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**THE EFFECT OF PRICE ARRANGMENT ON CONSUMER CHOICE AND
OVERALL SALES**

**Porto Alegre
2017**

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Dissertação de Mestrado apresentada ao Programa de Pós-Graduação em Administração da Universidade Federal do Rio Grande do Sul, como requisito parcial para a obtenção do título de Mestre em Administração.

Orientador: Prof. Dr. Vinícius Andrade Brei

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RESUMO

A relação entre preço e posicionamento de produto nas prateleiras de varejo ainda tem espaço para descobertas na literatura de marketing. O objetivo central dessa dissertação foi identificar o efeito do posicionamento de produtos levando em consideração o seu preço e a escolha do consumidor; mais especificamente o efeito positivo do posicionamento lógico de preços (i.e produtos posicionados do menor ao maior preço nas prateleiras) na escolha final, facilidade de escolha e número de unidades vendidas. Dois estudos foram feitos em busca de resultados, o primeiro sendo um experimento online, no qual escolha e facilidade de escolha foram estudadas a partir do posicionamento de preço. O segundo estudo foi um experimento de campo, no qual unidades vendidas foram verificadas através do posicionamento de preço. Os resultados encontrados em ambos os estudos indicam que o posicionamento de produtos a partir de uma ordem lógica de preço afeta a escolha do consumidor, embora não através da facilidade de escolha, e, mais ainda, afeta positivamente a quantidade de produtos vendidos. Contudo, verificou-se que o posicionamento a partir de preço não tem como consequência a facilidade de escolha.

Palavras-chave: escolha do consumidor, posicionamento de prateleira, preço, arranjo de preço, experiment de campo.

ABSTRACT

The relationship between price and product positioning on retail shelves still has room for breakthroughs in marketing literature. The main goal of this dissertation was to identify the effect of product placement, taking into account its price, and consumer choice; more specifically, the positive effect of product placement by a logical positioning of prices (i.e. products positioned from the lowest to the highest price on the shelves) on the final choice, choice easiness and overall number of units sold. Two studies were conducted to search for these results, the first one as an online experiment, which studied choice and choice easiness from price positioning. In this first study was found that there is a positive relation between logical price arrangement (i.e. positioning products from the cheapest to the most expensive one) and consumer choice. However, price positioning does not significantly affect the ease of choice. The second study was a field experiment, in which the overall number of units sold was verified through price positioning. The results found in both studies indicate that the positioning of products from a logical price order affects consumer choice, though not through easiness of choice and, moreover, positively affects the quantity of products sold. Yet, it has been found that considering primarily price to choose a shelf position does not have as consequence easiness of choice.

Key words: Consumer choice, shelf positioning, price, price arrangement, field experiment.

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1. INTRODUCTION

Imagine yourself trying to buy a new pair of shoes, imagine the last time you went out to hunt for any kind of products... Your first impression will probably be: so many different aspects I will need to focus my attention on. Sizes, brands, colors, retail stores, prices, differentiation factors... The list goes on depending on the person and product concerned. Many features in the scenario in different product categories change among consumers and, as demonstrated by many researchers, a lot of customers will find problems along the searching process (BOATWRIGHT; NUNES, 2001; BORLE et al., 2005; GOURVILLE; SOMAN, 2005; SCHEIBEHENNE; GREIFENEDER; TODD, 2010). Searching for a new product involves attention and concentration in many different aspects. Signals and cues are necessary to help consumers in this moment, once they need information to facilitate the decision process, and the correct price arrangement could be more important than it has been investigated.

The way options are presented represents an influence to the final decision-making process (JOHNSON et al., 2002). There are many different ways marketers could affect people, one of them is the moment of evaluating the options available and all the challenges that are connected to this particular moment (THALER; SUNSTEIN, 2008).

