? Or is the product bought sooner, or in larger quantities? Or does a household buy more of a different brand?

In this chapter, theory and concepts of sales promotion response decomposition are dealt with. The possible effects of sales promotions, the sales promotion reaction mechanisms, are discussed in more detail in Section 4.2. Based on prior literature, hypotheses regarding the relationship between the different sales promotion reaction mechanisms and product category characteristics are derived in Section 4.3.

4.2 Sales Promotion Reaction Mechanisms

Five mechanisms, by which promotions may affect sales, are identified in the sales promotion literature. These are brand switching, store switching, repeat purchasing, purchase timing, and category expansion. Each mechanism is dealt with more in-depth in the following subsections, along with relevant theory and empirical evidence pertaining to the mechanisms.

4.2.1 Brand Switching

Brand switching means that a consumer is induced to purchase a brand other than the one that would have been purchased had the promotion not been available.

A simple theoretical explanation of why promotions induce brand switching is based on the theory of reasoned action as developed by Fishbein and Ajzen (1975, 1980). This theory places behavior, behavioral intentions, attitude and subjective norm in one framework, where behavior is a function of behavioral intention, which in turn is a function of attitude and subjective norm. The attitude component consists of a weighted linear summation of beliefs about a product. Attitude is also considered as a predisposition to buy. A sales promotion (price cut, display, premium, etc.) could lead to a positive change in predisposition to buy the product, resulting for example in a brand switch. This theory provides an explanation for heterogeneity among households with respect to the concept of deal proneness. Some consumers attach great importance to price cuts, others to coupons. A third group might relate sales promotions to inferior products. This leads to different attitudes, different predispositions to buy, and ultimately different buying behavior due to the presence or absence of sales promotions.

Another theoretical explanation for brand switching is offered by the theory of involvement. Low-involvement consumer decision-making models especially provide explanations for why non-price promotions may induce brand switching. Consumers may simply buy the brand most readily available, the displayed brand. A feature may remind the consumer that he or she needs chips, and since the brand name is attached to the feature, the consumer goes to the store thinking, "I need brand X chips."

One of the most striking findings in empirical research is that the brand switching effects are asymmetric (e.g., Kumar and Leone 1988, Blattberg and Wisniewski 1988). That is, the cross-effect of a promotion for brand A on the sales of brand B may differ from the cross-effect of a promotion for B on the sales of brand A. For example, consumers generally preferring brands with low regular prices (e.g., store brands) may switch over whenever a temporary price cut is offered for a (national) brand with a high regular price. However, consumers preferring the national brands may be insensitive to the price for the store brand.

Economic theory provides an explanation for asymmetric brand switching. Consumer wants to minimize costs of satisfying his or her demand for the product. By buying a brand at a lower price, the consumer can decrease purchase costs. Price sensitive consumers could decide to switch from a store brand to a national brand, when the promotional price of the national brand is lower than the price of the store brand. Other consumers, more quality oriented, could stick to their preferred national brand.

Gupta (1988) concluded that more than 84% of the sales increase due to promotions is accounted for by brand switching (a very small part of which may be switching between different sizes of brands). Gupta worked with grocery coffee data. Chintagunta (1993) worked with yogurt data and the results from his study implied a percentage of 40% due to brand switching. Bucklin et al. (1998) also used yogurt data and they concluded that 58% of the sales increase was due to brand switching at the aggregate level. This suggests that sales promotions have a bigger impact on the brand choice decision for coffee than for yogurt, perhaps due to package size or perishability. Bell et al. (1999) offer a empirical generalization on promotional response. They concluded that brand switching varies systematically across product categories. Bucklin et al. (1998) also investigated whether there exists heterogeneity among household with regard to the sensitivity in brand switch behavior. The results showed that the intersegment variation was substantial (brand switch percentages ranging from 38% to 64%). The research discussed above shows that brand switching varies across households and across product categories.

4.2.2 Store Switching

Store switching is the analogue of brand switching, but instead of inducing a consumer to purchase a different brand, store switching means that a consumer is induced to shop at a different store. Evidence on store switching is less abundant than evidence on brand switching. This comes as no surprise, given the fact that store switching asks more effort from a consumer and from the data collector than brand switching. Store choice precedes the brand choice decision for most consumers, especially for purchasing FMCG, which are low-

involvement purchases for most consumers. Once inside a store, a consumer can still switch brands.

Consumers may patronize different stores for different reasons (Popkowski and Timmermans 1997). The basket of goods that they need to buy on the shopping trip may influence their store-choice behavior in that certain stores may not offer all the goods they need to buy. Price-sensitive and promotion-sensitive consumers are likely to shop at different stores to profit from the lowest prices at the various stores. The literature has also made a distinction between fill-in trips and regular trips. The consumers may make fill-in trips to a smaller, nearby store, while making regular trips to a different store.

Kumar and Leone (1988) found statistically significant cross-store effects of sales promotions for diapers (that is, when one store decreases its price, a competing store would have lower sales). Walters and MacKenzie (1988), however, found little association between store traffic and the particular product category promoted as a loss leader (loss leaders are products temporarily priced at or below retailer cost). Locational convenience and overall price perceptions seemed to be more important determinants of patronage than were weekly specials.

To summarize, sales promotions seem to influence store choice behavior only to a modest degree.

4.2.3 Purchase Acceleration

Purchase acceleration means that a consumer's purchase timing or purchase quantity is influenced by promotion activities. One possible consequence of purchase acceleration is that it shifts purchases forward that would have occurred anyway. Other effects can take place, however. Purchase time and/or quantity acceleration can prevent switching from the manufacturer's brand. Promotions can also lead to "decelerated" purchase timing, because consumers learn in advance or anticipate that a promotion will occur and wait for the event.

The economic theory as developed by Blattberg et al. (1981) provides one explanation for purchase acceleration and for differences between households. The consumer wants to minimize the costs of satisfying his or her household's demand for the product. By

buying on deal at a lower price, the consumer can decrease household purchase costs but may incur a cost of carrying more inventory of the product than is needed to satisfy immediate consumption. Some households, perhaps those with minimal storage space, have high holding costs and will not respond to price deals. Other households have relatively low inventory holding costs and will potentially respond to deals.

There is a good deal of empirical support for the purchase acceleration effects of sales promotions. Several researchers (e.g., Wilson et al. 1979, Shoemaker 1979, Grover and Rao 1985, Neslin et al. 1985, Gupta 1988, Schneider and Currim 1991) have provided empirical evidence that promotions are associated with increased purchase quantity and adjusted interpurchase times. Based on research on two product categories (bathroom tissue and instant coffee) Neslin et al. (1985) concluded that increased purchase quantity is more likely to be exhibited than shortened interpurchase times, but the specific effects were found to depend on the type of promotion. Gupta (1988) estimated that 14 percent of the increase in sales due to promotion is accounted for by accelerated purchase timing, and that 2 percent is accounted for by quantity. Chintagunta estimated respectively 15 and 45 percent. Bucklin et al. (1998) estimated that 20 percent of the increase in sales due to promotion is accounted for by accelerated purchase timing, and that 22 percent is accounted for by quantity. The empirical generalization offered by Bell et al. (1999) shows that purchase acceleration (timing and/or quantity) differs across households and product categories.

4.2.4 Category Expansion

Category expansion is compounded of purchase time and purchase quantity. It means that a consumer's total consumption of the product category is increased by a promotion. Promotions can stimulate primary demand by creating a new consumption occasion or by increasing the usage rate. A good example of a promotion creating a new consumption occasion is the display that reminds the consumer that potato chips are a good snack to bring along to a picnic. This phenomenon is sometimes referred to as category switching.

Increasing usage rate is a common goal for many packaged goods industries (Blattberg and Neslin, 1990). According to Blattberg and Neslin (1990) and Ailawadi and

Neslin (1998), there is a great need for further study, both theoretical and empirical, in this area. Although both academics and managers appear to be well aware of the potential for such an effect, there is little empirical research that examines promotion's potential to increase category demand. Promotion's effect on consumption stems from its ability to increase household inventory level. Higher inventory, in turn, can increase consumption through two mechanisms: fewer stockouts and an increase in the usage rate during non-stockout periods. It might be relatively easy to get consumers to stockpile, but getting consumers actually to use more of these products is a different problem. Assunçao and Meyer (1993) showed that consumption increases with inventory, not only because of the stock pressure from inventory holding costs, but also because higher inventories give consumers greater flexibility in consuming the product without having to worry about replacing it at high prices. Chiang (1995) found no category expansion effect in the detergent category. Wansink and Deshpandé (1994) showed in a lab study that promotional activity might cause consumers to consume a stockpiled product more quickly. The research performed by Wansink (1996) demonstrated that larger package sizes influence the usage volume of usage variant products, partially because larger packages are perceived to be less expensive to use (lower perceived unit costs). It is not surprising therefore, that directly decreasing a product's price correspondingly increases usage volume. If perceptions of unit costs can accelerate usage volume, it appears that various retailer promotions, such as "2-fers" (buy two for the price of one), "BOGO's" (buy one, get one free), and multipacks may not only stimulate purchase, but also stimulate greater usage frequency simply because of their reduced unit costs.

Ailawadi and Neslin (1998) demonstrated the existence of the flexible usage rate (consumption depends on the available inventory) empirically for yogurt and catsup. It turned out that a substantial percentage of the short-term promotion sales bump was attributable to increased category consumption, but that percentage differed across the two categories (35% for the yogurt category and 12% for the catsup category).

Nijs et al. (2001) found that only 54 out of 560 categories showed evolving long-run category-demand. Based on that, they derived the empirical generalization that long-run category-demand effects are the exception, rather than the rule. In the short run, price promotions were found to significantly expand category demand in 58% of the cases over, on

average, 10 weeks. But, in the long run, category-demand effects of price promotions were not found.

We end this section with a small summary. In the short run, category expansion effects are expected to exist and to differ between categories. But, based on the results found by Nijs et al. (2001), category expansion effects of promotions in the long run are not expected. In this dissertation, we focus on category expansion (in the short run) and combine the question which category characteristics drive category expansion with the question whether some households exhibit more category expansion than others.

4.2.5 Repeat Purchasing

Repeat purchasing indicates that a consumer's future probability of buying a brand currently purchased on promotion is influenced by the promotion. There are two types of repeat purchase effects connected with sales promotion: the purchase effect and the promotion usage effect. The purchase effect occurs simply because any purchase of a brand can have implications beyond the immediate purchase occasion. The consumer forms a habit toward purchasing the brand, sustains that habit, or learns about the performance of the brand. The second effect involves a change in purchase probability due to purchasing the brand on promotion. For instance, the fact that the brand was purchased on promotion may deteriorate the brand in the eyes of the consumer.

The purchase effect on repeat purchasing is supported by theories of habit formation and learning. A promotion triggers the first time buy for some consumers, which might be the first step in establishing a habit. By keeping other consumers from wandering away from an already established behavior, the promotion is also helping to sustain a habit. A low-involvement consumer does not want to spend a great deal of time thinking about what product to buy. Forming a habit is a convenient way to reduce that time. Consumer learning is presumed to occur when the consumer examines actual brand performance. The purchase effect, if it exists, is expected to be positive.

Attribution theory addresses the promotion usage effect (Blattberg and Neslin 1990). Attribution theory describes how consumers explain the causes of events; these explanations

are called “attributions.” Attributions result in attitude change rather than behavioral change, and attribution theory does not formally address the behavioral consequences of a consumer’s attributions. However, to the extent that attitudes are antecedents of behavior (cf. Foxall and Goldsmith 1994), the theory is very relevant. Attribution theory considers the causal judgments consumers make when they purchase a brand. The concern is that when the purchase involves use of a promotion, these judgments may be negative. For example, the thought that “I must have bought this brand because it was on promotion” weakens the consumer’s intrinsic interest in or preference for the brand. Once the promotion is no longer available, there is no firm cognitive reason for the consumer to continue buying. The consumer may buy once because the price is low, but may make a negative inference about the quality of the brand that will lower the probability of a subsequent purchase. There is theoretical debate as to whether the promotion usage effect should be positive or negative. If the effect is negative, the important overall question for repeat purchasing is whether the total (purchase and promotion usage) effect is positive or negative.

Studies in many areas of marketing suggest that brand loyalty is an important predictor of repeat buying of low-involvement, low-cost, frequently purchased products (Kumar et al. 1992). But there has been little empirical work on establishing the effect of sales promotions on brand loyalty and repeat purchase probability, and how that effect varies between categories. East and Hammond (1996) studied the erosion in time (the proportional fall) of repeat-purchase rates of brand buyers in stationary markets. Erosion was observed in all product categories covered (ground and instant coffee, detergent, toothpaste, carbonated drinks, and crackers). The variation was modest, with most results close to the average of 15 percent in the first year. But, the authors did not attempt to explain erosion with reference to marketing activity, while marketing activity can provide the basis for long-term changes. On the other hand, Dekimpe et al. (1996) found little empirical support for the contention that brand loyalty, and therefore repeat purchase probability, is eroding. Neslin and Shoemaker (1983) concluded that the repeat purchase effect should be manifested one purchase cycle after the promotion, so that the pattern of sales should be spike-dip-minispike. In addition, if the promotion converts nonregular customers to regular customers, the baseline should actually increase slightly. Neslin and Shoemaker (1989) provide an alternative explanation to explain possible lower repeat rates after promotions. This explanation is that a promotion

temporarily attracts a disproportionate number of households with low purchase probabilities. When the repeat rates of these households are averaged with the repeat rates of those that would have bought the brand even without a promotion, the average rate after a promotion purchase is lower.

The weight of research evidence suggests that promotions do not induce a positive repeat purchase effect (e.g., Dodson et al. 1978, Ehrenberg et al. 1994, Neslin and Shoemaker 1983, 1989, Scott 1976; Bawa and Shoemaker 1987, Nijs et al. 2001). However, Guadagni and Little (1983) showed that it is possible for promotion to induce a net positive increase in repeat purchase probability. So the book is not closed on this topic.

4.2.6 Integrating the Mechanisms

In real-world marketplaces, it is likely that all the sales promotion reaction mechanisms as described above occur simultaneously. Therefore, several researchers have tried to investigate the joint effects of some or all of these mechanisms. Neslin and Shoemaker (1983) constructed a simulation model that included brand choice, repeat purchasing, and acceleration effects. Vilcassim and Jain (1991) analyzed brand switching and purchase timing decisions of households in a single framework. They concluded that price and promotion had a greater impact on the rate of brand switching than on the rate of repeat purchase. Bucklin and Gupta (1992) developed an approach to market segmentation based on consumer response to marketing variables in both brand choice and purchase timing. The results suggested that many households that switch brands on the basis of price and promotion do not also accelerate their category purchases and that many households that accelerate their category purchases do not switch brands.

Gupta (1988) modeled brand choice, purchase time, and purchase quantity to decompose the promotional purchase bump for coffee using scanner panel data. The data set contains records of the complete purchase history of each household in the panel. In addition, a store file records weekly information on prices and promotions for all the coffee brands available in the stores in the market. It was found that more than 84 percent of the total sales increase is accounted for by brand switching, 14 percent or less by purchase time acceleration,

and less than 2 percent by stockpiling. Gupta (1988) remarked that this decomposition could be different for other product categories, based on for example storage constraints.

Narasimhan et al. (1996) studied the relationships between product category characteristics and the average increase in brand sales resulting from promotions within the product category. They considered four mechanisms: brand switching, store switching, category expansion, and purchase acceleration. They used store-level data to measure the effect of multiple types of promotions (price, price-feature, and price-display). Product category characteristics that were found to be of importance in explaining variety in promotional elasticities across product categories were: (1) category penetration (positive relation between category penetration and promotional elasticity, especially for featured price cuts); (2) interpurchase time (longer interpurchase times are associated with lower promotional elasticities); (3) price (higher price levels are associated with higher promotional elasticity for pure price cuts); (4) number of brands (negative relationship with promotional elasticity); (5) ability to stockpile (associated with higher promotional elasticity).

Bucklin et al. (1998) developed a joint estimation approach to segment households based on their response to price and promotion in brand choice, purchase timing, and purchase quantity decisions. This work extends the work of Gupta (1988) by incorporating segmentation in response to marketing activity. The model was fitted and estimated using household panel data from the yogurt category, which lead to five segments. Subsequently, the overall sales elasticity was decomposed into the response due to choice, timing, and quantity decisions. Aggregate-level results decompose response for all households into the choice (58%), time (20%), and quantity (22%) components. But, the intersegment variation turned out to be substantive. The impact of choice decisions ranged from 38% to 64%, the impact of purchase timing ranged from 10% to 29%, and the impact of quantity ranged from 11% to 52%.

Bell et al. (1999) extended the work of Gupta (1988) by decomposing the sales increase for a brand on promotion into brand switch, purchase time, and purchase quantity elasticities. This was done for 173 brands across 13 different categories. Two goals were defined: (1) investigate the decomposition across product categories, and (2) analyze more formally the variability of this decomposition. The brand-level is the unit of analysis. The authors examined the extent to which variance in brand choice, purchase time, and quantity

elasticities can be attributed to three sets of exogenous variables: category factors, brand factors, and consumer factors. As Gupta (1988), they concluded that switching (i.e., secondary demand) is the most important effect of a promotion. However, that effect is not as dominant as reported by previously reported. Promotions can also have a significant effect on primary demand for a product (i.e., purchase time and quantity choice). Furthermore, the magnitude of primary and secondary demand effects were found to vary substantially across brands and categories. The choice elasticity varied from 49% for butter to 94% for margarine. The time elasticity varied from 1% for liquid detergents to 42% for butter. The quantity elasticity varied from almost 0% for margarine to 45% for coffee. The overall average decomposes elasticities into 75/11/14 percent for respectively brand/time/quantity. Up to 70% of this variance was explained by the category-, brand-, and consumer-specific factors, in this order of importance. All refrigerated products had much higher timing effects than quantity effects. All storable products showed the opposite patterns. Recall that Gupta (1988) obtained different results for the storable product category coffee. Bell et al. (1999) attributed this to two factors. First, they use newer and different data. Second, while Gupta's model addresses the 'when' question of purchase timing, Bell et al. focus on the 'whether' question. No differences were found in brand choice elasticities related to storability. The overall elasticity decomposition distinguishing between storable and nonstorable products resulted in 75/3/22 for storable products versus 75/17/8 for nonstorable products.

But, as noted and researched by Van Heerde et al. (2001, 2002), there is a big difference between the promotional bump decomposition depending on whether this is derived using elasticities or unit-sales effects. Researchers decomposing the sales promotion elasticity into brand switching, purchase quantity, and purchase timing (e.g., Gupta 1988, Chiang 1991, Chinatagunta 1993, Bucklin et al. 1998, Bell et al. 1999) concluded on average that 74% is due to brand switching (secondary demand effects) and the remainder is due to timing acceleration and quantity increases (primary demand effects). Van Heerde et al. (2001, 2002) argued that the decomposition of unit sales effects is theoretically and managerially more relevant than the decomposition of elasticities. The former decomposition considers promotional sales effects in terms of comparable units (unit sales), whereas the latter is constructed in terms of percentage changes of non-comparable units (probabilities and purchase quantities). Van Heerde et al. (2001, 2002) transformed the elasticity-based results

into a unit sales decomposition and show that the two decompositions differ to a large degree. It was concluded that on average, the unit sales effect consists of roughly one third attributable to other brands, one third to stockpiling, and one third to category expansion. Furthermore, Van Heerde et al. (2002) showed how the decomposition results are moderated by characteristics of the price promotion.

As mentioned above, a number of researchers found evidence for differences in household reactions towards sales promotions across product categories. The next section presents a short overview of possible relationships between product category characteristics and the sales promotion reaction mechanisms.

4.3 Product Category Characteristics Related to Sales Promotion Reaction Mechanisms

Several researchers have investigated the topic of sales promotion reaction mechanisms (see Section 6.2). They investigated what specific effects sales promotions had, whether the size of these effects was consistent across categories (which turned out not to be the case) and identified segments of households based on the exhibited sales promotion reaction mechanisms (some households turned out mainly to switch brands due to promotions whereas other households exhibited all reaction mechanisms). But, what is lacking is theoretical and empirical knowledge about what product category characteristics influence promotion response. The following sub-sections each deal with one specific product category characteristic. The selection of product category characteristics is based on a literature overview.

4.3.1 Average Price Level

Based on the results of Bell et al. (1999), we hypothesize that *promotions for categories with a high price will have the largest response, especially as a result of purchase acceleration* (H_1).

4.3.2 Purchase Frequency

The study of Fader and Lodish (1990) implied a positive relationship between high frequency of purchase and promotional elasticity. Based on Bawa and Shoemaker (1987), Narasimhan et al. (1996) hypothesized that shorter consumer interpurchase times result in more brand switching because the consumer must live with the consequences of buying a less preferred brand for a shorter period. In addition Narasimhan et al. conjectured that interpurchase times are related to purchase acceleration. Long interpurchase times discourage acceleration because the stockpiled product must be stored for a longer period of time. This was supported by empirical findings. Bell et al. (1999) found less stockpiling for often purchased products. Based on above, we expect to find *a positive relationship between purchase frequency and promotional response, mainly due to brand switch effects* (H_2). Purchase frequency might be related to storability (which is discussed in Section 4.3.4). This will be investigated empirically.

4.3.3 Promotional Activity

If a brand is promoted very infrequently, consumers are likely to use these opportunities to stock-up for future consumption (Krishna et al. 1990). Decrease in stockpiling as promotional frequency increases has been shown using simulations in Helsen and Schmittlein (1992), and Assuncao and Meyer (1990). Winer (1986) and Lattin and Bucklin (1989) concluded that more frequent discounts might lower the reference price of the promoted brand, which in turn may additionally negate the effect of promotions. The study of Raju (1992) implies that categories with deeper, infrequent dealing show higher promotional elasticities. Bell et al. (1999) stated that more frequent dealing leads to more opportunities for the consumer to exploit price promotions, leading to lower promotional elasticities. We therefore hypothesize that *promotional frequency and promotion response are negatively related* (H_3).

4.3.4 Storability/Perishability

Storable products facilitate stockpiling and therefore intertemporal purchase displacement. Narasimhan et al. (1996) reported that promotions get the highest response for brands in easily stockpiled categories, especially due to purchase acceleration. Raju (1992) concluded that bulkiness (volume, which is inversely related to storability) and perishability both have a negative impact on the variability in category sales. Bell et al. (1999) argued that storability and purchase acceleration (both time and quantity) are positively related. They concluded that all refrigerated products had much higher proportions for the time effect than for the quantity effect and that all storable products showed the opposite pattern. Bucklin et al. (1998) argued that purchase quantity effects could be smaller for perishable product categories. It is therefore hypothesized that *storability is positively related with promotional effects, mainly due to purchase acceleration (H_4). Perishability is negatively related with promotional effects* (H_5).

4.3.5 Number of Brands

Narasimhan et al. (1996) observed a negative relationship between number of brands and promotional elasticity, which they attributed to brand switching. The presence of many brands reflects broader product differentiation, which, in turn, protects an individual brand from the enticement offered by a competitor's promotion. Bawa et al. (1989), however, found that larger assortments do tend to generate higher trial for new products. Bell et al. (1999) also hypothesized that purchase acceleration effects are positively related to number of brands within a category. We expect to find *a positive relationship between number of brands and promotional effects* (H_6).

4.3.6 Impulse

Narasimhan et al. (1996) hypothesized that promotional elasticity is higher for categories that are characterized by a high degree of impulse buying. We also believe that *brand switching as well as purchase acceleration effects will be higher for impulse categories* (H_7).

These hypotheses will be empirically tested in Chapter 8. But, please note that due to the limited number of different categories included in this dissertation (six), only tentative conclusions can be drawn with respect to the relationship between product category characteristics and promotion response and sales promotion reaction mechanisms. Furthermore, as no product categories are included in this research that have a really short life span or have to be stored in the refrigerator, the fifth hypotheses cannot be empirically tested.

Table A4.1 of the Appendix provides a chronological overview of papers dealing with effects of sales promotions on household purchase behavior. The table distinguishes three focal aspects of prior research done on these effects (promotion type, product category, and sales promotion reaction mechanism). These three aspects have been discussed thus far and most research contained in the table has been mentioned in this or the preceding chapters. These three aspects also serve as the dimensions of analysis used in the empirical part of this research.

With respect to the table, a plus or minus sign in these three columns indicates that the specific paper investigated consistencies across respectively different promotion types, different product categories, or different sales promotion reaction mechanisms and whether differences were found (+) or not (-). An empty cell indicates that consistency across any of the three dimensions was not studied. Furthermore, the table shows which (if any) relationships between promotional sensitivity and household characteristics and product category characteristics are empirically found. Finally, theories or concepts applied to explain these relationships are included.

It appears from Table A4.1 that most authors either considered no theory whatsoever, or only to a limited degree. Economic theory is most-often considered. Although economic theory is surely relevant, the restriction to this theory explains why so many interesting questions regarding promotion response still remain unanswered.

Economic theory ignores mental decision-making, tastes, etc. that seem vital in explaining promotional sensitivity.

With respect to deal proneness, the main part of prior research on deal proneness dealt with deal proneness as some sort of dependent outcome variable measured as promotion utilization. Most deal proneness research just focused on promotional behavior within one category. But, the work of Ainslie and Rossi (1998) is a positive exception. They use deal proneness in its original meaning, as a common consumer trait whose existence should result in similarities in promotion sensitivity across multiple categories. This line of reasoning will be extended by us across different sales promotion reaction mechanisms to make a contribution to deal proneness.

A final remark is that the most research presented in Table A4.1 did not incorporate the three aspects mentioned before into one single framework. In this research, we aim at providing insights into household promotional purchase behavior by incorporating the three aspects into a single framework.

5 METHDOLOGY, MODEL, AND MEASURES

5.1 Introduction

In this chapter we develop the general framework for studying the effects of sales promotions on individual household purchase behavior. The framework described in section 5.2 is based on findings and ideas from prior research. It describes the way households are influenced by sales promotions in their purchase behavior. We identify variables that are expected to influence the consumer as a result of sales promotions. Section 5.3 offers insight in the two-step approach used in this research to answer the research questions. The two research models developed and applied in the research are dealt with in section 5.4 in detail.

5.2 Perspective of Analysis

As mentioned in the previous chapters, several variables play an important role in explaining the effects of sales promotions on consumer purchase behavior. Different researchers studied sales promotion response using different dimensions. The dimensions incorporated in this research are: (1) household variables (demographics, psychographics, socio-economics, and purchase process characteristics), (2) sales promotion reaction mechanism (brand switching, store switching, purchase acceleration, category expansion, and repeat purchasing), (3) promotion-type (display, feature, price-cut, and combinations), and (4) product category characteristics. Figure 5.1 describes the way we believe that individual households are affected by sales promotions in their FMCG purchase behavior. Overt promotion response is influenced by many variables, such as income, time, size of the household, composition of the household, mobility of the household, occasion of the shopping trip, information (whether the household is acquainted with the promotional activity), and deal proneness. Not all of these variables are incorporated in the framework. Only variables that are household dependent and more or less constant over time (and therefore constant over shopping trips) are used in this research. Involvement is assumed to be related to variety

seeking (cf. Assael 1987, Desphande and Hoyer 1983, Van Trijp et al. 1996) and therefore indirectly incorporated. We want to derive drivers of promotion response in general. In our research, we use the four distinguished dimensions as entries to study effects of sales promotions on household purchase behavior.

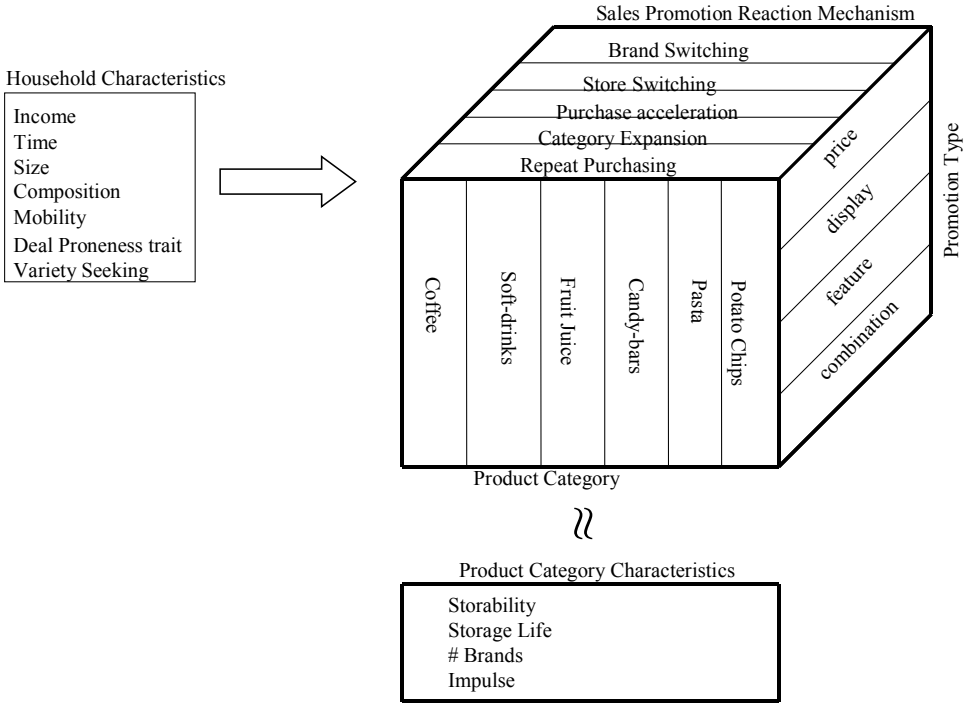


Figure 5.1: Pictorial representation of promotion response research

As mentioned in the previous chapters, most prior research concluded that overt promotion response differs across sales promotion reaction mechanism, deal-type, and product category. Recently, however, Ainslie and Rossi (1998) found empirical evidence for treating deal proneness as an individual household trait. They found similarities in brand choice behavior within promotion-type across product category. These findings provide support for treating deal proneness as a latent, unobservable, individual household trait. We will expand on this study to find out whether this cross category similarity also applies to other mechanisms than brand choice. We distinguish four types of variables and incorporate all of them in our research framework, providing opportunities to empirically test whether deal proneness is indeed a general trait. If households do not show any consistency or similarity in their overt

purchase behavior, taking intervening variables into account, the promotion trait conceptualization stands on shaky grounds. With this framework, we follow up on research by Seetharaman and Chintagunta (1998). They concluded that there is a need to simultaneously account for the effects of time-varying marketing variables, heterogeneity across households and higher-order effects (such as variety seeking) while modeling household purchase behavior in order to obtain valid estimates of model parameters. In addition, also possible differences across product categories are taken into account.

This framework applies to each individual household. The dependent variable is the overt household promotion response behavior. This possibly differs across reaction mechanism, promotion-type, product category, and can depend on household variables. This way of conceptualization offers the opportunity to answer the two research questions as stated in Chapter 1. First, can we relate the exhibited household promotion response behavior to household variables? If so, do we find a consistent pattern in individual household purchase behavior regarding promotion response, either across product categories, deal-types, and/or reaction mechanisms? And if we find a pattern, is this pattern then caused by the socio-economic, demographic, and/or psychographic household characteristics such as social class, size, composition of the household, variety seeking and purchase process characteristics alone, or also by an individual deal proneness trait? Second, can we find a general decomposition of household promotion response into the sales promotion reaction mechanisms across different product categories?

5.3 Research Methodology

The focus of this dissertation is to observe household purchase behavior at such a microscopic level that it allows us to draw conclusions about the effects of sales promotions on household purchase behavior. Are households influenced by sales promotions? And if so, in what way? Are all households influenced in the same way? Are there household characteristics that explain the difference in displayed household deal response behavior? Are there similarities within household promotion response across product categories? Are these similarities explained by household characteristics, or is

there another factor that is related to these similarities across product categories? Can we find a consistent household promotion response decomposition across different product categories? We have chosen a two-step approach to answer these questions.

1. Identify drivers of household promotion response;
2. Investigate the sales promotion reaction mechanisms that constitute household promotion response.

In the first step, we try to empirically identify drivers of household promotion response. The hypotheses regarding the possible drivers of household promotion response, as derived in Chapter 3, based on theories from consumer behavior and prior research, are empirically tested. Household variables such as size, composition of the household, variety seeking, purchase frequency are included in this research as possible drivers of promotion response. In addition, the empirical findings are used to make a statement about the deal proneness trait concept. We investigate whether the household characteristics mentioned above explain the biggest part of consistencies in household sales promotion response behavior across product categories, or whether a substantial amount of unexplained variance remains, which could point towards the existence of deal proneness

In the second step, the sales promotion reaction mechanisms are studied in detail. Did the household switch brands due to the promotion or not? Or did the household change its purchase quantity and purchase timing? Intuitively appealing, intertemporal measures (taking also the pre- and post-promotional changes in purchase behavior into account) are derived for each sales promotion reaction mechanism. Differences within and across households are studied, leading to additional insights in the deal proneness existence question. The different reaction mechanisms are studied from two different angles. The first angle is the intertemporal study of effects of sales promotions on household purchase behavior, meaning that not only the effects during the promotional shopping trip itself, but also pre-promotional and post-promotional effects on purchase behavior are incorporated. A household that buys more of a product when it is on promotion, may buy less before (anticipation effect) or after the promotion period. The intertemporal approach takes the time dynamic effects into account. The second angle is the decomposition of the promotional bump (e.g., Gupta 1990, Bucklin et al. 1998, Bell et al. 1999). This decomposition at the household level derives the frequency and strength of the different sales promotion reaction mechanisms.

The reaction mechanisms that can occur during the promotional period are brand switching, purchase timing (buying sooner or later), and purchase quantity (buying more or less). This second angle provides detailed insights in households' reaction to a promotion during the promotional shopping trip itself, but does not take the intertemporal dynamics into consideration.

The two-step approach presented in this section is used throughout the remainder of this dissertation. In the next section, we will develop two research models, one for each step.

5.4 Research Models

5.4.1 Promotion Response Model

We want to predict whether a household will make use of a specific promotion or not. There is a variety of multivariate statistical techniques that can be used to predict a dependent variable from a set of independent variables. For example, multiple regression analysis and discriminant analysis are two techniques that quickly come to mind. However, linear regression analysis poses difficulties when the dependent variable can have only two values. For such a binary variable, the assumptions for hypothesis testing in regression analysis are violated. For example, the distribution of errors can never be normal. Another difficulty with multiple regression analysis is that predicted values cannot be interpreted as probabilities. They are not constrained to fall in the interval between 0 and 1. Linear discriminant analysis does allow direct prediction of group membership, but the assumption of multivariate normality of the independent variables is not appropriate here.

