

***THE INFLUENCE OF PRODUCT RECALL ON CONSUMER LOYALTY***

**INFLUÊNCIA DO RECALL DE PRODUTOS SOBRE A LEALDADE DO  
CONSUMIDOR**

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**Abstract**

The number of recalls has increased over the last few years and research into crisis management strategies and their impact on consumer behaviour has been carried out, however, there are still issues relating to the subject that have been little explored and there are still few empirical investigation studies into how consumers process this type of negative information and which factors have an influence on this process (Matos & Rossi, 2007). The objective of this study is to check the impact of recall on consumer loyalty, considering brand image, the seriousness of the recall and involvement with the product. Its specific objectives are: (i) to check whether recall has an impact on brand loyalty; (ii) to identify whether the seriousness of the recall has an impact on different levels on loyalty to strong brands, when compared with weak brands; and (iii) to identify whether the seriousness of the recall has an impact on different levels on the loyalty to different types of product. To investigate the hypotheses a factorial experiment (between-subjects) was undertaken with 360 undergraduate students in São Paulo. The independent variables were type of product (automobile or condom), product brand (weak/little known, or strong/well known) and recall (no recall, a mild recall or a serious recall); the dependent variable was loyalty. The analyses were carried out by way of a general linear model (GLM) to check the association between the study

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variables. The results suggest that: (i) recall has an impact on loyalty to the brand; (ii) the seriousness of the recall has an impact on different levels on loyalty towards strong brands when compared with weak brands; and (iii) the impact of the recall on brand loyalty is more negative in products where there is less purchase involvement. The main contributions are: expansion of the discussion about product recall, including the consumer loyalty variable, and indications for preparing contingency strategies for facing up to a crisis. As its contribution to management, an understanding of how recall affects loyalty is relevant, so that companies can prepare contingency strategies for facing up to the situation when a recall becomes necessary, particularly if the recall is for reasons that are considered to be serious.

**Keywords:** Recall, loyalty, brand image.

### Resumo

O número de *recalls* tem aumentado nos últimos anos e pesquisas sobre estratégias de gestão de crise e seu impacto no comportamento do consumidor têm sido desenvolvidas, no entanto, ainda existem questões pouco exploradas sobre o tema e observa-se baixo número de investigações empíricas sobre como os consumidores processam este tipo de informação e quais os fatores que influenciam este processo (Matos & Rossi, 2007). O objetivo deste estudo é verificar o impacto do *recall* na lealdade do consumidor, considerando a imagem da marca, a gravidade do *recall* e o envolvimento com o produto. Os objetivos específicos são: (i) verificar se o *recall* impacta a lealdade à marca; (ii) identificar se a gravidade do *recall* impacta, em níveis diferentes, a lealdade a marcas fortes em comparação a marcas fracas; e (iii) identificar se a gravidade do *recall* impacta, em níveis diferentes, a lealdade a diferentes tipos de produtos. Para investigar as hipóteses, foi realizado um experimento fatorial, do tipo between subjects, com 360 estudantes de graduação de São Paulo. As variáveis independentes foram tipo de produto (automóvel ou preservativo), marca do produto (fraca/pouco conhecida ou forte/muito conhecida) e *recall* (ausência de *recall*, *recall* leve ou *recall* grave); a variável dependente foi lealdade. As análises foram conduzidas por meio de modelo linear geral (GLM) para verificar associação entre as variáveis do estudo. Os resultados sugerem que: (i) o *recall* impacta a lealdade à marca; (ii) a gravidade do *recall* impacta, em níveis diferentes, a lealdade a marcas fortes em comparação a marcas fracas; e (iii) o impacto do *recall* sobre a lealdade à marca é mais negativo em produtos de menor envolvimento de compra. As principais contribuições são: ampliação da discussão sobre *recall* de marca, incluindo a variável lealdade do consumidor, e direcionamento para a elaboração de estratégias

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contingenciais de enfrentamento de crise. Como contribuição gerencial, a compreensão de como o recall afeta a lealdade é relevante para que empresas possam, ao momento em que um *recall* se fizer necessário, elaborar estratégias contingenciais de enfrentamento, principalmente se o recall tiver um motivo considerado grave, bem como prever e/ou antecipar eventuais problemas que podem surgir nesse tipo de situação.

**Palavras-chave:** Recall, lealdade, imagem de marca.

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## 1 Introduction

Product recall can be understood as the procedure provided for in law that is to be adopted by suppliers for recalling consumers because of defects found in products or services placed in the market (Consumer Defence Protection Foundation – PROCON, 2014). Although the number of recalls has increased over the last few years and research into crisis management strategies and their impact on consumer behaviour has been carried out, there are still issues relating to the subject that have been little explored (MAGNO, 2012; SANTOS, 2008; SOUIDEN; PONS, 2009).