Assortment consists on the total summing of products, brands and the amount of shelf space devoted to a category (BRONIARCZYK; HOYER; BRIESCH; CHINTAGUNTA; FOX, 2009). Past studies regarding assortment have already demonstrated that it is possible to influence the decision-making process of consumers through changes in the environment, recommendations, product set composition and sequence of choices (JOHNSON et al., 2002; DELLAERT; HÄUBL, 2012; LEVAV; REINHOLTZ; LIN, 2012). The authors also suggested that there is still the need for further investigation regarding other aspects that could influence consumers in a retail store. However, one thing that it is known is that the shopping environment influences consumer to behave in a specific manner (TURLEY; MILLIMAN, 2000).

Shelf positioning is a simplifying heuristic that drives consumer's attention and, moreover, is used by them to make inferences about the products by themselves (VALENZUELA; RAGHUBIR, 2015). A research on consumers' beliefs on shelf displays, at least the ones marketers think they have, tried to unveil the truth and ended finding that they are not always true (VALENZUELA; RAGHUBIR, 2015).

Although shelf positioning has shown great importance on influencing consumer's behavior, as judgment and final decision, this subject has not been deeply explored in the marketing literature (VALENZUELA; RAGHUBIR; MITAKAKIS, 2013). Valenzuela, Raghubir e Mitakakis (2013) proved that customers prefer products placed on the left side of the shelf, as well as products placed on the top of it; moreover, even with no price tag attached to the product, just positioning it in the right place already affected the final choice (VALENZUELA; RAGHUBIR; MITAKAKIS, 2013). Another study, however, suggests that brands that are positioned in the center of the shelf are perceived as more popular and, therefore, are more likely to be chosen by consumers (VALENZUELA; RAGHUBIR, 2015).

As it is possible to notice, shelf displays effects and logic still need further investigation, so marketers can understand where is the best place to display their products. Besides that, Valenzuela e Raghubir (2015) suggested that the same positioning scheme should be tested with price sign boards added, so it would be possible to understand what drives more consumers choice in the end: price or positioning.

Consumers are more likely to process information made available horizontally (vs. vertically) because their field of vision is biologically binocular, therefore consumers perceive greater variety in the horizontal sense, which can be positive or negative depending on the quantity of products (DENG et al., 2016); meaning that the location where a product is set influence consumers' perception (CAI; SHEN and HUI, 2012).

Besides, Marketing and Psychology literature have already shown that people in general construct their mental map increasing from left to right, based largely on cultural experience (CASASANTO, 2009; 2011; ROMERO; BISWAS, 2016). Cai, Shen and Hui (2012) demonstrated in their research that there is a cognitive association between numerical magnitude and left-right position. Therefore, it could be concluded that consumers see as more logical when the cheapest product is placed on the left side of the shelf, while the most expensive products are expected to be on the right side of the self. However, these researchers also came to the conclusion that the casual relationship between location and numbers (i.e. prices) is not entirely clear (CAI; SHEN and HUI, 2012), which can be associated to the finding showed before by Valenzuela e Raghubir (2013, 2015) that consumers assigned larger numerical values to products placed in the right shelf.

If consumers' reed information more easily horizontally and in an increasing manner from left to right, and it is known that products positioning influence costumers' decision, a research question arises: When products are positioned on the shelves as it is logical for consumers, with prices increasing from left to right, what effect will be notice on sales?

Hence, the present research aims to fill some gaps in the literature about product placement: a) showing how logical price arrangement (i.e. increasing from left to right) positively affects sales and b) choice easiness. Another contribution of this study is using sales data from a real Hardware Store located in South Brazil to measure the price distribution and positioning outcomes, as until now assortment characteristics and their outcomes have been mostly studied from the customer perspective alone and using online studies, which not always can replicate a real retail setting. In this sense, the present study aims to fill in this gap, understanding how product placing assists a company to reach better sales results, using both online data and field data.