The logistic regression model requires far less assumptions. In logistic regression, one directly estimates the probability of an event occurring. For more than one independent variable the model can be written as

$$\Pr(\text{event}) = \frac{e^z}{1+e^z}$$

or equivalently

$$\Pr(\text{event}) = \frac{1}{1+e^{-z}} .$$

Here Z is the linear combination

$$Z = B_0 + B_1 X_1 + B_2 X_2 + ... + B_p X_p .$$

of constants $B_0,\ldots,B_p$ and independent variables $X_1,\ldots,X_p$.

The probability of the event not occurring is estimated as

$$P(no\ event) = 1 - P(event) .$$

In logistic regression the parameters are estimated using the maximum-likelihood method. That is, the coefficients that make our observed results most likely are selected. Since the logistic regression model is nonlinear, an iterative algorithm is needed for parameter estimation. To understand the interpretation of the logistic coefficients, consider a rearrangement of the equation of the logistic model. The logistic model can be rewritten in terms of the odds of an event occurring (the odds of an event occurring are defined as the ratio of the probability that it will occur to the probability that it will not). The log of the odds, also known as logit, can be written as

$$\log\left(\frac{\Pr(\text{event})}{\Pr(\text{no event})}\right) = B_0 + B_1 X_1 + ... + B_p X_p .$$

The logistic coefficient can be interpreted as the change in log odds associated with a one-unit change in the independent variable. Since it is easier to think of odds, the logistic equation can be written in terms of odds as

$$\frac{\text{P(event)}}{\text{P(no event)}} = e^{B_0 + B_1 X_1 + ... + B_p X_p} = e^{B_0} e^{B_1 X_1} ... e^{B_p X_p} = e^{B_0} (e^{B_1})^{X_1} ... (e^{B_p})^{X_p} .$$

Then e raised to the power B_i is the factor by which the odds change when the ith independent variable increases by one unit. If B_i is positive this factor will be greater than 1, which means that the odds are increased; if B_i is negative the factor will be less than 1, which means that the odds are decreased. When B_i is zero the factor equals 1, which leaves the odds unchanged.

Summarizing, binary logistic regression models are used to estimate the influence of household characteristics, characteristics of the purchasing process, and types of sales promotion on promotion response. One possible limitation of the empirical approach chosen is that we assume that all households in the dataset come from one distribution. Mixture models have found widespread application in marketing (Andrews et al. 2002). It is based on the assumption that the data arise from a mixture of distributions, and it estimates the probability that objects belong to each class. The purpose of mixture models is to "unmix" the sample, that is to identify groups or segments, and to estimate the parameters of the density function underlying the observed data within each group (Wedel and Kamakura 2000). The underlying assumption of mixture models is that because of one or more an additional variables, not incorporated in the model, consumers may come from different segments.

The purpose of the current analysis is to get insights in drivers of sales promotions response, where sales promotion response, the dependent variable, is measured as a single binary variable. A large number of independent variables are incorporated in the model. According to Wedel and Kamakura (2000), a large number of independent variables decreases parameter recovery of mixture regression models. Furthermore, mixture modeling has an additional problem, related to the independent variables. As there are fewer observations for estimation the regression model in each segment, collinearity among the independent variables could lead to severe identification problems (Wedel and Kamakure 2000). Based on the large number of independent variables, the limited number of households, and the possible presence of collinearity, it was chosen to identify the drivers of sales promotion response by incorporating the dependent and independent into a traditional, non-mixture model. Still, the outcomes of this non-mixture binary logistic regression model can *a posteriori* be used to identify segments based on different levels of relevant, significant independent variables. We will come back to the topic of mixture models in Section 9.4 when dealing with limitations and interesting topics for future research.

5.4.2 Sales Promotion Reaction Mechanism Measures

The work discussed in Chapter 4 (prior research done on sales promotion reaction mechanisms) uses mainly the individual brand as the unit of analysis. Additional sales of a specific brand as a consequence of sales promotions are decomposed into extra sales resulting from brand switching, purchase time acceleration, and purchase quantity acceleration. However, in our research, we are not interested in the promotional sales decomposition for a specific brand. We are interested in the promotional sales decomposition for a specific household. How is household purchase behavior influenced by sales promotions? Can we decompose the promotional bump into brand switching, purchase time acceleration, and purchase quantity acceleration? We emphasize the household as the unit of analysis, not the individual brand. As households encounter different brands, the household promotional bump decomposition is therefore possibly based on promotions for different brands. This promotional bump decomposition (irrespective of the unit of analysis used) deals only with the effects during the promotional shopping trip itself. Intertemporal dynamics are not incorporated. As we remarked before, however, pre- and post-promotional effects influence the profitability of a sales promotion and hence of great importance.

As our unit of analysis differs from the work discussed above, new measures have to be developed for the effects of sales promotions. Furthermore, measures developed by other researchers reflect how consumers respond to price changes at given points in time, but do not indicate how long it takes before these consumers return to the market. Our measures are based on an intertemporal analysis and do capture consumption dynamics. Following Bell et al. (1999), our measures compare promotional and non-promotional averages.

As described throughout this thesis and in detail in Chapter 4, promotions can affect consumer purchase behavior in various ways. The primary approach in this section is to develop a specific measure for each sales promotion reaction mechanism. These measures can be estimated for a single household, a single product class and a specific type of promotional activity, but they can also be used to measure the effect of promotions on more than one (possibly all) households, across different types of promotion, or across

more than one product category. In this research, the measures are estimated for each combination of household and product category, and for each household across the different product categories.

Before operationalizing the measures, let us first introduce some new concepts. For clarity, these concepts are graphically depicted in Figure 5.2. A shopping trip for a product class occurs if a household purchased from that specific product category during a day. Promotional activity is also defined per product class. We speak of promotional activity in a store when some brand within that product class is on promotion. A shopping trip is called a promotional shopping trip when there is promotional activity. A utilized promotional shopping trip is defined as a promotional shopping trip during which a household purchased one or more brands on promotion. A non-promotional shopping trip is a shopping trip that is not a promotional shopping trip. It has to be noted that the measures and calculations are conditional on a purchase having taken place and that the concepts are defined for each product category separately.

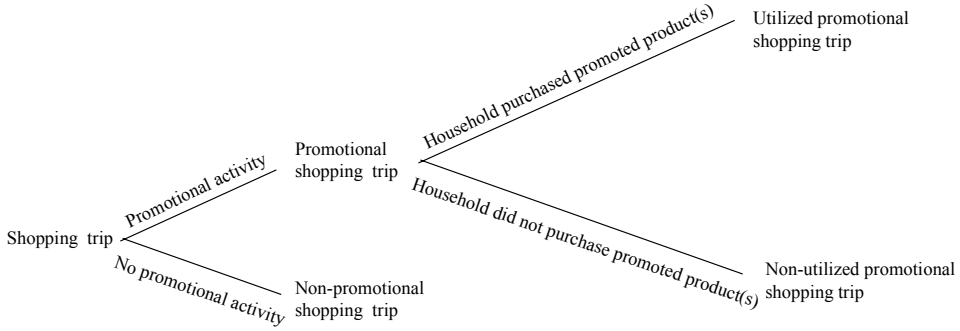


Figure 5.2: Graphical presentation of concepts defined

5.4.2.1 Promotional Utilization

A general indicator for promotion response is the following:

$$\text{(1) Promotional Utilization : } PU = \frac{\text{number of utilized promotional shopping trips}}{\text{number of promotional shopping trips}}.$$

It represents the fraction of shopping trips with brands on promotion, during which these promoted brands are purchased. This measure provides insights in the overall household sensitivity towards promotions. Compared to promotion response dealt with in the prior section, this promotional utilization measure aggregates the 0/1 record outcomes across the different shopping trips (or records).

However, our main interest goes beyond this overall level. Especially the specific mechanisms for buying on promotion are of interest to us. For these different sales promotion reaction mechanisms, indicators are defined and operationalized in the following subsections.

5.4.2.2 Brand Switching

We want to measure the extent to which households switch brands due to promotions. Brand switching itself can be conceived in several ways. There is no general agreement about what constitutes an appropriate conceptual or operational definition of brand loyalty (Jacoby and Chestnut 1978). We operationalize brand switching as switching from the favorite brand to another brand. The favorite brand is determined according to Guadagni and Little (1983) and Gupta (1988), as the brand with the largest exponentially weighted average of past purchases. The weight parameter must be in the [0,1] interval. As the parameter is smaller, historic purchases are more important in determining the favorite brand. A high value for the parameter means that only a few historic purchases determine the favorite brand. This operationalization of brand loyalty enables us to vary the time range of historic purchase behavior that determines the favorite brand. Several sensitivity analyses concluded that the results are insensitive to small changes in the weight parameter (Ortmeyer 1985, Gupta 1988, and Lattin 1987). We use non-promotional purchase data (purchases on shopping trips during which there were no promotions in the store or the available promotions were not utilized) to determine the favorite brand. Note that with this operationalization, the favorite brand can change over time. We compare brand switch behavior in promotional situations (switch behavior from the favorite brand to another brand during promotional shopping trips) with base line brand switch behavior (switch

behavior from the favorite brand to another brand during non-promotional shopping trips). This allows us to distinguish between intrinsic and extrinsic variety seeking behavior (van Trijp et al. 1996), where the extrinsic motivations are sales promotions.

(2) Non - promotional Brand Switching :

$$BS_{np} = \frac{\text{number of nonpromotional shopping trips on which nonfavorite brands are purchased}}{\text{number of nonpromotional shopping trips}}.$$

(3) Promotional Brand Switching :

$$BS_p = \frac{\text{number of promotional shopping trips on which nonfavorite brands are on promotion and purchased}}{\text{number of promotional shopping trips on which nonfavorite brands are on promotion}}.$$

The difference between the promotional and the non-promotional brand switch index provides a measure of the change in brand switch purchase behavior due to promotional availability for one or more of the non-favorite brands. The brand switch effect is therefore operationalized as follows:

(4)Brand Switching effect : $BS = BS_p - BS_{np}$.

Note that $-1 \leq BS \leq 1$. A large positive difference means that a household is more inclined to switch from its favorite to a promoted brand. The brand switching effect is expected to be ≥ 0.

5.4.2.3 Purchase Acceleration

Purchase acceleration can take place by means of two mechanisms, by changing purchase time or by changing purchase quantity. Both mechanisms will be studied from an intertemporal point of view. So not only the promotional shopping trip itself, but also the pre- and post-promotional shopping trips will be considered.

We measure possible time acceleration effects by comparing the interpurchase time between a non-promotional or not utilized promotional and a subsequent utilized promotional shopping trip, with the average time interval between two subsequent non-promotional or not utilized promotional shopping trips. We measure possible time readjustment effects by comparing the interpurchase time between a utilized promotional and a subsequent non-promotional or not utilized promotional shopping trip, with the average time interval between two subsequent non-promotional or not utilized promotional shopping trips.

The intertemporal purchase quantity effects are measured by comparing the average purchase volume per non-promotional or not utilized promotional shopping trip with (a) the non-promotional purchased volume one shopping trip before the utilized promotional shopping trip, (b) the purchased volume during the utilized promotional shopping trip, and (c) the non-promotional purchased volume one shopping trip after the utilized promotional shopping trip. This provides insights in whether the household purchased more due to promotion, or merely shifted purchases forward or backward that would have occurred anyway.

Opposite to the brand switch effect measure, the three purchase time measures and the four purchase quantity measures are ratio's, the average non-promotional time interval or purchase quantity serving as the denominator for normalization purposes.

5.4.2.3.1 Inter Purchase Time

Let $\overline{IPT}$ denote the average Inter Purchase Time, that is the average length of the time-interval between two successive non-promotional or non-utilized promotional shopping trips. Let $\overline{IPT\_}$ denote the average length of the time-interval between a non-promotional or non-utilized promotional and a subsequent utilized promotional shopping trip. Let $\overline{IPT_+}$ denote the average length of the time-interval between a utilized promotional shopping trip and the subsequent non-promotional or non-utilized promotional shopping trip. We expect that households purchase sooner due to a promotion, and therefore that

$\overline{IPT\_}$ is smaller than $\overline{IPT}$. We also expect that households purchase more of a product that is on promotion and then wait longer before they purchase again. So $\overline{IPT_+}$ is expected to be larger than $\overline{IPT}$. The sign of the net effect of sales promotions on purchase timing, $\frac{\overline{IPT\_} + \overline{IPT_+}}{2}$, depends on the quantity purchased. The following three measures will be used to assess the influence of sales promotions on a household's inter purchase timing.

(5) Time Acceleration effect : $TA = \frac{\overline{IPT\_} - \overline{IPT}}{\overline{IPT}}$.

The time acceleration effect is the relative change in the length of the pre-promotional interpurchase time (expected to be ≤ 0).

(6) Time Readjustment effect: $TR = \frac{\overline{IPT_+} - \overline{IPT}}{\overline{IPT}}$.

The time readjustment effect is the relative change in the length of the post-promotional interpurchase time (expected to be ≥ 0).

(7) Time Net effect : $TN = (TA + TR)/2 = \frac{(\overline{IPT\_} + \overline{IPT_+})/2) - \overline{IPT}}{\overline{IPT}}$.

The time net effect is the intertemporal relative net change in the length of the interpurchase time.

5.4.2.3.2 Purchase Quantity

The purchase quantity effect is measured by comparing the average purchase volume during non-promotional or not utilized promotional shopping trips ($\bar{q}$) with the average quantity bought during the non-promotional or not utilized promotional pre-promotional shopping trip ($\overline{q\_}$), the average quantity bought during a utilized promotional shopping trip ($\overline{q_0}$), and the average quantity bought during a non-promotional or not utilized

promotional post-promotional purchased volume ($\overline{q_+}$). The four purchase quantity measures are as follows (again using ratio measures for normalization purposes):

$$(8)\ \text{Quantity Before effect}: QB = \frac{\overline{q_-} - \bar{q}}{\bar{q}}.$$

The quantity before effect is the relative change of the pre-promotional purchase quantity (expected to be ≤ 0).

$$(9)\ \text{Quantity Promotional effect}: QP = \frac{\overline{q_0} - \bar{q}}{\bar{q}}.$$

The quantity promotional effect is the relative change of the promotional purchase quantity (expected to be ≥ 0).

$$(10)\ \text{Quantity After effect}: QA = \frac{\overline{q_+} - \bar{q}}{\bar{q}}.$$

The quantity after effect is the relative change of the post-promotional purchase quantity (expected to be ≤ 0).

$$(11)\ \text{Quantity Net effect}: QN = (QB + QP + QA)/3 = \frac{((\overline{q_-} + \overline{q_0} + \overline{q_+})/3) - \bar{q}}{\bar{q}}.$$

The quantity net effect is the intertemporal net relative change in purchase quantity.

We doubt whether the quantity before effect (*QB*) is significant. If so, it is expected to be negative (anticipation effects). We do expect the two other effects to be present. The quantity promotional effect (*QP*) is expected to be positive, households buying more of a product when it is on promotion. However, there are also counter-arguments. The quantity promotion effect could be negative if households are less willing to take risks for a non-favorite brand. A large positive time acceleration effect could also go hand in hand with a negative quantity effect, as a result of the higher average remaining stock at the purchase time. The quantity after effect (*QA*) is expected to be negative, due to possible promotional stockpiling effects. The sign of the quantity net effect (*QN*) depends on whether or nor changes in purchase time take place. Extra promotional purchases can lead

to postponed post-promotional purchases, leading to a positive quantity net effect. But instead of postponing post-promotional purchases, the post-promotional purchase quantity can decrease, possibly leading to a negative net quantity effect. We therefore do not specify the expected sign for the net quantity effect (*QN*).

Purchase time and purchase quantity are therefore interrelated entities. Their combined effect on sales is therefore studied in the next subsection.

5.4.2.4 Category Expansion

Category expansion is the net effect on sales resulting from the two intertemporal mechanisms discussed in the prior subsection, purchase timing and purchase quantity. The next figure graphically illustrates the two components of category expansion.

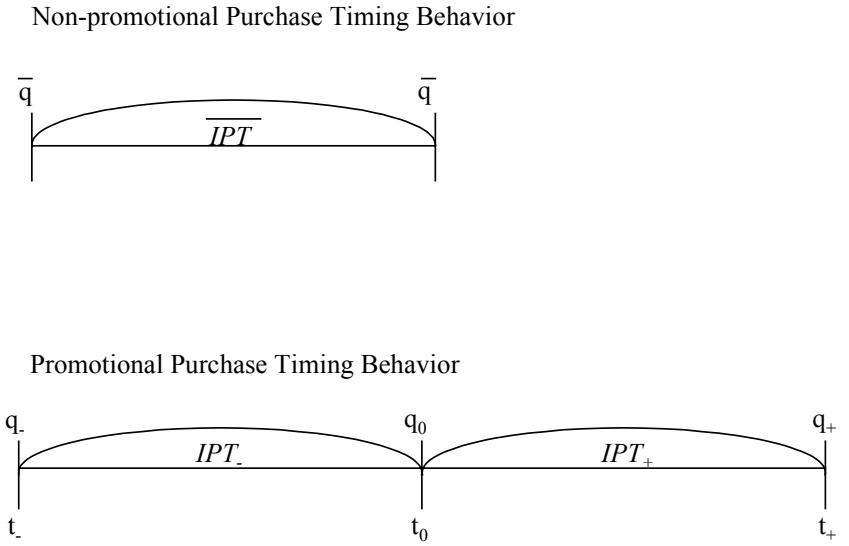


Figure 5.3: Graphical illustration category expansion

The Category Expansion measure is defined as follows (expected to be ≥ 0):

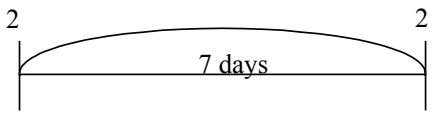
$$(12)\,\text{Category Expansion effect}: CE = \frac{QN+1}{TN+1} - 1 = \left(\left(\frac{(q_- + q_0 + q_+)/3}{\bar{q}} \right) \left(\frac{\overline{IPT}}{(IPT_- + IPT_+)/2} \right) - 1 \right).$$

The category expansion effect is expected to be non-negative, due to the fact that higher stocks may induce higher usage rates (see Section 4.2.4). The next example serves to illustrate the measure:

Example 5.1:

Suppose household A purchases on average during non-promotional shopping trips 2 liter bottles of Coca-Cola every week ($\bar{q}$ =2, $\overline{IPT}$ =7). During a shopping trip t_0, 5 days later than the last shopping trip, there is promotional activity for Coca-Cola in the primary store of household A. Household A purchased 2 bottles of Coke last shopping trip and did not intend to purchase Coke on this shopping trip. But, because its favorite brand is on promotion, the shopping responsible person from the household decides to buy it anyway, even more than otherwise, namely 4 bottles of Coca-Cola. After these promotional Coke purchases, household A waits one week before it purchases Coke again, this time 3 bottles, since the kids got used to more Coke.

Non-promotional Purchase Timing Behavior



Promotional Purchase Timing Behavior

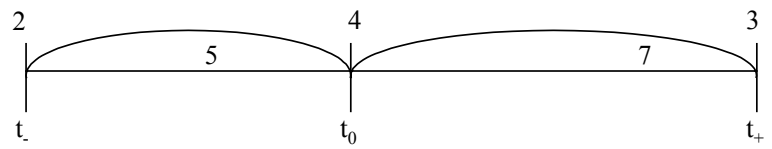


Figure 5.4: Graphical empirical illustration category expansion, example 5.1

This household has bought 9 bottles of Coke in total during the pre-promotional, the promotional and the post-promotional shopping trip. It has to be remarked that the pre- and post-promotional shopping trips are both non-promotional. These 9 bottles have been purchased during three shopping trips, leading on average to 3 liter per shopping trip. The average promotional interpurchase time amounts to 6 (12 divided by 2). Normally (when there are no promotions), this household purchases on average 2 liter bottles in 7 days. Now, with the promotion, the household has purchased on average 3 liter bottles in 6 days. So, the purchase quantity increases by a factor 0.5 (QN=0.5) and the interpurchase time decreases by a factor 1/7 (TN=1/7), leading to a category expansion effect (CE) of 1.5/(6/7)-1 = 0.75 or an increase of 75%.

PART II

EMPIRICAL ANALYSIS

6 DATA DESCRIPTION

6.1 Introduction

To study the effects of sales promotions on household purchase behavior, continuous household-level scanner data on product items is combined with retail outlet data regarding their promotional activity (the so-called causal data). The household data comes from GfK ConsumerScan and the retail data comes from IRI/GfK InfoScan. Both data sets cover the period from the last quarter of 1995 (IV 1995) until the last quarter of 1997 (IV 1997), 9 quarters in total. GfK ConsumerScan is the market leader with respect to household panel data in The Netherlands and is part of the pan-European market research agency GfK. For this study, data of various frequently-purchased packaged consumer goods is used, covering a variety of food/beverage products. We use only a subset of the available data (coffee, soft drinks, fruit juice, potato chips, candy bars, and pasta). These categories are chosen because of their frequent purchase and promotion activity character. Of the 2.25 years covered, we use the first 13 weeks (the last quarter of 1995) to initialize some model variables. We use the remaining 104 weeks of the period (1996 and 1997) for model calibration. The two different levels of data used (household panel and retail panel) are elaborated upon in the subsequent sections (Section 6.2 and Section 6.3). Section 6.4 describes linking these two different data sets in more detail. Section 6.5 deals with the representativeness of the resulting household analysis data set used in this research to answer the research questions. We conclude this chapter by providing some general descriptive statistics of the analysis data set.

6.2 Household Level Scanner Data

Household scanner panel data offers certain unique opportunities for understanding consumer behavior and deriving implications for marketing actions (Gupta et al. 1996). To decompose purchase behavior into the choice (brand, store), purchase timing, and purchase quantity effects, analysis must be conducted at this disaggregate (household) level (Bucklin et al. 1998). The GfK household scanner panel comprises 4060 households. This household panel represents the Dutch population of households. A household is defined as one or

more persons living together and dining at home at least four times a week. The sample is a stratified sample, using 'size of the household', and 'age of the housewife/househusband' as stratification variables, applying a Neyman-allocation (drawing relatively more/less households from strata with large/small dispersion regarding the stratification variables (Luijten 1993). Because of non-response (caused by all kinds of reasons, such as vacation, illness, and real non-response), social class, size of the municipality, and district are used as weights within each stratum. Appendix A6 provides an overview of the variables involved in the sample procedure.

Although household panel data offers several important advantages over store level data, it is often feared that this data is not representative. Russel and Kamakura (1994) did not find evidence that household panel data is nonrepresentative of store data. Tellis and Zufryden (1995) and Gupta et al. (1996) demonstrated that panel data provides unbiased estimators for general behavioral indicators, but more specific estimators are biased. Luijten and Hulsebos (1997) investigated the representativeness of the GfK ConsumerScan panel of the Dutch population. They concluded that the panel members are as price sensitive as non-panel members, and have the same attitudes towards media behavior, store choice, and store evaluation. Price knowledge differs for some product categories, where, in those cases, panel members were better informed about the exact prices. Panel members also turned out to have more interest in leaflets, brochures, etc.

Most households in the dataset are not single-person households (81.2%), which could lead to the problem that purchases from the same household may reflect the choices of different consumers on different purchase occasions (Mayhew and Winer, 1992). If the shopper within the household changes from one purchase occasion to the next, a possible brand switch does not have to be caused by, for example, promotional activity or variety seeking behavior at the individual consumer level. Conclusions are therefore drawn at the household level, not at the individual consumer level. For each of these 4060 households, we have information available for the six product categories mentioned above. More specifically, we have information on the specific item bought, the retail chain, the amount bought, the price paid, and the day and time of the purchase (morning, afternoon, or evening).

With only purchase-record information, one cannot infer the promotional environment during each shopping trip. The price variable in the data set does indicate whether purchased items where promoted using a price cut. But there is no information on other promotional activities for purchased items, such as display activity. Furthermore, there is no information at all for items that were not purchased. So, purchase-record information can be used to observe brand switching-, store switching-, purchase acceleration-, category expansion-, or repeat purchasing effects, but the causes of these possible effects remain unknown. Causal data from the retail outlet visited by a household is used to derive the missing promotional information. This is dealt with in the next section.

6.3 Store Level Promotional Data

The IRI/GfK retail panel consists of about 10% of the total population of retail outlets in The Netherlands. For each of these stores, weekly, SKU (Stock Keeping Unit)-level information about promotional activity is registered for display and feature promotions, together with the action price. This information can, first of all, be used to infer the promotional environment during each household shopping trip. Second, this information can be used to infer regular and special prices. The regular price is assumed to be the last non-special price for a brand in a store (cf. Mayhew and Winer 1992). When this price differs greatly from historically paid non-special prices, we apply an extra check on the validity of the price data.

If each retail outlet within a retail chain would apply the same promotional strategy, we could generalize the available retail chain-level information for all households from the household panel. Unfortunately, it turned out that promotional activity is not uniform across retail outlets within the same retail chain (using data from the last quarter of 1995). This was found for all six product categories included in this research. The estimated uniformity rate, defined as the percentage of sample store outlets having the same promotional activity in the same week, is typically less than 50%. This quite astonishing result (even outlets who profile themselves as being nationally organized retail chains showed low uniformity rates) forced us to think of another way to combine the household level data and the store. This linking process is dealt with in the next section.

6.4 Linking Household and Store Data

Since the individual household serves as the level of analysis in this research, the promotional activity data has to be disaggregated towards the same level. First of all, a specific retail outlet has to be assigned to each household that is a member of the household panel. For this purpose, we have determined the primary retail chain for each household, which is defined as the supermarket where the households spent at least 50 % of their grocery expenses for the last quarter of 1995. This assignment process resulted in 1770 (43.6%) households with a primary store. Next, we assigned a specific primary retail outlet to each household, based on postal code information (assuming that a household shops at the nearest by retail outlet belonging to their primary retail chain). This assumption is not very restrictive. Most prior research on store choice concluded that store location and travel distance are the most important determinants of store choice (e.g., Brown 1989, Craig, Ghosh, and McLafferty 1984, Huff 1964, Bell et al. 1998).

Figure 6.1 represents the household derivation process, starting with the household panel and resulting finally in the households remaining in the analysis. The household panel consists of 4060 households of which 1770 households can be assigned to a primary retail chain. Subsequently, these remaining 1770 households are assigned to a specific retail outlet from this primary chain, based on shortest distance. Then, it is possible to check whether each specific retail outlet is a member of the retail panel (indicated by r), which leads to an analysis set of 239 households for which both the household and the promotional activity data are at our disposal (indicated by h). Unfortunately, 39 households were not a member anymore of the household panel in 1996 or 1997. The final household analysis set therefore consists of 200 households. Only purchases from the primary store are incorporated in the analyses, as for these purchases both the household data and the promotional data are available.

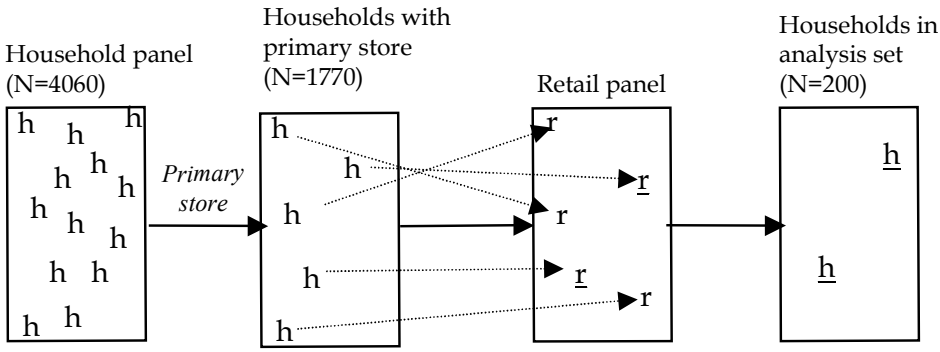


Figure 6.1: Pictorial representation of household selection process (h represents a household, r represents a retail outlet)

This primary store assignment process is at the expense of smaller, local, or specialty shops. They have a smaller probability to be included in this study, because of smaller assortments, less products, less choice, etc. Households will hardly ever spent 50% or more of their grocery expenses in these types of shops. The remaining households and their outlets are all members of the five biggest retail chains in The Netherlands, which constitute 53.7% of the total market share. Before using the resulting 200 household, the representativeness of this set of households compared to the GfK household ConsumerScan panel has to be determined, to ensure generalizability of the findings of this study. The next section contains some statistical tests that assess differences and/or similarities between the entire household panel and the set of households that will be used to assess the effects of sales promotions on household purchase behavior in the remainder of this dissertation.

6.5 Representativeness Household Analysis Set

The first 13 weeks of data are used to investigate whether the 200 households from the household analysis set provide a good representation of the entire household panel on a number of household and purchase process characteristics, such as social class, household size, age of the housewife, household cycle, purchase frequency, and grocery expenditures (as these variables were identified as possible drivers of sales promotion response, the representativeness with respect to these variables is very important).

Table 6.1 contains the results of several 2-sample independent t-tests, each testing the null hypothesis that two population means are equal, based on the results observed in two independent samples. In this situation, testing whether the two group (the 200 households that are a member of the final analysis set versus those 3860 households who are not) means are equal for several variables.

Table 6.1: Results independent t-test

Variable	Observed-two-tail significance level	Representative
Social class	0.08	YES
Size of the household	0.07	YES
Age of the housewife	0.96	YES
Household Cycle	0.62	YES
Yearly total number of grocery shopping trips	0.00	NO
Yearly total amount of grocery expenditures	0.43	YES

The final analysis sample of households used in this dissertation seems to differ from the entire household panel with respect to the total number of shopping trips. The households in the analysis set make (significantly) less shopping trips (on average 39 compared to 45 shopping trips per year for the remaining 3860 households). Therefore, frequent shoppers are underrepresented in the analysis set of households. More frequent shoppers could have the tendency to visit more different stores, resulting in a smaller probability for having a primary store.

A more in-depth study revealed that the difference is caused by a small percentage of very frequent shoppers (2 or even 3 shopping trips per day on average) in the entire household panel, which is underrepresented in the analysis sample. When excluding the top 10% of most frequently shopping households from both the entire panel and the analysis sample, the (two-sample independent) t-statistic does conclude that the average numbers of shopping trips are comparable. So the bulk (90%) of shoppers in the analysis sample is

representative for the bulk of shoppers in the entire household panel with respect to shopping frequency.

Based on the findings in Table 6.1 and the in-depth results as described above, we conclude that the final analysis set of household is reasonably representative for the entire household panel with respect to household characteristics and purchase process characteristics. The next section contains some descriptive statistics of the analysis data set to gain some first insights.

6.6 General Descriptive Statistics Analysis Data Set

To get a first grasp of the data used in this research, some descriptive statistics and some graphs will be presented for the 200 households from the analysis data set. The size of the household ranges between 1 and 7 where the average size equals 2.52 (standard error equals 0.09). Table 6.2 presents the frequency table for the variable size (in absolute and relative numbers). The modal household size equals two. Household sizes above five members hardly occur in the data set.

Table 6.2: Frequency distribution of household size

Household size	Frequency	Relative Frequency
1	45	23 %
2	71	36 %
3	38	19 %
4	31	16 %
5	13	7 %
6	1	1 %
7	1	1 %

The age of the shopping responsible person in the analysis data set ranges from 20-24 to 75 years or older. The bar chart presented in Figure 6.2 provides insights in the frequency distribution of age within the analysis data set.

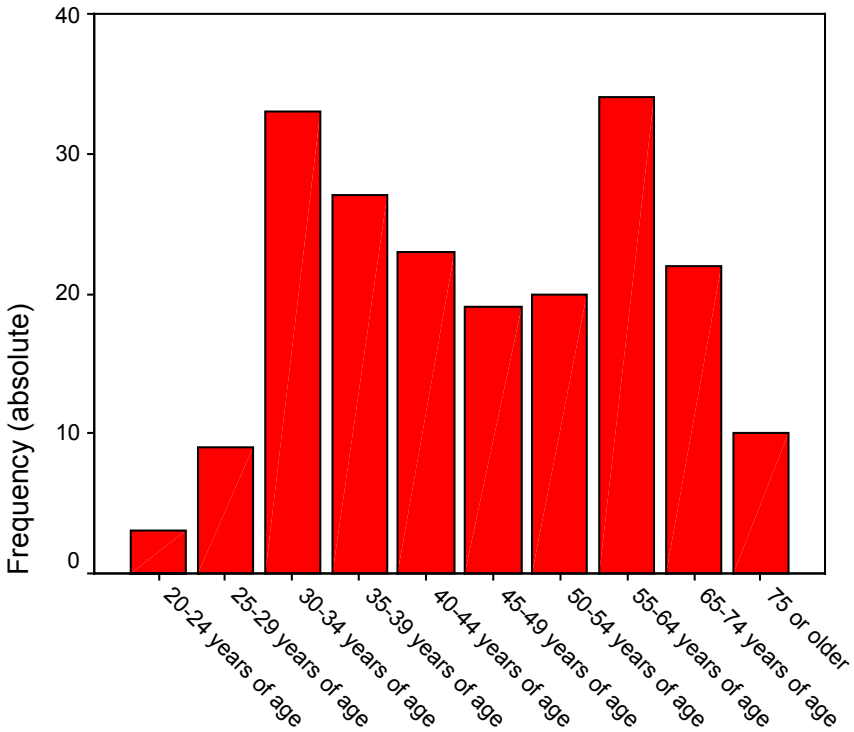


Figure 6.2: Frequency distribution age of the shopping responsible person in the household

Age is related with household cycle, of which the frequency distribution is shown in Table 6.3.

Table 6.3: Frequency distribution of household cycle

Household cycle	Frequency	Relative Frequency
Single, shopping responsible person younger than 35	9	5 %
Single, shopping responsible person 35-54	14	7 %
Single, shopping responsible person older than 54	22	11 %
Family with youngest child 0-5	25	13 %
Family with youngest child 6-12	18	9 %
Family with youngest child 13-17	17	9 %
Family without children, shopping responsible person younger than 35	15	8 %
Family without children, shopping responsible person 35-54	36	18 %
Family without children, shopping responsible person older than 54	44	22 %

High, or low income, could be a driver of sales promotion response. As discussed in Section 3.2.1, social class is an indicator of income. Therefore, it is interesting to look at the distribution of social class among the households in the analysis sample. Table 6.4 contains the (relative) frequency distribution.