According to Rubel, Naik and Srinivasan (2011), all brands are liable to undergo a crisis and many companies still do not know how to deal with the situation. So like other types of negative publicity, recall may seriously damage the image of the company, affect its reputation and customer loyalty, generate costs and reduce market results (VAN HEERDE; HELSEN; DEKIMPE, 2007; MATOS; ROSSI, 2007).

Studies indicate that recall may either improve the company's image, if it adopts a socially responsible attitude and is transparent in its relationships with the consumer, or may damage it (MOWEN, 1980; SIOMKOS, 1989, 1999; SIOMKOS; KURZBARD, 1994). Given this scenario, different authors have undertaken research into the impact of recall on consumer behaviour and on brand image in a variety of product segments, like clothing, beauty and personal hygiene (POPADIUK, 1993), automobiles (MATOS; ROSSI, 2007; SILVA; CALARGE; ROSA, 2011; SOUIDEN; PONS, 2009), food and drink (SALVADOR, 2013). They have also looked at relating aspects like involvement (MATOS, 2003; MATOS; ROSSI, 2007), loyalty and purchase intention (SOUIDEN; PONS, 2009).

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In Brazil, the vehicle and health products' segments have a large number of recalls. In 2013 alone there were more than 1,475,750 defective products in these two categories. In 2012, this number was even greater: there were more than 1,647,917 products in the two categories that could offer some risk to consumers (PROCON, 2014).

Given the above, the objective of this work is to check the impact of recall on consumer loyalty, considering the image of the brand. Its specific objectives are: (i) to check whether recall has an impact on brand loyalty; (ii) to identify whether the seriousness of the recall has an impact on different levels on loyalty to strong brands, when compared with weak brands; and (iii) to identify whether the seriousness of the recall has an impact on different levels on the loyalty to different types of product. Because of the number of recalls seen in recent years and the risks to the physical integrity and health of consumers that such products may offer in a recall situation, in order to carry out this study products were selected from the automobile and condom categories.

An attempt has been made to fill a gap in the literature, since there are still few empirical investigation studies into how consumers process this type of negative information and which factors have an influence on this process (MATOS; ROSSI, 2007). To test the study hypotheses an experiment was conducted with 360 undergraduate students from a higher education institution in São Paulo. The work is divided into the following sections: in addition to this introduction there is a review of the literature on the main themes - recall, loyalty and involvement; methodological procedures, with a description of the experiments, the operationalization of the variables and the statistical techniques used to check the propositions formulated; analysis of the results: tests of the hypotheses and results obtained; and finally the concluding considerations, including the limitations of this research and opportunities for future studies.

## **2 Literature review**

In this section we present the main concepts adopted in the research, the relationship between them and the formulation of the hypotheses we tested.

### **2.1 Recall**

Recall, which is also known as product call or risk warning, is a communication procedure with the customer that companies are recommended to adopt when they find some defect in their products/services (PROCON, 2014). Since these products are able to injure

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consumers or third parties they are collected (recalled) from the market so they can be substituted or repaired.

In Brazil, this supervision is carried out by PROCON, which since 2002 has kept an updated list of products and companies that have carried out a recall. The government agency indicates that when a defect in a product/service is discovered, the company responsible must undertake to communicate with the customers who bought it and repair the mistake or exchange the product for a new one. Thus:

The need for a recall is identified by the company or regulatory agency when they spontaneously discover the occurrence of problems with the product. After characterizing this need definitively, the information must be disclosed to the consumer public openly and extensively with the idea of reaching the largest possible number of consumers of the product (SILVA et al., 2011, p. 159).

In 2012, 2,298,785 defective products were recorded in Brazil. In 2013, the number of products that suffered a recall rose to 4,607,129. Among the product segments most affected are: food and drink, health, hygiene and beauty products and vehicles. Table 1 shows the 2012 and 2013 cases recorded on the PROCON website.

