ARTICLES

Submitted 10.02.2018. Approved 08.02.2019
Evaluated through a double blind-review process. Scientific Editor: Eduardo Ayrosa
Translated version
DOI: http://dx.doi.org/10.1590/S0034-759020200403

COGNITIVE BIASES IN MERCHANDISING ACTIVATION AND EFFECT ON SUPERMARKET SALES

Uso de vieses cognitivos em ativações de merchandising e o efeito nas vendas nos supermercados

El uso de sesgos cognitivos en activaciones de merchandising y su efecto en las ventas en supermercados

DANTE AVANZI[1,2]
dante.avanzi@espm.br
0000-0002-4715-1696

LEANDRO ANGOTTI GUISSONI[1]
leandro.guissoni@fgv.br
0000-0003- 1193-9251

JONNY MATEUS RODRIGUES[3]
jonnymateus@usp.br
0000-0002-4301-7553

RAFAEL D'ANDREA[4]
rafael.dandrea@toolboxtm.com.br
0000-0003-3773-4350

[1] Fundação Getulio Vargas, Escola de Administracao de Empresas de Sao Paulo, São Paulo, SP, Brazil

[2] Escola Superior de Propaganda e Marketing, São Paulo, SP, Brazil

[3] Universidade de São Paulo, Faculdade de Economia Administração e Contabilidade de Ribeirão Preto, Ribeirão Preto, SP, Brazil

[4] Grupo Toolbox Marketing & Tech, São Paulo, SP, Brazil

ABSTRACT

Competition among different brands in supermarkets motivates consumer goods companies to develop and implement and activate merchandising materials at the point of sales (POS). These merchandising materials attempt to influence shoppers and promote sales. On the other hand, behavioral economics studies the decision-making of individuals based on their preferences and beliefs, influenced by cognitive bias. This study attempts to understand the effect of loss aversion and mental accounting biases in POS materials on supermarket sales. We conduct two experiments with a consumer brand in a supermarket chain. The results reveal a positive and significant effect on sales only for the cognitive bias of loss aversion, applied to the POS materials.

KEYWORDS | Shopper marketing, merchandising, cognitive bias, retailing, behavioral economics.

RESUMO

A competição entre marcas disponíveis nos supermercados motiva os esforços das empresas na elaboração e ativação de materiais de comunicação no ponto de venda (MPV). Os MPVs objetivam influenciar o shopper e gerar vendas. A economia comportamental, por sua vez, estuda como um indivíduo toma uma decisão de acordo com as suas próprias preferências e crenças, influenciado pelos vieses cognitivos. O objetivo deste trabalho é compreender os efeitos nas vendas a partir do uso dos vieses aversão à perda e contas mentais nas mensagens de materiais de comunicação ativados em supermercados. Para isso, foram realizados dois experimentos de campo aplicados a uma marca de alimento em uma rede de supermercados. Os resultados mostram um efeito positivo e significativo nas vendas apenas quando foi utilizado o viés de aversão à perda na mensagem dos MPVs.

PALAVRAS-CHAVE */ Shopper marketing, materiais de comunicação, vieses cognitivos, varejo, economia comportamental.*

RESUMEN

La competencia entre marcas disponibles en supermercados motiva los esfuerzos de las empresas en el desarrollo y activación de material de comunicación en el punto de venta. Este material de comunicación tiene como meta influenciar compradores y generar ventas. La economía conductual, a su vez, estudia cómo un individuo toma una decisión de acuerdo con sus propias preferencias y creencias, influenciado por sesgos cognitivos. El objetivo de ese trabajo es comprender los efectos en las ventas a partir del uso de los sesgos cognitivos aversión a la pérdida y contabilidad mental en el material del punto de venta activado en supermercados. Se realizaron dos experimentos con una marca de alimento en una cadena de supermercados. Los resultados revelaron un efecto positivo y significativo en las ventas solo cuando se utilizó el sesgo cognitivo aversión a la pérdida en el material de los puntos de venta.

PALABRAS CLAVE */ Shopper marketing, material de comunicación, sesgos cognitivos, comercio minorista, economía conductual.*

> It's extremely difficult to change the way people's brains are wired. Instead, change the environment in which they make decisions. (Gino & Beshears, 2015, p. 46)

INTRODUCTION

Consumer goods companies have invested effort and resources to influence consumer decisions at various points in the product purchasing journey, with special attention to marketing stimuli in physical stores (Deloitte, 2009; Shankar, Inman, Mantrala, Kelley, & Rizley, 2011; Silveira & Marreiros, 2014). The point of sale (POS) has been highlighted in academic research as a major influencer of shoppers' decisions, and particularly for non-durable consumer products (Bell, Corsten, & Knox, 2011; Feijó & Botelho, 2012; Guissoni, Consoli, & Rodrigues, 2013; Shankar, 2011; Silveira & Marreiros, 2014). Further, the supermarket shopping environment can influence shoppers by activating their purported "shopping trigger" (Löfgren, 2005). Consumer goods manufacturers activate this trigger through in-store marketing stimuli, which compels the merchandising within stores to influence shoppers' purchase decision-making at the POS (Shankar et al., 2011).

Previous studies have demonstrated the subject's influence on and relevance in sales by investigating the various stimuli that occur in the POS environment. For example, research has been conducted on communication materials, product exposure, promotions, and product locations on gondolas and other types of displays (Bell et al., 2011; Chandon, Hutchinson, Bradlow, & Young, 2009; Court, Elzinga, Mulder, & Vetvik, 2009; Feijó and Botelho, 2012; Venkatesan, Farris, Guissoni, & Neves, 2015). Research on the subject has also incorporated behavioral economics with the cognitive biases of loss aversion (Hardie, Johnson, & Fader, 1993), and later, mental accounting (Stilley, Inman, & Wakefield, 2010a, 2010b). Cognitive biases are the mental and emotional filters on which one relies to understand and respond to external events. Thus, they represent distortions of judgment that can affect one's ability to evaluate information objectively and logically (Tversky & Kahneman, 1974). Understanding them is important, as cognitive biases can influence purchasing and consumption decision-making (Kahneman & Tversky, 1979; Thaler, 1980).