Table 6.4: Frequency distribution of social class (see Table A3.1 for the exact operationalization of social class)

Social class	Frequency	Relative frequency
High	23	12 %
Above average	58	29 %
Average	38	19 %
Below average	70	35 %
Low	11	6 %

Both the high and low social classes are a part of the household analysis data set, which is important when we want to derive whether social class is an important driver of sales promotion response (as will be discussed in detail in the next chapter).

Besides household demographics and socio-economic factors, purchase process characteristics also can play an important role in household sales promotion response. For example number of shopping trips and amount spent on groceries could be related with promotion response. On average, households visit a grocery store 39 times a year, ranging between 12 to 98 times (with a standard deviation of 18). The total amount of money per household spent on groceries equals, on average, about 16,000 guilders per year.

These general descriptive statistics serve as the starting-point of the empirical part of this research, which is focused on studying the effects of sales promotions on household purchase behavior. Table 6.5 contains some aggregate information on promotion response. The percentage of sales purchased on promotion for the six product categories included in this study for two years (2000 and 2001) can be found in the table. The numbers represent the aggregated percentages based on the entire retail panel.

Table 6.5: Promotional sales percentages (volume and money)

Product category	2000		2001	
	% Volume	% Money	% Volume	% Money
Coffee	24	19	27	22
Fruit juice	16	14	19	16
Soft drinks	28	24	30	26
Candy bars	31	27	31	26
Potato chips	28	24	30	26
Pasta	12	9	10	8

The percentages presented in Table 6.5 suggest that sales promotions have quite some influence on purchase behavior. On average, about one fourth of the total sales come from promotional sales. Furthermore, differences between product categories are found.

Promotion response is empirically studied in detail in the subsequent two chapters. In-depth empirical investigations will be reported and discussed. Each chapter deals with one step of the two-step approach we have chosen in this research. First the drivers of sales promotion response are studied (Chapter 7). Subsequently the decomposition of household promotion response into sales promotion reaction mechanisms is dealt with (Chapter 8).

7 EMPIRICAL ANALYSIS ONE: DRIVERS OF SALES PROMOTION RESPONSE

7.1 Introduction

Understanding household promotion response means understanding the drivers that determine whether or not to respond to a specific promotion. Based on the hypotheses formed in Chapter 4, we want to identify which household variables (demographics, psychographics, and purchase characteristics) influence purchase decisions, and in what way. Moreover, we want to check whether promotion response behavior of households is consistent across product categories. For each shopping trip of each household in our database, we know whether there were promotions and, if so, whether a promoted item was purchased. This information serves as the basis for the analyses performed and the results described in this chapter.

The variables used in the hypotheses derived in Section 4.2 and 4.3 will be operationalized in Section 7.2. This results in an overview of the variables used in the analysis. The model used to derive the drivers of promotion response was already dealt with in Section 5.4.1. Section 7.3 describes the format of the data used to test the hypotheses. Before actually starting the analyses, variables have to be screened on their usefulness or their potential disturbing influence. This is discussed in Section 7.4. The results will be presented in Section 7.5.

7.2 Operationalization

Promotion response can be operationalized at various levels of detail. In this chapter, we look at a rather general level. We ignore the specific type of promotion response (the so-called sales promotion reaction mechanisms). Whether or not a household responds to the available sales promotion is the key dependent variable of interest in this chapter. This dependent variable, from here on called *promotion response*, is defined as a binary variable for each individual shopping trip. It is 1 if a sales promotion is used and 0 otherwise. Only

promotional shopping trips during which households purchased from a specific product category are included in this research.

Summarizing, the types of variables included in the analysis will be the following: (1) household demographics: size and composition of the household, age, education, profession of the shopping responsible person, and job sector of the breadwinner; (2) household socio-economic variables: social class, type of housing, and home ownership; (3) household pychographics: variety seeking; (4) characteristics of the purchasing process: shopping frequency, average size shopping basket, number of favorite brands, and number of stores visited; and (5) promotion types present in the store.

Table 7.1 contains the operationalization of the variables, which are used in analyzing promotion response. Table A7.1 contains a more detailed overview of the variables used in the analysis. A (+) or (-) sign in Table 7.1 indicates whether the operationalization is expected to be positively or negatively related to a variable. For example, the number of different favorite brands is used as a positive indicator of variety seeking. Both variety seeking indicators are measured at the product category level. Steenkamp et al. (1996) demonstrated that variety seeking behavior does not occur to the same extent for all products.

The different promotion types that are distinguished in this study are grouped into in-store versus out-of-store promotions. In-store promotions are defined to occur when display activity is included in the promotion. Out-of-store promotions are defined to occur when feature activity is included in the promotion. Although not all feature promotions are out-of-store, the majority is. As most prior research has shown that display promotions are more effective than feature promotions, promotions with both display and feature activity are defined as belonging to the in-store promotions. In addition, three promotion characteristics are added to Table 7.1 (X^{*}, X^{other}, and X^{*other}). These variables are described in more detail in Section 7.3.

Table 7.1: Operationalization of the variables used in analyzing promotion response

Variable	Operationalization
	HOUSEHOLD CHARACTERISTICS
Social Class	Based on education and occupation of the breadwinner (see Table A3.1 for a more detailed operationalization).
Size	Number of persons in the household
Residence	1. Type of residence the households lives in (categorical) 2. Is the residence own property (dummy variable)
Age	Age of the shopping responsible person within the household
Education	Education of the shopping responsible person in the household
Employment Situation	1. Employment situation of the shopping responsible person within the household 2. Job sector of the breadwinner
Cycle	Family Life Cycle
Variety Seeking (intrinsic)	1. Number of different favorite brands during observed period (+) 2. BS_{np}[1], Non-promotional Brand Switching (see Section 5.4.2.2 for more details) (+)

continued

[1] Non - promotional Brand Switching :

$$BS_{np} = \frac{\text{number of nonpromotional shopping trips during which nonfavorite brands are purchased}}{\text{number of nonpromotional shopping trips}}.$$

Table 7.1 continued

Variable	Operationalization
	HOUSEHOLD PURCHASE CHARACTERISTICS
Store Loyalty	1. Number of different chains visited (-) 2. Share of primary store in total FMCG expenditures (+) (quantity) 3. Share of primary store in total FMCG expenditures 4. (+) (money)
Basket Size	Number of different items (brands) per shopping trip
Shopping frequency	Number of quarterly shopping trips in the primary store
	PROMOTION CHARACTERISTICS
In-store promotions	Display related promotions (D, DF, DP, DFP)
Out-of-store promotions	Feature related promotions (F, FP)
X^{*}	Favorite-brand promotion
X^{other}	Other promotion(s) present during shopping trip
X^{*other}	Other promotion(s) present is for favorite brand

7.3 Data Set

Only promotional shopping trips (shopping trips during which there was promotional activity in the primary store within the six product categories) can be used to determine the drivers of promotion response. This useful set of data contains 9,858 records on shopping trips for 156 households (44 out of the 200 households could not be used because of too much missing information). During 4,886 shopping trips there was only one type of promotion within that product category, the so-called *single-promotion data*. During the 4972 other shopping trips, more types of promotions within the same category were present, the so-called *multiple-promotion data*. During 3,301 of the 4,972 shopping trips, there were two different types of promotions present for different brands within the same category. During 1,236 shopping trips three different promotion types were present, and

during 435 shopping trips more than three different promotion types were present within the same product category.

Therefore, during one shopping trip, several different types of promotion for different brands can be present within the same product category. A household can decide to use one of the available promotions, more than one, or all of them. The household therefore has to decide for each available promotion whether to use it or not. That is the reason for decomposing the *multiple-promotion data* such that each case deals with only one available type of promotion.

The dependent variable only indicates whether or not a household made use of at least one of the available promotions during a shopping trip. It does not indicate which (of the) promoted SKU's were purchased. However, we do have that information available and want to incorporate it into the analysis. As mentioned before, we therefore change the data format by multiplying a single record in the multiple-promotion data set, corresponding to a shopping trip with n, n=2,3,…, promotions, to n records with 1 promotion in the new data set. We first describe this method of formatting the data using an example, and then discuss its legitimacy. We remark that the new *combined-record data set* has 17,144 records (the 4,886 single-promotion records plus the decomposed records from the multiple promotion data (12,258 records).

Suppose there is display activity for one of the favorite SKU's and feature activity for another, non-favorite SKU during the same shopping trip, both of them combined with a price cut. The household uses the display activity (in the sense that the household purchases the product that was on display), but not the feature activity. The original multiple-promotion-record (Y=1, X_{dp}=1, X_{fp}=1) decomposes into two single-promotion records, namely a two-record data format with only one type of promotion present in each specific record (Y=1, X_{dp}=1, X_{fp}=0), (Y=0, X_{dp}=0, X_{fp}=1). Then, two extra explanatory binary variables X^{other} and X^{*other} are added, indicating whether (1) or not (0) there were promotions for other SKU's and for other favorite SKU's respectively. So we end up with the following records: (Y=1, X_{dp}=1, X_{fp}=0, X^{other} =1, X^{*other}=*0*) and (Y=0, X_{dp}=0, X_{fp}=1, X^{other} =1, X^{*other}=*1)*.

Is the decomposition of an n-promotion type record into n one-promotion type records legitimate? A household that encounters n, n=2,3,…, promotions actually has to

make n purchase decisions. But those purchase decisions probably depend on each other. Indeed, that is why the explanatory variables X^{other} and X^{*other} are added to the multiplied records. We expect that the information provided by those two additional variables is sufficient to remove most of the bias. This will be validated in Section 7.5.1 by comparing the results obtained using only the single-promotion data with the results obtained from the combined record data.

Why should we even bother about the multiple-promotion data at all? Why not only take the single-promotion data into account? This research is aimed at acquiring knowledge about the drivers of sales promotion response. If we would only take single-promotion data into account, we would not obtain insights in the impact of the presence of other types of promotions on sales promotion response. This could lead to an unrealistic description of the drivers of sales promotion response. The presence of other types of promotions for other SKU's within the same category will intuitively have a detrimental effect on the impact of a promotion. Before presenting the results of the data validity check and the results of the empirical hypotheses testing, variable screening is performed to circumvent possible multicollinearity problems.

7.4 Variable Screening

All variables that could possibly be related to promotion response (Table A7.1) are candidates to be incorporated in the binary logistic regression analysis. But, the presence of multicollinearity could lead to large standard errors, which in turn could lead to unjustified non-significance of possible drivers of promotion response. In this section we discuss which variables are excluded from the analysis and for what reason. If a correlation coefficient is provided in the text, we will also mention its 2-sided significance (p-value), and the number of observations it is based on. These three numbers will be put between parentheses. For example (0.65, 0.03, 156) indicates that, based on 156 observations, a correlation coefficient of 0.65 was found and that the associated p-value is 0.03. This p-value of less then 0.05 implies that the correlation coefficient found statistically differs significant from zero (two-sided) using a significance level of 0.05.

The variables size, age, and cycle are related by definition. Household cycle is a composite variable consisting of both age and size of the household. Potential estimation problems can be prevented by incorporating cycle in the analysis as a nominal, categorical variable and at the same time incorporating age and size in the analysis as variables having a linear relationship with promotion response. But because this approach does not provide us with the detailed insights about the effect of age and size per se, additional analyses are carried out excluding cycle and incorporating age and size as categorical variables. These analyses are not restricted to a linear relationship between these two variables and promotion response.

Another potential variable that could bring estimation problems about is education. Numbers are assigned to education and social class so that both variables can be dealt with as interval variables (see Table A7.1). Education has a very strong relationship with social class (0.76, 0.00, 156). This is expected, because social class is defined based on education and occupation (see TableA3.1). Social class is a frequently used segmentation variable in marketing studies, which underlines the importance of incorporating this variable in this research. However, education is also of interest, and the correspondence between social class and education is not one-to-one. Excluding education would mean that the hypothesis regarding the relationship between education and promotion response could not be tested in an empirical setting. This problem is solved as follows. The nominal, categorical variable education has four levels. For this variable, four dummies are defined. Each of these dummies is logistically regressed on social class (which, in turn, is transformed into dummy variables for each specific level of social class). Four columns of error terms, one for each of the education levels, result. The variables are named EDUCRES_STANDARD (standard level), EDUCRES_LOWER (lower level), EDUCRES_MIDDLE (middle level), and EDUCRES_HIGH (high level). Three out of these four error terms, which add up to zero, are incorporated in the binary logistic regression analysis (leaving out EDUCRES_HIGH). They are uncorrelated with social class, and indicate the stand-alone effect of education on promotion response, relative to the highest level of education.

Two measures of store loyalty (STORLOY1 and STORLOY2, being the share of the primary store in total FMCG expenditures in quantity and money, respectively, see

Table A7.1) are highly interrelated (0.80, 0.00, 156). Two measures of the size of the basket (BASKET1 and BASKET2, being number of different items purchased quarterly and number of different items purchased not on promotion quarterly, see Table A7.1) also suffer from the interdependence problems (0.86, 0.00, 156). The tolerance values (Norusis 2000), the proportion of variability of a variable that is not explained by its linear relationship with the other independent variables, turns out to be 0.20 for the two basket size indicators and 0.35 for the two store loyalty indicators. These low tolerance values point at multicollinearity. It was therefore decided to incorporate the variables as factors. The two basket size measures served as input for a principal axis factor analysis, and so did the two store loyalty measures. The resulting factor scores are subsequently used as input for the binary logistic regression models (the factor scores are respectively named BASKET (basket size) and SHOPSHAR (share of the primary shop in total grocery expenditures)). When using these factor scores in the analysis, the potential multicollinearity problem is avoided (all tolerance values exceed 0.63).

We remark that during the estimation phase, some explanatory variable categories are combined because of a lack of observations. Adjacent categories, which obtained approximately the same estimates in the logistic regression analysis, are combined. The three highest Social class categories are combined. Household sizes exceeding 4 members combined into one category (≥5). Some categories of type of residence are combined based on size of the house and signs of the estimated coefficients, leading to four categories (single family house, town house, apartment, and other). With respect to the employment situation of the shopping responsible person the two paid job profession categories are combined. Furthermore, the welfare, disabled, and pensioned categories are combined. The different categories of the job sector of the breadwinner are combined based on the level of employment.

The binary logistic regression analysis is carried out for all six product categories together to identify general drivers of household promotion response. The results are discussed in the next section. The analyses are also carried out for each product category separately, to investigate the existence of a deal proneness trait (Section 7.6).

7.5 Results Drivers of Promotion Response

In this section, the hypotheses as derived in Section 3.2 and 3.3 will be empirically tested using 17,144 promotional purchase records from 156 households for the period (1996(II) – 1997(IV)). The structure of this section is as follows. The results using the single-promotion data, the decomposed multiple-promotion data and the combined data are compared in sub-section 7.5.1. Subsequently, the obtained results are dealt with in section 7.5.2 in detail. Each hypothesis is tabulated along with the estimated coefficients regarding the variable tested. Finally, the implications of the findings are discussed in Section 7.5.3.

7.5.1 Data Legitimacy Check

Before discussing the findings in detail, first the validity of the findings is checked by comparing the estimates for the combined-record data format (where all promotion shopping trips are decomposed in such a way that each data record deals with only one type of promotion) with the single-promotion data (where only those records are selected where only one type of promotion is present) and the decomposed multiple-promotion data (where those records are selected where more than one different type of promotion was present during a specific shopping trip, these shopping trips are decomposed such that every record deals with only one type of promotion) (see Section 7.3 for details about these three data formats). The results of the binary logistic regression analyses for these three different data inputs can be found in Table A7.2. The significance levels reported for the categorical variables indicate whether the variables itself are significant or not.

Overall, the parameter estimates for the three groups are reasonably in agreement. When we look at the parameter estimates for the possible drivers of promotion response, the overall picture that emerges of drivers of promotion response is also consistent (most significant estimates have the same sign and about the same size). Although some differences are present, the relative ranking of the parameter estimates for the different categories of a variable lead to the same findings.

Similar results are found regarding the influence of price-cut combined promotions for all three data sets: feature combined price cuts are used more than display combined price cuts, price cuts supported by both display and feature have the biggest impact from the different promotion types, and promotions for the favorite brand have the biggest impact on promotion response. Therefore, regarding the effect of the different types of sales promotions on promotion response, the results seem to validate the legitimacy of the multiple-promotion decomposition. But there are some exceptions. The parameter estimates for the different non-price cut promotion types (*XD*, *XDF*) do vary between the three groups of parameter estimates. For these promotions, the effects are estimated to be greater for the combined data and the decomposed multiple-promotion data. But, the effect of such a promotion is reduced due to the presence of other types of promotion. It can therefore be concluded that the presence of other types of promotions is especially detrimental for non-price cut sales promotions (although this only partly explains the differences found).

Overall, enough evidence for consistency in findings is obtained, leading to the conclusion that the results are providing us with valid and reliable results regarding the drivers of promotions response. In the subsequent sub-sections, the results using the combined data will be dealt with in more detail.

7.5.2 Results Hypotheses Testing Household (Purchase) Characteristics Related to Promotion Response

The results of the binary logistic regression analysis can be found in Table A7.3. In the next sub-sections, each hypothesis from Section 3.2 and Section 3.3 will be tested. As mentioned before, in each table we will zoom in on each specific variable that is hypothesized to be related with promotion response. Each sub-section deals with the outcomes of the relationship between promotion response and a specific driver of this promotion response. Each possible categorical (nominal) driver of promotion response is incorporated in the analysis as a deviation variable. The resulting estimated logistic regression coefficients for these categorical variables tell us how much more or less

responsive the households within that category are compared to the average household. Another group of variables are included as ratio variables (size, age, variety seeking, basket size, shopping frequency, and store loyalty). The resulting estimates for these variables therefore represent the influence of an increase of one unit on the log-odds. Furthermore, dummy variables are incorporated in the analyses (property possession, and the different types of promotion). Note that each record contains only one promotion type dummy that equals 1, except X^{*}, X^{other}, and X^{*other}, which are defined such that their influence is on top of the promotion type effect or on top of each other. The estimated effects therefore have to be added on top of the other promotional types effects. Suppose that a household encounters a display promotion for a favorite brand for a specific category and there are no other promotions within that category, than the log odds increases with the estimated effect of display promotions (XD) and the estimated effect for the dummy representing the favorite brand (X^{*}).

Table A7.3 contains the results of two logistic regression analyses. With respect to the categorical variables, both the significance of the separate levels and of the variable itself are provided. As mentioned in Section 7.4, one analysis was carried out incorporating the variable cycle as a categorical variable and the variables age and size as linear variables. The results of this analysis can be found in the first column of estimates (is the same as the first column of estimates from Table A7.2). The second analysis (of which the results can be found in the second column of estimates) was carried out excluding cycle from the analysis and incorporating age and size as categorical variables. The parameter estimates are comparable across the two analyses, which underlines the robustness of our findings. Small changes in the model do not lead to entirely different findings. Because of this consistency, we have chosen to use the results of the analysis where cycle is incorporated when appropriate.

7.5.2.1 Social Class

Table 7.2 contains the resulting estimated regression coefficients describing the relationship between promotion response and social class.

Table 7.2: Relationship promotion response and social class

SOCIAL CLASS *H_2: Social class and promotion response are positively related.*				
	B	S.E.	Sign.	Exp(B)
D (low)	-0.6430	0.1084	0.0000	0.5259
C (middle)	0.2549	0.0661	0.0001	1.2904
B_-,B_+,A (high)	0.3878	0.0620	0.0000	1.4737
Test results: Social class and promotion response are positively related.				

The results in Table 7.2 indicate that social class is positively related with promotion response. The lowest class uses the available sales promotions the least. More insights can be derived when this relationship is investigated distinguishing between in-store and out-of-store promotions.

We perform two separate analyses for in-store (display related) and out-of-store (feature related) promotions to take the interaction effect of promotion type into account. The resulting estimated coefficients of the binary logistic regression can be found in Table A7.4 (size and age are included linearly, cycle is included as a categorical variable in the analysis) and Table A7.5 (size and age are included as categorical variables, cycle is excluded from the analysis). The estimates for the relationship between social class and promotion response can be found in Table 7.3.

Table 7.3: Relationship promotion response and social class, looking for possible interaction effects with promotion type

SOCIAL CLASS

H_{2a}:Tthe positive relationship between social class and promotion response is stronger for in-store promotions than for out-of-store promotions.

	In-store promotions				Out-of-store promotions			
	B	S.E.	Sig	Exp(B)	B	S.E.	Sig	Exp(B)
D (low)	-0.7367	0.1252	0.0000	0.4787	-0.3728	0.2287	0.1030	0.6888
C (middle)	0.3117	0.0763	0.0000	1.3657	0.1140	0.1395	0.4139	1.1207
B_{-},B_{+},A (high)	0.4250	0.0711	0.0000	1.5296	0.2589	0.1327	0.0512	1.2955

Test results: The positive relationship between social class and promotion response is stronger for in-store promotions than for out-of-store promotions.

These results provide empirical support for the more flexible budget argument. Households with higher social standing use in-store promotions a lot, they have more freedom to enact on impulses. In addition to this analysis where the categorical variables are incorporated in the logistic regression model in deviation from their average, extra analyses are carried out in which the categorical variables are incorporated relative to one category of each variable (results are not reported). Based on the results from these last analyses, we can conclude that households from higher classes do use in-store promotion more than low- class households (p-value 0.00), whereas this difference is not significant for out-of-store promotions (p-value 0.07). Households of higher standing do not use out-of-store promotions significantly more or less than households from lower standing. The positive relationship between promotion response and social class is therefore especially the result of in-store promotions. Generally speaking, lack of income does not seem to be a promotion response driver, but a more than sufficient income does seem to offer the freedom to act on impulse. Our findings are thus in accordance with Inman and Winer (1998) who concluded that higher income households have a higher probability to act on impulse and in-store promotions could guide these impulse decisions.

7.5.2.2 Household Size

As mentioned in Section 7.4, size and cycle are intertwined. At first, size is therefore linearly incorporated (leading to the first parameter estimate for size in Table 7.4). The remaining rows show the results of treating size as a categorical variable (excluding cycle and including household size and age as categorical variables, all estimated regression coefficients can be found in Table A7.3). As mentioned before, no real differences are encountered when comparing the regression results with cycle and without cycle (age and size incorporated instead). This implies that the estimates are quite robust to incorporating different variables, which underlines the validity of the findings regarding the drivers of sales promotion response. Table 7.4 shows that bigger households make more use of the available promotions, but the positive effect diminishes for relatively large households (decreasing marginal returns after a household size of four).

Table 7.4: Relationship promotion response and household size

HOUSEHOLD SIZE

H_3: Household size and promotion response are positively related.

	B	S.E.	Sign.	Exp(B)
Coefficient in linear model	0.2544	0.0474	0.0000	1.2897
- 1	-0.1412	0.0820	0.0851	0.8683
- 2	-0.2244	0.0605	0.0002	0.7990
- 3	0.0450	0.0635	0.4785	1.0460
- 4	0.2265	0.0596	0.0001	1.2543
- >=5	0.0941	0.1113	0.3978	1.0986

Test results: Household size and promotion response are positively related.

These findings also direct towards Narasimhan (1984), who argued that the relationship between size of a household and using coupons is log-linear. Our findings provide an

indication that decreasing marginal returns are also found with respect to both in-store and out-of-store sales promotions.

7.5.2.3 Type of Residence

Type of housing itself is related to storage space and could therefore be a factor that influences promotion response. But Table 7.5 shows that our results do not confirm this. Note that a single family house is called detached in the UK and a town house is called a terraced house in the UK. Storage space or the lack of storage space does not seem to be an important driver of sales promotion response. On the other hand, households living in a town house are the most promotion responsive. These households have quite some storage space, and perhaps somewhat more limited grocery budgets that households living in single family houses. Perhaps the combination of grocery budget and storage space is more promising when trying to identify drivers of sales promotion response.

As mentioned before, storage space is not relevant for brand switching or store switching. But even when we exclude these two reaction mechanisms and focus and the remaining ones (excluding observations dealing with promotions for non-favorite brands and re-estimate the model, investigating the relationship between size of the house and non-brand switching promotion response, results are not reported), no empirical support is found for a positive relation between type of housing and promotion response.

Table 7.5: Relationship promotion response and storage space (type of residence)

TYPE OF RESIDENCE *H_4: Households living in a larger house (not in an apartment) are more promotion responsive.*				
	B	S.E.	Sign.	Exp(B)
Single family house	-0.3330	0.0949	0.0005	0.7170
Town house	0.3708	0.0582	0.0000	1.4489
Apartment	0.0493	0.0830	0.5527	1.0505
Other	-0.0870	0.1065	0.4121	0.9163
Test results: Households living in a larger house are not more promotion responsive.				

Whether storage space plays a more important role in household promotional purchase decisions when dealing with impulse purchases due to in-store promotions is investigated in Table 7.6. However, the results indicate that this is not the case (again, when only non-brand switch promotions are taken into account, no empirical proof is found for a positive relationship between size of the house and promotion response, neither for in-store nor for out-of-store promotions).

Table 7.6: Relationship promotion response and storage space, looking for possible interaction effects with promotion type

TYPE OF RESIDENCE

H_{4a}: Size of the house is more important for in-store promotions than for out-of-store promotions.

	In-store promotions				Out-of-store promotions			
Category	B	S.E.	Sig	Exp(B)	B	S.E.	Sig	Exp(B)
Single family house	-0.2306	0.1049	0.0279	0.7940	-0.9779	0.2556	0.0001	0.3784
Town house	0.3182	0.0664	0.0664	1.3747	0.6453	0.1313	0.0000	1.9065
Apartment	0.0310	0.0943	0.0943	1.0314	0.2058	0.1868	0.2705	1.2285
Other	-0.1186	0.1247	0.1247	0.8882	0.1208	0.2168	0.5774	1.1284

Test results: size of the house is not more important for in-store promotions than for out-of-store promotions.

The lack of empirical support for the stated hypotheses could be due to the fact that brand switching and store switching are not inhibited by storage space.

7.5.2.4 Age of the Shopping Responsible Person

As mentioned in Section 7.4, age and cycle are intertwined. At first, age is therefore linearly incorporated (corresponding with the first parameter estimate for size in Table 7.7). The remaining rows show the results of treating size as a categorical variable (excluding cycle and including household size and age as categorical variables, Table A7.3).

Table 7.7: Relationship promotion response and age

AGE				
H_5: Age and promotion response are U-shaped related.				
	B	S.E.	Sign.	Exp(B)
Coefficient in linear model	0.1673	0.0227	0.0000	1.1821
- 20-34	-0.6000	0.0563	0.0000	0.5488
- 35-49	0.0600	0.0480	0.2111	1.0619
- >=50	0.5400	0.0605	0.0000	1.7160
Test results: Age and promotion response are not U-shaped related but positively related.				

These findings imply that older consumers seem to be the most responsive towards sales promotions in general. No empirical evidence for a U-shape relation is found. Whether this is caused by lack of in-store promotion responsiveness among younger consumers or by an unexpected large in-store promotion responsiveness by older consumers is investigated in Table 7.8, which contains the results of the logistic regression analyses for the different types of promotions.

Table 7.8: Relationship promotion response and age

AGE

H_{5a}: Young shoppers are relatively more in-store promotion responsive whereas older shoppers are relatively more out-of-store promotion responsive.

	In-store promotions				Out-of-store promotions			
	B	S.E.	Sign.	Exp(B)	B	S.E.	Sign.	Exp(B)
Coefficient in linear model	0.1978	0.0262	0.0000	1.2187	0.0657	0.0477	0.1679	1.0679
- 20-34	-0.6945	0.0667	0.0000	0.4993	-0.3140	0.1103	0.0044	0.7305
- 35-49	0.1037	0.0556	0.0622	1.1092	-0.0710	0.1014	0.4839	0.9315
- >=50	0.5909	0.0692	0.0000	1.8055	0.2705	0.1372	0.0487	1.3107

Test results: young shoppers are not more in-store promotion responsive than older shoppers. Empirical support for a positive relationship between age and promotion response is found for both in-store and out-of-store promotions (although the effect is weaker for out-of-store promotions).

Type of promotion does seem to interact with age regarding promotion response (the coefficients change). But, older consumers use promotions significantly more in general, in-store and out-of-store (this was checked by running the analysis using the youngest shoppers as reference category (results are not shown)). It is concluded that age and promotion response are positively related. Therefore, the U-shape relationship is not found due to lack of promotion response among the young shoppers in the data set. Quite to our surprise, we do not find empirical evidence for young shoppers using in-store promotions more than older shoppers. They use in-store promotion (and out-of-store promotions) the least.

7.5.2.5 Education

As mentioned in Section 7.4, education and social class are intertwined. To solve this problem, education was logistically regressed on social class and three out of the four

resulting residuals were incorporated in the binary logistic regression model for promotion response (omitting the highest level of education). The findings regarding the relationship between education and promotion response can be found in Table 7.9. The variables represent the effect of education as far as it is not incorporated in social class. The estimated parameters are relative to the highest level of education.

Table 7.9: Relationship promotion response and education

EDUCATION (number of years of schooling)				
H_6: Education and promotion response are positively related.				
	B	S.E.	Sign.	Exp(B)
- standard (6 years)	0.0013	0.2138	0.9950	1.0013
- lower (10 years)	-0.2480	0.1044	0.0174	0.7801
- middle (12 years)	0.1324	0.0858	0.1226	1.1416
Test results: Education (after having corrected for social class) and promotion response are not positively related.				

The influence of education after correcting for the influence of social class on promotion response, is not significantly positive. The general assumption is that with experience (reflected in for example age and education), consumers are more efficient and have greater capability to engage in search. Although we did find a positive relationship between age and promotion response, the positive relationship between education (otherwise then measured by social class) and promotion response is not empirically supported.

Promotion type could be interacting with the relationship between education and promotion response. Out-of-store promotions need more search behavior, which could be carried out more efficiently by more highly educated households. The results are presented in the Table 7.10. Based on the results, one could conclude that the effect of education after correcting for social class seems to be positive. But, the coefficients are not significant.

Table 7.10: Relationship promotion response and education

EDUCATION (number of years of schooling)

H_{6a}: The positive relationship between education and promotion response is stronger for out-of-store than for in-store promotions.

	In-store promotions				Out-of-store promotions			
	B	S.E.	Sign.	Exp(B)	B	S.E.	Sign.	Exp(B)
- standard (6 years)	0.0161	0.2378	0.9459	1.0163	-0.3560	0.5380	0.5081	0.7005
- lower (10 years)	-0.2880	0.1212	0.0175	0.7498	-0.2442	0.2123	0.2501	0.7834
- middle (12 years)	0.1693	0.0976	0.0828	1.1845	-0.0197	0.1822	0.9140	0.9805

Test results: The positive relationship between education (otherwise than social class) and promotion response does not exist, neither for in-store nor for out-of-store promotions.

7.5.2.6 Employment Situation

The employment situation relates to at least two important drivers of promotion response: income and available time. Two hypotheses were developed in Section 7.2.6. The first deals with households without a paid job (either living on welfare, being unemployed, or being retired). The second deals with households were the shopping responsible person has a paid job out of the house. Table 7.11 and Table 7.12 contain the results of the logistic analysis. Table 7.11 contains the general results and Table 7.12 contains the results when taking possible interaction effects of the different promotion types into account.

Table 7.11: Relationship promotion response and employment situation

EMPLOYMENT SITUATION *H_7: Retired households or households living on welfare are more promotion responsive.* *H_8: Households where the shopping responsible person has a paid job are less promotion responsive.*				
	B	S.E.	Sign.	Exp(B)
- paid job	0.5352	0.0769	0.0000	1.7078
- retired, welfare	0.2972	0.0886	0.0008	1.3461
- school	-0.6966	0.1433	0.0000	0.4983
- housewife/ husehusband	-0.1360	0.0985	0.1681	0.8730
Test results: Retired households/households living on welfare use promotions more than average. But households in which the shopping responsible person has a paid job are the most promotion responsive.				

Both households in which the shopping responsible person has a paid job and retired households and households living on welfare use promotions above average. Working shopping responsible households even use promotions more than retired households (results are not reported). School going shoppers are found to be the least promotion responsive. Whether these findings still hold when we distinguish between in-store and out-of-store promotions is investigated using the outcomes presented in Table 7.12.

Table 7.12: Relationship promotion response and employment situation (distinguishing between in-store and out-of-store promotions)

EMPLOYMENT SITUATION

H_{7a}: Retired households or households living on welfare are more promotion responsive, especially for out-of-store promotions.

H_{8a}: Households where the shopping responsible person has a paid job are less out-of-store promotion responsive, but not less in-store promotion responsive.

	In-store promotions				Out-of-store promotions			
	B	S.E.	Sign.	Exp(B)	B	S.E.	Sign.	Exp(B)
- paid job	0.5471	0.0877	0.0000	1.7283	0.4627	0.1657	0.0052	1.5884
- retired, welfare	0.3773	0.1004	0.0002	1.4584	-0.0088	0.1977	0.9647	0.9913
- school	-0.7166	0.1625	0.0000	0.4884	-0.5367	0.3047	0.0782	0.5847
- housewife husbehusband	-0.2078	0.1138	0.0679	0.8123	0.0827	0.2051	0.6869	1.0862

Test results: Retired households/households living on welfare are not more out-of-store promotion responsive. When the shopping responsible person has a paid job out of the house, both in-store and out-of-store promotions are used more.

These results do seem to indicate that retired households, or households living on welfare are above average promotion responsive for in-store promotions, but not for out-of-store promotions. We remark that the biggest group of households are retired (from the 25 households there are only 3 of them living on welfare). Households in which the shopping responsible person has a paid job are the most promotion responsive, both with regard to in-store and out-of-store promotions.

Additional analyses (results not shown) in which the paid job category served as the reference category pointed out that households living on welfare do not use in-store promotions significantly less, but they do use out-of-store promotions significantly less than the households with a paid job for the shopping responsible person. These findings are completely opposite to our expectation and to what prior research concluded or argued. Based on the time-constraint and the income constraint, we expected to find that the

households living on welfare would (relatively) be especially responsive towards out-of-store promotions. But, this counterintuitive finding can be caused by a decrease in the number of observations when distinguishing between in-store and out-of-store promotions, especially with respect to the outcome of the out-of-store related promotion response.