Table 1 – Number of products that were recalled by segment

Segment	2012		2013	
	Total affected	%	Total affected	%
Food and drink	546,832	23,79	2,019,799	43.84
Household appliances/electrical and electronic products	217	0,01	4,866	0.11
Hygiene and beauty	558	0,02	886,084	19.23
Informatics	261	0,01	_____	_____
Children's products	_____	_____	180,739	3.92
Health products	1,250,625	54,40	809,407	17.57
Automobiles	397,292	17,28	666,343	14.46
Others	103,000	4,48	39,891	0.87

Source: PROCON (2014)

In recent decades, researchers have become interested in understanding the influence that recall has on consumer behaviour and the brand image (JOLLY; MOWEN, 1985; MAGNO, 2012; MATOS; ROSSI, 2007; MOWEN, 1980; SIOMKOS, 1989, 1999; SIOMKOS; KURZBARD, 1994; SOUIDEN; PONS, 2009).

Mowen, Jolly and Nickell (1981) were already predicting an increase in the number of recalls due to factors such as: (i) consumer activist movements – since the mid-1960s consumers have become more critical of the quality of products offered in the market; (ii)

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strong actions by the regulatory agencies; (iii) the greater manufacturing complexity of products to meet consumer demands and the safety and quality standards established by regulatory bodies.

Knowing that the brand creates value for the company and can (a) help consumers in their assessment of products and services, (b) affect confidence in the purchase decision and (c) offer a competitive advantage (AAKER, 1998; KELLER, 2008), authors like Jolly and Mowen (1985) and Siomkos (1999) suggest that brand image performs an important role in determining the impact of the recall on consumer behaviour.

Jolly and Mowen (1985) investigated how the way in which a recall is communicated may affect consumer behaviour. According to the authors the warning of a risk tends to damage the image of the company that issues it and the way in which this communication is handled may lead to a deterioration in an already negative image. The authors suggest that when a company carries out a recall and adopts a socially responsible attitude it is possible to reduce the negative effects caused in the perception of consumers.

Matos and Rossi (2007) and Magno (2012) also found similar results in their study into the recall of automobiles: by adopting communication that reveals a socially responsible attitude it is possible to reduce the negative effects of the recall and protect the image of the company.

According to Siomkos (1989) and Siomkos and Kurzbard (1994), the management of product recall is influenced by three factors:

- a) Corporate reputation: the consequences of the crisis can be limited if the company has a good reputation;
- b) External effects (like the media, for example): the media can lessen negative effects by showing that the company is acting in a responsible way, or vice-versa;
- c) Response to the crisis: the company can adopt four types of attitude to the recall. They are: denial; involuntary recall; voluntary recall; and “super effort”. In denial, the company accepts no responsibility for the defect and avoids any communication whatsoever with the customer. In involuntary recall, the manufacturer communicates and collects the products only after being notified by the regulatory agency. In voluntary recall, the company communicates and withdraws the product spontaneously. In “super-effort” or improvement campaign, the company carries out a voluntary recall and shows a concern for the wellbeing of consumers and transparency in its communication actions related to the crisis.

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Siomkos (1989) and Siomkos and Kurzbard (1994) suggest that voluntary recall does not negatively affect the company's image and may even improve it. The latter pointed out that the negative impact of recall on purchase intentions is smaller when dealing with a well-known company with a good reputation. In this same perspective, Weinberger, Romeo and Piracha (1991), in a study involving different brands of automobile in a recall situation, found that manufacturers who refuse to recall the product create a negative perception of both it and the company's image.

The research by Magno, Cassia and Marino (2010) showed that when a company voluntarily recalls a product and shows it is making a "super-effort" to do so, it can reduce the potential damage to its image. The authors indicate that better known companies with a good reputation suffer less with recall, but only if they adopt a socially responsible and voluntary attitude.

The study by Mowen (1980) also indicated that consumers perceive the company as being more responsible towards the problem when it acts before the intervention of the supervisory agencies, in other words, when the recall is voluntary. According to the author, consumers perceive familiar companies as being less responsible for the product defect than unknown companies.

Souiden and Pons (2009), in research with car users, found that a "super-effort" has a positive impact on the image of the manufacturer, which is bigger than that of the voluntary recall. They also found that denial has a negative impact on the image of the manufacturer, but that the latter is not affected in case of an involuntary recall. The authors found that the attitude adopted by the manufacturer (denial, involuntary, voluntary or "super-effort") during a recall can have an influence on the loyalty of customers and their purchase intentions by way of the manufacturer's image. In other words, if the impact of the recall on the manufacturer's image is negative, the loyalty of customers and their purchase intentions reduce. On the other hand, when this impact is positive, customer loyalty and purchase intentions increase.

## **2.2 Loyalty**

In a scenario of globalization and a highly competitive market, one of the concerns of companies is to retain their customers and this retention is very closely related to consumer loyalty, which is seen as a factor that has an influence on market performance and that is able

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to increase sales and market share (ESPARTEL; ROSSI, 2006; JONES; SASSER, 1995; ZEITHAML, 2000).