The main goal of this dissertation is to analyze if and how price arrangement influences consumer choice. The specific goals of this research are 1) to analyze the effect of price exhibition on consumers' perception of choice easiness; 2) to test the effect of different types of price arrangements on consumer choice; and 3) to compare the effect of logical price arrangement (i.e. increasing from left to right), illogical price arrangement (i.e. decreasing from left to right) and no price order arrangement (i.e. not taking price into consideration when placing products on the shelf) on buying decisions.

It is important to highlight that the field study was made specifically in partnership with Tramontina Eletrik, as the company supported the search to find a Hardware store aiming to host a field experiment. Therefore, the products studied in this research were all from Tramontina Eletrik, more specifically, outlet covers and light switches.

The results from the two studies conducted, online and field experiment, demonstrated that there is still a need to further investigate the effect of price on product placement. Increasing price positioning (from left to right) did change consumer choice and significantly altered overall sales from the Hardware Store, but despite these results, more aspects related to this phenomenon should be further verified.

2. THEORETICAL FRAMEWORK

In this section, theories and studies that were used as a baseline for the development of the hypotheses will be presented. The theoretical framework primarily addresses Consumer Choice, subdivided in Choice Architecture, Assortment Perception, Shelf Positioning and Shelf-Positioning and Price

2.1 CONSUMER CHOICE

Economy theory introduces the economy man as a rational subject, who must have sufficient knowledge about the environment, or at least a clear and extended cognitive notion of his surrounding. Simon (1955) explores the paradox between economy theory and management theory, with the intention of understanding and analyzing human behavior and all the situations regarded to this subject (SIMON, 1955). As an economic man, any individual has a well-organized system of preferences, as well as the ability of reasoning, which allows evaluation of the alternatives available in a particular condition, in order to choose the right path to achieve the highest level of happiness and satisfaction (SIMON, 1955).

“Struggles to find the best candidate or best match from a sequential string of potential alternatives happen in many searching problems” (SHU, 2008). When researchers look into consumer experiences, consumers are always trying to solve the problem between income and utility of their buying desires, which is fully revealed to the consumer upon its inspection (THALER, 1985; HÄUBL, DALLAERT and DONKERS, 2010). Therefore, characteristics regarding goods, that describe perceived utility by consumers, and pricing, which is directly linked to income, influence consumer choices (THALER, 1985). Comprehending the consumer search behavior features many challenges for current researchers, as it is an interesting and important part of the retail shopping experience (TITUS and EVERETT, 1995).

A research by Shu (2008) demonstrated that the consumer in a decision-making task often has an ideal candidate in mind, against which other candidates are measured; the

problem affecting the choice is: selecting a currently available option or continuing the search for a better alternative? As a result it was proved that the search might be continued depending on the searching task, in the case of Shu (2008) research, sequential and difficult types of search represented different outcomes (SHU, 2008).

When a decision-making situation is ambiguous or vague, it can put some weight into the decision task and also makes choosing a hard decision. For that reason, coding the options available becomes a necessity and an actual “problem solver”. Some researchers refer to the coding of options as *framing*. Framing is a shift of preference and evaluation by consumers on outcomes, contingencies or acts; thereby the same consumer can have a different preference for the same problem or alternative, depending only on the framing of the moment (TVERSKY; KAHNEMAN, 1985).

Consequently, as mentioned above, when choosing the final option is difficult for any particular reason, consumers use simplifying heuristics in their choice tasks, which provide a fast and effortless decision (BAUER; KOTUC; RUDOLPH, 2012). Those simplifying heuristics could be any strategies that consumers use to decide which option is the one to be selected, and could be related to any product, environment or retailer characteristic, as in the case of this research shelf positioning and price.

Therefore, many strategies are adopted by consumers to make decision-making a simpler and easier task. As Iyengar and Lepper (2000) reported, even the number of choices available could influence the final choice and have other consequences, such as satisfaction and enjoyment (IYENGAR; LEPPER, 2000). In addition, Wright (1975) stated that some elements and information could influence consumers’ cognitive perception, and thereby affected his final decision (WRIGHT, 1975).