Consequently, academic research has examined the relationships involved in cognitive biases from the consumer behavior perspective, with an emphasis on sales promotion and price discount stimuli (Moran & Montero, 2014; Nunes & Park, 2003; Stilley et al., 2010a, 2010b; Thaler, 1985). Generally, such studies have presented evidence regarding the benefits of using these biases in sales promotion strategies and have indicated greater chances of impulse purchases in supermarkets. Regarding the "loss aversion" bias, for example, literature has addressed whether shoppers reacted differently if the prices of products shown to them were presented as gains or losses (Fabrizi, Lippert, Puppe, & Rosenkranz, 2016; Kalwani & Yim, 1992; Kalyanaram & Winer, 1995). Academic studies of the "mental accounting" bias have revealed its effects when the shopper mentally allocates different budgets for purchases in the retail environment; further, researchers have discovered a relationship between this bias and impulse purchases (Reinholtz, Bartels, & Parker, 2015; Stilley et al., 2010a).

While previous studies traditionally investigated promotional incentives for consumers by using specific cognitive biases (Fabrizi et al., 2016), no consensus exists regarding whether the use of merchandising activities without price incentives could also influence sales of a product in supermarkets. Stilley et al. (2010b) observe the behavioral economics field as applied to shopper marketing to note that "further research could consider activations without price promotion" (p. 45). In closing this gap, this study intends to contribute to such literature by investigating whether applying cognitive biases in changing a brand's communication message at the POS—or specifically, through banners and displays—could influence a product's sales without the promotional stimuli widely present in previous studies.

Existing literature on the subject does not point to evidence that the results found in the price promotional field would also apply to the use of these biases to activate POS that do not present promotional stimuli, which are important in industry and retail practices. Business practices have also highlighted the subject's potential combinations, such as using cognitive biases based on behavioral economics principles with marketing communications (Welch, 2010). Therefore, this study proposes the following research question: What is the effect on sales from applying the premises of cognitive biases to communications, and to the messages in supermarkets' communication materials developed to influence shoppers' purchase decisions?

A quantitative and experimental research approach was used to answer this research question based on two field experiments with Ovomaltine, a chocolate powder and a brand of non-durable consumer goods. The experiment was conducted in a supermarket chain; two cognitive biases were selected based on in-depth interviews with the brand's executives and a literature review on the subject: "loss aversion" and "mental accounting." Retail literature has expressed interest in these biases as evidence has been revealed regarding their implications for shopper marketing at the POS (Stilley et al., 2010a, 2010b). Unlike previous studies that emphasize promotional incentives, this study uses both cognitive biases in communications and in

  © RAE | São Paulo | **60(4)** | **July-August 2020** | 262-272 ISSN 0034-7590; eISSN 2178-938X

the messaging in point of sales materials, or specifically, special displays and communication totems without promotional stimuli.

THEORETICAL FOUNDATION AND HYPOTHESES

The subject of shopper marketing has received increasing attention in both academic and professional literature, but especially since early 2005, with evidence provided on the importance of shoppers' decisions not only at the POS, but also during their purchase journey (Chandon et al., 2009; Court et al., 2009; Löfgren, 2005; Shankar et al., 2011). The present study relates to shopper marketing research's emphasis on the marketing factors and stimuli that occur within the store environment, such as merchandising activations. Literature has traditionally highlighted these from the purported "first moment of truth" (Chandon et al., 2009; Shankar et al., 2011; Venkatesan, Farris, Guissoni, & Neves, 2015), or the moment the shopper observes the gondolas and makes a purchase decision (Silveira & Marreiros, 2014; Stilley et al., 2010b).

This study uses the cognitive biases in point-of-sale materials to analyze the influence of consumer sales from shopper marketing strategies. Cognitive biases are the mental and emotional filters on which one relies to understand and respond to external events, and they affect objective and logical decision-making (Tversky & Kahneman, 1974). When applied to activations at the POS, cognitive biases can influence the shopper to choose which brand to purchase (Wansink, Kent, & Hoch, 1998). Thus, retail literature has emphasized the "loss aversion" and "mental accounting" biases chosen for this study (Stilley et al., 2010a, 2010b).

The "loss aversion" cognitive bias

The prospect theory emerged with a study of how individuals decide between alternatives that present risks regarding the use of money (Kahneman & Tversky, 1979). One principle in this theory is represented by the "loss aversion" cognitive bias, in which the impacts of directly compared or weighted losses are greater than gains of the same magnitude (Kahneman & Tversky, 1979; Thaler, 1980). Subsequently, researchers have studied loss aversion in multiple applications and contexts. For example, when comparing the price of a product with its reference price in a retail setting, the consumer perceives the variation in price as a "gain" or "loss," with their sensitivity to a perceived loss greater than an equally intense gain (Fabrizi et al., 2016; Hardie et al., 1993; Mayhew & Winer, 1992; Putler, 1992).