Although there is no consensus as to the definition of the term, loyalty can be understood from the behavioural point of view, which is generally measured by repurchase rate (DUBOIS; LAURENT, 1999); the attitude, which comprises a feeling of affection and preference for products or brands, which can be measured by purchase intention (MITTAL; ROSS; BALDASARE, 1998; MOWEN; MINOR, 2003; ZEITHAML; BERRY; PARASURAMAN, 1996); and the compound point of view, in which behaviour and attitude are two essential conditions of loyalty (DICK; BASU, 1994). So it is not possible to define customer loyalty by taking only repeated purchase patterns as the basis for doing so. The cognitive and affective attitudes of customers also need to be considered, which include reliability, emotion and sentiment, as do situational aspects, such as a lack of a preferred brand, sales point promotions and exchange incentives (DICK; BASU, 1994; LARAN; ESPINOZA, 2004).

In this sense, loyalty can be defined as the degree by which the consumer maintains a positive attitude with regard to the brand, is committed to it and intends to buy it in the future (DICK; BASU, 1994; MOWEN; MINOR, 2003).

In previous studies, authors have suggested that loyalty can be impacted by satisfaction (PAN; SHENG; XIE, 2012; REICHELDT, 2008; SANTOS; FERNANDES, 2008; WEBSTER; SUNDARAM, 1998), by brand image and reputation (JOHNSON et al., 2001; PINHEIRO, 2006), by complaint rates (ALMEIDA; RAMOS, 2012; SANTOS; ROSSI, 2002), among other aspects.

Consumers expect to receive products and services that meet their expectations and may feel frustrated and dissatisfied otherwise. Jones and Sasser (1995) say that high quality products induce high levels of satisfaction in consumers and increase their loyalty levels. Satisfaction may be understood as the judgment of a product or service of a certain supplier and has proved to be an important predictor of the repurchase intentions of consumers. Satisfaction is a fundamental step in the formation of loyalty (LARAN; ESPINOZA, 2004; OLIVER, 1999).

Given the above it can be understood that brand image has an impact on consumer loyalty. As recall is a negative message and one that has a significant impact on brand image, it is supposed that:

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*H1: Product recall reduces consumer loyalty.*

Different authors state that brand equity, formed by aspects like knowledge and familiarity of the brand, perceived quality and loyalty are key components for the consumer to measure product value, interfere in the purchase decision and improve the perception of products in relation to those of the competitors, thus having an influence on a consumer's preference for one brand over various other competing brands (AAKER, 1991, 1998; KELLER, 2008).

So it is more probable that a well-known brand has better market results than a less well-known brand. These better known brands become stronger than the others, since they maintain a strong and unique network of associations in the mind of the consumer that can be used to judge a product or service (BRONIARCZYK; ALBA, 1994; KELLER, 2008). So it is proposed that:

*H2: There is less loyalty to the products of a weak brand than to the products of a strong brand.*

### **2.3 Involvement**

Consumer loyalty is also shaped by aspects of involvement, which is “a person's perceived relevance of an object based on inherent needs, values, and interest” (ZAICHKOWSKY, 1985, p. 342). Therefore, in a situation in which there is major involvement with the product the consumer pays more attention and gives more importance to the purchase decision than when the situation is one of little involvement (CARO et al., 2011). Conversely, low levels of involvement suggest little concern with the purchase of the product, a situation in which consumers may not even have a specific brand in mind (ROTHSCHILD, 1979).

According to Blackwell, Miniard and Engel (2011), consumer involvement in decision-making may be influenced by aspects that are personal (related the interest of the individual), physical (that have to do with the characteristics of the product), and situational (related to purchase motives). In this sense, involvement increases as greater risk is perceived in the purchase or use of a product or service (FONSECA; ROSSI, 1998).

Although involvement with the product is a perception of the individual and may vary from one person to another, some characteristics may differentiate situations where there is

little or intense involvement. According to Popadiuk (1993), in a situation in which there is intense involvement there is a search for information from other users, the decision process is not simple, there are various stages, there is greater tendency towards brand loyalty and the product or brand messages are more elaborate. On the other hand, in a scenario of little involvement there is merely a search for general information about the product or brand, third parties have little influence over the purchase decision and communication messages are repetitive in order to become persuasive.

In a study into the effect of recall on consumer attitude, Matos (2003) saw how the effects of recall and the degree of consumer involvement with the product may affect the company's image. He found that the negative effect is greater when there is intense involvement, since this shows that this is a product of greater interest and more value to the consumer. Santos (2008) carried out research into vehicle recall and evaluated the seriousness index of the defect as perceived by the consumer. He emphasized that the degree of risk is perceived as being more serious when it involves physical injury to users.