An additional interesting finding is that school going shopping responsible persons (students) turn out to be non-responsive to sales promotions. In general, students have a limited budget and are not really time-pressed. Based on economic theory, one would expect them to be promotion responsive. But as Table 7.11 and Table 7.12 show, students have the lowest estimated coefficient for promotion response. Perhaps students expect to earn relatively a lot in a few years, and they therefore are not really focused on saving money.

The second variable associated with employment situation incorporated in this research is the job sector of the breadwinner. No hypotheses were derived about the relationship between this variable and promotion response, as we believe that the employment situation of the shopping responsible person is a more important driver of promotion response. The results show that a household in which the breadwinner has a relatively 'high' job, that promotion response is lower, especially due to lower response for in-store promotions. The rest of the findings are non-significant for this variable.

7.5.2.7 Presence of Non-school Age Children

The presence of young, non-school age children in the household is a possible time constraining factor. The negative influence of children in the household on promotion response is expected to be especially present when dealing with out-of-store promotions. Table 7.13 contains the resulting logistic regression coefficients for all promotion types. Table 7.14 contains the results distinguishing between in-store and out-of-store promotions (Table A7.4).

Table 7.13: Relationship promotion response and presence of children in the household

CYCLE *H_9: The presence of non-school age children in the household and promotion response are negatively related.*				
	B	S.E.	Sign.	Exp(B)
- single	0.3259	0.1052	0.0019	1.3853
- non-school age child	-0.2740	0.0909	0.0026	0.7606
- older children	-0.1700	0.0780	0.0292	0.8436
- family without children	0.1178	0.0593	0.0470	1.1250
Test results: The presence of children in general has a detrimental influence on promotion response.				

The results show that children in general, not only the presence of non-school age children, lead to less promotion response.

Table 7.14: Relationship promotion response and presence of children in the household (distinguishing between in-store and out-of-store promotions)

CYCLE

H_{9a}: The presence of non-school age children in the household and promotion response are negatively related, especially for out-of-store promotions.

	In-store promotions				Out-of-store promotions			
	B	S.E.	Sign.	Exp(B)	B	S.E.	Sign.	Exp(B)
- single	0.2554	0.1198	0.0330	1.2910	0.5492	0.2320	0.0179	1.7318
- non-school age child	-0.2219	0.1043	0.0335	0.8010	-0.4402	0.1918	0.0217	0.6439
- older children	-0.1373	0.0874	0.1164	0.8717	-0.3335	0.1775	0.0602	0.7164
- family without children	0.1037	0.0679	0.1269	1.1093	0.2246	0.1244	0.0710	1.2518

Test results: Households with children, especially non-school age children are less responsive towards out-of-store promotions than towards in-store promotions, but the in-store promotion responsiveness is still below average.

The estimated coefficients do not provide the expected empirical support regarding the different promotion types. Both in-store and out-of-store promotions are relatively under-used by households with these young children.

As mentioned before, both employment situation and the presence of non-school age children are two variables that deal with time constraints. But their effects are quite different, as a comparison of the results of this and the previous section shows. Apparently, these two variables influence promotion responsiveness in more ways than through time constraints alone. Especially the combination of available time and available budget seems to matter. Lack of time has a negative influence on promotion response. But, lack of time in combination with no lack of shopping budget seems to lead to promotion responsive households. Sales promotions as decision-making cues could be the reason behind this.

7.5.2.8 Variety Seeking

Two intrinsic variety seeking measures are incorporated in this study (VARSEEK1 and VARSEEK2 from Table A7.1). The first is the probability of a switch from a favorite brand to other brands when there are no promotions present (BS_{NP}, the exact definition is provided in Section 5.4.2.2). This measure corresponds most closely with the intrinsic variety seeking discussed in most prior research on variety seeking (see Section 2.3.5). Second, the number of different favorite brands throughout the model calibration period (1996-1997) is incorporated as a variety seeking measure. Their relation (logistic regression) with promotion response is given in Table 7.15.

Table 7.15: Relationship variety seeking and promotion response all promotions

VARIETY SEEKING *H_{10}: Intrinsic variety seeking and promotion response are not related.*				
	B	S.E.	Sign.	Exp(B)
BS_{np} (Brand Switch index for Non-Promotional shopping trips)	0.0378	0.1122	0.7363	1.0385
Number of favorite brands	-0.1870	0.0341	0.0000	0.8292
Test results: Variety seeking and promotion response are negatively related.				

Households that switch brands due to intrinsic reasons (VARSEEK1, BS_{np}) do not use promotions more. It seems as though the presence of promotions in the retail store is not a strong enough factor to influence intrinsic variety seekers. Intrinsic variety seekers do not switch for economic benefits. This finding underlines the hypothesis that intrinsic and extrinsic variety seeking are not related, which in turn underlines the importance of separating intrinsically and extrinsically motivated variety seeking (cf. Van Trijp et al. 1996).

In addition, the results for the second indicator of variety seeking, indicate that households with more favorite brands even make less use of the available promotions. Brand loyalty therefore seems to be a more important driver than variety seeking. Variety seeking leads to less loyalty and to less promotion response. When we want to get more precise knowledge on the effects of variety seeking on sales promotion response, we should actually look at the effect of for example BS_{np} on promotion response for non-favorite brand promotions. Table 7.16 contains the resulting coefficients when only promotions for non-favorite brands are included in the analysis. The results from this analysis are not reported in an additional table. With respect to the relationship between household characteristics and promotion response, no differences were found when incorporating only non-favorite brand promotions in the analysis. Only for the household purchase process characteristics differences were encountered. These will be discussed in the corresponding sub-sections.

Table 7.16: Relationship variety seeking and promotion response non-favorite brand promotions (N=15060)

VARIETY SEEKING *H_{10}: Intrinsic variety seeking and promotion response are not related.*				
	B	S.E.	Sign.	Exp(B)
BS_{np} (Brand Switch index for Non-Promotional shopping trips)	0.0301	0.1277	0.8135	1.0306
Number of favorite brands	-0.0659	0.0377	0.0808	0.9362
Test results: Variety seeking and promotion response are not related.				

The resulting coefficients are in accordance with the foregoing finding, intrinsic and extrinsic variety seeking are not related. Sales promotions do not drive the 'real' (intrinsic) variety seekers to try a different brand. Furthermore, no significant effect of the second variety seeking measure (number of favorite brands) on promotion response is found

anymore. Therefore it is concluded that variety seeking and promotion response are not related.

As the relationship between variety seeking and promotion response is found to be negative across all promotions, and non-existing for non-favorite brand promotions, this relationship has to be even stronger negative for favorite brand promotions. This implies that when a household likes to seek variety, a promotion for the favorite brand decreases the purchase probability.

7.5.2.9 Store Loyalty

Two indicators of store loyalty are incorporated in this study: (1) number of chains visited, and (2) share of primary store in FMCG expenditures. The results from Table 7.17 show that households that shop in more retail stores do use the available promotion to a larger degree (although not significantly at the 0.05 significance level). This indicates a negative relationship between store loyalty and promotion response. The FMCG share variable also leads to this result, although again non-significant.

Table 7.17: Relationship store loyalty and promotion response

STORE LOYALTY				
H_{11}: Store loyalty and promotion response are negatively related.				
	B	S.E.	Sign.	Exp(B)
SHOPSHAR	-0.0270	0.0316	0.3886	0.9731
NCHAINS	0.0735	0.0432	0.0890	1.0763
Test results: Store loyalty and promotion response are not significantly related.				

As mentioned in Section 3.3.1, we do expect that promotion type interacts with store loyalty. The results in Table 7.18 indicate, however, that the relationship between store loyalty and promotion response is non-significant for both in-store and out-of-store promotions.

Table 7.18: Results interaction store loyalty with promotion type response

STORE LOYALTY *H_{11a}: Store loyalty and promotion response are negatively related, especially for out-of-store promotions*.								
	In-store promotions				Out-of-store promotions			
	B	S.E.	Sign.	Exp(B)	B	S.E.	Sign.	Exp(B)
SHOPSHAR	-0.0389	0.0359	0.2786	0.9618	0.0007	0.0691	0.9923	1.0007
NCHAINS	0.0783	0.0487	0.1079	1.0814	0.0726	0.0963	0.4510	1.0753
Test results: Store loyalty and promotion response are not significantly related.								

But, as mentioned when dealing with variety seeking, different results are found when we take only promotions for non-favorite brands into account. The results can be found in Table 7.19.

Table 7.19: Relationship store loyalty and promotion response (non-favorite brand promotions)

STORE LOYALTY *H_{11}: Store loyalty and promotion response are negatively related*.				
	B	S.E.	Sign.	Exp(B)
SHOPSHAR	-0.0969	0.0361	0.0072	0.9362
NCHAINS	0.1221	0.0492	0.0131	1.1298
Test results: Store loyalty and promotion response are negatively related.				

For non-favorite brand promotions we do find a significant negative relation between store loyalty and promotion response. Households that are more loyal towards their primary store, turn out to be less promotion responsive for non-favorite brand promotions. Building store loyalty therefore seems to be beneficial both for the retailer and for the brand manager of the favorite brand of a household. No significant results were found when taking differences between different types of promotions into account (in-store and out-of-store promotions).

Thus, store loyalty and promotion response are found to be negatively related for non-favorite brand promotions. Households that shop mainly within one store are not focused on promotions for non-favorite brands. As no differences were found across all promotions, store loyal households are focused mainly on promotions for their favorite brands, even more than other households. Therefore, store loyalty is negatively related with non-favorite brand promotions, but positively related with favorite brand promotions.

7.5.2.10 Basket Size and Shopping Frequency

As basket size and shopping frequency are closely negatively related (both per shopping trip and overall), this section treats the results at the same time (Table 7.20).

Table 7.20: Relationship basket size and shopping frequency with promotion response

BASKET SIZE and SHOPPING FREQUENCY				
	B	S.E.	Sign.	Exp(B)
BASKETSIZE	0.0936	0.0357	0.0088	1.0981
NSHOPTRIPS PRIMARY STORE	-0.0460	0.0071	0.0000	0.9555
Test results: Basket size and promotion response are positively related. Shopping frequency and promotion response are negatively related.				

Large basket size shoppers make more use of the available promotions and frequent shoppers make less use of the available promotions. Table 7.21 shows that we find the same results for both in-store and out-of-store promotions (although the relationship between basket size and out-of-store promotional response is not significant).

Table 7.21: Results interaction basket size and shopping frequency with promotion type response

BASKET SIZE and SHOPPING FREQUENCY								
	In-store promotions				Out-of-store promotions			
	B	S.E.	Sig	Exp(B)	B	S.E.	Sig	Exp(B)
BASKETSIZE	0.0903	0.0410	0.0275	1.0945	0.1083	0.0746	0.1467	1.1143
NSHOPTRIPS	-0.0462	0.0080	0.0000	0.9549	-0.0464	0.0162	0.0042	0.9547
PRIMARY STORE								
Test results: Basket size and promotion response are positively related and shopping frequency and promotion response are negatively related to promotion response for both in-store and out-of-store promotions (although not-significant for basket size with respect to out-of-store promotions).								

Large basket shoppers are using both in-store and out-of-store promotions to a larger degree than small basket shoppers. Frequent shoppers make less use of both types of promotions.

As discussed in Section 6.5, it turned out that the households in the analysis data set shop less frequently than in the entire household panel. The promotion response found and discussed in this research therefore could be positively biased. But, as mentioned in Section 6.5, this difference was caused by only a very small subset of the households. The general insights obtained from the households in the analysis data set are representative for the entire household panel and therefore provide valid insights into the general drivers of household's promotional purchase behavior.

7.5.2.11 Promotion Type

As mentioned in Section 7.5.2, dummy variables are incorporated in the analyses that represent the different types of promotions included in this research. Note that each record contains only one promotion type dummy that equals 1, which means the promotion type

dummies add up to one. This implies that not all of them can be incorporated in the analysis. It was chosen to exclude feature promotions from the analysis, because prior research has shown that this type of promotions is often the least effective. Each promotion type parameter estimate has to be interpreted as the extra effect of that specific promotion type compared to feature promotions.

Display promotions are more effective than feature promotions. DF promotions have the same impact as DP promotions, even though no economic price gain is attached to them (the differences between the estimated coefficients are not significant, which is tested by using DP promotions as the reference category, these results are not shown). Apparently, Dutch consumers react to strong promotional signals (promotions without an economic benefit attached to them, see Inman et al. (1990)) when it concerns a display. Promotional feature signals have less impact. A possible explanation for the different effects for display and feature promotional signals could be that households that take the trouble to look at features, also look whether there are price reductions (price gains) attached to them. For US consumers, Inman et al. (1990) concluded that some consumers react to promotion signals without considering relative price information. Anderson and Simester concluded that sale signs increase demand. The households from our analysis set do react to display and to combined display/feature signals. With respect to the combined display/feature signal, the effect is even as much as for price cuts combined with a display. As mentioned before, displays especially tend to work as promotional signals. To our knowledge, the influence of promotion signals on sales has not been studied on a large scale in the Netherlands before.

FP promotions have more influence than DP promotions (the difference in estimates being significantly different from zero, results are not shown). Many prior studies found that displays are more effective than feature activities, but for example Rossi and Allenby (1993) found the opposite effect. The best communicated promotions (DFP) have the strongest positive effect on the probability that a household makes use of a promotion.

Promotions for the favorite brand have a large estimated regression coefficient and therefore a strong impact on households when deciding whether to use the available promotion or not. This effect is even on top of the effect of the specific promotion type

present for the favorite brand. The number 22.8 (being e^B) is therefore the minimum value of the factor by which the odds change when a favorite brand is on promotion. The odds ratio in this research is the quotient of the probability that a household uses a promotion and the probability that the household does not use the promotion. The probability of response therefore increases to a very large amount when the brand on promotion is the favorite one. This supports the criticism from many practitioners and scientists that sales promotions have strong effects, leading to peak sales, but that a big share of these extra sales comes from customers who would have bought the product anyway.

The effects of the different promotion types have face validity. Promotions with an economic benefit attached to them have a bigger impact than promotions without an economic benefit. The display and feature combined price-promotions have the biggest positive influence of all promotion types. Promotions for the favorite brand have a strong positive influence, and the presence of other types of promotions decreases the influence of a promotion. When the other promotion is for a favorite brand, the negative effect even becomes larger.

7.5.3 Contributions of the Study Regarding the Relationship between Household (Purchase) Characteristics and Promotion Response

In the preceding sections, the drivers of promotion response have been investigated. Different household characteristics (demographics, psychographics, and purchase characteristics), identified to be possible drivers based on prior research, have been incorporated in a binary logistic regression model to estimate the influence of these variables. Table 7.22 contains all hypotheses empirically tested and the empirical findings. The most interesting findings will be summarized in this subsection. Most hypotheses have been empirically tested at two levels, at the general level (across all sales promotions) and distinguishing between in-store and out-of-store promotions. Some hypotheses are rejected when all promotions are taken into account, but are accepted at the specific level of in-store versus out-of-store promotions.

Table 7.22: Overview empirical testing of derived hypotheses regarding drivers of promotion response

Hypothesis		Findings (NR=not rejected R = rejected)
H_2:	Social class and promotion response are positively related.	NR
H_{2a}:	The positive relationship between social class and promotion response is stronger for in-store promotions than for out-of-store promotions.	NR
H_3:	Household size and promotion response are positively related.	NR
H_4:	Households living in a larger house (not in an apartment) are more promotion responsive.	R
H_{4a}:	Size of the house is more important for in-store promotions than for out-of-store promotions.	NR
H_5:	Age and promotion response are U-shaped related.	R
H_{5a}:	Young shoppers are relatively more in-store promotion responsive whereas older shoppers are relatively more out-of-store promotion responsive.	R
H_6:	Education and promotion response are positively related.	R
H_{6a}:	The positive relationship between education and promotion response is stronger for out-of-store promotions than for in-store promotions.	R
H_7:	Retired households and households living on welfare are more promotion responsive.	R
H_{7a}:	Retired households and households living on welfare are more promotion responsive, especially for out-of-store promotions.	NR

continued

Table 7.22 continued

Hypothesis		Findings (NR=not rejected R = rejected)
H_8:	Households where the shopping responsible person has a paid job are less promotion responsive.	R
H_{8a}:	Households where the shopping responsible person has a paid job are less out-of-store promotion responsive, but not less in-store promotion responsive.	R
H_9:	The presence of non-school age children in the household and promotion response are negatively related.	NR
H_{9a}:	The presence of non-school age children in the household and promotion response are negatively related, especially for out-of-store promotions.	NR
H_{10}:	Intrinsic variety seeking and promotion response are not related.	NR
H_{11}:	Store loyalty and promotion response are negatively related.	R
H_{11a}:	Store loyalty and promotion response are negatively related, especially for out-of-store promotions.	R

Out of the 10 hypotheses tested across in-store and out-of-store promotions, 4 hypotheses were not rejected. Two of these empirical outcomes confirm the two relationships most consistently described in literature. The positive relationship between size of the household and promotion response (H_3) and the negative relationship between promotion response and the presence of young, non-school age children (H_9) were supported in this research. The presence of non-school age children is found to be detrimental for promotion response, especially for out-of-store promotions. The two other hypotheses supported by the empirical findings led to new insights as prior research led to inconsistent results. Social class and promotion response were found to be positively related (H_2), even more strongly positive for in-store promotions (H_{2a}), supporting the

enacting-on-impulse hypothesis and not supporting for example economic theory. Another very interesting findings is that intrinsic variety seeking and promotion response were not related (H_{10}). The relationship between intrinsic variety seeking and promotion response (extrinsic variety seeking) has been the center of quite some debate, as discussed in Section 3.2.8. Most prior research stated or assumed that intrinsic variety seeking and promotion response should be positively related. Similarly to Van Trijp et al. (1996) we found that intrinsic and extrinsic variety seeking are not related. So the 'real' (intrinsic) variety seekers are not more easily persuaded by sales promotions to try a different brand. Even when the model corrects for age, education, and several more possible influencing factors, intrinsic and extrinsic variety seeking are not correlated.

As mentioned before, out of the 10 hypotheses tested for all promotion types at the same time, 4 were accepted whereas 6 were not. Of these hypotheses not supported by empirical findings, the relationship between employment situation of the shopping responsible person and promotion response is the most striking one (H_8). Households in which this person has a paid job turn out to be the most responsive towards both in-store and out-of-store promotions. Possibly the time-saving element of in-store promotions is important in combination with the financial freedom to let promotions drive the purchases. But the time-investment element of out-of-store promotions does not seem to inhibit promotion response for households in which the shopping responsible person has a paid job. Possibly these households are more interested in money-saving measures in general.

Two hypotheses (H_4, H_7) are rejected for sales promotions in general, but accepted when distinguishing between in-store and out-of-store promotions. In-store versus out-of-store promotions seem to affect different consumers and have different effects. Distinguishing between these two different forms of sales promotions is therefore of great interest when analyzing the effects of sales promotions.

Three hypotheses (H_5, H_6, and H_{11}) were rejected for sales promotions in general, but also when distinguishing between in-store and out-of-store promotions. The non-linear relationship incorporated between age and promotion response was not found (H_5). Older people were found to be more promotion responsive, both in-store as well as out-of-store. Education was not found to be related with promotion response, both at the general level, and when distinguishing between in-store and out-of-store promotions. The negative

relation between store loyalty and promotion response (H_{11}) for non-favorite brand promotions, and the positive relationship between store loyalty and promotion response for favorite brand promotions imply that store loyal households are also more brand loyal. Store loyalty and brand loyalty seem to be positively related.

7.6 Deal Proneness

Until now, we have studied household promotion response, over all product categories. Many possible drivers of promotion response were mentioned and empirically researched. This was done for all product categories together. But do households show a common pattern in promotion response across different product categories? That is, is deal proneness really a consumer trait? This question will be dealt with in this section. As Ainslie and Rossi (1998) stated very clearly, if sensitivity to marketing mix variables is a common consumer trait (deal proneness), then one should expect to see similarities in sensitivity across multiple categories. Prior research has lead to a mixed bag of empirical evidence. Some studies did find consistencies across categories in promotion response (indicated by the + in Table 7.23), but others did not (indicated by a 0 in the table).

Table 7.23: Summary of studies relating promotion response across categories

Sign Relationship	Study
+	Bawa and Shoemaker (1987)
	Wierenga (1974)
	Seetharaman et al. (1999)
	Blattberg et al. (1976, 1978)
	Ainslie and Rossi (1998)
0	Bell et al. (1999)
	Cunningham (1956)
	Massy et al. (1968)
	Wind and Frank (1969)
	Manchanda et al. (1999)
	Narasimhan et al. (1996)
Hypothesis:	*Deal proneness does not exist.*

Several studies mention category characteristics that are related to promotion response. These are: (1) the number of brands within a category, (2) the average price level within a category, (3) the average interpurchase time of a category, (4) storability, (5) perishability, (6) impulse sensitivity, and (7) category promotion frequency. Bolton (1989) found that the effects of category-display and feature activity on promotional elasticities are much larger than the effects of brand-prices, display, and feature activity. Raju (1992) concluded that there is more promotional response for categories with deeper, infrequent dealings and good storability. Narasimhan et al. (1996) studied the relationship between product category characteristics and promotional elasticity for 108 product categories. They reported that promotions get the highest response in easily stockpiled, high penetration categories with short purchase cycles. Bell et al. (1999) concluded that storability and share of budget are two category characteristics that play a large role.

Based on the fact that category characteristics such as storability, perishability, promotion frequency, number of different brands, etc. differ across categories and influence promotion response, we expect that promotion response differs across product

categories. But, this has to be empirically tested to answer the question whether consistencies exist or not, and, if so whether these consistency can be mainly explained by demographic, socio-economic, and purchase process characteristics, or if they should be attributed to a deal proneness trait. We will do so in the next sub-section.

7.6.1 Across Product Category Dependence

In contrast to most prior research (Ainslie and Rossi 1988 being a positive exception), we do not try to answer the question about the existence of a deal proneness trait directly from household purchase behavior (or attitudinal household statements regarding their purchase behavior). Deal proneness is not isomorphic with promotion utilization. Consistencies in promotion response across different categories can be caused by household characteristics. Based on the extensive research overview, we believe that the most important household variables are incorporated in this study. We therefore believe that we can use the error terms to make a specific statement about the existence of a deal proneness trait. An error-term in a regression model represents (among other things) the influence of omitted variables on the dependent variables. In the analyses, the error terms represent the promotion response observed, corrected for several household characteristics. If the term deal proneness is justified, then not incorporating deal proneness (or an indicator for deal proneness) into the category models should lead to errors at the household level that are correlated across product categories.

For each category, the error terms are deduced including the same set of explanatory variables as used throughout the binary logistic regression analyses described before. The analyses were carried out in the corresponding subset of the data, only those records which dealt with each specific product category. Table 7.24 contains the correlation coefficients found between the error terms of each product category. The error terms are computed by taking the average error term per household per product category.

Table 7.24: Correlation error coefficients across product categories (cycle)

Correlations	Coffee	fruit juice	soft-drinks	candy bars	Potato chips	pasta
Coffee	1					
	(81)					
Fruit juice	0.21	1				
	(0.07, 48)	(96)				
Soft-drinks	0.17	**0.27**	1			
	(0.11, 56)	**(0.01, 80)**	(112)			
Candy bars	0.08	-0.01	0.2	1		
	(0.34, 29)	(0.48, 30)	(0.13, 34)	(41)		
Potato chips	0.06	**0.27**	-0.04	0.04	1	
	(0.40, 20)	**(0.04, 42)**	(0.39, 47)	(0.43, 22)	(52)	
Pasta	-0.09	-0.02	-0.04	-0.08	0.18	1
	(0.31, 30)	(0.45, 43)	(0.39, 47)	(0.37, 22)	(0.17, 31)	(54)

There are two significant correlations between the error terms, both positive. These are for soft drinks and fruit juice and for fruit juice and potato chips. Other error term pairs are not significantly positively related and sometimes even negatively correlated. If deal proneness would exist, it would manifest itself into a number of significant positive correlations across the different product categories. As the results show, only two out of the fifteen correlation coefficients are significantly positive. Therefore, deal proneness is not observed.

In this chapter, we have empirically identified drivers of household promotion response, therefore answering the first sub-question as stated in Chapter 1 using the first step of the research approach as presented in Chapter 5. As a side-effect, the existence of a deal proneness trait was empirically investigated using (in)consistencies in household promotion response across different product categories. In the next chapter, we follow up on the second step of the two-step approach followed, namely decomposing promotion response into the sales promotion reaction mechanisms.

8 EMPIRICAL ANALYSIS TWO: SALES PROMOTION REACTION MECHANISMS

8.1 Introduction

The approach we follow is twofold. First, the intertemporal effects of sales promotions on household purchase behavior are studied (taking the pre- and post-promotional effects into account). Bucklin and Gupta (1999) conducted an investigation of UPC scanner data using both the practitioner's and the academic view of the use of this data. They concluded that one of the immediate research needs was to develop simple, robust models that take the intertemporal effects into account and investigate the consumption effect. Second, we focus on the non-intertemporal part, namely decomposing the promotional bump.

In both approaches, the household is the unit of analysis. Brand switching, purchase acceleration, purchase quantity, and category expansion are incorporated in our study. Store switching and repeat purchasing are left out. Store switching is not incorporated in the analyses because of lack of causal data regarding stores other than the primary store. The repeat purchasing effect is not incorporated because we only had data for a relatively short period of time. Besides, it is very difficult to investigate the enduring effect of a certain promotion when other promotions interfere. Fortunately, previous research indicates that the restrictive effect of not incorporating repeat purchasing is limited. Nijs et al. (2001), for example, concluded that category demand was found to be predominantly stationary around a fixed mean. This conclusion was based on examining category-demand effects of consumer price promotions across 560 consumer product categories over a 4-year period.

The following questions will be answered in this chapter. (1) To what degree are the different sales promotion reaction mechanisms exhibited by the households? Do, for instance, promotions lead more often to brand switching than to purchase acceleration? (2) Do the sales promotion reaction mechanisms differ across product categories? In other words, are household reactions to sales promotions related with certain product category characteristics? (3) Do sales promotion reaction mechanisms differ across product categories at the individual household level? For instance, do households that switch brands in one category also do so in

another category? Or do households that switch brands in one category also buy more or sooner within the same category, but do not switch brands in other categories? In general, do promotions lead more to consistencies within a product category across the different sales promotion effects than across categories for each of the sales promotion reaction mechanisms?

The empirical work in this chapter can be divided into the two parts that were mentioned before. In the first part, the three questions raised in this introduction are answered using the intertemporal approach of the sales promotion reaction mechanisms. In Section 8.2, data descriptions of both general measures of promotion response and the more in-depth reaction mechanism specific measures are provided. The hypotheses derived in Section 4.3 are tested in Section 8.3. Section 8.4 deals with the question whether or not the effects of sales promotions at the household level are consistent across categories. Does a household show the same effects of sales promotions for each product category or for certain sub-sets of categories? Or do households show more consistent effects of promotions within a category? In the second part of the empirical work, Section 8.5, the promotional bump decomposition (non-intertemporal) is presented. This chapter ends with the main findings and new insights obtained regarding the sales promotion reaction mechanisms.

8.2 General Results Promotion Response and Sales Promotion Reaction Mechanisms

Data from 200 households is used to estimate the sales promotion reaction mechanisms. As mentioned in Chapter 6, six product categories are included in this dissertation. It was found in the previous chapter that promotion response differs between product categories. Recall that a promotional utilization measure *PU* was defined in Section 5.4.2.1. It was also mentioned in that section that this promotional utilization measure is the aggregated equivalent of promotion response as empirically investigated in the prior chapter. The promotional brand switch measure BS_p, defined in Section 5.4.2.2, is also an indicator for promotional utilization (for non-favorite brand promotions). Table 8.1 contains the estimates

for the two indicators for each product category. Throughout this chapter, tabulated significant findings are printed in bold.

Table 8.1: Average promotional utilization (across the households)

	First indicator (*PU*)		Second indicator (BS_p)	
	Mean	S.E.	Mean	S.E.
Pasta	**0.08**	0.02	**0.06**	0.01
Candy-Bars	**0.32**	0.04	**0.24**	0.05
Soft-drinks	**0.23**	0.02	**0.13**	0.01
Fruit Juice	**0.28**	0.02	**0.13**	0.01
Potato-Chips	**0.17**	0.02	**0.11**	0.02
Coffee	**0.44**	0.03	**0.35**	0.04

Significant findings mean that the promotional utilization measures significantly differ from zero. Table 8.1 shows that both indicators result in the same rank-order (apart from the tie for BS_p for soft-drinks and fruit juice). Sales promotions for coffee products are used the most, followed by candy bars, fruit juice, soft drinks, potato chips, and finally pasta. These rank-orders are in accordance with those from Chapter 7.

But our interest exceeds promotion response as such. We want to obtain insights in the specific sales promotion reaction mechanisms that occur. If a household purchases products on promotion, are these products bought in bigger amounts, is the favorite brand bought, are the purchases accelerated by the sales promotion? Do households compensate during pre- or post-promotional shopping trips, etc? In general, what sales promotion reaction mechanisms occur due to the presence of promotions? Do some mechanisms occur more often than others? Does this differ across product categories? Are the findings in coherence with prior research on this topic? These questions are empirically dealt with in the remainder of this section. Table 8.2 contains the estimated product category average intensities of each of the reaction mechanisms specific measures. The first two columns of estimates contain across category averages for the six sales promotion reaction mechanism measures, weighted (categories which are bought by more households get a bigger weight)

and unweighted. With respect to the unweighted averages, the fraction of significant estimates across the six product categories are mentioned between parentheses. For the exact definitions of the mechanisms, the reader is referred to Section 5.4.2. Estimates significantly different from zero are printed in bold numbers.

Table 8.2: Average intensity sales promotion reaction mechanisms across households (standard error, n=200, significance level of 5 %)

Reaction Mechanism[1]		Across Categories		Pasta	Candy Bars	Soft-drinks	Fruit Juice	Potato Chips	Coffee
		weighted	unweighted						
BS	*Brand switching*	**0.18 (0.02)**	0.23 (6/6)	**0.20 (0.04)**	**0.30 (0.06)**	**0.07 (0.02)**	**0.15 (0.03)**	**0.16 (0.05)**	**0.47 (0.08)**
	Purchase timing								
TA	Time acceleration effect	0.00 (0.03)	-0.04 (2/6)	**-0.21 (0.07)**	**-0.13 (0.07)**	0.01 (0.03)	0.08 (0.06)	0.01 (0.07)	-0.00 (0.07)
TR	Time readjustment effect	**0.22 (0.05)**	0.27 (2/6)	0.23 (0.18)	0.57 (0.36)	**0.14 (0.05)**	0.08 (0.06)	0.07 (0.07)	**0.51 (0.15)**
TN	Time net effect	**0.12 (0.03)**	0.11 (2/6)	-0.03 (0.09)	0.27 (0.19)	**0.09 (0.04)**	0.08 (0.05)	0.03 (0.05)	**0.24 (0.10)**
	Purchase quantity								
QB	Quantity before effect	-0.01 (0.02)	-0.04 (2/6)	**-0.16 (0.06)**	-0.00 (0.06)	0.05 (0.04)	0.01 (0.03)	**-0.13 (0.03)**	-0.00 (0.03)
QP	Quantity promotional effect	**0.47 (0.05)**	0.46 (4/6)	0.64 (0.36)	0.16 (0.09)	**0.26 (0.08)**	**0.46 (0.07)**	**0.27 (0.05)**	**0.96 (0.17)**
QA	Quantity after effect	**0.07 (0.03)**	0.05 (3/6)	-0.05 (0.09)	0.06 (0.15)	0.02 (0.04)	**0.17 (0.06)**	**-0.07 (0.03)**	**0.14 (0.06)**
QN	Quantity net effect	**0.24 (0.03)**	0.23 (4/6)	0.27 (0.16)	0.11 (0.09)	**0.14 (0.04)**	**0.27 (0.05)**	**0.06 (0.03)**	**0.52 (0.10)**
CE	*Category expansion*	**0.10 (0.03)**	0.10 (1/6)	0.17 (0.18)	0.06 (0.10)	0.00 (0.00)	**0.24 (0.06)**	0.07 (0.07)	0.07 (0.06)

The two net effect measures (*TN*, *QN*) are defined as the average effect of the pre-promotional and post-promotional reaction mechanism measures. We remark that the estimated values for these net measures are not exactly equal to the average of the pre-and

[1] The reader is referred to Section 5.4.2 for the definitions of the different reaction mechanisms.

post-promotional estimates. The differences are due to rounding and due to the effect of consecutive promotions. Household purchases of products from a specific product category during two consecutive promotional shopping trips are both used to estimate *QP*. But the first post-promotional effect and the second pre-promotional effect are missing.

In general, the effects of sales promotions on household purchase behavior seem to be idiosyncratic, differing across the product categories. For some categories resulting in brand switching and purchasing sooner, for other categories in brand switching and purchasing more without purchasing sooner. Also with respect to the interrelatedness of the reaction mechanisms differences are found across the product categories. Accelerated purchases are sometimes corrected for by buying less during the promotion, but also postponed subsequent purchases are encountered. But, overall, brand switching (*BS*) and purchase quantity acceleration (*QP*, *QN*) seem to be the two most prevalent effects of sales promotions across the categories.

Promotions lead to significantly more brand switching (*BS*) for all 6 product categories. These effects are as expected, all positive. The effect is the largest for coffee purchases. The quantity bought during the promotional period is almost twice the amount bought during non-promotional shopping trips.

Purchase timing and purchase quantity effects are significant for some, but not for all of the product categories. Time acceleration effects (*TA*) are found for candy-bar and pasta promotions. With respect to candy-bars, it could be the case that candy-bar purchases are mainly determined by sales promotions, being a high impulse category. With respect to pasta, the category purchased by the smallest selection of households from our dataset, purchases could also be very sales promotion driven as they can be seen as a substitute category for potatoes. The positive post-promotional effects on purchase timing (*TR*) do confirm our expectations. These postponing effects of the post-promotional shopping trip even seem to be larger than that the promotional shopping trip itself was accelerated. Significant, positive results are found for the net effect on purchase timing (*TN*) for two product categories (soft drinks and coffee). For these two product categories, households bought larger quantities during the promotional period (without acceleration these promotional purchases), but postpone their subsequent purchases within these product categories.