For instance, Xu, Jiang and Dhar (2013) proposed that larger products assortments could generate a perception that all items are very similar, resulting in choice overload (i.e. choice being impossible due to the number of options to choose from). Also the study showed that a greater number of comparisons between options are needed once it facilitates the final choice (XU; JIANG; DHAR, 2013). Similar to those findings, another study revealed that choice overload could easily happen when the available options are all very similar, and then the expectations of the customer may not be met (SCHEIBEHENNE; GREIFENEDER; TODD, 2010). Another study on the literature about the atmospheric effect on shopping behavior has summed up all of the manipulations, results and discoveries in this area and showed that more research on this area of study is needed to further investigate consumer choice and decision making behavior (TURLEY; MILLIMAN, 2000).

Sometimes decision-makers continue their searching beyond the stopping point. Many shoppers suffer from buyers' remorse, so they keep checking for better discounts and conditions even after deciding and purchasing something (SHU, 2008). Regardless of any challenges a retailer might face, consumers expect them to offer the right mix of products, at the right time, at the right place and several studies point out that it is possible to influence the decision-making process of consumers through changes in the environment, recommendations, product set composition and sequence of choices (MEYER, 1997; GRUEN and SHAH, 2000; DELLAERT and HÄUBL, 2012; LEVAV, REINHOLTZ e LIN, 2012).

2.1.1 Choice Architecture

As Wright affirmed "the goal of any marketing program is to induce the consumer to choose one specific option out of the many options available" (WRIGHT, 1975). Titus e Everett (1995) stated that further investigation is necessary on the search and navigation strategies commonly used by consumers, in order to adapt the buying process to individual demands and peculiarities. In addition, the moment of search for products is an essential point of contact between the company and the consumer, not only with the environment and employees, but also through the objects and common spaces.

There are many ways to present a possible choice to a customer, choice architecture studies several techniques of assisting and influencing the time of the search, Johnson et al. (2002), through an extensive research, described a number of possible tools, such as number of alternatives, defaults, order of consideration, limit time experience, and so on. Also known as nudge, choice architecture represents different techniques through which the architect aims to encourage individuals to get involved in a desired action, making consistently more likely that everyone will behave as wanted, but at the same time allowing the choice to exist, without forcing the consumers to follow the architect's design and enabling free will circulation (YEUNG, 2016).

Considering the moment of evaluating of the options available and all the challenges that are involved in this particular moment, the searching process is a good way to influence consumers' choice and the choice architect is the one who has the responsibility to organize the context where people make decisions (THALER and SUNSTEIN, 2008). In their book

called *Nudge*, Thaler and Sunstein (2008) question when is the right time to use the choices architecture techniques to assist on the search and selection of products, inducing consumers to purchase them. The authors show aspects of the products and the buying processes that represent good opportunities to use these tactics. They are:

- Degree of difficulty - choices that are intrinsically difficult;
- Benefits of costs now and then - late choice consequences;
- Frequency - the first time that something is happening or is it something that will happen only once;
- Feedback - learning becomes easier for consumers when they have constant feedback and information about their choices;
- Know what you want - degree of familiarity with the product.

Individual differences can influence how choice architecture play out in the market, thus marketers need to target very specifically decision-makers and getting to know consumers is therefore extremely important for the development of the choice architecture (JOHNSON et al., 2002; THALER and SUNSTEIN, 2014). The wise design of choice architecture can help clients to make better decisions for themselves and for others (CAMILLERI; LARRICK, 2014.). Also, sorting alternatives in order of expected attractiveness can be an effective way to improve search outcomes (JOHNSON et al., 2002).