Knowing that the negative impact of recall on intention to buy and consequently on loyalty is smaller when it is a known company with a good reputation and that this effect may also be influenced by the level of involvement with the product, the following hypotheses are presumed:

*H3: There is a significant interaction effect on loyalty between the seriousness of the recall and product brands: as the seriousness of the recall increases there is a greater reduction in loyalty towards the products of weak brands than towards the products of strong brands.*

*H4: There is a significant interaction effect on loyalty between the seriousness of the recall and the type of product: as the seriousness of the recall increases there is a greater reduction in loyalty in consumers of condoms than in the consumers of automobiles.*

The methodological procedures used in the research are presented below, as are the analyses and results of the tests of the hypotheses that were formulated.

### 3 Methodological procedures

The study hypotheses were tested using a between-subjects experiment. The independent variables were type of product (automobile or condom), product brand (weak/little known, or strong/well known) and recall (no recall, a mild recall or a serious recall); the dependent variable was loyalty. The experimental design, therefore, was of the 2 x 2 x 3 type; the numbers of participants, divided by experimental group, are shown in Table 2.

Table 2 – Number of participants by experimental group

Factor			
Type of product	Type of brand <sup>1 2</sup>	Recall	n (total = 360)
Automobile	Little known	No recall	30
Automobile	Little known	Mild	30
Automobile	Little known	Serious	29
Automobile	Well known	No recall	30
Automobile	Well known	Mild	30
Automobile	Well known	Serious	30
Condom	Little known	No recall	30
Condom	Little known	Mild	31
Condom	Little known	Serious	30
Condom	Well known	No recall	30
Condom	Well known	Mild	30
Condom	Well known	Serious	30

<sup>1</sup> Little known automobiles: Lifan; well-known automobiles: Volkswagen. Little known condoms: Lovetex; well-known condoms: Jontex. <sup>2</sup> In this study little knowns brands are used as synonyms for weak brands; well-known brands are used as synonyms of strong brands.

The 360 experiment participants were undergraduate students in Business in a private higher education institution located in São Paulo. Data was collected during August 2013. Students were approached in class and received instructions to complete the printed questionnaire without communicating with one another. A researcher was present during the whole of the time they were completing the questionnaires, which were distributed in twelve versions.

#### 3.1 Pre-test of the elements that went to make up the experiment questionnaire

Preparation of the questionnaires involved decisions about which products would be used, which brands (since the decision was taken to work with real instead of fictitious products), and the drafting of the recall scenarios.

The products chosen were automobiles and condoms, because these categories are highly representative within the universe of products that have undergone recall in Brazil over the last few years and because of their different characteristics as to probable levels of

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consumer involvement (intense and little, respectively) when going through the purchase decision processes.

A survey involving 29 students that preceded the experiment served to establish which brands of automobiles and condoms are well-known, or least known by the research reference population. In total 30 automobile brands and 7 condom brands were evaluated, from which those that were used in this study were chosen.

It was judged necessary to adopt consumer involvement with the product and consumer attitude to the brand mentioned in the questionnaire (because it was an existing brand in the market) as co-variables.

The scenarios were drafted by a female researcher from the area, based on information obtained from PROCON and reviewed by two other researchers. The scenarios underwent pre-tests to measure their capacity for referring the respondent back to the stimuli the researchers wanted.

### ***3.2 Operational definitions***

With the exception of the constructs ‘involvement’, ‘attitude to the brand’ and ‘loyalty’ the other variables measured are observable: product type, brand type, recall, age, gender and income.

The latent construct ‘involvement with automobile or condom products’ was measured by way of four items on a five-point Likert scale, adapted from Zaichkowsky (1985) by Matos (2003). This construct can be defined as “a person's perceived relevance of an object based on inherent needs, values, and interest” (ZAICHKOWSKY, 1985, P. 342). Cronbach's alpha coefficient, calculated for these four items, was 0.7727, a figure considered to be satisfactory since it is greater than 0.70 (CHURCHILL, 1979; ZAMBALDI; COSTA; PONCHIO, 2014). A database was created for analyses, with a column containing the average response to the four items on this scale, which represented the ‘respondent involvement’ construct.