The loss aversion cognitive bias can also arouse feelings and emotions (Novemsky & Kahneman, 2005). For example, a consumer's feeling of guilt may influence their decision to purchase an indulgent product or one that is not actually needed; however, they were influenced by persuasive communication in a marketing campaign that emphasized a potential loss if he or she did not buy the product (Burnett & Lunsford, 1994; Han, Duhachek, & Agrawal, 2014; Huhmann & Brotherton, 1997). However, such studies addressed stimuli related to the value of money, such as prices and promotions. In contrast, this study anticipates that communication based on the "loss aversion" bias can result in better sales performance without a promotional incentive, which has been widely tested in previous research on the subject:

> H1: Communications developed based on the "loss aversion" cognitive bias and applied to supermarkets' point-of-sale materials will create positive, significant variations in sales.

The "mental accounting" cognitive bias

The "mental accounting" cognitive bias is also associated with the prospect theory. Thaler (1985) demonstrated that consumers use a type of mental budget, in that they allocate money through a mental accounting process and try to resist further purchases when the estimated budget is depleted. Stilley et al. (2010a) later presented evidence that consumers perform such mental accounting during their supermarket purchases, although part of their mental accounting is not attributed to a particular product before they reach the POS. This results in impulse purchases in supermarkets, and those purchases can be encouraged by promotional stimuli.

Regarding consumer and retail products, this study investigated an application of the "mental accounting" bias to shopper marketing, namely temptation bundling. This bias implies a combination in which the shopper is presented with a stimulus that offers a positive result in terms of potential satisfaction, and a negative one, in the same mental accounting process (Milkman, Minson, & Volpp, 2013). The negative result is linked to a potential instant and short-term satisfaction that involves what the shopper desires, but can result in feelings of guilt, as it may not present the best long-term benefits. The positive result is then potentially linked to something the shopper should do; specifically, it is not necessarily what he or she desires, but it brings long-term benefits, such as having a healthy diet. Through the "temptation bundling" bias, the shopper may be able to reduce or even omit the negative result from an instant satisfaction due to the positive result being presented, which concerns a long-term benefit in the

   ISSN 0034-7590; eISSN 2178-938X

same mental accounting process. Thus, the consumer's feeling of guilt may decrease (Duke & Amir, 2018). This study considers the "mental accounting" bias to anticipate that an increase in sales will occur without the promotional incentive widely tested in previous research on the subject:

> H2: Communications developed based on the "mental accounting" cognitive bias and applied to supermarkets' point-of-sale materials will create positive, significant variations in sales.

RESEARCH METHODS

Two experimental studies were conducted involving a product purchase scenario at the POS by means of a field experiment to test this study's hypotheses. Hypothesis H1 was tested to determine whether the "loss aversion" effect can lead to increased sales by using premises of that bias to influence the shopper's decision at the POS through POS without promotional incentives. Hypothesis H2 was tested to detect that effect with premises of the "mental accounting" bias. The experiments were applied to Ovomaltine, a "powdered chocolate" brand; the brand category was for its relevance in Brazil, generating approximately 1.9 billion reais in 2015 (Nielsen, 2015), and for shoppers' low interactions with the brand in supermarkets (Shopper Marketing Group, 2014), which motivates the need to change shopper behavior in the category. Such changes can be triggered by the influence of POS. Second, the Ovomaltine brand was also chosen for its small market share within the category (Nielsen, 2015). According to Fazio, Powell, and Williams (1989) and Nedungadi (1990), supermarket shoppers tend to be more influenced by in-store marketing stimuli promoted by brands with a small market share. This is because it is assumed that brands with a large market share invest more in advertising and are more accessible in the shopper's memory; therefore, such brands receive less attention in specific messages promoted by POS.

The experiments were conducted in an independent retail chain of supermarkets with eight stores in the region of the city of Mogi Mirim in the state of São Paulo, and were divided into three stages. In the first stage, all stores displayed the products without any treatment (pre-experiment period), in that the chocolate powder was available for purchase on the shelves without any communication from March 13 to April 30, 2016. In the second stage, all stores had a week of pre-tests to validate the communication materials and decide on their location within the stores, from May 14 to 22 in the same year. The third stage occurred in two waves (post-experiment period), with each lasting seven weeks and each week beginning on a Sunday, with two-week intervals between them. The first wave tested Hypothesis H1 ("loss aversion"), and spanned June 12 to July 30, while the second wave tested Hypothesis H2 ("mental accounting"), and spanned August 14 to October 1. The seven-week period per wave was necessary to expand the sampling base, as the studied brand's market share is small (Nielsen, 2015); this also reflects the supermarket chain in which the experiment was conducted. The experiment was applied in a supermarket chain because literature has conceded that shoppers are more susceptible to the stimuli of in-store marketing factors within a self-service store environment (Bell et al., 2011; Stilley et al., 2010a).

A field experiment allows the researcher to observe significant behaviors; moreover, its structure and results are typically easier to explain to a wider audience (Samson, 2014). This also enables an examination of cause-and-effect relationships, which allows companies to better understand the relationship between a change in strategy and their customers' behavioral reactions (Andersen, Ertac, Gneezy, List, & Maximiano, 2013; Davenport, 2009). On the one hand, a recent article published in the *Journal of Marketing Research* (Gneezy, 2017) emphasizes the importance of using field experiments in marketing research. On the other hand, it also demonstrates the difficulties in such experiments, including the need for collaboration with and approval from companies that allow interventions in their actions according to the researcher's recommendations.

This study collaborated with companies that allowed a field experiment to test our research hypotheses, as well as in developing the study. Consequently, this involved collaborations with three companies: (1) a supermarket chain in the state of São Paulo that allowed the activation of materials in its stores according to the researcher's guidance and monitoring; (2) Ovomaltine in Brazil, whose brand managers approved the communication materials according to the brand's guidelines and allowed for intervention in their brand's communications at the retail stores selected for the field experiment; and (3) Toolbox, a shopper marketing agency that designed and produced the materials based on the researcher's guidance. Figures 1 and 2 illustrate the implementation of each treatment of the two hypotheses. Each hypothesis' results were assessed through a treatment, which was conducted and analyzed for each cognitive bias studied in the experimental store groups. These treatments illustrate the activation of communication materials for the experiment and control groups, as well as the locations of all materials in the stores. The brand and supermarket chain both approved all communications and messages presented in the materials.