In general, the average quantity during the pre-promotional shopping trips (*QB*) does not differ significantly from the average non-promotional purchase quantity. Households do seem to buy somewhat less potato chips and pasta on pre-promotional shopping trips.

As expected, promotional quantity (*QP*) is positive for all product categories indicating that people buy more when a product is on promotion. In general, households do not compensate for this by purchasing less during the next shopping trip (*QA* is not significantly negative except for potato chips). It is even significantly positive for two of the six product categories (fruit juice and coffee). With respect to coffee, the post-promotional shopping trip is postponed such that the net effect of purchase timing and purchase quantity combined (*CE*) is not significant. But, although the subsequent fruit juice purchase moment is postponed, a positive net effect on consumption is found (*CE*). In general, the promotional quantity effect is so large that it outweighs any negative pre- and post-promotional effects, leading to a positive net effect on purchase quantity (*QN*).

In general, consumers seem to be systematic shoppers. When they buy more due to promotions (*QP* significantly positive), they do not buy it sooner (significant negative *TA*). Purchase timing (*TA*) and purchase quantity (*QP*) seem to be two interdependent mechanisms. The counterintuitive findings regarding the average sizes of the post-promotional quantity effects for coffee and fruit juice can be explained by taking this interrelatedness between purchase time and quantity into account. Households buy more coffee when there is a promotion. After doing so, they postpone the next coffee purchase (large positive *TR*), probably until they reach their normal storage level. With respect to fruit juice, category expansion (*CE*) effects are found. Promotions for these products lead to extra purchased quantities without purchase time compensation (or post-promotional quantity decreases). Fruit juice promotions apparently lead to increased usage rates. The results underline the importance of distinguishing the intertemporal effects of sales promotions and the intertwining effects of purchase quantity and purchase timing. This net category effect (*CE*) of sales promotions takes the interrelatedness between timing and quantity into account.

8.3 Testing the Hypotheses Relating Product Category Characteristics with Sales Promotion Reaction Mechanisms

Prior research has shown that not all sales promotion reaction mechanisms occur to the same degree across all categories. The findings from the previous section support this across category difference in promotional response. Linking these differences with some important product category characteristics might lead to meaningful insights. We therefore try to explain the differences found in the previous section using the category characteristics discussed in Section 4.3. Testing the derived hypotheses will be impossible because of the limited number of categories included in this research. Therefore only tentative conclusions will be drawn.

First, we need to determine the value of the category characteristics for each of the indicators mentioned in Section 4.3. Table 8.3 contains the results of this process. Besides the estimated size of the indicators, also the ranking of each of the categories is included in Table 8.3. The categories are ordered according to their overall promotional utilization (last column). Most of the product category characteristics can be derived objectively, using either data from the households themselves or causal data. Some ratings are copied from other studies incorporating the same category characteristics. Impulse rating and storability are partly derived based on subjective arguments. The last row contains the Spearman rank correlation coefficients between the category characteristics and promotional utilization. Next, the derivations of (rankings of) category characteristics will be discussed in detail.

The average price level per modal unit size is derived using purchase data from the households (e.g., Bell et al. (1999)). The modal unit-size is defined as the unit-size that is purchased most often. A second indicator for the product category price level is the average dollar spent per purchase occasion (Fader and Lodish (1990)). This price level can also be easily determined using purchase data. Note from Table 8.3 that the two price indicators lead to different, though similar rankings of the product categories.

Purchase frequency is defined as the average number of purchase occasions per household per quarter of a year. Table 8.3 contains the results using purchase data from the last quarter of 1995.

The indicator for promotional activity used in the research deals with promotional frequency, not with the magnitude of the promotions. We have used the causal data (promotional data) from different stores and different weeks to derive an average number of promotions within each of the six categories per week. As Table 8.3 shows, pasta and fruit juice are promoted the least whereas candy bars and potato chips are promoted most often.

With respect to storability, different indicators have been used in prior research. Bulkiness (volume) and perishability (Raju 1992), shape of the product (regular or not), refrigerated or not (Bell et al. 1999). Regarding bulkiness, we use a refinement of the modal unit-size (as derived to obtain the average price level) as an indicator (modal unit-size and storability being negatively related). The dimension of modal unit-size differs across the product categories. Some sizes are measured in grams, other are measured in cubic centimeters (cc's). Furthermore, some of the categories included in this research have packaging containing a lot of air (and therefore storage space) whereas others are packaged vacuum. The refinement of the modal unit-size takes these differences into account, it is based on the number of cc's of each modal unit-size. Regarding storability, following Bell et al. (1999), we use a dichotomous classification scheme for the product categories. Three of our product categories were also used in their study. Coffee and soft drinks were classified as being storable whereas potato chips category was classified as not being storable. The remaining three categories (fruit juice, pasta, and candy bars) are classified as being storable or not using subjective arguments, but trying to follow the classification of Bell et al. (1999), combining shape, perishability, and storage place (inside or outside the refrigerator). Fruit juice products are comparable to soft drink products. They last long unopened, but once the product is open, the storage life is not very long. Therefore fruit juice is being classified as storable. We classify candy bars as not storable since they need to be refrigerated. Pasta products are not easily classified. Storage life is quite long, but the shape of the product is not very suited for stacking. We do classify it as storable, but less storable than coffee products. Narasimhan et al. (1996) did the same.

The number of brands can be determined using several indicators. The number of different brands or the number of different SKU's can be used, both based on retail or on consumer data. We investigate the effects of sales promotions on brand switching at the SKU level. We therefore decided to use the SKU level instead of the brand level indicator. Furthermore, based on the information obtained from GfK, we decide to use the number of different SKU's purchased by the households instead of the number of different SKU's existing. The list of existing SKU's contained about 600 different pasta products. But, a lot of these products are very unfamiliar.

The impulse rating is derived based on a subjective personal assessment in combination with the article from Narasimhan et al. (1996). These authors used consumer attitude scales to assess the degree of impulse buying for several categories. Candies and potato chips were evaluated as being very impulse sensitive categories. Coffee products are neither high on impulse nor low on impulse. Pasta, fruit juice and soft drinks were not included in their study. Narasimhan et al. (1996) used two measurement items: (1) I often buy this product on a whim when I pass it in the store, and (2) I typically like to buy this product when the urge strikes me. When we (subjectively) try to derive the degree of impulse for the three remaining categories, we believe that soft drinks and fruit juice are of the same impulse degree as coffee whereas pasta is expected to be less impulse driven.

Table 8.3: Product category rating and ranking on important category characteristics

	Average price level		Purchase frequency	Pomotion frequency		Storability	Number of brands	Impulse	PU
	Modal unit-size	Purchase occasion			Modal unit-size (in cc)	Storable			
Pasta	1.47	1.63	3.67	5	700	Yes	103	Low	0.08
	(1)	(2)	(2)	(1)	(3)	(5)	(4)	(1)	(1)
Potato-Chips	1.68	2.16	6.52	20	800	No	64	High	0.17
	(3)	(3)	(5)	(6)	(4)	(2)	(1)	(5)	(2)
Soft-drinks	1.78	1.60	13.52	10	1500	Yes	169	Average	0.23
	(4)	(1)	(6)	(4)	(6)	(3)	(6)	(4)	(3)
Fruit Juice	1.50	3.10	5.82	6	1000	Yes	153	Average	0.28
	(2)	(4)	(3)	(2)	(5)	(4)	(5)	(3)	(4)
Candy-Bars	3.83	3.57	3.26	13	400	No	68	High	0.32
	(5)	(5)	(1)	(5)	(2)	(1)	(2)	(6)	(5)
Coffee	6.71	7.89	6.22	8	350	Yes	83	Average	0.44
	(6)	(6)	(4)	(3)	(1)	(6)	(3)	(2)	(6)
ρ(PU)	**0.83**	**0.83**	-0.14	0.14	-0.49	0.00	-0.09	0.31	
	(0.04)	**(0.04)**	(0.79)	(0.79)	(0.33)	(1.00)	(0.87)	(0.56)	

It appears from Table 8.3 that average price level seems to be most consistent with promotional utilization, which is confirmed by the Spearman (rank) correlation coefficient. But, as mentioned before, these correlation coefficients are based on only 6 observations.

We expect to find additional insights when we look at the consistency between these product category characteristics and the specific sales promotion reaction mechanisms. For example, for higher priced categories we expect that promotions lead to more purchase acceleration effects than for lower priced categories. Tables A8.1 and A8.2 contain the same category characteristics with the rankings of these characteristics and the rankings of the different reaction mechanisms are included. The Spearman (rank) correlation coefficients can be found in the lower part of Table A8.2. This table offers some tentative insights that can be used to make a qualitative statement regarding the

relationship between product category characteristics and the sales promotion reaction mechanisms. But, again, these correlation coefficients are based on only 6 observations.

Brand switching (*BS*) occurs most often for the higher priced categories coffee and candy bars. Furthermore, brand switching (*BS*) occurs less often within more bulky categories. Purchases are not accelerated (*TA*) for higher priced categories. Quantity net (*QN*) effects are negatively related with promotional frequency. Households buy more of a promoted product that is better storable (*QN*).

As mentioned before, the numbers in Table A8.2 regarding the promotion reaction mechanisms are based on across household averages, meaning loss of information. Therefore, instead of computing the Spearman correlation coefficient between the product category characteristics and the estimated averages of the sales promotion reaction mechanisms, we use data at the individual household level and compute the Pearson correlation coefficient.

For each household we have estimates for each of the reaction mechanisms. Figure A8.1 in Appendix A8 depicts the general format of the dataset used in this chapter. The data matrix contains 200 rows (number of households) and 114 columns (6 x 19, 6 product categories, for each category 11 sales promotion reaction mechanism measures and 8 product characteristic ratings are estimated). As not all households purchased from all categories, some matrix elements for the sales promotion reaction mechanism measures contain no information. The product category characteristic ratings are the ratings as introduced in Table 8.3. These ratings differ across the product categories, but are constant within the product category across the different households. We will refer to this data format for clarification purposes throughout the remainder of this chapter.

So for each sales promotion reaction mechanism, we can compute the correlation coefficient using data from each individual household, where the category characteristics are of course constant across the households but differ across the product categories. The resulting Pearson correlation coefficients can be found in Table 8.4. These coefficients are used to test the hypotheses derived in Section 4.3. Note, however, that only 6 product categories are included in this research and therefore the hypotheses can only be tested in a tentative way.

Table 8.4: Pearson correlation between product category characteristics and sales promotion reaction mechanisms at the household level (two-tailed significance)

Category characteristic	*PU*	*BS*	*TA*	*TR*	*TN*	*QB*	*QP*	*QA*	*QN*	*CE*
N	553	425	315	319	349	328	414	335	415	255
Average price per modal unit-size	**0.37** (0.00)	**0.28** (0.00)	-0.03 (0.54)	**0.20** (0.00)	**0.13** (0.02)	0.02 (0.72)	**0.21** (0.00)	0.06 (0.29)	**0.21** (0.00)	-0.05 (0.42)
Average price per purchase occasion	**0.37** (0.00)	**0.27** (0.00)	0.00 (0.98)	**0.17** (0.00)	**0.12** (0.03)	0.02 (0.75)	**0.23** (0.00)	0.10 (0.08)	**0.23** (0.00)	0.02 (0.74)
Quarterly purchase frequency	0.00 (0.95)	**-0.19** (0.00)	0.04 (0.44)	-0.08 (0.18)	-0.03 (0.54)	**0.11** (0.04)	-0.09 (0.06)	-0.05 (0.35)	-0.08 (0.09)	**-0.15** 0.02)
Quarterly promotional frequency	-0.06 (0.14)	-0.01 (0.80)	-0.02 (0.68)	-0.02 (0.70)	-0.02 (0.68)	**-0.12** (0.03)	**-0.12** (0.01)	**-0.14** (0.01)	**-0.17** (0.00)	-0.11 (0.09)
Modal unit-size	**-0.19** (0.00)	**-0.27** (0.00)	0.06 (0.26)	**-0.16** (0.01)	-0.09 (0.11)	0.10 (0.08)	**-0.17** (0.00)	-0.04 (0.50)	**-0.15** (0.00)	-0.06 (0.32)
Storability	0.07 (0.09)	-0.06 (0.22)	0.05 (0.34)	-0.02 (0.74)	0.00 (1.00)	**0.14** (0.01)	**0.12** (0.01)	**0.11** (0.04)	**0.16** (0.00)	0.04 (0.57)
Number of brands	-0.07 (0.09)	**-0.21** (0.00)	0.08 (0.14)	**-0.12** (0.03)	-0.05 (0.34)	**0.16** (0.00)	-0.08 (0.12)	0.06 (0.29)	-0.03 (0.51)	0.01 (0.89)
Impulse	0.07 (0.09)	0.03 (0.60)	0.01 (0.85)	0.01 (0.79)	0.03 (0.57)	-0.07 (0.22)	**-0.12** (0.01)	-0.07 (0.21)	**-0.14** (0.01)	-0.05 (0.42)

Based on these results, we can confirm that average price level is positively related with promotion response (promotion utilization) (H_1). The average price level is positively related with brand switching (*BS*) and the promotional (*QP*) and the net purchase quantity volume (*QN*). But, no empirical support is found for a relationship with purchase time acceleration (*TA*). However, households do postpone their next purchase moment for the higher priced categories (*TR*). Therefore, promotions for higher priced products do seem to

guide purchases once consumers are inside a store. They do not accelerate purchase timing. But, they do decelerate post-promotional purchases within these higher priced categories.

Purchase frequency was hypothesized to be positively related with promotional effects, especially with brand switching (H_2). But the results are different. First of all, purchase frequency is not significantly related with promotional utilization. Furthermore, promotions even seem to lead to less brand switching within categories that are purchased more often. One explanation could be that households have more pronounced preferences for frequently purchased product categories. Promotions for frequently purchased product categories turn out to be significantly negatively related with purchase quantity (*QP*, *QN*) and category expansion (*CE*). Apparently, it is more difficult for a product to create new, additional consumption opportunities when consumption is already rather high.

We expected that promotions for more often promoted categories are less effective (H_3). The findings do show a negative, significant relationship between promotional frequency and the quantity purchased during the promotional shopping trip (*QP*) and the net intertemporal effect on quantity (*QN*). Testing one-sided, promotional frequency and category expansion are also significantly negatively related.

Regarding the first (negative) indicator of storability, modal unit-size, we find that promotions for bulkier products are less effective. More easy to store products lead more often to brand switching (*BS*) and extra promotional quantity (*QP*, *QN*). The second indicator seems to be positively related with promotional quantity (*QP*, *QN*). Promotions for better storable products lead to extra promotional volume sold. The hypothesis that storability and promotional effects are positively related (H_4) is therefore supported by the findings, especially in terms of extra volume purchased during the promotional shopping trip.

With respect to number of brands within a category, we hypothesized that it would have a positive relationship with promotional effects, due to both brand switching and purchase acceleration (H_6). Surprisingly, we do not find evidence for a positive relationship between number of SKU's within a category and promotional utilization in general (*PU*) or brand switching (*BS*), time acceleration (*TA*, *TN*), or the promotional quantity purchased (*QP*, *QN*).

We hypothesized that within impulse categories, promotions would lead to more promotion effects, both due to brand switching and purchase acceleration (H_7). A significant positive relationship between impulse and promotional utilization (*PU*) is found. But, based on Table 8.4, promotions for impulse products seem to result in less extra promotional volume.

The category characteristics identified are, of course, not independent. For example with respect to purchase frequency and storability, hard to store products are expected to be purchased more often and in smaller quantities than easy to store products. But, surprisingly, we find that easy to store products are also bought more frequently (results are not shown). Another interesting finding is that promotional frequency and impulse are positively related (results not shown). The causal direction of this relationship is not clear. Retailers can identify that some products, especially high impulse products, are mostly bought on promotion and therefore promote them a lot. But it could also be the other way around (or both ways). Consumers identify categories that are often promoted, which leads to cherry picking.

The findings presented in this section show that promotion utilization and the occurrence of the sales promotion reaction mechanisms are related to some extent to product category characteristics (although the findings have to be interpreted with care as they are based on data from six product categories).

Now that we have found that the average intensity of the sales promotion reaction mechanisms differs across product categories, the follow-up step is to investigate whether these differences are also found at the specific household level. Do households differ in their sales promotion reactions across the product categories or not? Do households that switch brands for pasta during 20 percent of the promotional shopping trips also switch brands for coffee during 20 percent of the promotional shopping trips or more often or less often? These types of questions will be answered in the next section.

8.4 Household Consistencies

The prior sections did reveal some consistencies across categories regarding promotion utilization and regarding sales promotion reaction mechanisms. One clear consistency across all categories is that brand switching is the most common reaction to sales promotions (Table 8.2). But, at the same time, it was also clear that the degree to which brand switching occurs varies across product categories. In this section, we are interested in the consistencies or inconsistencies at the individual household level. We try to answer the question whether the intertemporal effects (the sales promotion reaction mechanisms) differ across product categories at the individual household level? Households that switch brands in one category do not necessarily switch brands in another category. Some households do, other households exhibit several sales promotion effects within one and the same product category, whereas there also exist households that switch brands in one category, but purchase more in another. These types of questions are investigated in this section. In the first subsection it is investigated whether households show consistent effects across categories. The second subsection deals with the question whether households show more consistencies within a category across reaction mechanisms than within the same reaction mechanism across categories. When empirical results point out that households show more consistencies within a product category across sales promotion reaction mechanisms than within sales promotion reaction mechanisms across product categories, promotion proneness does not seem to exist.

8.4.1 Across Category Consistencies Within Sales Promotion Reaction Mechanism

In Chapter 7, consistency in promotion response across product categories was studied using error correlation coefficients from binary logistic regressions (Table 7.24). Based on these error correlation coefficients, it was concluded that this dependency across categories does not exist. Table 8.5 contains the estimated correlation coefficients (as far as they are significant) between the different pairs of product categories for the different sales promotion reaction mechanisms (*BS, TA, TR, TN, QB, QP, QA, QN, CE*) and for the promotional utilization

measure (*PU*). Referring to Figure A8.1, the correlation coefficients are computed between for example the promotional utilization estimates (*PU*) for candy bars and potato chips, etc.

Table 8.5: Across product categories correlations within sales promotion reaction mechanisms

	candy bars	potato chips	soft drinks	coffee	fruit juice
potato chips	***PU*(+)**				
	***BS*(-)**				
soft drinks					
coffee	***TN*(+)**	***TR*(+)**			
fruit juice		***PU*(+)**		***PU*(+)**	
		***BS*(+)**			
pasta		***BS*(+)**	***BS*(-)**	***QN*(-)**	***QN*(+)**

With respect to promotional utilization (*PU*), no significant negative coefficients are found (at least not at the 0.05 significance level). Only three out of the possible 15 significant positive relationships are found (between potato chips and candy bars, between potato chips and fruit juice, and between fruit juice and coffee). Deal proneness is not observed, confirming the findings from Chapter 7.

Next, it is investigated whether the across product category consistencies change when we look at the specific sales promotion reaction mechanisms that occur rather than whether or not a response occurs. Consistency at the promotion response level does not mean that households that use promotions in one category, leading to brand switching, also switch brands in a different category. As can been seen from Table 8.5, almost as many positive as negative correlations are found when looking at the sales promotion reaction mechanisms. Concluding, a consistent pattern in sales promotion reaction mechanisms across different product categories is not found.

8.4.2 Within Product Category Consistencies Across Sales Promotion Reaction Mechanisms

In this sub-section, we investigate whether promotion effects on households are consistent within a category across the different sales promotion reaction mechanisms. Table 8.6 contains the significant correlation coefficients. First of all, we have to mention that, in theory,

a positive correlation between the two purchase acceleration measures (timing and quantity) means that households buy more but not sooner or buy sooner but not more of the product. This positive relation is what we expect to find in general, because consumers cannot purchase and consume infinite amounts of products. This relationship between interpurchase timing and purchase quantity is also present when there are no promotions. Most households do not have a fixed interpurchase time. Sometimes they shop once a week, but sometimes more often or less often. When one buys more of a product, one will postpone the next purchase. Snack categories might form exceptions, since buying extra volume during promotional shopping trips could easily lead to category expansion. So we would expect more consistency across reaction mechanisms for potato chips-candy bars than for pasta-coffee.

In Table 8.6 only significant correlation coefficients between a subset of the reaction mechanisms are included. These are: brand switching (*BS*), time acceleration (*TA*), net time effect (*TN*), promotional quantity (*QP*), net quantity effect (*QN*), and category expansion (*CE*). These are the direct and net effects of sales promotions.

Indeed, the results from table 8.6 show that a positive coherence is found between the two net effect measures of purchase timing (*TN*) and purchase quantity (*QN*) for three categories, candy-bars, soft drinks, and fruit juice. No significant positive correlation coefficients are found for purchase acceleration (*TA*) and purchased promotional quantity (*QP*). Households do seem to use these two reaction mechanisms (purchase timing and purchase quantity) for compensation purposes. Not during the promotional shopping trip itself, but with the subsequent promotional shopping trip.

Based on the number of different pairs (15) that could have been found to be significant for each specific product category, only a limited number of significantly correlated pairs are found. But, we do believe that these significant findings represent actual behavior and are not found by accident (especially not the coefficients found with the lowest p-values).

Table 8.6: Significant within category across reaction mechanism correlations (α=0.10)

Significant pair	Candy-bars	Soft drinks	Fruit juice	Potato chips	Coffee	Pasta
BS, QP			**0.19**			
			(0.08,90)			
BS, QN		**-0.21**				
		(0.10,60)				
BS,CE			**0.27**			
			(0.04,59)			
TA, *CE*		**-0.55**	**-0.39**	**-0.50**	**-0.57**	
		(0.00,80)	**(0.00,67)**	**(0.00,36)**	**(0.00,40)**	
TN, *QN*	**0.45**	**0.19**	**0.25**			
	(0.03,25)	**(0.07,92)**	**(0.02,84)**			
TN, *CE*	**-0.61**	**-0.72**	**-0.64**	**-0.75**	**-0.63**	
	(0.01,19)	**(0.00,80)**	**(0.00,67)**	**(0.00,36)**	**(0.00,40)**	
QP, *CE*			**0.40**	**0.42**		**0.89**
			(0.00,67)	**(0.01,36)**		**(0.00,14)**
QN, *CE*	**0.49**	**0.44**	**0.61**	**0.53**		**0.91**
	(0.03,19)	**(0.00,80)**	**(0.00,67)**	**(0.00,36)**		**(0.00,14)**

When promotions induce households to buy more of a product, extra consumption occurs for 5 out of the 6 product categories (*QN*, *CE*), not for coffee. Also promotions that induce households to buy sooner lead to extra consumption for 5 out of the 6 product categories (*TN*, *CE*), not for pasta. Therefore, although households seem to act systematic in their promotional purchase behavior, purchase acceleration does seem to lead to category expansion.

With respect to dependencies with brand switching, we see that soft drink promotions lead either to less brand switching or to extra quantity bought (negative correlation between *BS* and *QN*). Apparently, preference for the favorite brands is quite strong. Conversely, the results found for fruit juice impose that brand switching and

promotional quantity are positively related (*BS* and *QP*), also leading to extra consumption (*BS* and *CE*).

In general, sales promotions do induce households to change their purchase behavior, especially to switch brands and buy more of the promoted product. But when a different brand is chosen, households do not seem to purchase more than they would normally do (except for promoted fruit juice products, no significant positive correlation is found between *BS* and *QP*). When households do not switch brands, buying sooner and/or more seems to occur across all categories, even resulting in additional consumption (either a negative correlation between *TN* and *CE*, or a positive correlation between *QN* and *CE*). Promotions therefore seem to be profitable for retailers and product managers. But some caution has to be taken. Frequent promotions within a category may lead to cherry picking behavior, especially for high impulse product categories.

Summarizing, sales promotions do affect sales. They influence households to purchase different brands, buy a product sooner or later, or purchase more of the product. But consistencies across categories within the same reaction mechanism only occur to a modest degree. We have found empirical evidence that consistencies are stronger within a category across mechanisms than across categories within mechanisms (based on the relative number of significant correlation coefficients). In accordance with the findings and conclusions in Chapter 7, promotion response is more consistent within a product category than across different product categories. No empirical proof for the existence of deal proneness is found, neither at the promotional utilization level, nor at the level of the sales promotion reaction mechanisms.

Thus far, the empirical argumentation has used the results from the intertemporal approach. Not only were the effects during the promotional shopping trip itself studied but also before and after effects were incorporated to gain understanding of the effects of sales promotions on household purchase behavior. Incorporating this intertemporal aspect is of great importance to capture the household dynamics to determine for example whether or not consumption increases as a result of promotions. Nevertheless, the next section deals with the empirical decomposition of just the promotional bump, not taking the possible intertemporal adjustments into account. Many other important contributions to sales promotion models have

looked at this promotional bump decomposition at and across product categories (e.g., Gupta 1988, Chiang 1991, Chintagunta 1993, Bucklin et al. 1998, and Bell et al. 1999).

8.5 Promotional Bump Decomposition into Brand Switching, Purchase Quantity, and Purchase Timing

A promotion can affect the timing, brand choice, and quantity of a household's purchase. A change in timing means that a purchase is moved forward (TA_-) or backward (TA_+) in time. In order to exclude small 'natural' variations when analyzing the timing effect, we only speak of a change if the interpurchase time before a promotional shopping trip is at least 10 percent smaller or larger than the overall average non-promotional interpurchase time. Similarly, we speak of a positive (QP_+) or negative (QP_-) change in purchase quantity due to a promotion if the purchase quantity during the promotional shopping trip is at least 10 percent more or less, respectively, than the overall average non-promotional purchase quantity. We speak of a brand switch (*BS*) if a non-favorite brand is purchased during the promotional shopping trip. The promotional effects are household and product category specific.

The purchase timing effect has three possible outcomes (accelerated, decelerated, no change). Brand switching has two possible outcomes (it occurs or not). The purchase quantity effect has three possible outcomes (increased, decreased, no change). This leads in total to eighteen possible combinations of promotional reaction mechanisms that can occur during a utilized promotional shopping trip (one of them representing that none of the effects occurred). Table A8.3 shows how often these combinations of effects occur and the average quantity purchased with each of the effects. The results are given for each product category separately, since we expect differences between categories based on prior studies. The results for the pasta category are not shown due the limited number of observations (n=38). The bottom part of Table A8.3 gives some additional occurrences (without making the distinction between accelerated or decelerated purchase times and increased or decreased purchase quantities). Table 8.7 provides the total aggregated percentages of occurrence for each of the five possible response effects (*BS*, QP_-, QP_+, TA_-, TA_+).

Table 8.7: Aggregated relative occurrence promotional response effects

Relative occurrence	Soft drinks	Fruit juice	Coffee	Potato chips	Candy bars
Brand switching (*BS*)	0.61	0.68	0.68	0.27	0.90
Decreased quantity (QP_-)	0.19	0.12	0.02	0.15	0.40
Increased quantity (QP_+)	0.51	0.53	0.69	0.43	0.56
Purchase time acceleration (TA_-)	0.25	0.36	0.31	0.35	0.67
Purchase time deceleration (TA_+)	0.14	0.16	0.15	0.07	0.24

The results presented in Table 8.7 show that promotions lead more often to increased purchase quantities and accelerated purchase times than to decreased purchase quantities and postponed purchase times. Soft drink, fruit juice, and coffee promotions mainly lead to brand switching and increased purchase quantity. The relative occurrence of the effects differs the most between potato chips and candy bars promotions. Brand switching, increased purchase quantity, and purchase time are the most often occurring effects for both product categories, but the degree of occurrence is much higher for candy bar promotions. Promotions seem to influence potato chips purchases the least and candy bar purchases the most. The detailed results presented in Table A8.3 show that brand switching occurs the least for potato chips promotions and the most for candy bar promotions. Candy bar promotions also have the largest influence on household purchase timing decisions. Purchases within this category seem to be guided by promotions to a large extent.

Interestingly, the effect of a sales promotion on purchase quantity is larger when it is not in combination with brand switching. Table 8.8 contains the comparison between brand switch and non-brand switch involved aggregated effects for each product category separately. The cells represent the average quantities per shopping trip when the mentioned effects occur.

Table 8.8: Differences in promotional purchase quantity comparing favorite brand with non-favorite brand purchases

Effects per category	Favorite brand purchases	Non-favorite brand purchases	Relative difference
Soft drinks			
QP	4342	2994	-31%
QP&TA	4346	2902	-33%
Fruit juice			
QP	4121	2713	-34%
QP&TA	4673	2470	-47%
Coffee			
QP	1092	1063	-3%
QP&TA	1030	1092	+6%
Potato chips			
QP	351	304	-13%
QP&TA	352	316	-10%
Candy bars			
QP	400	297	-26%
QP&TA	397	286	-28%

For fruit juice promotions, the difference is the largest. Purchase quantities for non-favorite brands are 40 percent lower than for favorite brands. No difference is found for coffee products. But, overall, the largest quantities bought on promotions are made for favorite brand purchases. Combining this with the insight from Chapter 7 that promotions for the favorite have a big impact on the probability to respond, it seems as though a large part of promotional sales comes from loyal shoppers and is borrowed from future purchases.

The findings presented thus far, do not provide insights into the relative strength of each of the promotional bump reaction mechanisms. The relative occurrences and the average effect of each combination of promotional reaction mechanisms are provided in Table A8.3,

Table 8.7, and Table 8.8. But what is lacking is a decomposition of the promotional bump that provides detailed insights in the relative strengths of brand switching, purchase timing, and purchase quantity.

Following the line of reasoning applied in the major prior studies on promotional bump decomposition (e.g., Gupta 1988, Bell et al. 1999, Van Heerde et al. 2001, 2002), three different response patterns can occur when a promotion takes place. Current purchases can be borrowed from future purchases (changes in purchase time; purchase time acceleration or purchase time deceleration), current purchases can be drawn from planned current other brand purchases (unchanged purchase timing combined with brand switching), or regular customers purchase a different quantity (unchanged purchase timing, no brand switching). Two different approaches have been applied in prior studies to decompose the promotional sales, the elasticity based decomposition (e.g., Gupta 1988, Bucklin et al. 1998, Bell et al. 1999), and the unit sales based decomposition (Van Heerde et al. 2001, 2002).

The elasticity based approach decomposes the total elasticity of a brand into brand choice elasticity, purchase time elasticity, and purchase quantity elasticity. Overall, the elasticity based decomposition studies found that the brand switching component is by far the largest (74 percent), followed by purchase quantity (15 percent), and purchase timing (11 percent). It was also found that this decomposition differs across product categories.

Van Heerde et al. (2001) demonstrated that decomposing the promotional sales bump using an elasticity approach differs from a unit sales approach. They argue that a temporary price cut for a brand may increase the purchase incidence probability. A large part of this typically goes to the promoted brand. However, the authors argue that the non-promoted brands can also benefit. That is, even though their conditional choice probabilities tend to decrease, other brands may gain in part from the increased purchase incidence probability. As stated by Van Heerde et al. (2001), the elasticity based decomposition does not take this into account whereas the unit sales decomposition does take this into account. In addition, a mathematical explanation for the difference between the elasticity based and the unit sales based approach is derived by Van Heerde et al. (2001). The authors argued that the unit sales decomposition should be preferred. Although differences are found across product categories, there is a clear tendency that brand switch effects derived using the unit sales

approach (about one third) are much smaller than what the elasticity based decomposition suggests (about thee fourth).

In our study, we are dealing with household data. Applying the unit sales decomposition offers the opportunity to derive an insightful decomposition of the promotional bump into the relative influence of the three response patterns, change in purchase timing, brand switching, and change in purchase quantity. Figure 8.1 depicts the decomposition of promotional unit sales into the three response patterns, corresponding to the decomposition used by Van Heerde et al. (2001). The focal point of this decomposition is distinguishing between purchases that would have taken place anyway during the current shopping trip, versus purchases that are changed in time. A retailer is interested in the degree to which sales promotions draw consumers to the store, consumers that would not have bought currently from that product category when the promotion would not have been there. Therefore resulting in an increase of the current unit sales.

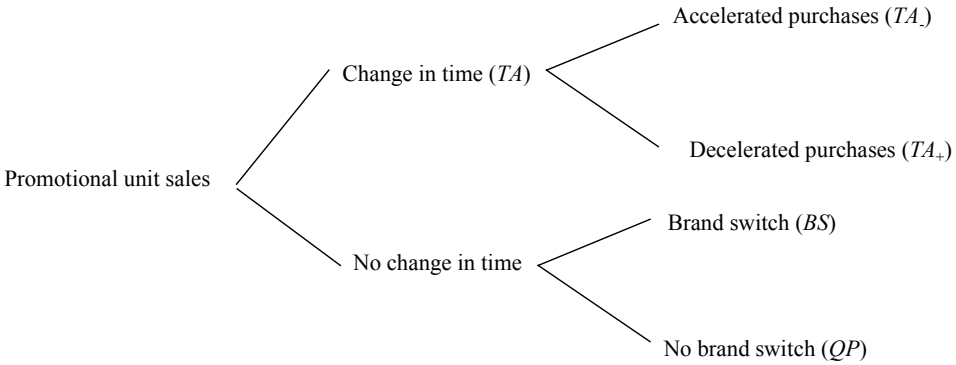


Figure 8.1:Decomposition of promotional unit sales

First of all, promotional unit sales can come from purchases that are either accelerated or decelerated in time (TA_- and TA_+). When purchases are not borrowed in time from other shopping trips, promotional unit sales either come from regular consumers (consumers that also purchase the brand when it is not on promotion, *QP*) or from non-regular consumers (consumers that normally do not purchase the brand when it is not on promotion, *BS*).

The results of this decomposition can be found in Table 8.9. The first rows contain the results for each product category separately. The last row contains the decomposition across all product categories. This overall decomposition is derived by decomposing the total

promotional unit-sales across the categories. This is the weighted average of the category specific decompositions, where the weights are based on the number of promotional shopping trips within each product category.

Table 8.9: Unit-sales decomposition of promotional sales

Product category	Change in purchase time (*TA*)	Brand switching (*BS*)	Change in purchase quantity (*QP*)
Soft drinks	0.38	0.34	0.27
Fruit juice	0.58	0.25	0.17
Coffee	0.48	0.39	0.14
Potato chips	0.41	0.13	0.46
Candy bars	0.63	0.27	0.10
Pasta	0.47	0.39	0.14
Overall	0.46	0.33	0.21

The strongest effect of promotions seems to be a change in purchase time. Overall, almost half of the promotional unit sales are due to changes in purchase timing. Promotions have a large impact on consumers' purchase timing decisions. These unit sales are incremental at this moment, but cannot be considered as truly incremental since at least some of these consumers would have bought the promoted brand in the future, anyway. Across the categories, the brand switch effect is 33 percent, which means that 1/3 of the current promotional unit sales comes from consumers that did not change their interpurchase timing but were drawn from a competitive brand. Regular consumers that would have bought the brand at the promotional shopping trip anyway account for the remaining 20 percent of the promotional unit sales.