The ‘attitude to brand’ construct was measured using Fishbein's multi-attributes model (AJZEN; FISHBEIN, 1972). During the pre-test phase 29 students said what the most important characteristics when assessing automobiles and condoms were. They chose eight attributes for automobiles and four for condoms. Each participant in the experiment then weighted (from 1 to 5) the importance of the attribute to themselves and how well (from 1 to 5) the brand involved in the scenario performed in each attribute. The average of the products

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that were perceived to be important to performance represented the respondents' attitude to the brands.

Finally, eleven items on a five-point Likert scale, as developed by Bobalca, Gatej and Ciobanu (2012), were used to measure loyalty. The eleven items that refer to the cognition, affection, conation and action of loyalty were highly correlated. Cronbach's alpha coefficient, calculated for these 11 items, was 0.9682, a value considered to be high. The 'loyalty' construct was measured as being the average of the replies to the eleven items on this scale.

Table 3 shows the Pearson correlation coefficients between the constructs described.

Table 3 – Pearson correlation coefficients between study constructs

	<b>Involvement<sup>1</sup></b>	<b>Attitude to the brand<sup>1</sup></b>
<b>Attitude to the brand</b>	0.189 ***	-
<b>Loyalty</b>	0.099 (n.s.)	0.620 ***

<sup>1</sup> n.s.: not significant (p-value > 0.05); \*\*\*: significant at the 0.01 level.

#### 4 Analyses and results

Of the 360 respondents, 184 (51.1%) were male and varied in age between 18 and 29, with an average age of 21.2, a median age of 21 and a standard deviation of 1.53 years. The family income of the respondents is high and all belong to socio-economic classes A or B. Table 4 contains the descriptive statistics of the loyalty of the consumers by experimental group.

Table 4 – Descriptive statistics of the loyalty variable by experimental group

Product	Brand	Recall	Average	Standard deviation	n
Condom	Weak	No recall	2.2053	0.93	30
		Mild	1.6535	0.55	31
		Serious	1.5607	0.53	30
		Total	1.8048	0.74	91
	Strong	No recall	3.2630	1.12	30
		Mild	3.2627	0.98	30
		Serious	2.6917	0.80	30
		Total	3.0726	1.00	90
	Total	No recall	2.7342	1.15	60
		Mild	2.4451	1.13	61
		Serious	2.1262	0.88	60
		Total	2.4352	1.08	181
Automobile	Weak	No recall	1.8603	0.64	30
		Mild	1.7907	0.69	30
		Serious	1.7086	0.67	29
		Total	1.7874	0.66	89
	Strong	No recall	2.4970	0.83	30
		Mid	2.7840	0.84	30
		Serious	2.5940	1.01	30
		Total	2.6239	0.90	90
	Total	No recall	2.1787	0.80	60
		Mild	2.2873	0.91	60
		Serious	2.1571	0.96	59
		Total	2.2080	0.89	179

Based on the data collected a general linear model was prepared (complete factorial), the variable response (dependent) of which is loyalty and its fixed effects are the type of product (automobile or condom), product brand (little known or well-known) and recall (no recall, a mild recall or a serious recall). The co-variables are 'involvement' and 'attitude to brand'. Statistics of the model are shown in Table 5.

The assumptions of the general linear model are that the residuals are independent, homoscedastic and normally distributed, with their expected value equal to zero. These characteristics are observed in the analysis database, with one reservation: the p-value of the Levene test for homogeneity of variance within the groups (null hypothesis of error variances of the dependent variable is equal between groups) was equal to 0.046. Although there is some evidence for rejecting the null hypothesis we chose to continue with the model.

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Table 5 – Effect size test – GLM between subjects model (variable response: loyalty)

Source	SQ (type III)	g.l.	MQ	F	Sig. <sup>2</sup>	Partial squared Eta
Corrected model	180.06 <sup>1</sup>	13	13.9	26.69	0.000***	0.501
Intercept	6.94	1	6.94	13.37	0.000***	0.037
Involvement	0.11	1	0.11	0.21	0.648(n.s.)	0.001
Attitude to brand	54.00	1	54.00	104.07	0.000***	0.231
Product	4.18	1	4.18	8.06	0.005***	0.023
Brand	21.67	1	21.67	41.76	0.000***	0.108
Recall	3.45	2	1.73	3.32	0.037*	0.019
Product*Brand	0.60	1	0.60	1.15	0.285(n.s.)	0.003
Product*Recall	5.96	2	2.98	5.74	0.004***	0.032
Brand*Recall	5.36	2	2.68	5.17	0.006***	0.029
Product*Brand*Recall	0.30	2	0.15	0.29	0.747(n.s.)	0.002
Error	179.54	346	0.52			
Total	2,300.98	360				
Total corrected	359.60	359				

<sup>1</sup> R<sup>2</sup> = 0,501 (R<sup>2</sup> adjusted = 0.482).