When individuals see simplified profiles and important products information displayed, they are more likely to choose a target alternative than subjects seeing full profiles and too much information. Also, when an assortment is perceived to be wide, it increases the feelings of regret and effort of choosing, whereas the presence of necessary information, reversibility of choice, and a reduction of assortment decrease the effect of both regret and effort, proving some advantages of thin assortments (GOURVILLE; SOMAN, 2005). In a meta-analysis on published and unpublished experiments about choice overload (i.e. too many options), Scheibehenne, Greifender and Todd (2010) found that choice overload is a reliable phenomenon and its occurrence depends on specific moderator variables: no familiarity and no dominant option (SCHEIBEHENNE; GREIFENEDER; TODD, 2010). As a recent research wisely expressed, having an optimal amount of assortment, which could be wide or thin, is critical to both manufacturers and retailers (BRONIARCZYK; HOYER; MCALISTER, 2010).

As previously stated in this chapter, the search process is becoming gradually more complicated and, for that reason, many marketers are reconsidering and researching the moment of choice. Findings suggest that product attributes influence consumer perception of assortment and could end in different outcomes (HOCH; BRADLOW; WANSINK, 1999; BOATWRIGHT; NUNES, 2001; GOURVILLE; SOMAN, 2005). Assortment characteristics impact consumers differently, as the probability of consumers choosing a store is positively motivated by width, or the number of brands offered (e.g. Coke, Pepsi, 7up, Sprite), and the availability of their favorite products. However customers store choice is negatively affected by the number of SKU each brand offers (BRIESCH; CHINTAGUNTA; FOX, 2009). Large assortments increase expectations that the right product will be there, but conversely when the available options are all very similar, choice overload could happen and the expectations may not be met (SCHEIBEHENNE; GREIFENEDER; TODD, 2010).

2.1.2 Assortment Perception

Instinctively assortment is the total number of products a category offers, but some papers found that consumers assortment perception was in fact influenced by three different aspects: depth (i.e. number of products), width (i.e. number of brands or product lines) and amount of space devoted to a category (BRONIARCZYK; HOYER; MCALISTER, 1998, 2010; BRIESCH; CHINTAGUNTA; FOX, 2009; DHAR *et al.*, 2001; BAUER; KOTUC; RUDOLPH, 2012). Overall, assortment refers to the composition of products - the product mix - within a specific category.

An interesting finding explored by past researches was that assortments could be more important than retail prices and advertisement in store choice decisions, as store decision was more responsive to changes in product assortment than product price or overall advertisement about products (BRIESCH; CHINTAGUNTA; FOX, 2009). Thus, assortment has different impacts for retailers and manufacturers, as all decision regarding assortment will automatically influence consumers and, in extension, sales outcomes and further profits, assortment composition is very important for the company and its further success (BAUER; KOTUC; RUDOLPH, 2012). Hence, assortment management is an important weapon of

competitive strategy for both retailers and manufacturers, and extra attention should be paid to its composition and development (SPASSOVA; ISEN, 2013).

Thinking about the perfect assortment seems almost surreal to most companies, since there are different questions regarding this issue: quantity, shapes, designs, brands, colors, and other particularities. Marketers are generally reluctant to cut items for fear of losing consumers who will be unhappy with their offerings, although many authors had already addressed this issue and proved that portfolio optimization is healthy for the company (BRONIARCZYK; HOYER; MCALISTER, 1998, 2010; BOATWRIGHT; NUNES, 2001; BORLE *et al.*, 2005; BRIESCH; CHINTAGUNTA; FOX, 2009; SCHEIBEHENNE; GREIFENEDER; TODD, 2010).

Consumer perceptions and preferences, point of sale restrictions (i.e. shelf space), and external factors (i.e. variety of competing products) are some of the most difficult challenges in retail (MANTRALA *et al.*, 2009). An issue that has persisted in the literature review is the role of similarity, as redundancy is detrimental to assortment composition. Besides, the perception of variety in assortment determined, in a large extend, by the number of distinct combinations of relevant product attributes (BAUER; KOTUC; RUDOLPH, 2012).