   ISSN 0034-7590; eISSN 2178-938X

Figure 1. **Loss Aversion**

Figure 2. **Mental Accounting**

CHECKING THE EXPERIMENT'S MANIPULATION

Field experiments are routine in several companies. One advantage of such experiments is that participants are seldom aware that they are part of an experiment, and thus, the data collected is more likely to represent predominant market realities. Alternatively, it is difficult to accurately manipulate all inputs and ensure controls for extraneous variables (Venkatesan, Farris, & Wilcox, 2015, p. 189).

The experiment's design should guarantee the independence of observations and the independent variables' effects on the dependent variable (Price, Jhangiani, Chiang, Leighton, & Cuttler, 2017), thus isolating the influence of exogenous factors to establish causality among the studied variables. Building on Venkatesan, Farris and Wilcox's (2015) work, a given action can be considered effective when it establishes a causal relationship, such that: the treatment increases the product's sales, the non-use of material does not alter sales, the use of communication materials impacts sales in subsequent periods, and no other external factors contribute to the effects on sales.

Thus, it is necessary to determine how non-observed factors influenced the experiment. Although factors external to the POS can influence the shopper's purchase decision-making, such as the brand's marketing stimuli that occur outside the store environment (Bell et al., 2011), the present study isolates these due to its focus on the communications conveyed within the store environment in POS. Thus, the experiment aimed to observe the variations in the brand's sales by considering only the POS context and comparing control and experimental groups in which the independent variable—the cognitive biases—has been manipulated.

The use of control stores first allows for the management of the effects of sales growth or a decrease in the market; and second, to determine whether the stores are similar or differ regarding their sales behavior. The use of several periods and pre- and post-experiment differentiations help to meet the conditions of causality; thus, any increases in the short-term and in subsequent periods can be assessed. Table 1 presents the results for the control and experiment stores in Stage 1, or when the treatment stimulus had not yet been applied. The statistical procedure for analyzing the control stores and the hypotheses was based on an analysis of average sales between the experiment and control groups. Further, sales were analyzed based on weekly variations relative to the store's average to control for the store size's effect on the results.

ISSN 0034-7590; eISSN 2178-938X

Table 1. **Comparative tests with the control group, before and during the experiment**

Hypothesis	Before the experiment, experiment and control groups (Chi-square; p-value)	Control group, before and during the experiment (Chi-square; p-value)
H1	0.762; 0.382	5.069; 0.024**
H2	0.135; 0.713	3.378; 0.066**

*, **, and *** indicate significance at p < 10%, p < 5%, and p < 1%, respectively.

The results do not demonstrate significant differences between the control and treatment stores. Thus, evidence exists that the stores do not present significant differences in their sales. The second step involves establishing that only the experimental group's stores experienced a significant increase from one period to the next. As competitors can easily observe field experiments, their reactions can obscure the results. However, field experiments are still recommended as they allow marketers to test campaigns with clients in a natural environment (Venkatesan, Farris, & Wilcox, 2015, p. 189).

Experiments among people are often used to determine whether a treatment works. Subsequently, a treatment is defined as any intervention designed to change an individual's behavior (Price et al., 2017). In this study's treatment, the in-store marketing factors chosen for the application of cognitive biases were communication materials—namely, special displays and communication totems—and their locations within the stores, as these significantly influence shoppers' decision-making (Inman, Ferraro, & Winer, 2009; Wilkinson, Mason, & Paksoy, 1982). The communications and message applied to the communication materials in the experiment group were based on the characteristics of each cognitive bias addressed in this study and according to the research hypotheses.

The messages used to test Hypotheses H1 and H2 were designed by the Toolbox group's shopper marketing agency, and the researchers monitored this process. The brand company also provided secondary research on the studied category, which was used in the process of designing the communication materials. The messages designed based on the studied biases were then evaluated by a consumer panel in the agency's focus group room. The goal was to qualitatively determine—and according to the market practices of the company collaborating with the field experiment—whether the messages were consistent with the studied biases' premises. The authors then submitted the messages suggested by the agency to the brand company's executives and to the employees of the supermarket chain conducting the experiment. Thus, the authors' qualitative assessment as supported by individual conversations determined whether the messages were consistent with the desired ideas for testing the studied biases according to Hypotheses H1 and H2.

Ultimately, the authors evaluated their final messages to ensure their consistency with relevant literature on the subject, or with the biases' premises. The researchers also had individual conversations with consumers during the pre-test stage, and according to the previously described steps, to assess the consistency of the communication materials with the studied biases. Such conversations focused on the perceptions of guilt and loss (loss aversion), and positive and negative outcomes within the same mental accounting process (mental accounting). Moreover, both materials for Hypotheses H1 and H2 were directed to parents to encourage them to buy the product for their children for the same consumption occasion (breakfast). Such decisions followed the brand's guidance and secondary research on the category, which notes that most shoppers in the "powdered chocolate" category buy the product for their children's breakfast. Figures 1 and 2 display the communications used that resulted from this process. In contrast, the communications applied to the control group were based on those already in use by the studied brand and without the premises or elements of the biases studied in behavioral economics.