<sup>2</sup> n.s.: p-value > 0,05; \*: significant at the 5% level; \*\*\*: significant at the 1% level.

There is evidence of an association between the co-variables ‘brand attitude’ and ‘loyalty’, and between the ‘product’, ‘brand, recall’ and ‘loyalty’ factors. There is evidence to support H1 (‘Product recall reduces consumer loyalty’): the measures of loyalty vs. type of recall (no recall, mild and serious) are respectively, 2.46, 2.37 and 2.14. The p-value of recall in the model shown in Table 5 is equal to 0.037, which at the 5% significance level allows us to reject the null hypothesis of equality of loyalty means between groups submitted to different types of recall.

Loyalty to products of a weak brand is, on average, equal to 1.80, while loyalty to products of a strong brand is on average 2.85. There is, therefore, evidence to support H2 (‘There is less loyalty to the products of a weak brand than to a strong brand’). The p-value of the brand in the model presented in Table 5 is equal to 0.000.

There is a significant interaction effect between the seriousness of the recall of weak brand products when compared with strong brand products. The p-value of the interaction term ‘brand\*recall’ in the model shown in Table 5 is equal to 0.006, which supports H3.

Figures 1 illustrates the significant effect that interaction between the seriousness of the recall and the type of product has on loyalty: as the seriousness of the recall increases there is a greater reduction in loyalty in consumers of condoms (blue line) than in consumers of automobiles (green line). The p-value of the interaction term ‘product\*recall’ in the model presented in Table 4 is equal to 0.004, which is support for H4.