Adding redundant new products may also be harmful to category sales. As Boatwright and Nunes (2001) showed in their results, the reduction of assortment resulted in the increase of category sales in around 11%. The availability of favorite products proved to be crucial for the consumers and their perception of the assortment size, furthermore the threshold for consumer sensitivity to reduction appears to be between a 25% and 50% (BRONIARCZYK; HOYER; MCALISTER, 1998).

Too much information is as bad as little information, as it hampers a cohesive organization of all data to make the decision and, in both situations, it is necessary more attention and focus to filter the relevant information (SAATY, 2008). If too many alternatives are offered, consumers feel they have to engage in an extensive search to find a satisfactory option, which could be costly and sometimes end in no decision at all. Conversely, if too few alternatives are offered, they get the impression that no acceptable choice would be found, so they don't even engage in the search process. As a result, it is possible to imagine that the best choice for an assortment composition is a finite optimal number of alternatives, which increases the probability of choosing (KUKSON; VILLAS-BOAS, 2010).

When faced with an extensively wide assortment, consumers tend to reduce their cognitive effort to analyze quickly the product set and reduce it to a subset with potential to meet their needs, choosing the final object among this subset (HAUSER; WERNERFEIT,

1990 apud BRONIARCZYK; HOYER; MCALISTER, 1998). Researches showed that the same choice selected from a narrow assortment leads to better performance when compared to the same option that was selected from a wide assortment, as consumers found the decision-making process to be more frustrating (BRONIARCZYK; HOYER; MCALISTER, 1998). Sometimes it becomes too exhaustive for the consumer to compare throughout the whole product set, and so the size of the assortment available strongly influences the final decision (MEYER, 1997).

In summary, assortment perception results in different reactions from the public, therefore many researchers suggested that future work in this field of study should explore more of the different cues that could bias the optimal assortment (BOATWRIGHT; NUNES, 2001; BORLE *et al.*, 2005).

2.1.3 Shelf Positioning

Turley and Milliman (2000) concluded a study on atmospheric effect on shopping behavior, and summed up all manipulations, results and discoveries in this area; according to the authors, previous studies related to shopping behavior had manipulated a great number of stimuli, such as color, music and crowd effect (TURLEY; MILLIMAN, 2000). As they also indicated, those studies evaluated the stimuli influence in many behaviors – shop image, consumer satisfaction, time, overall sales, impulse sales (TURLEY; MILLIMAN, 2000).

Shelf positioning has shown great importance to influence consumer's behavior, as judgment and final decision, even though the subject has not yet been deeply explored in the marketing literature (VALENZUELA; RAGHUBIR; MITAKAKIS, 2013). Therefore, shelf positioning could be considered another simplifying heuristic, which drives consumer's attention and, moreover, could and should be used to make inferences about products themselves (VALENZUELA; RAGHUBIR, 2015). It is known that consumers hold some beliefs about shelf displays, but they are not always true. For instance, it is already known that consumers perceive greater variety in the horizontal sense, in comparison to vertical sense, which can be positive or negative depending on the product; also literature has shown that consumers read more easily the information that is displayed horizontally (DENG *et al.*, 2016).

Magnitude Theory proposes that possessing information such as time, space, numbers and other dimension happens in a common way among humans and, more specifically, small numbers are mostly associated with left, while large numbers are associated with the right side (BUETI; WALSH, 2009). Marketing and Psychology literature have shown that consumers usually construct their mental map from left to right, based largely on cultural experience (CASASANTO, 2009; 2011; ROMERO; BISWAS, 2016) and, therefore, consumers read information more easily when they are displayed increasing from left to right.