In executing retail field experiments, poorly trained store employees can either produce or interfere with the results, creating inaccuracies. Thus, disturbances are controlled through a mediation plan (Price et al., 2017); specifically, staff training was conducted, and included presenting technical details of the experiment and increasing the supermarket managers' awareness of the importance of not directly interfering with the treatments' results. According to Thomke and Manzi (2014), store managers and employees can impact experiment groups' homogeneity, as their awareness of the experiment may influence them to be more or less inclined to improve the applied treatment's quality. Consequently, the present study's methodology allowed for an understanding of the variations in sales in the different store groups (dependent variable) caused by the application of cognitive biases (independent variable) to the communication materials.

Some precautions were also taken to preserve homogeneity between the control and experimental groups: First, the cities where the supermarket chain stores are located are near each other and have highly similar HDI-income indexes (PNUD, 2013). This helps minimize factors that could impact homogeneity, such as more abrupt climate changes or an increased unemployment rate (Moran & Montero, 2014). Second, the average sales for

   ISSN 0034-7590; eISSN 2178-938X

the "chocolate powder" category has no significant variation across all eight stores in the chain. Third, collaboration with the retail chain during the field experiment controlled for the main in-store marketing factors for all brands in the "chocolate powder" category, such as homogeneous price changes, promotions or visual stimuli, and a guaranteed supply of products on all stores' shelves throughout the periods before and after the experiment. The in-store displays and communication totems were developed with exactly the same configuration and dimensions. Fourth, the researchers in loco monitored the evolution of treatments; fifth, training sessions were conducted with all store managers before the beginning of the experiment, and were reinforced throughout, to ensure correct execution in all stores.

Thus, the following sales analyses were considered: (1) a comparison of average weekly sales variations within the experiment group stores between the pre- and post-experiment periods; (2) a comparison of average weekly sales variations between the pre- and post-experiment periods, between the experiment and control groups; and (3) a comparison of average weekly sales variations between the pre- and post-experiment periods, between the studied brand and the entire "powdered chocolate" category within the experiment group's stores.

ANALYSIS OF RESULTS

A Shapiro-Wilk normality test was used prior to analyzing the sales comparisons in the main procedure and assessing the hypotheses. This test is important in understanding whether the values are distributed along curves for the periods before and after the experiment, as the curves for the experiment and control groups are close to a normal distribution (Callegari-Jacques, 2003). All tests reject the null hypothesis at a 10% level of significance, which suggests that no evidence indicates that the curves follow a normal distribution. Therefore, for the sales comparison tests, the Mann-Whitney-Wilcoxon (MWW) non-parametric test of means was used, which is applied to curves without a normal distribution.

Another factor in the data analysis is that the cumulative effect on sales can influence the experiments' results. To avoid any interference, intervals without any intervention should be included between one treatment and the next (Paksoy, Wilkinson, & Mason, 1985). Thus, the periods were separated by a two-week interval to prevent any cumulative effects on sales and ensure that the results of one wave did not impact sales results in the next. This interval is sufficient, as the average purchase frequency for the "powdered chocolate" category shopper is one to two times a month (Shopper Marketing Group, 2014). The other effects of co-variables were analyzed using a test of means for the "powdered chocolate" category and for the control stores between the pre- and post-experiment periods; in all cases, no significant variations were found that corroborate a need to correct for seasonality and other effects.

TESTING HYPOTHESIS H1

Regarding Hypothesis H1, which is based on the "loss aversion" bias, losses seem greater than gains of the same intensity (Kahneman & Tversky, 1979). In the treatment, the materials were applied to the experiment group with the aim of using the communication to explore a situation in which the "powdered chocolate" category shopper—or parents, in this case—loses by not buying the studied brand for their children. Thus, the activation material for testing Hypothesis H1 emphasized the loss and guilt elements by saying, "*Vai deixá-los sem um sorriso logo cedo?* [Will you leave them without a smile early in the morning?]" Table 2 displays the results of the total sales variations as percentages, as revealed between the pre- and post-experiment periods for the treatment of Hypothesis H1, as well as the *p*-values for the non-parametric test of the means.

Table 2. **Comparative tests of weekly sales variations before and after the experiment for Hypotheses H1 and H2**

	Within the experiment group		Between the experiment and control groups		Experiment group, discounting the category's sales; same stores	
Hypothesis and treatment	Total sales variation (%)	MWW test P-value	Total sales variation (%)	MWW test P-value	Total sales variation (%)	MWW test P-value
H1: Loss Aversion	75.4%	0.001***	31.1%	0.048**	87.7%	0.001***
H2: Mental Accounting	66.2%	0.001***	22.7%	0.312	64.8%	0.001***

*, **, and *** indicate significance at p < 10%, p < 5%, and p < 1%, respectively.

   ISSN 0034-7590; eISSN 2178-938X

Regarding the treatment of Hypothesis H1, or the "loss aversion" cognitive bias, the results of the three MWW tests were significant, with all *p*-values less than 5%. The brand's sales performance within the experiment group before and after the experiment was 75.4%, with significant differences in *p*-values at less than 1%. The difference between the brand's and category's sales was 87.7% ($p < 0.01$). The difference between the experiment and control groups was 31.1% ($p < 0.05$).

Thus, given the significance of the three tests' results and the positive variation in the brand's sales, Hypothesis H1 is validated and accepted. This result is consistent with the theory regarding the "loss aversion" cognitive bias and its applications in consumer marketing (Inman et al., 2009; Kahneman, 2011; Mayhew & Winer, 1992). These results also suggest that the "loss aversion" bias can be effective in activating the shopper's "shopping trigger" at the POS when applied specifically to supermarket POS at the "moment of truth." Applying this bias also presented positive results for communications focusing on an emotional and affective relationship, such as that between parents and their children.