Figure 1 – Estimated marginal means (loyalty): recall vs. product

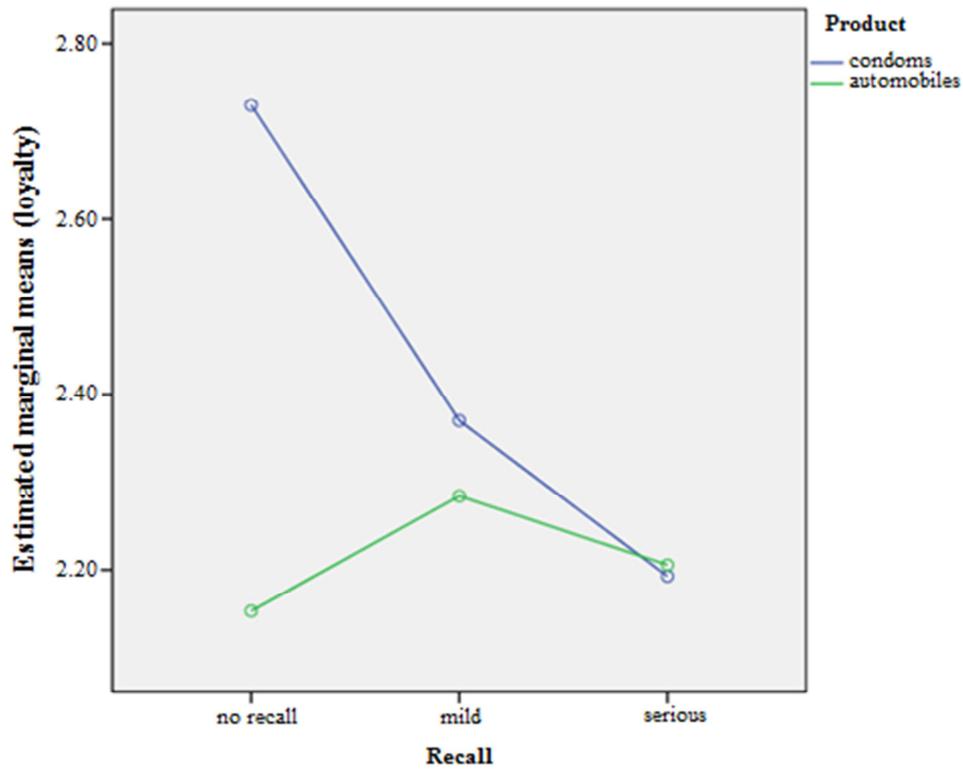


Figure 2 – Summary of the tests of the research hypotheses

Research hypothesis	Result
<b>H1:</b> Product recall reduces consumer loyalty.	<b>There is some evidence</b> (p-value of 'recall' equal to 0.037 in Table 4). The data in Table 3 also supply evidence in this direction.
<b>H2:</b> There is less loyalty to the products of a weak brand than to the products of a strong brand.	<b>There is evidence</b> (the p-value of 'brand' is equal to 0.000 in Table 4). The data in Table 3 also supply evidence in this direction.
<b>H3:</b> There is a significant interaction effect on loyalty between the seriousness of the recall and product brands: as the seriousness of the recall increases there is a greater reduction in loyalty towards the products of weak brands than towards the products of strong brands.	<b>There is evidence</b> (the p-value of the interaction term brand*recall is equal to 0.006 in Table 4). The data in Table 3 also supply evidence in this direction.
<b>H4:</b> There is a significant interaction effect on loyalty between the seriousness of the recall and the type of product: as the seriousness of the recall increases there is a greater reduction in loyalty in consumers of condoms than in the consumers of automobiles.	<b>There is evidence</b> (the p-value of the interaction term product*recall is equal to 0.004 in Table 4). The data in Table 3 and Figure 1 also supply evidence in this direction.

## 5 Final considerations

The main objective of this article was to check the impact of recall on consumer loyalty, considering the image of the brand, the seriousness of the recall and the type of product. To do so four hypotheses were prepared and tested by way of a factorial experiment (between-subjects) with 360 undergraduate students in a higher education institution in São Paulo.

The research found evidence that: (i) recall has an impact on loyalty to the brand; (ii) the seriousness of the recall has an impact on different levels on loyalty to strong brands in comparison with weak brands; and (iii) the seriousness of the recall has an impact on different levels on loyalty to different types of product (condoms vs. automobiles).

The test of H1 – ‘Product recall reduces consumer loyalty’ – supplied evidence that consumer loyalty can be impacted by product recall and may even damage the company’s image, as indicated in the study by Jolly and Mowen (1985).

In line with the studies of Johnson et al. (2001) and Pinheiro (2006), evidence was considered that the image and reputation of the brand may have an impact on loyalty. The respondents believe that loyalty to products of a weak brand was less than the loyalty to the products of a strong brand. Therefore, there is evidence to support H2 – ‘There is less loyalty to the products of a weak brand than to the products of a strong brand’.

According to Siomkos and Kurzbard (1994) and Souiden and Pons (2009), the strength of a brand may reduce the impact of the recall and the impact is less when it is a known company with a good reputation (a strong brand). The test of H3 – ‘There is a significant interaction effect on loyalty between the seriousness of the recall and product brands: as the seriousness of the recall increases there is a greater reduction in loyalty towards the products of weak brands than towards the products of strong brands’ – supplied evidence that loyalty to weak brands suffers a greater negative impact from recall than loyalty to strong brands.

The results provide evidence that loyalty is impacted by the type of product (condoms vs. automobiles). Taking buying condoms as representative of the low involvement category and the purchase of automobiles as representative of intense involvement then the results are in accordance with the idea that in the purchase or use situations of products with which there is little involvement, consumers generally do not have the name of the brand in mind (ROTHSCHILD, 1979), which makes it more vulnerable to low loyalty ratings. Therefore, it is possible to support H4 – ‘There is a significant interaction effect on loyalty between the

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seriousness of the recall and the type of product: as the seriousness of the recall increases there is a greater reduction in loyalty in consumers of condoms than in the consumers of automobiles'. A suggestion for future studies is to assess whether brands of other types of product, with which there is little involvement, suffer more from the negative effects of recall than brands of product with which there is intense involvement.

The main academic contribution of the study is the fact that it has added the consumer loyalty aspect to the Brazilian discussion about brand recall and included it in the discussion started by Almeida and Ramos (2012), Mattos (2003), Matos and Rossi (2007), Santos (2008), and Santos and Fernandes (2008).

As its contribution to management, an understanding of how recall affects loyalty is relevant, so that companies can prepare contingency strategies for facing up to the situation when a recall becomes necessary, particularly if the recall is for reasons that are considered to be serious. It is also important for predicting and/or pre-empting possible problems that may arise in this type of situation. There is speculation that there may be a tendency for recalls to grow, given the strong actions of the regulatory and consumer defence agencies and the activism of consumers who are demanding affirmative actions from companies in cases where there are problems.

The main limitation of this study lies in its non-probabilistic sample, formed of students in brand studies (BUIL; MARTINEZ; DE CHERNATONY, 2013), even though it deals with products that are of interest to this group, like automobiles and condoms. Another limitation lies in the choice of the brands tested. Some participants did not know the weak brands and had to imagine them during the test. In future experimental studies it is important to include manipulation checks to discover how respondents perceive the brand (strong or weak) and for them not reply to questions without being certain.

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