In this specific mental map construction, magnitude increases from left to right and, in Romero and Biswas (2016) study, consumers indeed saw products placed on the left side as healthy and less expensive and products placed on the right side as unhealthy and more expensive, therefore increasing magnitude from left to right (ROMERO; BISWAS, 2016). Valenzuela and Raghbir (2015) also proved that consumers associate products placed on the left with sale products, or at least cheaper than the ones placed on the right (VALENZUELA; RAGHUBIR, 2015)

As many researches proved in the past, customers built positioning maps for products displayed in a retail space and, probably, positioning products in an expected way could facilitate their choice and, therefore, increase sales and easiness (VALENZUELA; RAGHUBIR; MITAKAKIS, 2013; VALENZUELA; RAGHUBIR, 2015; ROMERO; BISWAS, 2016). Valenzuela, Raghbir e Mitakakis (2013) proved that customers prefer products placed on the left of the shelf, as well as products placed on the top of it but, on the contrary, another study has suggested that brands positioned in the center of the shelf are perceived as more popular and, therefore, will be more likely to be chosen by consumers (VALENZUELA; RAGHUBIR, 2015). Therefore, it could be understood as logical to consumers that the cheapest product is placed on the left side of the shelf, while the most expensive products are expected to be on the right side of the self.

According to Deng et al. (2016), if an item is compared to the same item positioned in a vertical way, a horizontal display allows information processing to take place more efficiently, and as a consequence the perceived variety also increases. This means that a consumer can process more items at the same time (i.e. horizontally displayed). The explanation lies in the correspondence between the binocular field of vision (which is in the horizontal sense) and the dominant direction of eye movements for the processing of horizontal screens (DENG et al., 2016).

A very important contribution made by the studies of Valenzuela and Raghbir (2015) on shelf positioning, was proving that shelf positioning is consider by consumers to be a piece

of information that they take into consideration when choosing a product (VALENZUELA; RAGHUBIR, 2015). Shelf positioning drives clients attention and customers use it to make products inferences. Moreover, even with no price related to the product, positioning it in the correct place affected the final choice (VALENZUELA; RAGHUBIR; MITAKAKIS, 2013). Valenzuela e Raghbir (2015) suggested that the same positioning scheme should be tested with prices added, so it would be possible to understand this interaction and what drives more consumers choice in the end: price or positioning. Therefore, the first hypotheses in this research intend to prove that organizing products in an logical price order (i.e. increasing from left to right) could facilitate consumers' choice.

H1: displaying products in a logical (illogical) price order increases (decreases) choice easiness

2.1.4 Shelf Positioning and Price

One product attribute that influence consumer choice is price, it has been proved that retail consumers could be in fact more price sensitive than service quality or brand name sensitive (GONZÁLEZ-BENITO; MARTOS-PARTAL; FUSTINONI-VENTURINI, 2014). Another research before showed that there are differences among consumers, for example this particular study discovered that offline consumers are especially more sensitive to price than online consumers and also less sensitive to brand names and other sensitive attributes, like smell (DEGERATU; RANGASWAMY; WU, 2000).

Danziger, Hada and Morwitz (2014) also studied the relation between retailer price strategy, consumer judgment and choice. In their research, it was shown that consumers tend to choose products by its price. Especially when searching for small prices, they usually select the retailer that is often cheaper, than the retailer that provides good discounts less recently and with less frequency (DANZIGER; HADA; MORWITZ, 2014). Choices made under price uncertainty are generally quite similar to usual choices, when no uncertainty is related to the purchase (DANZIGER; HADA; MORWITZ, 2014). However, among so many different information presented in a retail environment there are some correlations and assumptions, as when more than one stimulus is consider in the moment of choice, the numerical one might be influenced by any other one presented (GEVERS; REYNVOET; FIAS, 2003).

Degratu, Rangaswamy and Wu (2000) studied four attributes that could influence decision-making process: categories, brand name, price, sensory attributes (i.e. smell) and non-sensory attributes (i.e. fat information); they concluded that when information is presented in a suitable format (i.e. as expected) for consumers, it facilitates information acquisition and comprehension (DEGERATU; RANGASWAMY; WU, 2000). Furthermore, Scheibehenne and Todd (2009) completed this finding demonstrating that the final choice fundamentally depends on the setting in which options are available; they expressed that the amount of information available to the consumers is of great importance to the final decision (SCHEIBEHENNE; TODD, 2009).