TESTING HYPOTHESIS H2

Regarding Hypothesis H2, which is based on the "temptation bundling" cognitive bias, positive and negative results are presented within the same mental accounting process (Milkman et al., 2013). The materials were applied to the experiment group to present an indulgent image of the studied brand (Shopper Marketing Group, 2014) with negative results in connection with the consumption of healthy, nutritious fruits, which was presented as a positive result. This cognitive bias was applied to not only the communications in the materials, but also in locating the special display, which was set up in each store's produce section. Thus, the activation material to test Hypothesis H2 emphasized the positive and negative elements by saying, "*O café da manhã saudável fica ainda mais delicioso*" [A healthy breakfast becomes even more delicious], with the image of a breakfast including fruit and Ovomaltine chocolate powder (Figure 2). Table 2 presents the results of the sales variations found between the pre- and post-experiment periods for the treatment of Hypothesis H2.

Further, sales within the experiment group grew by 66.2% ($p < 0.01$) after the experiment testing Hypothesis H2 based on the temptation-bundling bias, and performed 22.7% better than the control group, although with no significance ($p = 0.312$). Compared with sales in the "powdered chocolate" category, the brand's sales performance within the experiment group was 64.8% higher ($p < 0.01$). Thus, the communications' and special display's location in the supermarket's produce section suggests that the shopper's same mental accounting process does not allocate perceptions of the studied brand as indulgent as a negative result (short-term satisfaction), with nutritious fruits as a positive result (long-term benefits). Therefore, Hypothesis H2 was not supported given the influence on sales from the "mental accounting" bias in the communication materials.

One possible explanation may relate to the non-use of a promotional element. Evidence suggests that positive effects occur from cross-merchandising activations of products with similar value propositions for the consumption occasion (Bell et al., 2011). For example, discounts and joint activations can be offered for purchases of peanuts and beer, instead of activations for products with different benefits to balance the consumer's mental accounting bias, such as powdered chocolate and fruits as investigated in this study. Thus, Hypothesis H2 could not be supported or be used to validate the influence on sales from the "mental accounting" bias in communication materials, while Hypothesis H1 was validated. While literature has validated mental accounting's effects in the supermarket environment using stimuli related to pricing and promotional benefits, no consensus has been reached on the use of this bias for stimuli without price activations (Stilley et al., 2010a). Such literature suggests that the "mental accounting" bias is associated with the consumer's budget forecast, for example, for use in supermarkets. Thus, emphasizing only the message communicated at the POS without a price stimulus is apparently insufficient for observing a positive, significant effect on sales. Alternatively, loss aversion literature points to evidence that this bias could have positive results, even without the price stimulus (Thaler, 1980), and this study corroborates such previous literature.

CONCLUSIONS, LIMITATIONS, AND MANAGERIAL IMPLICATIONS

This study contributes to current literature by demonstrating the potential combinations of shopper marketing and cognitive biases—the basis of behavioral economics—in the search for evidence on how to better develop POS to influence shoppers. As a complement to previous studies that emphasize the relationship between the "loss aversion" and "mental accounting" biases and promotional incentives, the present study investigated the adequacy of messages conveyed in POS without such incentives. The two treatments in the field experiment revealed variations in sales, thus complementing previous studies focusing on

  © RAE | São Paulo | **60(4)** | **July-August 2020** | 262-272 ISSN 0034-7590; eISSN 2178-938X

consumer behavior and price promotions based on laboratory experiments.

The results indicate that using the "loss aversion" cognitive bias in POS created significant, positive results in sales, while no such influence was observed for the "mental accounting" bias. As the "mental accounting" bias emphasizes the idea of a consumer budget (Thaler, 1985), working with promotional triggers as discussed in previous studies (Stilley et al., 2010a) may be more important than simply changing the message communicated through POS. In other words, price and promotional stimuli should not be overlooked when basing messages on the mental accounting bias. Alternatively, using the loss aversion bias in this study presented greater chances of success when applied to communication materials without price stimuli. These results indicate opportunities for further research to test the relationship between messages in POS and prices for cognitive biases of interest.

In the treatment of Hypothesis H1 regarding the "loss aversion" bias, we considered the relationships between premises to emphasize the feeling of guilt in the communication if the consumer did not buy the product (Novemsky & Kahneman, 2005), which was reflected in the POS design. In contrast, the treatment of Hypothesis H2 regarding the mental accounting bias used an activation that could reduce the consumer's guilt (Duke & Amir, 2018). Therefore, the results observed only supported Hypothesis H1, in that communication materials emphasizing elements regarding feelings of guilt may better influence sales without price stimuli than elements that can minimize such feelings, as in the premise for testing Hypothesis H2. As this study aimed to observe the effects on sales from two field experiments including these biases, further research could investigate these consumer marketing aspects—including behavioral economics, risk, and guilt—with a focus on POS from a consumer behavioral perspective. For example, research could focus on guilt-related literature to assess consumers' associations with different types of communication. Further research could also consider other retail formats with different value propositions for the consumer, such as small retailers, hypermarkets, and drugstores; or integrate communication within and outside of the store, such as through advertising in media outside the store environment.

However, this study has some limitations. Considering the researchers' access, the field experiment was conducted using products of a brand with specific characteristics, as previously described. Thus, further research could consider products from other brands in different categories and with different levels of market share. Additionally, the experiment was conducted using a particular POS environment—supermarkets—which limits its generalizability and conclusions for other types of retail. Developing a field experiment like the one proposed in this study has both advantages and limitations, as the researcher must reconcile the multiple interests of the companies involved, limited resources, executives' time, and the manipulated brand's guidelines while seeking theoretical contributions, methodological rigor, and validation of the experiment. Nevertheless, the field experiment can provide important contributions by conveying the effects of variables of interest in real situations, such as behaviors rather than the perceptions, intentions, and attitudes emphasized in laboratory experiments (Gneezy, 2017).