Differences across the product categories are found. The brand switch effect varies between the categories from 13 percent for potato chips tot 39 percent for coffee and pasta. Coffee and pasta promotions are the most effective in drawing current consumers from competitive brands. Especially candy bars seem to be bought from promotion to promotion, as 63 percent of the total unit sales can be attributed to changes in purchase timing. Potato chips

promotions lead to large purchase timing and purchase quantity effects. But they are less effective for drawing current consumers from competitive brands (13 percent).

As mentioned before, prior studies on promotional bump decomposition focused on decomposing extra sales due to promotions instead of the total sales. The quantity purchased during an accelerated or decelerated shopping trip leads entirely to extra current unit sales, the same goes for brand switch purchases. But when regular buyers purchase the promoted product during a regular time interval, the quantity bought is not entirely incremental. The average non-promotional purchase quantity is subtracted to get the extra quantity purchased due to the promotion ($q - \overline{q}$), where $\overline{q}$ represents the average non-promotional purchase quantity. Figure 8.2 depicts this decomposition of incremental promotional unit sales.

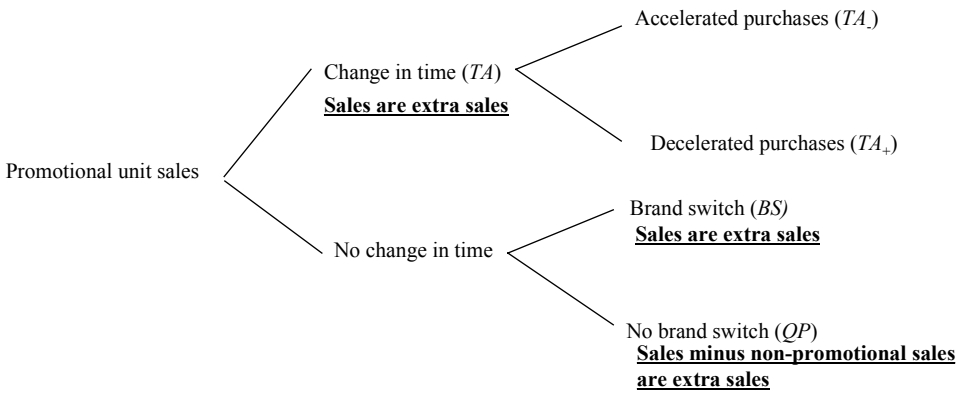


Figure 8.2:Decomposition of promotional incremental unit sales

The empirical results of this decomposition can be found in Table 8.10. The more detailed results (distinguishing between time acceleration and time deceleration effects) can be found in Table A8.6 (absolute numbers) and Table A8.7 (relative numbers).

Table 8.10: Unit-sales decomposition of extra promotional sales

Product category	Change in purchase time (*TA*)	Brand switching (*BS*)	Change in purchase quantity (*QP*)
Soft drinks	0.46	0.41	0.14
Fruit juice	0.62	0.27	0.10
Coffee	0.52	0.43	0.06
Potato chips	0.62	0.20	0.17
Candy bars	0.69	0.30	0.01
Pasta	0.55	0.45	0.00
Overall	0.53	0.37	0.10

Overall, the findings presented in Table 8.10 are comparable to the results obtained by Van Heerde et al. (2001). We find that 37 percent of the increase in promotional unit sales is due to drawing current consumers from competitive brands, where Van Heerde et al. (2001) report an overall percentage of 35 percent. The tendency is clear: brand switch effects are much smaller than what the elasticity decomposition literature suggests. The purchase timing effect accounts for of about 1/2 of the total effect of promotions on the increase in promotional unit sales. The quantity effect accounts for about 10 percent of the increase in promotional unit sales. In total, this indicates that in general, promotions are very effective in drawing future purchases to the promotional shopping trip, either resulting in stockpiling and/or consumption increases (about 2/3 of the total effect). The effectiveness of drawing current consumers from competitive brands is less effective (1/3 of the total effect).

Differences between categories are found. The strength of the brand switch effect varies between 20 percent for potato chips promotions up to more than 40 percent for soft drink, coffee, and pasta promotions. But, despite differences found between the categories, the conclusions drawn by Van Heerde et al. (2001) are supported in this research. The effects of promotions on brand switching are by far less important than what has been claimed by prior studies using the elasticity based decomposition of incremental promotional sales. So, promotions are more attractive for retailers than what has been assumed based on those

studies. Promotions do not lead primarily to a reallocation of current expenditures by households across items within a category.

But, the decomposition dealt with thus far assumes that consumers first decide when to buy and then what and how much. The focal point was whether a promotion resulted in a change in interpurchase time or not. Is it realistic to assume that consumers first decide when to buy when performing across product category research? A consumer does not visit a store for each product category separately. Normally, purchases are made within more than one product category during one and the same shopping trip. When a consumer is shopping, he or she may run into a promotion for a product category from which he or she did not intend to buy, where the promotion is for a non-favorite brand. This can result in accelerated non-favorite brand purchases. Are these accelerated purchases mainly due to a change in purchase timing or due to a brand switch? Van Heerde et al. (2001) assigned these accelerated purchases to a change in purchase timing, as the increase in own-brand sales cannot be assigned to current cross-brand effects. But, isn't more logical to assign these increased unit sales to brand switching instead of a change in purchase timing? When assigning the entire effect to brand switching, an upper limit is obtained for the brand switch effect, whereas the assignment procedure followed before provides a lower limit for the brand switch effect. The effect of combined responses of changes in purchase timing and brand choice is assigned to brand switching instead of purchase timing, as depicted in Figure 8.3. The focal point in this approach is whether current promotional unit sales come from regular consumers (consumers that also buy the brand when it is not on promotion) or from non-regular consumers (consumers who switched to the promoted brand). A manufacturer is not so much interested in drawing purchases from other shopping trips. A manufacturer is interested in the ability of sales promotions to draw consumers from competitive brands.

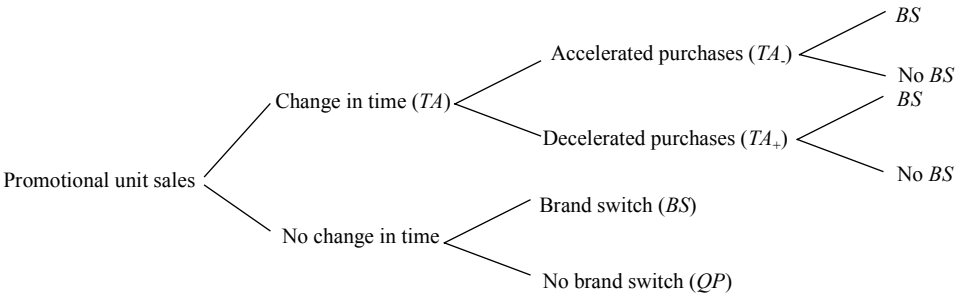


Figure 8.3: Decomposition of promotional unit sales, assigning accelerated brand switches to this brand switch instead of to the change in time

The results are reported in Table 8.11.

Table 8.11: Unit-sales decomposition of promotional sales where accelerated and decelerate brand switches are assigned to brand switching

Product category	Change in purchase time (*TA*)	Brand switching (*BS*)	Change in purchase quantity (*QP*)
Soft drinks	0.22	0.51	0.27
Fruit juice	0.31	0.52	0.17
Coffee	0.14	0.73	0.14
Potato chips	0.29	0.26	0.46
Candy bars	0.22	0.67	0.10
Pasta	0.22	0.64	0.14
Overall	0.21	0.58	0.21

The results from Table 8.11 show that regular shoppers account for about 40 percent of the total promotional unit sales. The remaining 60 percent of the current promotional unit-sales come from non-regular consumers. Again, differences between product categories are found.

As mentioned before, prior sales promotion decomposition research looked at decomposing the increase in sales due to promotions. Figure 8.4 depicts the process of decomposing incremental promotional sales.

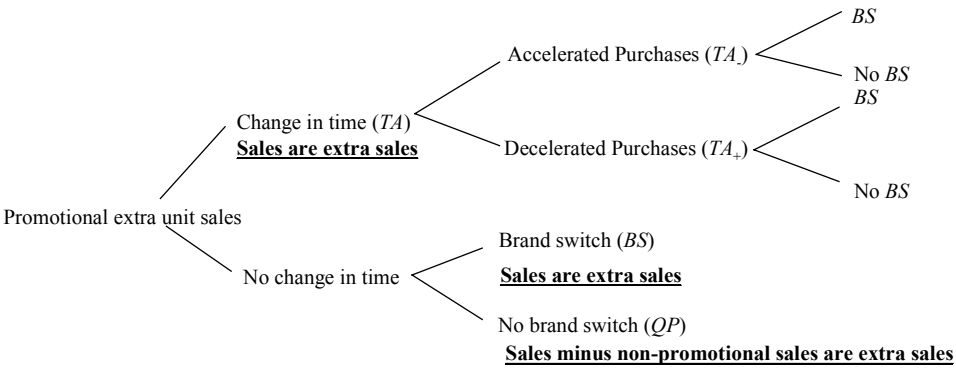


Figure 8.4: Decomposition of promotional incremental unit sales, assigning accelerated brand switches to this brand switch instead of to the change in time

The results of this decomposition can be found in Table 8.12.

Table 8.12: Unit-sales decomposition of extra promotional sales where accelerated and decelerated brand switches are assigned to brand switching

Product category	Change in purchase time (*TA*)	Brand switching (*BS*)	Change in purchase quantity (*QP*)
Soft drinks	0.26	0.61	0.14
Fruit juice	0.34	0.55	0.10
Coffee	0.15	0.80	0.06
Potato chips	0.43	0.38	0.17
Candy bars	0.25	0.74	0.01
Pasta	0.25	0.75	0.00
Overall	0.24	0.65	0.10

These results lead to a different view on the promotional bump decomposition. On average, 65% percent of the additional promotional sales are due to brand switching. About half the changes in purchase times are accompanied by a brand switch. The relative strength of brand switching is therefore almost doubled, compared to the first decomposition (focal point is change in purchase timing).

The first decomposition discussed assigns combined changes in purchase timing and brand choice to the change in time, providing a lower limit for the strength of the brand switch effect. The second decomposition assigns these combined changes to brand switching, providing an upper limit for the strength of the brand switch effect. The upper limits obtained are to a large extent in accordance with the elasticity based findings (74 percent of the effect on promotional sales was attributed to brand switching). The differences found between the elasticity based decomposition and the unit-sales based decomposition therefore do not seem to originate only from differences in approach. The assumptions made are also very important. Are accelerated brand switches due to a change in purchase timing, due to brand switching, or due to both?

Finally, it is of interest to investigate which part of the total promotional unit sales is really incremental and what part would have been purchased anyway (baseline sales). For example, with respect to the overall effects of sales promotions, the total promotional unit sales equal 6559 units. The incremental promotional unit sales equal 5753 units. The baseline sales are equal to the difference, which is 806 units. Figure A8.2 contains the incremental versus baseline sales across the categories and separately for each product category (in percentages). In general, a promotion leads to a large increase in unit sales, almost seven times as much units are purchased, varying across product categories from twice as much for potato chip promotions up to nine times as much for coffee promotions. Promotions therefore have large effects on unit sales, leading to large incremental current sales. But, a reasonable part of these current incremental unit sales are borrowed from the future (across the categories at most 34 percent, either borrowed in time (24 percent) or in quantity (10 percent)).

8.6 Conclusions

This chapter dealt with the second sub-question raised in Chapter 1. Can promotional household purchase behavior be decomposed into the sales reaction mechanisms and, if so, does this decomposition differ across product categories? First of all, measures have been defined that measure the effect of promotions on household purchase behavior in an intertemporal and comprehensive way. Application of those measures per and across product

categories revealed that the strongest (average) effects are: extra promotional volume (ranging between categories from 16% up to 96 %), followed by brand switching (ranging between categories from 7% up to 47%), and purchasing sooner (ranging between categories from 0% up to 21%).

The promotional increase in unit sales was decomposed in two different ways. The first decomposition is based on distinguishing between purchases that would have taken place anyway at this moment, or purchases that are changed in time. The current additional expenditures are of interest, accounting for about 2/3 of the extra promotional unit sales. The second decomposition distinguishes between purchases coming from regular versus non-regular consumers. This different point of view showed that about 2/3 of the unit sales increase is due to brand switching, coming from non-regular consumers. Promotions do turn out to be quite effective in drawing consumers from competitive brands.

What is the contribution of decomposing the promotion unit sales effects using household level data instead of store level data? The different findings dealt with in this section, based on the two different ways of decomposing the promotional effects, can only be made explicit using household level data. These micro level data offer a higher level of detail, leading to a direct understanding of for example choice behavior, and the relationship between purchase behavior and consumer socioeconomic characteristics (Russel and Kamakura 1994, Bucklin and Gupta 1992). Bucklin and Gupta (1999) stated that research is needed to develop simple, robust models that will provide better estimates of promotional sales that are truly incremental for the manufacturer. Van Heerde et al. (2002) decomposed the sales increase due to sales promotions using a unit sales approach, based on store level data, although they state that household data provide the best opportunity for decomposition. But, store level data are far more likely to be used by managers and they are also more representative. A disadvantage of using store level data instead of household level data is that it is impossible to recover the individual purchase behaviors that underlie models of household behavior (brand choice, purchase timing, and purchase quantity decisions) (Van Heerde et al. 2002). Their unit sales decomposition distinguishes three sources: cross-brand effects (the units that other brands lose at the time of the promotion), stockpiling effects (sales that are shifted from other weeks to the current week), and category expansion effects (the remainder of the unit sales increase). Unit sales that come from households that accelerated

their purchases but also switched brands are attributed to stockpiling in this model. However, they should be attributed to brand switching, not as current cross-brand effects, but as dynamic cross-brand effects. The second decomposition treated in this chapter provides these detailed insights, which can only be obtained using household level data. Finally, household data offer the opportunity to relate the purchase behavior found with consumer characteristics, which could be very interesting to both manufacturers and retailers.

In general, promotions do result in large unit sales increases, for some categories even increasing sales by a factor nine. But, on average, 40 percent is not true incremental sales, as these purchases come from regular consumers and are borrowed at least partly from other shopping trips. But, the assumptions made underlying the promotional bump decomposition are important. Besides the type of decomposition chosen (elasticity based versus unit sales based), the specific process to assign promotional sales to the possible response patterns is found to be of crucial importance.

Both empirical approaches applied in this chapter (intertemporal and promotional unit sales decomposition) show that the effects of sales promotions differ across product categories. Based on the intertemporal approach, brand switching is the most prevalent effect of sales promotions (in terms of occurrence), but the effect on unit sales is smaller when brand switching is involved. It is therefore not the strongest effect. Brand switching is especially exhibited for coffee and candy bar promotions, the two higher priced product categories in this research. Promotions in categories that are often on promotion (potato chips and candy bars) have a large effect on purchase quantity, but these extra purchases are borrowed from future purchases to a large extent. The data presented in Chapter Six on the part of the sales which could be attributed to promotional sales (Table 6.5) pointed out that about one third of the total sales in the Netherlands for these two categories are promotional sales. When the purpose of a promotion is to get rid of stock or to keep customers away from the market when competitive promotions are expected, promotions within these categories are worthwhile. But for increasing profits, retailers and manufacturers should try to avoid using a lot of promotions for often purchased product categories.

With respect to the possible existence of deal proneness at the level of sales promotion reaction mechanisms, consistencies within category across reaction mechanisms and within reaction mechanism across categories were found, but only to a very modest

degree. When households switch brands, they buy less extra volume. Furthermore, purchase timing and purchase quantity are used by consumers as two interdependent reaction mechanisms. Shoppers either accelerate their purchases due to a promotion but do not buy more, or buy more but not accelerate purchase timing. When a promotional shopping trip results in a large quantity increase, the post-promotional shopping trip is postponed. Thus, some consistencies were found, but only to a very modest degree. The phenomenon of deal proneness could not be demonstrated, neither at the level of promotion utilization, nor at the sales promotion reaction mechanism specific level.

9 CONCLUSIONS, DISCUSSION, AND SUGGESTIONS FOR FURTHER RESEARCH

9.1 Introduction

This thesis has provided new insights in the effects of sales promotions on household purchase behavior. Two research questions were central:

(1) Can we explain the observed household promotion response behavior by socio-economic, demographic, purchase, and psychographic household characteristics such as income, available time, household composition, variety seeking, purchase frequency in accordance with consumer behavior theory?

(2) Can we decompose promotional household purchase behavior into different sales promotion reaction mechanisms (brand switching, store switching, purchase acceleration, repeat purchasing, and category expansion) in accordance with prior promotional sales decomposition research? To what degree do the different sales promotion reaction mechanisms occur? Are they related, for the same household, with each other or across product categories?

Theories from consumer buying behavior were applied to the topic of sales promotions in Chapter 2. This provides a theoretical understanding of why and how sales promotions influence household purchase behavior. Chapter 3 used these theories, in combination with prior research to derive hypotheses regarding household variables and their expected relation with sales promotion response, taking possible promotion type interaction effects into account. In Chapter 4 the possible mechanisms that constitute sales promotion response were dealt with in detail, the so-called sales promotion reaction mechanisms: brand switching, store switching, purchase acceleration (purchase time or purchase quantity), category expansion, and repeat purchasing. Prior findings were dealt with and hypotheses were derived that relate product category characteristics to these sales promotion reaction mechanisms. In Chapter 5, we developed a research framework and a two-step research approach. In the first step, possible drivers of household sales promotion response were identified. In the second step, the

specific sales promotion reaction mechanisms that constitute household promotion response were studied. Measures were derived for each sales promotion reaction mechanisms separately that take the intertemporal aspect into account (not only the promotional periods, but also pre- and post-promotional periods are considered). Chapter 6 contained the data description. Chapter 7 dealt with empirically determining drivers of household sales promotion response (the first step of the two-step research approach). The hypotheses derived regarding the relationships between household variables and promotion response were tested here. Chapter 8 dealt with decomposing promotion response into the sales promotion reaction mechanisms (the second step of the two-step research approach). Both an intertemporal approach (taking post-and pre-promotional effects into account) and a temporal approach (decomposing the current promotional sales bump) were applied.

The order of discussion in this chapter is as follows. In section 9.2 we summarize and discuss the most important findings. In section 9.3 we discuss the managerial implications. In section 9.4 we identify limitations of the research in this thesis, which can be addressed in future research.

9.2 Summary, Conclusions, and Discussion of Findings

9.2.1 Household Promotion Response

The findings from Chapter 7 provide insights into the first research question, identifying drivers of sales promotion response. Binary logistic regressions are used to test the hypotheses specifying the relationship of household characteristics with promotion response. The household characteristics included are socio-economic, demographic, psychographic, and purchase process variables. In addition, certain characteristics of the promotion itself are taken into account (type of promotion (display, feature, price cut or combinations of these three)), whether the promotion is for a favorite brand or not, whether other promotions are present during the same shopping trip, and whether these are for favorite brands). Furthermore, differences in the relationships between in-store and out-of-store promotions are examined. Data from two-year, 17,144 records (156 households, 6 product categories (soft

drinks, fruit juice, coffee, potato chips, candy bars, pasta)) are used to test the hypotheses. The most interesting findings are mentioned in the summary below.

9.2.1.1 Drivers of Sales Promotion Response

Which household characteristics determine whether households respond to a promotion? Since the 1960s, managers and researchers have tried to identify the characteristics of those households that are responsive to sales promotions (e.g., Webster 1965, Massy et al. 1968, Bell et al. 1999). However, prior research led to conflicting findings. A clear, unequivocal relationship between household variables such as demographics, socio-economics, psychographics, purchase variables, has not yet been found. This research investigates these relationships in depth across six product categories (soft drinks, fruit juice, coffee, potato chips, candy bars, pasta).

The following household characteristics are related to the probability of responding to a promotion: social class, household size, age, employment situation of the shopping responsible person, presence of non-school age children, store loyalty, basket size, and shopping frequency. The promotion responsive households can be profiled as larger households consisting of older children and a somewhat older (≥ 35 years of age) shopping responsible person that works out of the house and shops not very often, but purchases larger shopping baskets. Practitioners can make use of this information to improve their promotional strategies.

Promotions can influence household purchase behavior inside or outside the store. Some households scan newspapers and leaflets for interesting sales promotions, whereas other households only pay attention to promotions inside the retail store. It is interesting to know whether the probability to respond to these different types of promotions, in-store and out-of-store promotions, is related to different household characteristics. It is found that households without non-school age children in which the shopping responsible person has a paid job are very promotion responsive, especially with respect to in-store promotions. A sufficient grocery budget combined with time pressure results in more in-store promotion response. These types of promotions are used as time saving cues. As unplanned purchasing is

increasing (Inman and Winer 1998), in-store promotions are becoming more and more important.

A household encounters a lot of sales promotions for non-favorite brands. Responding to these promotions would require brand switching. A lot of research has been done on variety seeking, whether it is just random behavior, or there is some sort of intrinsic drive in a person to seek variety (e.g., Pessemier and Handelsman 1984, Van Trijp et al. 1996, Ainslie and Rossie 1998). It has been emphasized that intrinsically motivated and extrinsically motivated variety seeking should be dealt with separately. The results in this research confirm this separate treatment. Intrinsic variety seeking and extrinsic variety seeking are not related. Shoppers that have an intrinsic drive to seek variety (switch a lot of brands when there are no promotions) are not more promotion response. Brand switch research would benefit greatly by isolating those brand switches that are of the intrinsic variety seeking type from those that are extrinsically motivated before estimating parameters associated with these behaviors.

Besides making the distinction between in-store and out-of store promotions, it is also of interest to examine whether favorite brand and non-favorite brand promotions have different effects. Promotions for favorite brands have a strong impact on the probability to respond to a promotion (the relative probability to respond is multiplied with at least a factor 22.8). Furthermore, the promotional quantity purchased is bigger for favorite brands. This seems to stress that promotions mainly result in purchases by consumers that would have bought the brand anyway. But, for a specific brand, the number of regular consumers is most of the time much smaller than the number of non-regular consumers and promotions can drive these non-regular consumers to switch to the promoted brand, which is found to be about 60 percent of the total promotional unit sales. Furthermore, it is found that the probability to respond to a non-favorite brand promotion is larger for non-store loyal households than for store loyal households.

With respect to the different promotion types, the combined display/feature/price cut promotion is the most effective, about nine times as effective as a feature promotion without a price cut. Promotional signals work, especially displays increase promotion response, although their influence on promotion response is less than for promotions with an economic gain attached to them. This is additional evidence that in-store promotions are used as decision-making facilitators.

Summarizing, the results are in accordance with the most consistently described relationships in the literature, the positive relationship between household size and promotion response, and the negative relationship between non-school age children and promotion response. The relationship between intrinsic and extrinsic variety seeking is not found in this research, which underlines the importance of making this distinction. The difference found between in-store and out-of-store promotions is a very interesting one. Especially the positive relationship between shopping responsible persons with a paid job and in-store promotion response found is of great interest. The combination of the freedom to enact on impulse (large shopping budget) and the timesaving element of in-store promotions seems to increase the probability to respond to these types of promotions.

9.2.1.2 Deal Proneness

Do consumers have an intrinsic drive to look for deals and make use of these deals? Managers and researchers have spent considerable effort trying to identify and understand the so-called 'deal prone' consumer (e.g., Webster 1965, Montgomery 1971, Blattberg and Sen 1974, McAlister 1986, Bawa and Shoemaker 1987, Schneider and Currim 1991, Lichtenstein et al. 1995; 1997, Bawa et al. 1997, Ainslie and Rossi 1998). A wide range of definitions and operationalizations has been applied, leading to equivocal findings. Deal proneness reflects the general propensity to react to sales promotions. If deal proneness exists, one should see similarities in promotional purchase behavior across multiple categories (Ainslie and Rossi 1998). Most prior research set deal proneness equal to promotion response (e.g., Webster 1965, Blattberg and Sen 1974, Wierenga 1974, Cotton and Babb 1978, Bawa and Shoemaker 1987). Promotional purchase behavior was studied for only one product category, or consistencies were sought across several product categories.

But, deal proneness should not be conceptualized as isomorphic with actualized promotion response. If one inferred it directly from promotional purchase behavior, the consistency found could be caused by for example household characteristics. And as discussed before, promotion response indeed is found to be determined by a number of household characteristics. Therefore, the existence of deal proneness should be inferred

indirectly from promotional purchase behavior. The consistency found across product categories has to be purged for the part due to observable household characteristics. When a substantial part of the consistency remains, intrinsic deal proneness exists.

In this research, we examine whether deal proneness adds to explaining consistency in promotion response across six product categories (soft drinks, fruit juice, coffee, potato chips, candy bars, pasta). However, after correcting for across effects of household variables, no systematic consistency remains across the different product categories. We have not been able to demonstrate the existence of deal proneness.

9.2.2 Sales Promotion Reaction Mechanisms

The findings from Chapter 8 provide insights into the second research question, decomposing promotion response into the sales promotion reaction mechanisms. When a household responds to a promotion, does it switch brands, or buy the promoted product earlier, or in a larger quantity? Despite the enormous amount of research dealing with sales promotion effects, inconsistent empirical results have been found with respect to the decomposition of promotional sales increase into the underlying sales promotion reaction mechanisms. In this research, both an intertemporal (taking pre-and post-promotional effects into account) and a non-intertemporal approach (decomposing the promotional sales bump at one moment) were developed and applied. The sales promotion reaction mechanisms measures were estimated for 200 households. The most interesting findings are mentioned in the summary below.

9.2.2.1 Decomposing Promotion Response into the Sales Promotion Reaction Mechanisms

A sales promotion can influence household purchase behavior in many ways (the so-called sales promotion reaction mechanisms). A household can decide to switch brands, purchase a larger quantity than intended, purchase it at a different moment than intended, etc. But not only the current behavior can be influenced. Suppose that a household purchases a larger quantity due to the promotion. During the subsequent shopping trip, the household can decide

to buy less than what it normally purchases, or the household can decide to postpone its subsequent shopping trip to compensate for these extra promotional purchases. The sales promotion therefore can also influence the household behavior during the next shopping trip (the so-called post-promotional effects). Some households anticipate a sales promotion coming up and therefore wait for it, or buy less right now (the so-called pre-promotional effects). The effects of sales promotions on household purchase behavior have to be studied in an intertemporal setting, not taking only the current promotional shopping trip into account but also the pre- and post-promotional shopping trips.

First of all, households have to buy the promoted products before any of these effects can occur. Households use coffee promotions the most. On average, households made use of the available promotions during 44 percent of the promotional shopping trips for coffee (a promotional shopping trip is called promotional if both a household purchases from the specific category and there was a promotion within that specific category). Pasta promotions are used the least (8 percent). Promotion response differs across the product categories.

Measures that take this intertemporal aspect into account are developed for brand switching, changes in purchase time, changes in purchase quantity, and category expansion (the net effect of timing and quantity). The measures are based on comparing the promotional, pre-, and post-promotional shopping trip with the average non-promotional purchase behavior. The measures are estimated for each individual household for the six product categories, the interested reader is referred to Section 5.4.2 for the details.

When we look at the specific sales promotion reaction mechanisms, again differences between categories are found. For all six categories included in this research significant brand switch effects are found, but ranging from 7 percent for soft drink promotions up to 47 percent for coffee promotions. Purchase timing and purchase quantity effects are found to be significant for some categories, but not for all. Promotions are found to accelerate purchase timing for two categories, pasta and candy bars. In addition, households postpone their post-promotional shopping trip for two other categories, coffee and soft drinks. The quantity bought on promotion is increased for four product categories, soft drinks, fruit juice, potato chips, and coffee. The increase ranges from 26 percent for soft drinks up to 96 percent for coffee. Households do seem to adjust their pre- and post-promotional purchase

quantity downward for potato chips. Category expansion effects are found to be positive for all categories, but only significant for fruit juice (increase of 24 percent).

In general, households seem to behave in a systematic way. Purchase timing and purchase quantity are used as two interdependent mechanisms. Shoppers either accelerate their purchase timing due to a promotion but do not buy more, or they buy more of a promoted product during a non-accelerated promotional shopping trip. When a promotion results in a large quantity increase, the next shopping trip is postponed. Purchase quantity and purchase timing are therefore two interdependent mechanisms and are used by shoppers to correct for their promotional purchase behavior, during the promotional and/or the post-promotional shopping trip. For example, coffee promotions lead to an increase in purchased quantity, which is almost doubled. But, the next shopping trip is postponed, waiting extra long to repurchase again within the same product category. But not all promotional effects are compensated for. The extra promotional fruit juice purchases lead to category expansion. This indicates that sales promotions do not lead only to cannibalization of future category expenditures. Sales promotions also result in incremental category expenditures.

9.2.2.2 Product Category Characteristics

The sales promotion reaction mechanisms occur in different patterns across the six product categories. For some categories brand switching is relatively often combined with accelerated purchase timings (candy bars and pasta), whereas for other categories brand switching is combined with changes in purchase quantity (soft drinks, fruit juice, potato chips, and coffee) is more common. In turn, the extra promotional potato chips purchases are compensated for by buying less before and after the promotional shopping trip. For this product category, promotions seem to lead to cherry picking purchase behavior. Households compensate for the extra promotional coffee and soft drinks purchases by postponing their next purchase.

Buying a different quantity due to a promotion occurs the most often, followed by brand switching and a change in interpurchase time. But, the extra quantity purchased is smaller if the promoted brand is not a favorite brand, i.e. in case of a brand switch. This is found to be the strongest for fruit juice products. The purchase quantity of promotional non-

favorite brands is about 40 percent lower for fruit juice products, 30 percent lower for soft drinks and candy bars, 10 percent lower for potato chips, and hardly any differences are found for coffee. In general, purchasing an unfamiliar product is risky, and consumers are apparently risk avert.

Thus far, different effects of sales promotions across the product categories have been discussed. These differences were related to category characteristics. Below, the results found are summarized for each category characteristic separately. But, because of the limited number of product categories included in this study, these conclusions are tentative.

- Average price level: households make relatively more use of promotions in categories that have a higher average price level. For these categories, households exhibit more brand switch behavior and the promotional quantity purchased is higher than for lower priced categories. Promotions in these categories do not lead to more acceleration in purchase timing. Promotions for higher priced categories influence household purchase behavior once the household is inside the store.
- Purchase frequency: promotions in categories that are more often purchased have less impact on households. The promotions are used less often and when they are used, the quantity purchased is relatively less. Households also have less tendency to expand consumption for these categories.
- Promotional frequency: promotions within frequently promoted product categories are less effective in increasing the promotional purchase quantity bought by households. An overload of promotions within a product category does seem to lead to saturation effects.
- Storability: promotions for better storable products are used more and lead to larger promotional quantities bought.
- Number of brands: households do not switch more between brands for categories in which more brands are present.
- Impulse: promotions within more impulse sensitive categories result in lower promotional purchased quantities than within less impulse sensitive product categories.

9.2.2.3 Deal Proneness

With respect to the possible existence of deal proneness at the level of sales promotion reaction mechanisms, consistencies within category across reaction mechanisms and within reaction mechanism across categories were only found to a very modest degree. When households switch brands, they do not buy extra volume and vice versa. When households switch brands for coffee promotions, they do not have a higher probability to switch brands for fruit juice promotions, etc. An important implication of these results is that differences in promotional response for one purchase behavior are not predictive of differences in promotional response for other types of purchase behavior. The phenomenon of deal proneness has not been demonstrated, neither at the level of promotion utilization, nor at the sales promotion reaction mechanism specific level.

9.2.2.4 Promotional Bump Decomposition

Another interesting topic is decomposing the promotional sales bump into the underlying causes of this bump. Sales of a brand which is currently on promotion can come from households that change their purchase timing (leading to extra sales because without the promotion these households would not have bought the specific brand at that moment), households that intend to purchase at this moment, but switch to the promoted brand (also resulting in extra sales for the promoted brand), or the promotional sales can come from households that already intend to buy from the category and also already intend to buy the brand which is on promotion.

Prior studies (e.g., Gupta 1988, Chiang 1991, Bucklin et al. 1998, Bell et al. 1999, Van Heerde et al. 2001, 2002) concluded that differences exist across product categories. But, two different approaches have been followed. Based on the elasticity based approach (e.g., Gupta 1988, Bell et al. 1999), the general tendency found is that brand switching accounts for the vast majority of the total elasticity (about three fourth), whereas purchase quantity and purchase timing account for the remaining one fourth. But, based on the unit sales approach

(Van Heerde et al. 2001, 2002), the results found show that the brand switch effect is, on average, at most about one third of the total unit sales effect.

In this research, a promotional unit sales decomposition is used for the six product categories included. This decomposition of the extra promotional unit sales is found to differ across the 6 product categories incorporated in this research. Promotions turn out to be very effective in drawing purchases to the promotional shopping trip, which is of interest to the retailer, either resulting in stockpiling and/or consumption increases (two third of the total effect), supporting the work of Van Heerde et al. (2001, 2002). But, a part of these additional current purchases are borrowed from future purchases made by regular consumers. The results found show that about two third of the current increase in promotional unit sales comes from non-regular consumers that were drawn from competitive brands, which is of interest to the manufacturer.

Thus, besides the approach chosen to decompose the promotional sales bump (elasticity based or unit sales based), also the point of view chosen is of great importance.

9.3 Managerial Implications

Retailers and manufacturers can use the findings from this thesis to develop better understanding of household reactions to sales promotions and perhaps indirectly to develop more profitable promotion strategies. Interesting findings are the following:

- Promotions result in large spikes in unit sales, overall almost 7 times as many units are purchased during a promotional period trip. Varying across product categories from twice as many units (potato chips) up to nine times as many units (coffee, candy bars, and fruit juice). The main part of these extra unit sales (65 percent) comes from non-regular consumers. The remaining part is borrowed from future purchases of regular consumers (borrowed in time (24 percent) plus borrowed in quantity (10 percent)), but these borrowed purchases could lead to extra consumption.
- Household variables such as size and composition of the household, social class, employment situation, store loyalty, purchase frequency, average basket size, etc. are

related to promotion response. Micro-marketing strategies therefore have potential. Retailers can use (or gather) this household information to develop better promotional strategies. The composition of the store environment (in terms of types of shoppers) partly determines the effectiveness of the promotional strategy. For example, neighborhoods consisting of double-income families without non-school age children turn out to be very promising for promotional strategies.