Regarding any managerial implications, this study addressed research opportunities from a business perspective, such as identified by Welch (2010), about the importance of gaining further insights into the use of behavioral economics principles in marketing. Consequently, this study provides contributions for consumer goods professionals and retailers who seek new possibilities for improving sales results; this can be accomplished by activating POS while applying cognitive biases to their communications. This work's primary managerial implications stem from the fact that consumer brands' traditional communication practices are not necessarily the best alternative. Traditionally, brands have used generic messages at the POS or among many promotional appeals. This study revealed that using the "loss aversion" bias can influence sales without the need for a promotional incentive that might harm the retailer's margins and the consumer industry's returns given the costs of merchandising activations in supermarkets.

REFERENCES

Andersen, S., Ertac, S., Gneezy, U., List, J. A., & Maximiano, S. (2013). Gender, competitiveness, and socialization at a young age: Evidence from a matrilineal and a patriarchal society. *Review of Economics and Statistics*, *95*(4), 1438-1443. doi: 10.1162/REST_a_00312

Bell, D. R., Corsten, D., & Knox, G. (2011). From point of purchase to path to purchase: How pre shopping factors drive unplanned buying. *Journal of Marketing*, *75*(1), 31-45. doi: 10.1509/jm.75.1.31

Burnett, M. S., & Lunsford, D. (1994). Conceptualizing guilt in the consumer decision-making process. *Journal of Consumer Marketing*, *11*(3), 33-43. doi: 10.1108/07363769410065454

Callegari-Jacques, S. M. (2003). *Bioestatística: Princípios e aplicações*. Porto Alegre, RS: Artmed.

Chandon, P., Hutchinson, J. W., Bradlow, E. T., & Young, S. H. (2009). Does in-store marketing work? Effects of the number and position of shelf facings on brand attention and evaluation at the point of purchase. *Journal of Marketing*, *73*(6), 1-17. doi: 10.1509/jmkg.73.6.1

Court, D., Elzinga, D., Mulder, S., & Vetvik, O. J. (2009). The Consumer Decision Journey. *McKinsey Quarterly*. Recuperado de https://www.mckinsey.com/business-functions/marketing-and-sales/our-insights/the-consumer-decision-journey

Davenport, T. H. (2009). How to design smart business experiments. *Harvard Business Review*. Recuperado de https://hbr.org/2009/02/how-to-design-smart-business-experiments

Deloitte. (2009). *Shopper marketing: Providing a 360º view of your shoppers and consumers*. London, UK: Deloitte LLP.

Duke, K. E., & Amir, O. N. (2018). Guilt dynamics: Consequences of temporally separating decisions and actions. *Journal of Consumer Research*, *45*(6), 1254-1273. doi: 10.1093/jcr/ucy049

Fabrizi, S., Lippert, S., Puppe, C., & Rosenkranz, S. (2016). The manufacturer´s suggested retail price. *Journal of Economic Psychology*, *53*, 141-153. doi: 10.1016/j.joep.2016.02.001

Fazio, R. H., Powell, M. C., & Williams, C. J. (1989). The role of attitude accessibility in the attitude-to-behavior process. *Journal of Consumer Research*, *16*(3), 280-288. doi: 10.1086/209214

Feijó, F. R., & Botelho, D. (2012). Efeito dos fatores de merchandising nas vendas do varejo. *RAE-Revista de Administração de Empresas*, *52*(6), 628-642. doi: 10.1590/S0034-75902012000600005

Gino, F., & Beshears, J. (2015). Os líderes como arquitetos de decisão. *Harvard Business Review*. Recuperado de http://hbrbr.uol.com.br/os-lideres-como-arquitetos-de-decisao

Gneezy, A. (2017). Field experimentation in marketing research. *Journal of Marketing Research*, *54*(1), 140-143. doi: 10.1509/jmr.16.0225

Guissoni, L. A., Consoli, M. A., & Rodrigues, J. M. (2013). Is category management in small supermarkets worth the effort?. *RAE-Revista de Administração de Empresas*, *53*(6), 592-603. doi: 10.1590/S0034-75902013005000005

Han, D., Duhacheck, A., & Agrawal, N. (2014). Emotions shape decisions through construal level: The case of guilt and shame. *Journal of Consumer Research*, *41*(4), 1047-1064. doi: 10.1086/678300

Hardie, B. G. S., Johnson, E. J., & Fader, P. S. (1993). Modeling loss aversion and reference dependence effects on brand choice. *Marketing Science*, *12*(4), 378-394. doi: 10.1287/mksc.12.4.378

Huhmann, B. A., & Brotherton, T. P. (1997). A content analysis of guilt appeals in popular magazine advertisements. *Journal of Advertising*, *26*(2), 33-45. doi: 10.1080/00913367.1997.10673521

Inman, J. J., Winer, R. S., & Ferraro, R. (2009). The interplay among characteristics, customer characteristics and customer activities on in-store decision making. *Journal of Marketing*, *73*(5), 19-29. doi: 10.1509/jmkg.73.5.19

Kahneman, D. (2011). *Thinking, fast and slow*. New York, USA: Macmillan.

Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, *47*(2), 263-292. doi : 10.2307/1914185

Kalwani, M., & Yim, C. (1992). Consumer price and promotion expectations: An experimental study. *Journal of Marketing Research, 29*(1), 90-100. doi: 10.1177/002224379202900108

Kalyanaram, G., & Winer, R. S. (1995). Empirical generalizations from reference price research. *Marketing Science*, *14*(3), G1-G236. doi: 10.1287/mksc.14.3.G161

Löfgren, M. (2005). Winning at the first and second moments of truth: An exploratory study. *Managing Service Quality*, *15*(1), 102-115. doi: 10.1108/09604520510575290

Mayhew, G. E., & Winer, R. S. (1992). An empirical analysis of internal and external reference prices using scanner data. *Journal of Consumer Research*, *19*(1), 62-71. doi: 10.1086/209286

Milkman, K. L., Minson, J. A., & Volpp, K. G. M. (2013). Holding the hunger games hostage at the gym: An evaluation of temptation bundling. *Management Science,* 60(2), 283-299. doi: 10.1287/mnsc.2013.1784

Moran, D., & Montero, M. (2018) Automated behavioral economics patterns in promotion testing and methods therefor. *U.S. Patent Application No. 10,140,629*. Washington, DC: U.S. Patent and Trademark Office.

Nedungadi, P. (1990). Recall and consumer consideration sets: influencing choice without altering brand evolutions. *Journal of Consumer Research*, 17(3), 263-276. doi: 10.1086/208556

Nielsen. (2015). Nielsen Retail Index. *Seminário Nielsen Tendências*, São Paulo, SP.

Novemsky, N., & Kahneman, D. (2005). The boundaries of loss aversion. *Journal of Marketing Research*, *42*, 119-128. doi: 10.1509/jmkr.42.2.119.62292

Nunes, J. C., & Park, C. W. (2003). Incommensurate resources: Not just more of the same. *Journal of Marketing Research*, *40*, 26-38. doi: 10.1509/jmkr.40.1.26.19131

Paksoy, C. H., Wilkinson, J. B., & Mason, J. B. (1985). Learning and carryover effects in retail experimentation. *Journal of the Market Research Society*, *27*(2), 109-129.

PNUD. (2013). *Ranking IDH entre os municípios*. Recuperado de http://www.pnud.org.br/atlas/ranking/Ranking-IDHM-Municipios-2010.aspx

Price, P. C., Jhangiani, R. S., Chiang, I. A., Leighton, D. C., & Cuttler, C. (2017). Research methods in psychology (3rd ed.). Pullman, USA: Open Text WSU.

Putler, D. S. (1992). Incorporating reference price effects into theory of consumer choice. *Marketing Science*, *11*(3), 287-309. doi: 10.1287/mksc.11.3.287

Reinholtz, N., Bartels, D. M., & Parker, J. R. (2015). On the mental accounting of restricted-use funds: How gift cards change what people purchase. *Journal of Consumer Research*, *42*, 596-614. doi: 10.1093/jcr/ucv045

Samson, A. (2014). *The Behavioral Economics Guide 2014*. London, UK: Behavioral Economics Group.

Shankar, V. (2011). *Shopper marketing*. Massachussets, USA: Marketing Science Institute.

Shankar, V., Inman, J. J., Mantrala, M., Kelley, E., & Rizley, R. (2011). Innovations in shopper marketing: Current insights and future research issues. *Journal of Retailing*, *87*(Supplement 1), S29-S42. doi: 10.1016/j.jretai.2011.04.007

Shopper Marketing Group. (2014). *Understanding the chocolate powder shopper*. São Paulo: ShopperMkt.

Silveira, P.D., & Marreiros, C. G. (2014). Exploring shopper marketing approach implications on brand communication at the point-of-purchase: An expert´s opinion qualitative study. *The Journal of Applied Business Research*, *30*(5), 1329-1338.

Stilley, K. M., Inman, J.J., & Wakefield, K. L. (2010a). Planning to make unplanned purchases? The role of in store slack in budget deviation. *Journal of Consumer Research*, *37*(2), 264-278. doi: 10.1086/651567

Stilley, K. M., Inman, J. J., & Wakefield, K. L. (2010b, May). Spending on the fly: Mental budgets, promotions, and spending behavior. *Journal of Marketing*, *74*, 34-47. doi: 10.1509/jmkg.74.3.034

Thaler, R. H. (1980). Toward a positive theory of consumer choice. *Journal of Economic Behavior & Organization*, *1*(1), 39-60. doi: 10.1016/0167-2681(80)90051-7

Thaler, R. H. (1985). Mental accounting and consumer choice. *Marketing Science*, *27*(1), 15-25. doi: 10.1287/mksc.1070.0330

Thomke, S., & Manzi, J. (2014). The discipline of business experimentation. *Harvard Business Review*. Recuperado de https://hbr.org/2014/12/the-discipline-of-business-experimentation

Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science*, *185*(4157), 1124-1131. doi: 10.1126/science.185.4157.1124

Venkatesan, R., Farris, P., Guissoni, L. A., & Neves, M. F. (2015). Consumer brand marketing through full-and self-service channels in an emerging economy. *Journal of Retailing*, *91*(4), 644-659. doi: 10.1016/j.jretai.2015.04.003

Venkatesan, R., Farris, P., & Wilcox, R. T. (2015). *Cutting-edge marketing analytics: Real world cases and data sets for hands on learning*. Upper Saddle River, New Jersey: Pearson Education.

Wansink, B., Kent, R. J., & Hoch, S. J. (1998). An anchoring and adjustment model of purchase quantity decisions. *Journal of Marketing Research*, *35*(1), 71-81. doi: 10.1177/002224379803500108

Welch, N. (2010). A marketer's guide to behavioral economics. *McKinsey Quarterly, 47*(1), 1-4.

Wilkinson, J., Mason, J., & Paksoy, C. (1982). Assessing the impact of short term supermarket strategy variables. *Journal of Marketing Research*, *19*(1), 72-86. doi: 10.1177/002224378201900107

AUTHORS' CONTRIBUTIONS

The authors declare that they participated in all stages of development of the manuscript. From the conceptualization and theoretical-methodological approach, as well the theoretical review (literature survey), and finally, writing and final review the article.