- In-store and out-of-store promotions have different effects. The findings point out that promotions especially seem to function as in-store decision-making cues. Households with larger grocery budgets and less available time are found to be the most responsive towards in-store promotions. The grocery store environment presents a myriad of visual cues and information to consumers at the point of sale. A typical supermarket may offer consumers the opportunity to make purchases from 30,000 distinct SKUs, and individual brands within these SKUs may present more than 100 separate pieces of information (price, size, product features and claims, nutrition information, ingredients, etc.) to the consumer. In such an information-rich environment, consumers will selectively attend to easily available information. In-store promotions can serve as important decision-making cues. As the number of young, two-person households in which both partners work and the amount of in-store decision-making is increasing, the potential of in-store promotions is growing.
- Promotional signaling works. Display signals without a price cut attached to them do influence household purchase behavior, i.e. increase the probability of a purchase.
- Promotions can be beneficial for both the retailer and the manufacturer. The retailer is especially interested in drawing purchases towards the current shopping trip. Promotions turn out to be very effective in drawing purchases to the promotional shopping trip, either resulting in stockpiling and/or consumption increases (about 2/3 of the total effect). But, about 30 percent of the current unit sales increase comes from non-regular consumers that accelerated their purchases and purchased a non-favorite brand due to the promotion. This means that a manufacturer encounters an increase in promotional unit sales of about 60 percent, which is an attractive result. Promotions are effective in drawing consumers from competitive brands. Finally, promotions are found to lead to increased consumption rates, especially for fruit

juice products. Thus, in general, although promotions for the favorite brand have a large impact on the probability that a household makes use of the promotion, a substantial part of the promotional sales effect comes from non-regular consumers and from increased expenditures. In addition, a small part comes from increased consumption.

9.4 Limitations and Future Research

This study takes a close look at the effects of sales promotions on households purchase behavior. These effects are studied across six product categories, for different types of promotions, and for different possible effects of sales promotions on promotions response (sales promotion reaction mechanisms), taking the intertemporal dynamic effects into account. This in-depth approach has led both to a number of new and interesting insights, as discussed previously. But, as most studies, our research also has limitations.

First, the number of households and the number of product categories could be expanded to validate the findings of this research.

Second, this study is limited to FMCG. But consumers also encounter sales promotions outside the field of FMCG. It is hard to think of a field of product where promotions are not used. But empirically deriving different measures for different categories, promotion types, and sales promotion reaction mechanisms requires the availability of data. This implies that a much longer time frame is needed for less frequently purchased products. But it would be very interesting to see whether household responses towards sales promotions can be generalized towards other product fields.

A third limitation of this research is that the empirical part is concerned with a sub-set of the possible sales promotion reaction mechanisms. Store switching and repeat purchasing are not empirically incorporated. In order to get a complete insight in household sales promotion response, especially store switching should be included, as most prior research stated that the long-run effects of promotions on brand purchase probabilities are limited. It was found in this thesis that in-store and out-of-store promotions have a different impact on household purchase behavior. But, store switching is expected to be especially

influenced by out-of-store promotions. Investigating store switch behavior in detail will be an interesting avenue for future research.

A fourth limitation deals with the modeling approach chosen to identify the drivers of sales promotion response. As mentioned in Section 5.4.1, it is assumed that the households incorporated in this research come from one and the same distribution. Although different arguments have been provided for the validity and reliability of the approach chosen, applying mixture modeling could be a very interesting avenue for further research. But, the number of households should then also be extended to enable reliable parameter recovery.

A fifth and final issue that should be discussed is the fact that most studies in this field, including this one, incorporate mainly the 'standard' types of sales promotions (such as display, feature, price cut) into account. Furthermore, we did not incorporate the depth of the price cut as part of the promotions. Deeper price cuts are assumed to have more impact on response. Although this impact may differ between the sales promotion reaction mechanisms, we believe that the findings presented in this dissertation with respect to the sales promotion reaction mechanisms are valid. Comparable to the flexible decomposition of price promotion effects performed by Van Heerde et al. (2002), incorporating the characteristics of the promotion into the household unit sales promotional decomposition is an interesting avenue for future research.

An interesting, relatively new field is the study of sales promotions for on-line grocery shopping and on-line shopping in general.

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APPENDIX A3: Operationalization Social Class

At GfK, social class is defined as a combination of education and the job sector of the breadwinner. The reason behind this is that occupation is closely interrelated with income. A lot of market research studies have shown that consumers provide unreliable answers regarding income related questions. GfK therefore decided to use a social class classification scheme based on education and occupation. The classification scheme used is the following (D represents the lowest class and A the highest class):

Table A3.1: Operationalization social class

Occupation breadwinner	Education Breadwinner							
	S	HV	HG	MV	MG	LV	LG	?
Director 6 or more persons	A	A	A	A	B_+	B_-	B_-	B_-
Director 5-	A	A	A	A	B_+	B_-	B_-	B_-
Owner 6+	A	A	A	A	B_+	B_-	B_-	B_-
Owner 6-	A	A	A	A	B_+	B_-	B_-	B_-
Farmer	A	A	A	A	B_+	B_-	B_-	B_-
Higher	A	B_+	B_+	B_+	B_+	B_-	B_-	B_-
Middle, specialized	A	B_+	B_+	B_+	B_-	C	C	C
Middle	A	B_+	B_+	B_+	B_-	C	C	C
Lower, specialized	A	B_-	B_-	B_-	C	C	C	C
Lower	A	B_-	C	C	C	C	D	D
Housewife	B_-	B_-	C	C	C	C	D	D
Student	B_-	B_-	C	C	C		D	D

The first index represents the level of education, Scientific (S), Higher (H), Middle (M), or Lower (L). The second index represents Vocational (V) or General (G). The question mark (?) represents missing values for education.

APPENDIX A4: Research Overview

Table A4.1: Overview of prior promotion researches (selection)

Article	Promotion Type	Product Category	Product Category Characteristic	Household Characteristic	Reaction Mechanism	Applied Theory(ies)
Webster (1965)				Age (+) Purchased amount (-) Behavioral brand loyalty (-)		Deal proneness (outcome measure)
Massy and Frank (1965)				Behavioral brand loyalty (-)		
Montgomery (1971)				Behavioral brand loyalty (-)		Deal proneness (outcome measure)
Scott (1976)	+					Attribution (self-perception) theory
Blattberg et al. (1976)		-			-	Economic theory
Dodson et al. (1978)	+	-				Economic theory Self-perception theory
Cotton and Babb (1978)	+	+		Household size (-) Race Workwives (+)		
Blattberg et al. (1978)		-		Resource variables (+) Time (-) Children under six- Husband and wife work (-)		Economic theory Deal proneness (outcome variable)
Neslin et al. (1985)	-	-		Purchase frequency (+)	- (TA/QP)	
McAlister (1986)	+-	+		No children under six (+) House (+) Unemployed adult in house (+) Income below median (+)	+	Deal proneness (outcome Variable)
Bawa and Shoemaker (1987)		-		Household size (+) Income (-) Young children (-) Working housewife (-) Urban area (+) Education (+) Store loyalty (-)		Economic theory Deal proneness (outcome measure)
Gupta (1988)	-				+ (BS, TA, QP)	
Bolton (1989)		+	Promotion intensity			
Neslin and Shoemaker (1989)						Self-perception theory Price adaptation
Fader and McALister (1990)				Purchased unit-size (+) Purchase frequency (+)		Involvement
Krishna et al. (1991)		+		Income (-)		Reference price Involvement
Schneider and Currim (1991)	+				+	Information processing ELM Deal proneness (outcome measure)
Vilcassim and Jain (1991)					- (BS,TA)	
Kalwani and Yim (1992)		"+"				Self-perception theory Reference pricing Threshold
Grover and Srinivasan (1992)	+					
Kahn and Schmittlein (1992)	-			Basket size		

continued

Table A4.1 continued

Article	Promotion Type	Product Category	Product Category Characteristic	Household Characteristic	Reaction Mechanism	Applied Theory(ies)
Raju (1992)		+	Magnitude of discounts Frequency of discounts Number of brands Bulkiness			
Davis et al. (1992)		"+/-"				Self-perception Theory
Mayhew and Winer (1992)						Reference prices Prospect theory
Krishna (1994)		+				
Gupta and Chintagunta (1994)				Income(-)		
Blattberg et al. (1995)	+	+				
Stone and Mason (1995)						Attitude Risk
Hoch et al. (1995)		+		Education (-) Size (+) Working women (+) Type of housing (-)		
Lichtenstein et al. (1995)	-					Information processing NFC Deal proneness (attitudinal outcome measure)
Narasimhan et al. (1996)	+	+	Interpurchase time Price Number of brands Ability to stockpile			
Urbany et al. (1996)		+		Time (-) Children under six (-) Age (+) Female (+) Education (+)		Economic theory
Thomas and Garland (1996)				Non-list shoppers (+)		
Van Trijp et al. (1996)		+				Risk, involvement
Warneryd (1996)				Risk ~ Income (-) Gender (men) Education (-)		Risk Prospect theory
Palson (1996)				Risk ~ Gender (men) Age (-)		Risk
Mela et al. (1997)	+					Self-perception theory Behavioral learning NFC
Bawa et al. (1997)		+				Deal proneness (attitudinal)
Lichtenstein et al. (1997)	+			Age (-) Education (-)		Deal proneness (attitudinal outcome measure)
Bucklin et al. (1998)	+				-	
Ainslie and Rossi (1998)	+	-		Price reductions ~ Income (-) Family size (+) Shop frequency (+) Size market basket (-) Heavy user (-)		Economic theory Trait theory

continued

Table A4.1 continued

Article	Promotion Type	Product Category	Product Category Characteristic	Household Characteristic	Reaction Mechanism	Applied Theory(ies)
Ailawadi and Neslin (1998)		-			-	Economic theory
Inman and Winer (1998)	+			In-store promotions ~ Involvement (-) Household size (+) Income (+) Women (+)		Consumer behavior model Exposure, motivation, recognition, decision NFC Information processing Economic theory
Burton et al. (1999)				In-store: Age (+) Women(+) Education(-) Income(+)		Information processing Deal proneness (attitudinal outcome measure)
Manchanda et al. (1999)		+/-		Family size (+) Shopping frequency (+)		
Raghubir and Corfman (1999)						Attribution theory
Bell et al. (1999)		+	Share of budget Storability Brand assortment Size assortment Necessity Purchase frequency	Age (-) Education (+)	+ (BS, TA, QP)	
Chandon et al. (2000)	-					Deal proneness (attitudinal) NFC

Plus and minus signs in the second, third, and sixth column indicate that this article provides empirical evidence for differences (+) or lack of differences (-) either across different promotion types, product categories, or reaction mechanisms, respectively. A plus or minus sign in the fourth and fifth column indicates finding of empirical evidence for a positive (+) of negative (-) relationship between promotion sensitivity and the mentioned category and household characteristic. The last column contains information about the theories and concepts from consumer behavior (see sections 2 and 3 from Chapter 2) used in each specific research.

APPENDIX A6: Overview Variables Involved in Sampling Procedure

Two underlying variables defining the strata:

- Age housewife/husband:
  - ≤ 29 years
  - 30 – 39 years
  - 40 – 49 years
  - 50 – 64 years
  - ≥ 65 years

- Size of the household:
  - 1 person
  - 2 persons
  - 3 persons
  - 4 persons
  - ≥ 5 persons

Three weighing variables used within strata:

- Social class:
  - A
  - B-upper (B_+)
  - B-lower (B_-)
  - C
  - D

- Size of municipality:
  - ≤ 19.999 inhabitants
  - 20.000 – 49.999 inhabitants
  - 50.000 - 99.999 inhabitants
  - ≥ 100.000 inhabitants

- District:
  - 3 biggest cities plus conurbations
  - remainders West
  - North
  - East
  - South

APPENDIX A7: Empirical Analysis One: Sales Promotion Response

Table A7.1: Variables used in the logistic regression

Symbol	Description
Y	0/1 variable indicating whether the household used the available promotion(s) or not, dependent variable
Social class	Social Class of the household 1 = D 2 = C 3 = B_- 4 = B_+ 5 = A
Size	Number of persons in the household
Type of Residence	1 = single family house 2 = 2 under 1 roof 3 = corner 4 = town house 5 = apartment 6 = flat 7 = other
Property Possession	0 = no 1 = yes
Age	Age of the person responsible for shopping 1 = 12-19 2 = 20-24 3 = 25-29 4 = 30-34 5 = 35-39 6 = 40-44 7 = 45-49 8 = 50-54 9 = 55-64 10 = 65-74 11 = ≥75
Education	Education of the person responsible for the shopping in numbers of years of schooling 1 = standard (6 years) 2 = lower (10 years) 3 = middle (12 years) 4 = higher (16 years)
EDUCRES_STANDARD	Resulting error term of regressing standard level of education on social class

continued

Table A7.1 continued

Symbol	Description
EDUCRES _LOWER	Resulting error term of regressing lower level of education on social class
EDUCRES_MIDDLE	Resulting error term of regressing middle level of education on social class
EDUCRES_HIGH	Resulting error term of regressing higher level of education on social class
Employment Situation Shopper	1 = paid profession >=30 hours 2 = paid profession < 30 hours 3 = unemployed/job-seeker 4 = welfare 5 = disabled 6 = pensioned (early retirement) 7 = pensioned 8 = school going 9 = housewife/househusband
Job Sector Breadwinner	1 = director/owner 2 = agriculture 3 = higher 4 = middle 5 = lower 6 = student
Cycle	Household Cycle, categorical 1 = single, age < 35 2 = single, 35-54 3 = single, > 54 4 = family with youngest child under 5 years 5 = family with youngest child 6-12 6 = family with youngest child over 12 7 = family without children, shopping responsible person < 35 8 = family without children, shopping responsible person 35-54 9 = family without children, shopping responsible person > 54
VARSEEK1	BS_{np}. First Variety Seeking Index. Brand switch index when there are no promotions (= ratio of the number of shopping trips a non-favorite brand is purchased and the total number of shopping trips that there were no promotions present in the primary store). 0≤VARSEEK1≤1. Only known at the category level.
VARSEEK2	Number of favorite brands
BASKET1	Number of different items purchased quarterly
BASKET2	Number of different items purchased not on promotion quarterly

continued

Table A7.1 continued

Symbol	Description
STORELOY1	Relative Share primary store FMCG expenditures (number)
STORELOY2	Relative Share primary store FMCG expenditures (money)
SHOPSHAR	Factor of STORELOY1 and STORELOY2
NCHAINS	Number of Chains visited
BASKET	Factor of BASKET1 and BASKET2
SHOPFREQ	Number of quarterly shopping trips in the primary store
X_d	0/1 variable indicating whether it is a display promotion
X_f	0/1 variable indicating whether it is a feature promotion
X_{df}	0/1 variable indicating whether it is a combined display/feature promotion
X_{dp}	0/1 variable indicating whether it is a combined display/price-cut promotion
X_{fp}	0/1 variable indicating whether it is a combined feature/price-cut promotion
X_{dfp}	0/1 variable indicating whether it is a combined display/feature/price-cut promotion
X^*	0/1 variable indicating whether the sales promotion had to do with a favorite brand
X^{other}	0/1 variable indicating whether there were other promotion types present at the same shopping trip
X^{*other}	0/1 variable indicating whether one of the other sales promotions had to do with a favorite brand
PC	Index for product category

Table A7.2: Data legitimacy check (dependent variable represents binary promotion response)

Variable	B[1]	S.E.	Sig	Exp(B)	B	S.E.	Sig	Exp(B)	B	S.E.	Sig	Exp(B)
	Combined data (N=17,144)				**Single-promotion records (N=4,886)**				**Decomposed multiple-promotion records (N=12,258)**			
SOCCLASS			0.0000				0.0000				0.0000	
- D	-0.6430	0.1084	0.0000	0.5259	-0.4976	0.1694	0.0033	0.6080	-0.7110	0.1433	0.0000	0.4911
- C	0.2549	0.0661	0.0001	1.2904	0.0732	0.1060	0.4899	1.0760	0.3420	0.0863	0.0001	1.4078
- B-, B+, A	0.3878	0.0620	0.0000	1.4737	0.4244	0.0967	0.0000	1.5286	0.3690	0.0822	0.0000	1.4463
SIZE	0.2544	0.0474	0.0000	1.2897	0.2327	0.0737	0.0016	1.2620	0.2721	0.0636	0.0000	1.3128
TYPE OF RESIDENCE			0.0000				0.0000				0.0000	
- single family house	-0.3330	0.0949	0.0005	0.7170	-0.1080	0.1579	0.4939	0.8976	-0.4570	0.1205	0.0002	0.6334
- town house	0.3708	0.0582	0.0000	1.4489	0.4469	0.0923	0.0000	1.5634	0.3018	0.0759	0.0001	1.3523
- apartment	0.0493	0.0830	0.5527	1.0505	-0.0080	0.1320	0.9514	0.9920	0.0865	0.1090	0.4272	1.0904
- other type	-0.0870	0.1065	0.4121	0.9163	-0.3308	0.1731	0.0560	0.7184	0.0683	0.1354	0.6142	1.0706
PROPERTY POSESSION	-0.0420	0.0361	0.2452	0.9589	-0.1287	0.0574	0.0248	0.8792	0.0023	0.0482	0.9618	1.0023
AGE	0.1673	0.0227	0.0000	1.1821	0.2078	0.0372	0.0000	1.2310	0.1496	0.0294	0.0000	1.1614
EDUCATION[2]												
EDUCRES_STANDARD	0.0013	0.2138	0.9950	1.0013	-0.1706	0.3199	0.5939	0.8432	0.0722	0.3003	0.8100	1.0748
EDUCRES_LOWER	-0.2480	0.1044	0.0174	0.7801	-0.6346	0.1683	0.0002	0.5301	-0.0550	0.1361	0.6876	0.9467
EDUCRES_MIDDLE	0.1324	0.0858	0.1226	1.1416	0.1386	0.1322	0.2944	1.1487	0.0585	0.1157	0.6133	1.0602
EMPLOYMENT SITUATION SHOPPER			0.000				0.0017				0.0000	
- paid job	0.5352	0.0769	0.0000	1.7078	0.3550	0.1230	0.0039	1.4262	0.6104	0.1017	0.0000	1.8411
- social security	0.2972	0.0886	0.0008	1.3461	0.3917	0.1416	0.0057	1.4795	0.2323	0.1176	0.0482	1.2615
- school	-0.6970	0.1433	0.0000	0.4983	-0.4700	0.2303	0.0413	0.6250	-0.7180	0.1892	0.0001	0.4878
- housewife/ husehusband	-0.1360	0.0985	0.1681	0.8730	-0.2768	0.1499	0.0649	0.7582	-0.1250	0.1356	0.3572	0.8826
JOB SECTOR BREADWINNER			0.0132				0.0227				0.1102	
- Director or Owner, higher employee, middle specialized	-0.1780	0.0681	0.0091	0.8374	-0.1390	0.1109	0.2102	0.8703	-0.1960	0.0877	0.0252	0.8218

continued

[1] In general, the estimated effects of each categorical variable is relative to the average effect of that variable.

[2] The estimated effects of education are corrected for social class and relative to the highest level of education.

Table A7.2 continued

Variable	B[1]	S.E.	Sig	Exp(B)	B	S.E.	Sig	Exp(B)	B	S.E.	Sig	Exp(B)
	Combined data (N=17,144)				**Single-promotion records** (N=4,886)				**Decomposed multiple-promotion records** (N=12,258)			
- Agriculture	0.1359	0.1382	0.3252	1.1456	-0.2045	0.2334	0.3808	0.8151	0.3302	0.1723	0.0554	1.3912
- Middle and Lower employee	0.0196	0.0637	0.7584	1.0198	0.1554	0.1040	0.1352	1.1681	-0.0780	0.0822	0.3451	0.9254
- Student	0.0220	0.1108	0.8430	1.0222	0.1881	0.1740	0.2797	1.2069	-0.0560	0.1479	0.7032	0.9452
CYCLE			0.0065				0.3224				0.0264	
- single	0.3259	0.1052	0.0019	1.3853	0.2307	0.1626	0.1557	1.2595	0.3754	0.1412	0.0078	1.4555
- non-school age child	-0.2740	0.0909	0.0026	0.7606	-0.2627	0.1427	0.0656	0.7690	-0.2440	0.1205	0.0431	0.7837
- older children	-0.1700	0.0780	0.0292	0.8436	-0.0594	0.1253	0.6355	0.9423	-0.2580	0.1023	0.0117	0.7727
- family without children	0.1178	0.0593	0.0470	1.1250	0.0913	0.0960	0.3414	1.0956	0.1262	0.0778	0.1046	1.1345
VARSEEK1	0.0378	0.1122	0.7363	1.0385	-0.1907	0.1902	0.3160	0.8264	0.1816	0.1425	0.2027	1.1991
VARSEEK2	-0.1870	0.0341	0.0000	0.8292	-0.2562	0.0571	0.0000	0.7740	-0.1250	0.0435	0.0041	0.8827
SHOPSHAR	-0.0270	0.0316	0.3886	0.9731	0.0439	0.0499	0.3786	1.0449	-0.0720	0.0420	0.0858	0.9303
NCHAINS	0.0735	0.0432	0.0890	1.0763	0.0876	0.0737	0.2345	1.0916	0.0637	0.0549	0.2458	1.0658
BASKET	0.0936	0.0357	0.0088	1.0981	0.0452	0.0605	0.4555	1.0462	0.1151	0.0450	0.0104	1.1220
SHOPFREQ	-0.0460	0.0071	0.0000	0.9555	-0.0942	0.0121	0.0000	0.9101	-0.0170	0.0090	0.0546	0.9828
XD[3]	0.6992	0.1685	0.0000	2.0122	0.3996	0.2821	0.1567	1.4912	0.8747	0.2132	0.0000	2.3982
XDF	1.2839	0.1793	0.0000	3.6109	0.6637	0.3138	0.0344	1.9419	1.5956	0.2228	0.0000	4.9313
XDP	1.1372	0.1763	0.0000	3.1179	1.1151	0.3040	0.0002	3.0498	1.1592	0.2205	0.0000	3.1873
XFP	1.5408	0.1667	0.0000	4.6684	1.5407	0.2791	0.0000	4.6678	1.5909	0.2114	0.0000	4.9082
XDFP	2.1490	0.1616	0.0000	8.5762	2.0158	0.2691	0.0000	7.5064	2.2429	0.2054	0.0000	9.4205
X^{*}	3.1297	0.0718	0.0000	22.868	3.1192	0.1264	0.0000	22.629	3.2132	0.0888	0.0000	24.857
X^{other}	-0.5970	0.0582	0.0000	0.5507								
X^{*other}	-0.2450	0.1245	0.0492	0.7829					-0.2340	0.1255	0.0627	0.7917
Constant	-5.5740	0.3142	0.0000		-5.1030	0.5068	0.0000		-6.5610	0.4064	0.0000	
FIT MEASURES												
Nagelkerke R2				0.34								0.31
Percentage Correctly Classified				89.39%								91.27%

[3] The estimated effects of the different promotion types are relative to the effect of feature promotions.

Table A7.3: Results binary logistic regression analysis for promotion response

Variable	N1	N2	B[1]	S.E.	Sig	Exp(B)	B	S.E.	Sig	Exp(B)
	Record	Hh	Age and size linear, with cycle				Age and size categorical, without cycle			
SOCCLASS					0.0000				0.0000	
- D	1200	10	-0.6430	0.1084	0.0000	0.5259	-0.5726	0.1088	0.0000	0.5641
- C	5511	47	0.2549	0.0661	0.0001	1.2904	0.1960	0.0670	0.0034	1.2165
- B-, B+, A	9797	99	0.3878	0.0620	0.0000	1.4737	0.3766	0.0625	0.0000	1.4573
SIZE			0.2544	0.0474	0.0000	1.2897			0.0000	
- 1	2233	32					-0.1412	0.0820	0.0851	0.8683
- 2	5896	63					-0.2244	0.0605	0.0002	0.799
- 3	3893	23					0.0450	0.0635	0.4785	1.046
- 4	3478	27					0.2265	0.0596	0.0001	1.2543
- >=5	811	11					0.0941	0.1113	0.3978	1.0986
TYPE OF RESIDENCE					0.0000				0.0000	
- single family house	1550	17	-0.3330	0.0949	0.0005	0.7170	-0.3193	0.0995	0.0013	0.7267
- town house	11589	97	0.3708	0.0582	0.0000	1.4489	0.3630	0.0570	0.0000	1.4376
- apartment	2220	29	0.0493	0.083	0.5527	1.0505	0.1326	0.0825	0.1079	1.1418
- other type	1149	12	-0.0870	0.1065	0.4121	0.9163	-0.1764	0.1026	0.0856	0.8383
PROPERTY POSESSION	8459	80	-0.0420	0.0361	0.2452	0.9589	0.0464	0.0350	0.1846	1.0475
AGE			0.1673	0.0227	0.0000	1.1821			0.0000	
- 20-34	3472	35					-0.6000	0.0563	0.0000	0.5488
- 35-49	7241	57					0.0600	0.0480	0.2111	1.0619
- >=50	5598	64					0.5400	0.0605	0.0000	1.7160
EDUCATION[2]										
EDUCRES_STANDARD			0.0013	0.2138	0.9950	1.0013	0.1334	0.2150	0.5350	1.1427
EDUCRES_LOWER			-0.2484	0.1044	0.0174	0.7801	-0.1797	0.1056	0.0886	0.8355
EDUCRES_MIDDLE			0.1324	0.0858	0.1226	1.1416	0.2011	0.0897	0.0250	1.2228
EMPLOYMENT SITUATION SHOPPER						0.0000		0.0000		
- paid job	11924	100	0.5352	0.0769	0.0000	1.7078	0.4629	0.0748	0.0000	1.5887
- social security	2408	25	0.2972	0.0886	0.0008	1.3461	0.2014	0.0891	0.0237	1.2232
- school	533	8	-0.6970	0.1433	0.0000	0.4983	-0.6992	0.1440	0.0000	0.497
- housewife/house husband	1625	23	-0.1360	0.0985	0.1681	0.8730	0.0349	0.0980	0.7222	1.0355
JOB SECTOR BREADWINNER					0.0132				0.3677	

continued

[1] In general, the estimated effects of each categorical variable is relative to the average effect of that variable.

[2] The estimated effects of education are corrected for social class and relative to the highest level of education.

Table A7.3 continued

Variable	N1	N2	B[1]	S.E.	Sig	Exp(B)	B	S.E.	Sig	Exp(B)
	Record	Hh	Age and size linear, with cycle				Age and size categorical, without cycle			
- Director or Owner, higher employee, middle specialized	8490	77	-0.1775	0.0681	0.0091	0.8374	-0.0843	0.0663	0.2040	0.9192
- Agriculture	473	4	0.1359	0.1382	0.3252	1.1456	0.0478	0.1405	0.7338	1.0489
- Middle and Lower employee	6820	68	0.0196	0.0637	0.7584	1.0198	0.0223	0.0641	0.7278	1.0226
- Student	725	6	0.0220	0.1108	0.8430	1.0222	0.0142	0.1156	0.9024	1.0143
CYCLE					0.0065					
- single	2233	32	0.3259	0.1052	0.0019	1.3853				
- non-school age child	2123	18	-0.2740	0.0909	0.0026	0.7606				
- older children	4333	31	-0.1700	0.0780	0.0292	0.8436				
- family without children	7819	75	0.1178	0.0593	0.0470	1.1250				
VARSEEK1			0.0378	0.1122	0.7363	1.0385	0.0313	0.1113	0.7784	1.0318
VARSEEK2			-0.1870	0.0341	0.0000	0.8292	-0.1795	0.0343	0.0000	0.8357
SHOPSHAR			-0.0270	0.0316	0.3886	0.9731	-0.0236	0.0313	0.4505	0.9766
NCHAINS			0.0735	0.0432	0.0890	1.0763	0.0659	0.0415	0.1123	1.0681
BASKET			0.0936	0.0357	0.0088	1.0981	0.0867	0.0358	0.0156	1.0905
SHOPFREQ			-0.0460	0.0071	0.0000	0.9555	-0.0511	0.0072	0.0000	0.9501
XD[3]	4142		0.6992	0.1685	0.0000	2.0122	0.7230	0.1688	0.0000	2.0606
XDF	1749		1.2839	0.1793	0.0000	3.6109	1.2977	0.1792	0.0000	3.6607
XDP	2273		1.1372	0.1763	0.0000	3.1179	1.1618	0.1764	0.0000	3.1958
XFP	2940		1.5408	0.1667	0.0000	4.6684	1.5755	0.1667	0.0000	4.8332
XDFP	3987		2.1490	0.1616	0.0000	8.5762	2.1809	0.1616	0.0000	8.8541
X^{*}	1412		3.1297	0.0718	0.0000	22.868	3.1285	0.0719	0.0000	22.8395
X^{other}	12258		-0.5970	0.0582	0.0000	0.5507	-0.5828	0.0581	0.0000	0.5583
X^{*other}	1320		-0.2450	0.1245	0.0492	0.7829	-0.2485	0.1247	0.0464	0.7800
Constant			-5.5740	0.3142	0.0000		-3.7885	0.2118	0.0000	
FIT MEASURES										
Nagelkerke R2						0.34				0.34
Percentage Correctly Classified						89.39%				89.32%

[3] The estimated effects of the different promotion types are relative to the effect of feature promotions.

Table A7.4: Results interacting with in-store versus out-of-store promotions for promotion response

Variable	B	S.E.	Sig	Exp(B)	B	S.E.	Sig	Exp(B)	B	S.E.	Sig	Exp(B)
	all promotions (N=17,144)				in-store promotions (N=12,579)				Out-of-store promotions (N=4565)			
SOCCLASS			0.0000				0.0000				0.1493	
- D	-0.6430	0.1084	0.0000	0.5259	-0.7367	0.1252	0.0000	0.4787	-0.3728	0.2287	0.1030	0.6888
- C	0.2549	0.0661	0.0001	1.2904	0.3117	0.0763	0.0000	1.3657	0.1140	0.1395	0.4139	1.1207
- B-, B+, A	0.3878	0.0620	0.0000	1.4737	0.4250	0.0711	0.0000	1.5296	0.2589	0.1327	0.0512	1.2955
SIZE	0.2544	0.0474	0.0000	1.2897	0.2753	0.0540	0.0000	1.3169	0.2076	0.1027	0.0433	1.2307
TYPE OF RESIDENCE			0.0000				0.0000				0.0000	
- single family house	-0.3330	0.0949	0.0005	0.7170	-0.2306	0.1049	0.0279	0.7940	-0.9719	0.2556	0.0001	0.3784
- town house	0.3708	0.0582	0.0000	1.4489	0.3182	0.0664	0.0000	1.3747	0.6453	0.1313	0.0000	1.9065
- apartment	0.0493	0.0830	0.5527	1.0505	0.0310	0.0943	0.7427	1.0314	0.2058	0.1868	0.2705	1.2285
- other type	-0.0870	0.1065	0.4121	0.9163	-0.1186	0.1247	0.3419	0.8882	0.1208	0.2168	0.5774	1.1284
PROPERTY POSESSION	-0.0420	0.0361	0.2452	0.9589	-0.0219	0.0417	0.5991	0.9783	-0.0932	0.0751	0.2144	0.9110
AGE	0.1673	0.0227	0.0000	1.1821	0.1978	0.0262	0.0000	1.2187	0.0657	0.0477	0.1679	1.0679
EDUCATION[1]												
EDUCRES_STANDARD	0.0013	0.2138	0.9950	1.0013	0.0161	0.2378	0.9459	1.0163	-0.3560	0.5380	0.5081	0.7005
EDUCRES_LOWER	-0.2480	0.1044	0.0174	0.7801	-0.2880	0.1212	0.0175	0.7498	-0.2442	0.2123	0.2501	0.7834
EDUCRES_MIDDLE	0.1324	0.0858	0.1226	1.1416	0.1693	0.0976	0.0828	1.1845	-0.0197	0.1822	0.9140	0.9805
EMPLOYMENT SITUATION SHOPPER			0.0000				0.0000				0.0402	
- paid job	0.5352	0.0769	0.0000	1.7078	0.5471	0.0877	0.0000	1.7283	0.4627	0.1657	0.0052	1.5884
- social security	0.2972	0.0886	0.0008	1.3461	0.3773	0.1004	0.0002	1.4584	-0.0088	0.1977	0.9647	0.9913
- school	-0.6966	0.1433	0.0000	0.4983	-0.7166	0.1625	0.0000	0.4884	-0.5367	0.3047	0.0782	0.5847
- housewife/househusband	-0.1360	0.0985	0.1681	0.8730	-0.2078	0.1138	0.0679	0.8123	0.0827	0.2051	0.6869	1.0862
JOB SECTOR BREADWINNER			0.0132				0.0037				0.8112	
- Director or Owner, higher employee, middle specialized	-0.1775	0.0681	0.0091	0.8374	-0.2193	0.0785	0.0052	0.8031	-0.0694	0.1452	0.6327	0.9330
- Agriculture	0.1359	0.1382	0.3252	1.1456	0.1800	0.1545	0.2439	1.1973	-0.0144	0.3236	0.9646	0.9857
- Middle and Lower employee	0.0196	0.0637	0.7584	1.0198	0.0407	0.0725	0.5749	1.0415	-0.0896	0.1420	0.5283	0.9143
- Student	0.0220	0.1108	0.8430	1.0222	-0.0014	0.1304	0.9917	0.9986	0.1733	0.2206	0.4320	1.1892
CYCLE			0.0065				0.0995				0.0570	
- single	0.3259	0.1052	0.0019	1.3853	0.2554	0.1198	0.0330	1.2910	0.5492	0.2320	0.0179	1.7318
- non-school age child	-0.2740	0.0909	0.0026	0.7606	-0.2219	0.1043	0.0335	0.8010	-0.4402	0.1918	0.0217	0.6439

continued

[1] The estimated effects of education are corrected for social class and relative to the highest level of education.

Table A7.4 continued

Variable	B	S.E.	Sig	Exp(B)	B	S.E.	Sig	Exp(B)	B	S.E.	Sig	Exp(B)
	all promotions (N=17,144)				in-store promotions (N=12,579)				Out-of-store promotions (N=4565)			
- older children	-0.1700	0.0780	0.0292	0.8436	-0.1373	0.0874	0.1164	0.8717	-0.3335	0.1775	0.0602	0.7164
- family without children	0.1178	0.0593	0.0470	1.1250	0.1037	0.0679	0.1269	1.1093	0.2246	0.1244	0.0710	1.2518
VARSEEK1	0.0378	0.1122	0.7363	1.0385	-0.0265	0.1257	0.8327	0.9738	0.2187	0.2537	0.3886	1.2445
VARSEEK2	-0.1870	0.0341	0.0000	0.8292	-0.1639	0.0392	0.0000	0.8489	-0.2801	0.0729	0.0001	0.7557
SHOPSHAR	-0.0270	0.0316	0.3886	0.9731	-0.0389	0.0359	0.2786	0.9618	0.0007	0.0691	0.9923	1.0007
NCHAINS	0.0735	0.0432	0.0890	1.0763	0.0783	0.0487	0.1079	1.0814	0.0726	0.0963	0.4510	1.0753
BASKET	0.0936	0.0357	0.0088	1.0981	0.0903	0.0410	0.0275	1.0945	0.1083	0.0746	0.1467	1.1143
SHOPFREQ	-0.0460	0.0071	0.0000	0.9555	-0.0462	0.0080	0.0000	0.9549	-0.0464	0.0162	0.0042	0.9547
XD	0.6992	0.1685	0.0000	2.0122								
XDF	1.2839	0.1793	0.0000	3.6109	0.5755	0.1129	0.0000	1.7780				
XDP	1.1372	0.1763	0.0000	3.1179	0.4328	0.1078	0.0001	1.5415				
XFP	1.5408	0.1667	0.0000	4.6684					1.5073	0.1707	0.0000	4.5146
XDFP	2.1490	0.1616	0.0000	8.5762	1.4536	0.0806	0.0000	4.2784				
X^{*}	3.1297	0.0718	0.0000	22.8682	3.1082	0.0837	0.0000	22.3816	3.1852	0.1452	0.0000	24.1722
X^{other}	-0.5970	0.0582	0.0000	0.5507	-0.5556	0.0663	0.0000	0.5737	-0.7013	0.1238	0.0000	0.4959
X^{*other}	-0.2450	0.1245	0.0492	0.7829	-0.2302	0.1482	0.1202	0.7944	-0.2721	0.2324	0.2417	0.7618
Constant	-5.5740	0.3142	0.0000		-5.1908	0.3208	0.0000		-4.6474	0.6098	0.0000	

Table A7.5: Results age and size non-linear interacting with in-store versus out-of-store promotions for promotion response

Variable	B	S.E.	Sig	Exp(B)	B	S.E.	Sig	Exp(B)	B	S.E.	Sig	Exp(B)
	Age and size categorical, without cycle				in-store promotions				out-of-store promotions			
SOCCLASS			0.0000				0.0000				0.1532	
- D	-0.5726	0.1088	0.0000	0.5641	-0.6439	0.1256	0.0000	0.5253	-0.3583	0.2315	0.1217	0.6989
- C	0.1960	0.0670	0.0034	1.2165	0.2280	0.0776	0.0033	1.2560	0.0995	0.1403	0.4785	1.1046
- B-, B+, A	0.3766	0.0625	0.0000	1.4573	0.4159	0.0718	0.0000	1.5157	0.3080	0.1359	0.0234	1.3607
SIZE			0.0000				0.0000				0.7793	
- 1	-0.1412	0.0820	0.0851	0.8683	-0.2168	0.0960	0.0239	0.8051	0.1247	0.1652	0.4504	1.1328
- 2	-0.2244	0.0605	0.0002	0.7990	-0.2463	0.0698	0.0004	0.7817	-0.1353	0.1250	0.2790	0.8735
- 3	0.0450	0.0635	0.4785	1.0460	0.0628	0.0732	0.3904	1.0649	0.0344	0.1324	0.7952	1.0350
- 4	0.2265	0.0596	0.0001	1.2543	0.3012	0.0682	0.0000	1.3515	-0.0387	0.1287	0.7639	0.9621
- >=5	0.0941	0.1113	0.3978	1.0986	0.0990	0.1286	0.4412	1.1041	-0.0102	0.2288	0.9644	0.9898
TYPE OF RESIDENCE			0.0000				0.0000				0.0000	
- single family house	-0.3193	0.0995	0.0013	0.7267	-0.2044	0.1105	0.0643	0.8151	-0.9743	0.2610	0.0002	0.3774
- town house	0.3630	0.0570	0.0000	1.4376	0.3047	0.0647	0.0000	1.3563	0.6618	0.1312	0.0000	1.9383
- apartment	0.1326	0.0825	0.1079	1.1418	0.1207	0.0937	0.1980	1.1283	0.3106	0.1839	0.0913	1.3642
- other type	-0.1764	0.1026	0.0856	0.8383	-0.2210	0.1204	0.0664	0.8017	0.1208	0.2132	0.5711	1.1284
PROPERTY POSESSION	0.0464	0.0350	0.1846	1.0475	0.0752	0.0402	0.0614	1.0781	0.0034	0.0750	0.9634	1.0035
AGE			0.0000				0.0000				0.0065	

continued

Table A7.5 continued

Variable	B	S.E.	Sig	Exp(B)	B	S.E.	Sig	Exp(B)	B	S.E.	Sig	Exp(B)
	Age and size categorical, without cycle				in-store promotions				out-of-store promotions			
- 20-34	-0.6000	0.0563	0.0000	0.5488	-0.6945	0.0667	0.0000	0.4993	-0.3140	0.1103	0.0044	0.7305
- 35-49	0.0600	0.0480	0.2111	1.0619	0.1037	0.0556	0.0622	1.1092	-0.0710	0.1014	0.4839	0.9315
- >=50	0.5400	0.0605	0.0000	1.7160	0.5909	0.0692	0.0000	1.8055	0.2705	0.1372	0.0487	1.3107
EDUCATION[1]												
EDUCRES_STANDARD	0.1334	0.2150	0.5350	1.1427	0.2065	0.2394	0.3883	1.2294	-0.3149	0.5406	0.5602	0.7298
EDUCRES_LOWER	-0.1797	0.1056	0.0886	0.8355	-0.1977	0.1229	0.1076	0.8206	-0.1532	0.2149	0.4759	0.8580
EDUCRES_MIDDLE	0.2011	0.0897	0.0250	1.2228	0.2626	0.1032	0.0109	1.3004	0.0242	0.1867	0.8970	1.0245
EMPLOYMENT SITUATION SHOPPER		0.0000					0.0000				0.0150	
- paid job	0.4629	0.0748	0.0000	1.5887	0.4492	0.0855	0.0000	1.5670	0.4857	0.1588	0.0022	1.6254
- social security	0.2014	0.0891	0.0237	1.2232	0.2517	0.1012	0.0128	1.2862	-0.0528	0.1974	0.7893	0.9486
- school	-0.6992	0.1440	0.0000	0.4970	-0.7050	0.1635	0.0000	0.4941	-0.5987	0.3057	0.0502	0.5495
- housewife/househusband	0.0349	0.0980	0.7222	1.0355	0.0041	0.1131	0.9712	1.0041	0.1280	0.2065	0.5352	1.1366
JOB SECTOR BREADWINNER			0.3677				0.1172				0.7821	
- Director or Owner, higher employee, middle specialized	-0.0843	0.0663	0.2040	0.9192	-0.1327	0.0763	0.0822	0.8757	0.0408	0.1422	0.7742	1.0416
-Agriculture	0.0478	0.1405	0.7338	1.0489	0.1006	0.1573	0.5224	1.1058	-0.1301	0.3276	0.6913	0.8780

continued

[1] The estimated effects of education are corrected for social class and relative to the highest level of education.

Table A7.5 continued

Variable	B	S.E.	Sig	Exp(B)	B	S.E.	Sig	Exp(B)	B	S.E.	Sig	Exp(B)
	Age and size categorical, without cycle				in-store promotions				out-of-store promotions			
- Middle and Lower employee	0.0223	0.0641	0.7278	1.0226	0.0363	0.0730	0.6186	1.0370	-0.0662	0.1425	0.6422	0.9359
- Student	0.0142	0.1156	0.9024	1.0143	-0.0043	0.1351	0.9749	0.9958	0.1797	0.2340	0.4425	1.1968
VARSEEK1	0.0313	0.1113	0.7784	1.0318	-0.0447	0.1251	0.7211	0.9563	0.2860	0.2487	0.2500	1.3311
VARSEEK2	-0.1795	0.0343	0.0000	0.8357	-0.1486	0.0394	0.0002	0.8620	-0.2894	0.0734	0.0001	0.7487
SHOPSHAR	-0.0236	0.0313	0.4505	0.9766	-0.0384	0.0358	0.2829	0.9623	0.0080	0.0682	0.9065	1.0080
NCHAINS	0.0659	0.0415	0.1123	1.0681	0.0656	0.0471	0.1641	1.0678	0.0836	0.0896	0.3506	1.0872
BASKET	0.0867	0.0358	0.0156	1.0905	0.0854	0.0412	0.0383	1.0892	0.0868	0.0741	0.2414	1.0907
SHOPFREQ	-0.0511	0.0072	0.0000	0.9501	-0.0526	0.0080	0.0000	0.9488	-0.0500	0.0164	0.0023	0.9512
XD	0.7230	0.1688	0.0000	2.0606	*							
XDF	1.2977	0.1792	0.0000	3.6607	0.5619	0.1134	0.0000	1.7539				
XDP	1.1618	0.1764	0.0000	3.1958	0.4301	0.1080	0.0001	1.5373				
XFP	1.5755	0.1667	0.0000	4.8332					1.5172	0.1709	0.0000	4.5595
XDFP	2.1809	0.1616	0.0000	8.8541	1.4626	0.0811	0.0000	4.3172				
X^{*}	3.1285	0.0719	0.0000	22.8395	3.1070	0.0838	0.0000	22.3539	3.1796	0.1450	0.0000	24.0370
X^{other}	-0.5828	0.0581	0.0000	0.5583	-0.5370	0.0663	0.0000	0.5845	-0.6855	0.1235	0.0000	0.5038
X^{*other}	-0.2485	0.1247	0.0464	0.7800	-0.2363	0.1486	0.1118	0.7895	-0.2665	0.2325	0.2517	0.7660
Constant	-3.7885	0.2118	0.0000		-3.1143	0.1771	0.0000		-3.7189	0.3606	0.0000	

APPENDIX A8: Empirical Analysis Two: Sales Promotion Reaction Mechanisms

Table A8.1: Product category ratings on category characteristics at the reaction mechanism level

Product category	Average price level (ranking)		Quarterly purchase frequency	Quarterly promotional frequency	Storability		Number of brands	Impulse	*BS*	*TA*	*TR*	*TN*	*QB*	*QP*	*QA*	*QN*	*CE*
	Unit-size	Purchase			Modal unit-size	Storability											
Pasta	1.47	1.63	3.67	5	700 cc	Yes	103	Low	0.20	-0.21	0.23	-0.03	-0.16	0.64	-0.05	0.27	0.17
	(1)	(2)	(2)	(1)	(3)	(5)	(4)	(1)	(4)	(1)	(4)	(1)	(6)	(5)	(5)	(4)	(4)
Potato-chips	1.68	2.16	6.52	20	800 cc	No	64	High	0.16	0.01	0.07	0.03	-0.13	0.27	-0.07	0.06	0.23
	(3)	(3)	(5)	(6)	(4)	(2)	(1)	(5)	(3)	(4)	(1)	(2)	(5)	(3)	(6)	(1)	(5)

continued

Table A8.1 continued

Product category	Average price level (ranking)		Quarterly purchase frequency	Quarterly promotional frequency	Storability		Number of brands	Impulse	*BS*	*TA*	*TR*	*TN*	*QB*	*QP*	*QA*	*QN*	*CE*
Soft-drinks	1.78 (4)	1.60 (1)	13.52 (6)	10 (4)	1500 cc (6)	Yes (3)	169 (6)	Average (4)	0.07 (1)	0.01 (5)	0.14 (3)	0.09 (4)	0.05 (1)	0.26 (2)	0.03 (4)	0.14 (3)	0.00 (1)
Fruit juice	1.50 (2)	3.10 (4)	5.82 (3)	6 (2)	1000 cc (5)	Yes (4)	153 (5)	Average (3)	0.15 (2)	0.08 (6)	0.08 (2)	0.08 (3)	0.01 (2)	0.46 (4)	0.17 (2)	0.27 (5)	0.24 (6)
Candy-bars	3.83 (5)	3.57 (5)	3.26 (1)	13 (5)	400 cc (2)	No (1)	68 (2)	High (6)	0.30 (5)	-0.13 (2)	0.57 (6)	0.27 (6)	-0.00 (3)	0.16 (1)	0.06 (3)	0.11 (2)	0.06 (2)
Coffee	6.71 (6)	7.89 (6)	6.22 (4)	8 (3)	350 cc (1)	Yes (6)	83 (3)	Average (2)	0.47 (6)	-0.00 (3)	0.51 (5)	0.24 (5)	-0.00 (4)	0.96 (6)	0.18 (1)	0.52 (6)	0.07 (3)

Table A8.2: Product category ratings on category characteristics at the reaction mechanism level

Product Category	Average (ranking)	Price Level	Purchase Frequency	Promotional Frequency	Storability		Number of Brands	Impulse	*BS*	*TA*	*TR*	*TN*	*QB*	*QP*	*QA*	*QN*	*CE*
	Unit-size	Purchase			Modal Unit-size	Storability											
Pasta	(1)	(2)	(2)	(1)	(3)	(5)	(4)	(1)	(4)	(1)	(4)	(1)	(6)	(5)	(5)	(4)	(4)
Potato-Chips	(3)	(3)	(5)	(6)	(4)	(2)	(1)	(5)	(3)	(4)	(1)	(2)	(5)	(3)	(6)	(1)	(5)
Soft-drinks	(4)	(1)	(6)	(4)	(6)	(3)	(6)	(4)	(1)	(5)	(3)	(4)	(1)	(2)	(4)	(3)	(1)
Fruit Juice	(2)	(4)	(3)	(2)	(5)	(4)	(5)	(3)	(2)	(6)	(2)	(3)	(2)	(4)	(2)	(5)	(6)
Candy-Bars	(5)	(5)	(1)	(5)	(2)	(1)	(2)	(6)	(5)	(2)	(6)	(6)	(3)	(1)	(3)	(2)	(2)
Coffee	(6)	(6)	(4)	(3)	(1)	(6)	(3)	(2)	(6)	(3)	(5)	(5)	(4)	(6)	(1)	(6)	(3)

continued

Table A8.2 continued

Product Category	Average Price Level (ranking)		Purchase Frequency	Promotional Frequency	Storability		Number of Brands	Impulse
	Unit-size	Purchase			Modal Unit-size	Storability		
Corr.								
BS	0.49 (0.33)	*0.77 (0.07)*	-0.54 (0.27)	-0.03 (0.96)	**-1.00 (0.00)**	-0.21 (0.69)	-0.60 (0.21)	0.09 (0.86)
TA	-0.06 (0.91)	-0.09 (0.87)	0.58 (0.23)	0.20 (0.70)	0.67 (0.15)	0.11 (0.84)	0.29 (0.58)	0.24 (0.65)
TR	0.54 (0.27)	0.49 (0.33)	-0.60 (0.21)	-0.14 (0.79)	-0.71 (0.11)	0.00 (1.00)	-0.09 (0.87)	-0.06 (0.91)
TN	**0.87 (0.02)**	0.60 (0.21)	-0.14 (0.79)	0.37 (0.47)	-0.37 (0.47)	-0.21 (0.69)	-0.09 (0.87)	0.46 (0.36)
QB	0.35 (0.50)	-0.06 (0.91)	0.41 (0.43)	0.09 (0.87)	0.52 (0.29)	0.32 (0.54)	0.64 (0.17)	0.08 (0.88)
QP	-0.14 (0.79)	0.26 (0.62)	0.03 (0.96)	-0.66 (0.16)	-0.37 (0.47)	0.62 (0.19)	0.09 (0.87)	-0.65 (0.16)
QA	0.54 (0.27)	0.71 (0.11)	-0.20 (0.70)	-0.31 (0.54)	-0.37 (0.47)	0.41 (0.41)	0.26 (0.62)	-0.12 (0.82)
QN	0.06 (0.91)	0.32 (0.54)	-0.12 (0.83)	**-0.81 (0.05)**	-0.32 (0.54)	**0.84 (0.04)**	0.46 (0.35)	*-0.75 (0.09)*
CE	-0.60 (0.21)	0.14 (0.79)	-0.14 (0.79)	-0.26 (0.62)	0.09 (0.87)	0.00 (1.00)	-0.20 (0.70)	-0.06 (0.91)

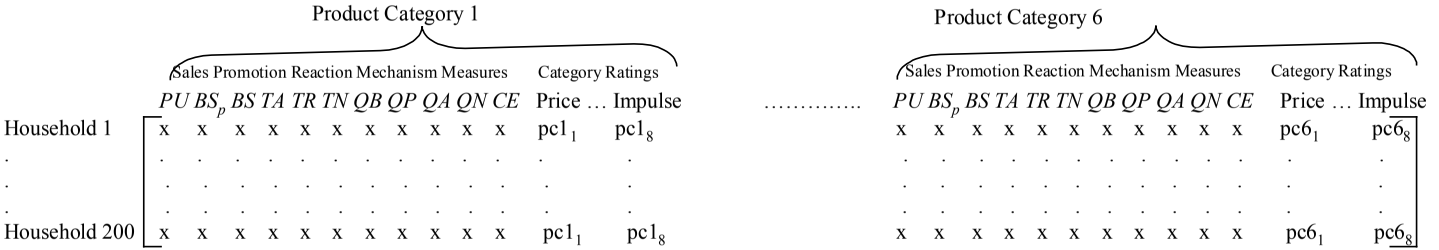

Figure A8.1: General format dataset used in this chapter

Table A8.3: Relative occurrence and average size of the effects (in quantity) for each product category separately

Effect	Soft drinks (n=1198)	Fruit Juice (n=648)	Coffee (n=575)	Potato Chips (n=186)	Candy Bars (n=93)
Modal Unit-size	1500	1000	250	200	300
No effect	0.08	0.05	0.08	0.17	0.10
	2140	1400	544	222	282
BS	0.12	0.14	0.07	0.05	0.11
	1853	1089	480	220	298
QP-	0.03	0.01	0.00	0.08	0.01
	2099	1133	375	186	150
QP+	0.13	0.08	0.08	0.19	0.03
	4808	4480	1125	217	483
TA-	0.04	0.03	0.05	0.12	0.12
	1976	1450	600	209	286
TA+	0.02	0.02	0.03	0.02	0.01
	2037	1467	525	200	190
BS& QP-	0.10	0.06	0.01	0.02	0.13
	1371	995	290	120	219
BS& QP+	0.18	0.15	0.29	0.07	0.17
	3881	2713	1100	346	356
BS& TA-	0.04	0.08	0.04	0.06	0.12
	1684	1192	477	200	284
BS& TA+	0.03	0.04	0.01	0.00	0.04
	2133	1241	583		295
QP-& TA-	0.01	0.01	0.00	0.03	0.03
	2154	1160	250	134	208
QP-& TA+	0.00	0.01	0.00	0.00	0.01
	3125	1040	500		250
QP+& TA-	0.07	0.10	0.05	0.09	0.09
	4634	2046	1164	393	459
QP+& TA+	0.04	0.03	0.02	0.03	0.03
	4523	5250	889	417	467
BS& QP-& TA-	0.03	0.02	0.01	0.01	0.13
	1494	923	164	200	196
BS& QP-& TA+	0.02	0.01	0.00	0.01	0.09
	1431	883	1000	105	159
BS& QP+& TA-	0.06	0.12	0.16	0.04	0.18
	3527	2681	1160	389	398
BS& QP+& TA+	0.03	0.05	0.09	0.01	0.06
	3939	2882	1060	300	323

continued

Table A8.3 continued

Main effects					
QP (*QP*-&*QP*+)	0.16	0.09	0.08	0.26	0.04
	4342	4121	1092	351	400
TA (*TA*-&*TA*+)	0.05	0.05	0.09	0.14	0.13
	1997	1457	570	208	278
BS&*QP*	0.27	0.21	0.31	0.09	0.30
	2994	2157	1063	304	297
BS&*TA*	0.06	0.13	0.05	0.06	0.16
	1862	1205	500	200	287
QP&*TA*	0.13	0.15	0.07	0.15	0.16
	4346	4673	1030	352	397
BS&*QP*&*TA*	0.13	0.20	0.26	0.07	0.46
	2902	2470	1092	316	286

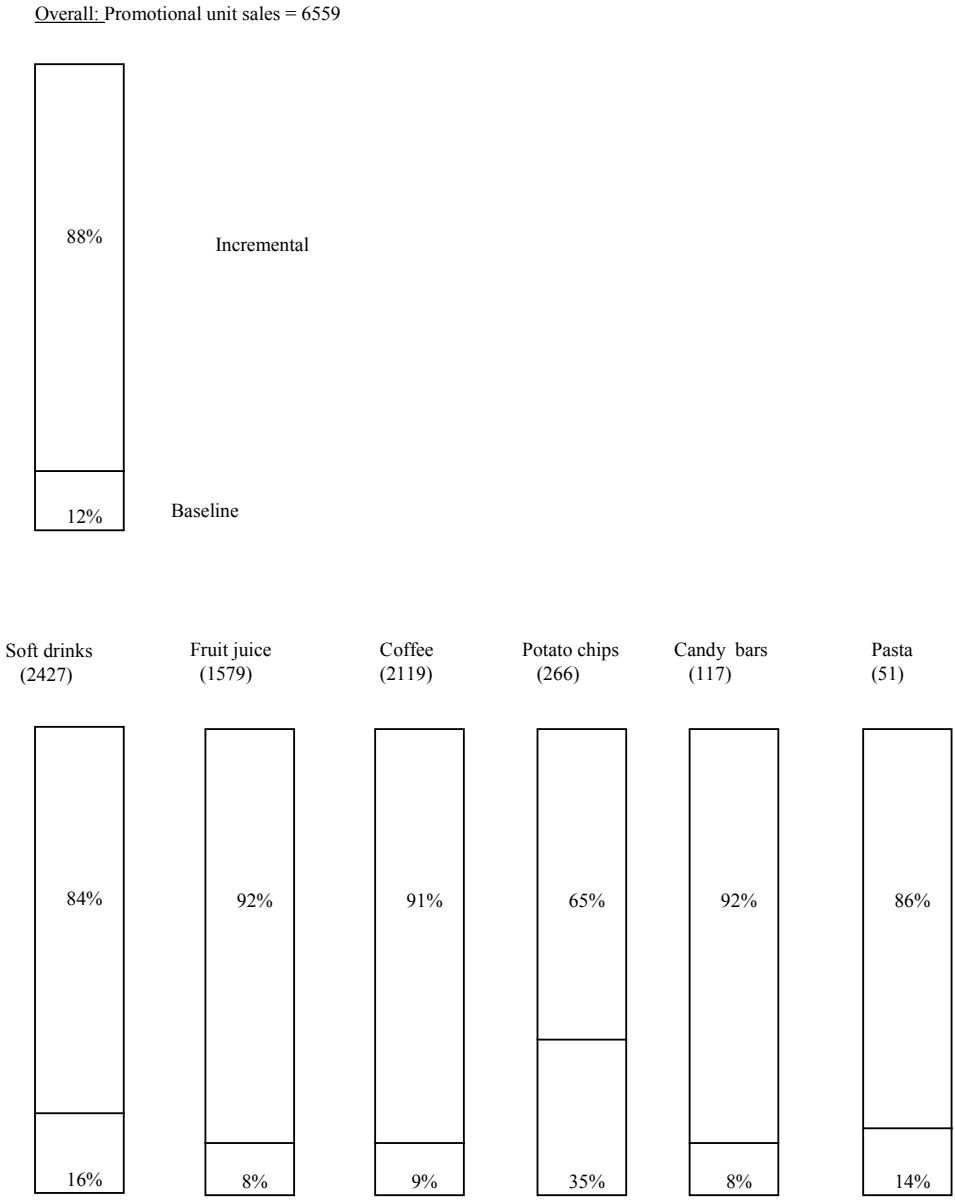

Figure A8.2: Decomposing total promotional unit sales into baseline and incremental sales

Samenvatting

Consumenten worden veelvuldig geconfronteerd met verkoopacties (sales promotions), zowel binnen alsook buiten de supermarkt. De uitgaven van producenten en winkeliers aan deze vorm van verkoopbevorderende instrumenten neemt al een aantal decennia toe, zelfs ten koste van de uitgaven aan advertenties. Echter, ondanks het vele interessante en belangrijke onderzoek dat reeds is gedaan op het terrein van sales promotions, bestaan er nog steeds vragen aangaande de werkelijke effecten van sales promotions op het aankoopgedrag van huishoudens. Het promotionele aankoopgedrag van huishoudens (het aankoopgedrag wat huishoudens vertonen als er sales promotions zijn) staat in dit onderzoek centraal. In dit proefschrift is getracht te komen tot een beter inzicht in de invloed van sales promotions op huishoudaankoopgedrag.

In Hoofdstuk 1 wordt aandacht besteed aan de toename in bestedingen aan sales promotions. Er wordt ingegaan op de centrale onderzoeksvragen in dit proefschrift. De twee onderzoeksvragen die worden onderscheiden zijn de volgende:

1. *Kan geobserveerd promotioneel huishoudaankoopgedrag worden verklaard door socio-economische, demografische, koopproces specifieke, en/of psychografische huishoudkarakteristieken?*
2. *Kan dit promotionele aankoopgedrag worden opgesplitst in verschillende reactiemechanismen en wat is de verhouding en relatie tussen deze verschillende mechanismen?*

Tevens wordt ingegaan op de wetenschappelijke en theoretische bijdrage van dit proefschrift.

Gebaseerd op theorieën uit het consumentengedrag, welke worden behandeld en toegepast op sales promotions in Hoofdstuk 2, worden in Hoofdstuk 3 diverse hypothesen geformuleerd met betrekking tot de relatie tussen deze huishoudkarakteristieken en promotierespons in zijn algemeenheid.

Deze promotie respons kan op verschillende manieren worden aangetroffen. Een huishouden kan door een sales promotion een ander merk kopen dan anders, maar een huishouden kan ook meer kopen, of naar een andere winkel gaan omdat daar een

interessante aanbieding is. Combinaties van de hierboven beschreven mogelijke reacties zijn natuurlijk ook mogelijk. De mogelijke reacties, die ook wel sales promotion reaction mechanisms worden genoemd, worden behandeld in Hoofdstuk 4. Het overzicht van de literatuur laat onder meer zien dat verschillende studies tot inconsistente bevindingen hebben geleid. Een oorzaak hiervan is het feit dat er relaties bestaan tussen het voorkomen van deze reactiemechanismen en karakteristieken van productcategorieën. Voor deze relaties worden dan ook hypothesen opgesteld.

Hoofdstuk 5 behandelt de onderzoeksopzet die gekozen is om de hierboven beschreven onderzoeksvragen te operationaliseren. Vier belangrijke aspecten worden onderscheiden, te weten: huishoudkarakteristieken, promotiekarakteristieken, productcategoriekarakteristieken, en de verschillende vormen van reactiemechanismen. Aan deze vier aspecten wordt aandacht besteed in dit proefschrift. Twee onderzoeksmodellen worden geïntroduceerd en geoperationaliseerd. Het eerste onderzoeksmodel, een binaire logistische regressie, is gericht op het verklaren van de kans dat een huishouden wel of niet reageert op een sales promotion. De verklarende variabelen die worden opgenomen in het model zijn huishoudkarakteristieken en promotiekarakteristieken. Dit model is gericht op het beantwoorden van de eerste onderzoeksvraag. Het tweede onderzoeksmodel kijkt niet naar dit binaire niveau van wel of niet reageren, maar gaat een stapje verder. Hier staan de specifiek vertoonde reactie mechanismen centraal. Hiertoe worden een aantal maatstaven ontwikkeld die rekening houden met het dynamische karakter van de effecten van sales promotions. Extra aankopen ten gevolge van een sales promotion op dit moment kunnen later gecompenseerd worden door minder aankopen te plegen. Hier dient rekening mee gehouden te worden om de daadwerkelijke effecten van sales promotions op het aankoopgedrag van huishoudens te kunnen achterhalen. Dit tweede model is gericht op het beantwoorden van de tweede onderzoeksvraag.

Hoofdstuk 6 is het eerste empirische hoofdstuk in dit proefschrift. Het beschrijft de gegevens die zijn gebruikt om de parameters van beide onderzoeksmodellen te schatten en de onderzoeksvragen te beantwoorden. Er wordt gebruik gemaakt van zogenaamde huishoud scanner data, die het daadwerkelijke aankoopgedrag van huishoudens weergeven.

Deze gegevens worden gekoppeld aan winkeldata die informatie bevatten omtrent de aanwezigheid van promotionele activiteiten binnen en buiten een bepaald supermarktfiliaal.

In Hoofdstuk 7 wordt het eerste onderzoeksmodel empirisch geschat om inzichten te verkrijgen in huishoudkarakteristieken die bepalend zijn voor een huishouden om wel of niet in te gaan op een promotie. De hypothesen opgesteld in Hoofdstuk 3 met betrekking tot de relatie tussen deze huishoudkarakteristieken en promotierespons worden empirisch getoetst. Belangrijke karakteristieken die de kans van respons beïnvloeden blijken te zijn: sociale klasse, grootte van een huishouden, leeftijd, baan buitenshuis aankopend lid huishouden en of de promotie voor een favoriet merk is. Een belangrijke en interessante bevinding is dat de relaties tussen huishoudkarakteristieken en de kans op respons verschillen voor type promotie (in de supermarkt versus buiten de supermarkt). Vervolgens wordt nog onderzocht of er zoiets bestaat als een aangeboren eigenschap om op promoties te reageren, in de literatuur wel deal proneness genoemd. Het blijkt dat als er wordt gecorrigeerd voor belangrijke observeerbare huishoudkarakteristieken, het bestaan van deal proneness niet kan worden aangetoond.

De analyses in Hoofdstuk 8 graven een niveau dieper. In plaats van response als een 0/1 variabele te onderzoeken, wordt gekeken naar het type respons (het reactie mechanisme). De ontwikkelde maten worden geschat om zodoende de tweede onderzoeksvraag te kunnen beantwoorden. De dynamische maatstaven laten zien dat huishoudens verschillend gedrag vertonen per productcategorie. De reactiemechanismen aankoopmoment en aankoophoeveelheid blijken door huishoudens als compensatoire mechanismen gebruikt te worden, zowel tijdens de promotionele periode alsook ervoor en erna. Huishoudens kopen door een promotie of eerder of meer, maar meestal niet beide. Indien een promotie resulteert in een toename van de aankoophoeveelheid, dan wordt bijvoorbeeld het volgende aankoopmoment uitgesteld. Toch worden voor sommige productcategorieën zelfs categorie-expansie-effecten gevonden. Een sales promotion resulteert dan daadwerkelijk in extra consumptie, waarbij gecorrigeerd is voor eventuele dynamische aanpassingen (voor en/of na de promotionele aankoop). De hypothesen opgesteld in Hoofdstuk 4 met betrekking tot de relaties tussen de verschillende reactiemechanismen en productcategoriekarakteristieken worden empirisch getoetst. Prijsniveau, consumptiefrequentie, promotionele frequentie, opslagmogelijkheden,

aantalmerken in een categorie en impulsgevoeligheid blijken van invloed te zijn op de vertoonde reacties van huishoudens. Op dit tweede, wat diepergaand, niveau van analyse wordt wederom geen empirisch bewijsmateriaal gevonden dat het bestaan van deal proneness onderschrijft. Tenslotte wordt in navolging van eerder onderzoek de promotionele stijging van de verkopen opgesplitst in 3 mogelijke oorzaken: concurrerende effecten (huishoudens wisselen van merk door een promotie), tijdseffecten (huishoudens kopen eerder of later door een promotie en hoeveelheideffecten (huishoudens kopen meer of minder door de promotie). Deze decompositie is uitgevoerd op huishoudniveau, waarbij de stijging in verkochte eenheden (unit-sales) centraal staat. De resultaten laten zien dat deze decompositie verschilt tussen de productcategorieën, maar dat in zijn algemeenheid ongeveer 65 procent van de stijging in verkoop eenheden is ontstaan door nieuwe kopers (huishoudens die normaliter het aanbiedingsmerk niet kopen). Ongeveer een kwart komt door verschuivingen in de tijd en 10 procent door stijging in de aankoophoeveelheid.

In Hoofdstuk 9 eindigen we met een samenvatting, implicaties voor de praktijk, de beperkingen van het onderzoek en richtingen voor verder onderzoek. De analyses in dit proefschrift laten zien dat promotioneel koopgedrag deels verklaard kan worden door huishoudkarakteristieken, hetgeen producent en winkelier mogelijkheden biedt om micromarketing toe te passen. Verder blijkt dat karakteristieken van de productcategorie en de promotie onderkend dienen te worden bij het analyseren van de effecten van sales promotions op huishoudaankoopgedrag.

Curriculum Vitae

Linda H. Teunter was born in 1972 in Doetinchem, The Netherlands. She attended the secondary school 'Gemeentelijke Scholengemeenschap Doetinchem' in Doetinchem, The Netherlands, from 1984 to 1990. She studied econometrics at the University of Groningen, where she graduated in 1995 on her Master's thesis 'Benefit segmentation for the Norwegian mobile telephony market', for which she spent six months in Oslo. Next she started as a Ph.D. candidate at the Faculteit Bedrijfskunde/Rotterdam School of Management of the Erasmus University Rotterdam. She performed research on the effects of sales promotions on household purchase behavior. Linda Teunter has given presentations on this subject in both Europe and North America. During her Ph.D. period, she has given lectures to students about methodology and sales promotions. Furthermore, she has played an active role in several Ph.D. councils. Since September 1999, Linda Teunter is assistant professor of statistics at the Faculteit Bedrijfskunde/Rotterdam School of Management. She now teaches courses on statistics and continues her research on sales promotions.

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