The location a product is placed can influence consumers' perception and a research by Cai, Shen and Hui (2012) showed there is a cognitive association between numerical magnitude and left-right position; therefore the location of a product influence consumers' numerical estimate (CAI; SHEN and HUI, 2012). However, these same researchers came to the conclusion that the casual relationship between location and numbers (i.e. prices) is not entirely clear (CAI; SHEN and HUI, 2012), which connects the finding showed before by Valenzuela e Raghbir (2013, 2015) that consumers assigned larger numerical values to products placed in the right shelf.

Shelf positioning still needs more research, as it was displayed in both Shelf Positioning and Shelf Positioning and Price sections, it involves many different aspects that retailers need to be aware of to better place all of their products to consumers. Especially, this research intended to further investigate the interaction between price and positioning, since as it was shown above these two aspects of retail are studied often separated. So, the two hypotheses in this research intend to prove that organizing products in an logical price order (i.e. increasing from left to right) could increase overall sales volume.

H2: displaying products in a logical (illogical) price order increases (decreases) sales

3. METHOD

Before presenting the two studies carried out in this research, it is important to remember the two main goals of these experiments: 1) Test if and how the logical price distribution affects choice easiness (H1) and 2) increases overall sales volume (H2). To address the two objectives, two experiments were conducted, the first one with data collected on Amazon Mechanical Turk, and the second one collecting data through a field experiment at a Hardware Store in Porto Alegre. Before the two experiments started, a pretest was carried out on the streets of Porto Alegre.

3.1 PRE TEST¹

As one of the hypothesis (H1) aimed to understand if logical price arrangement would facilitate consumer choice, it was necessary to understand how difficult it is to choose the products to be used in the two experiments. A an important characteristic to determine difficulty of choice among products is similarity, as it was shown by many researchers, product similarity can be confusing for consumers and make the choosing process a much more difficult task (BRONIARCZYK; HOYER; MCALISTER, 1998; BAUER; KOTUC; RUDOLPH, 2012; MANTRALA et al., 2009; SAATY, 2008). Therefore a pre test was conducted to understand how similar were the products to be tested later in the two forthcoming experiments.

We tested the level of similarity of two different items of the same product category of a Hardware Store: outlet covers and light switches. These products were chosen, among all Tramontina Eletrik products that are sold in a hardware store, because they are the best sellers. Tramontina Eletrik has 12 different product lines for outlets and light switches, for this pretest and for the forthcoming experiments 5 lines were chosen (as it would practically be impossible to test all lines) and the ones chosen were the five most important ones in sales volume: Giz, Liz, Lux2, Tablet and Izy Flat. This was a more conservative decision on the

¹ The pre test was conducted with assistance of three undergraduate students, as it was also a part in two conclusion papers (Cassiane Carvalho, Nicole Rech). The third student (Jéssica Santos) was a scholarship of scientific initiation.

part of the researchers, and it was taken so that the comparison of results was made between truly competitive products.

The pre test was carried out on two different streets in the city of Porto Alegre: Andradas Street (an important Downtown street for pedestrians) and São Pedro Street (a famous street in the city for Hardware Stores). We tested separately the five outlet covers and five light switches similarity in pairs, meaning that each subject gave their grade of similarity for 10 different pairs of products.

The goal of the pre test was to understand how similar these products are in the eyes of the consumers. Similarity among products was tested with and without packaging, and also with and without price tag. Therefore, the design of the pre test survey was a 2 (with vs. without price) X 2 (with vs. without packaging) X 2 (outlet covers vs. light switches) survey, resulting in eight different scenarios. The pre test was conducted on the streets and each day of data collection one of the eight conditions was tested. It is important to highlight that the order of pairs of products evaluated was randomly assigned before the pre test was out on the streets.

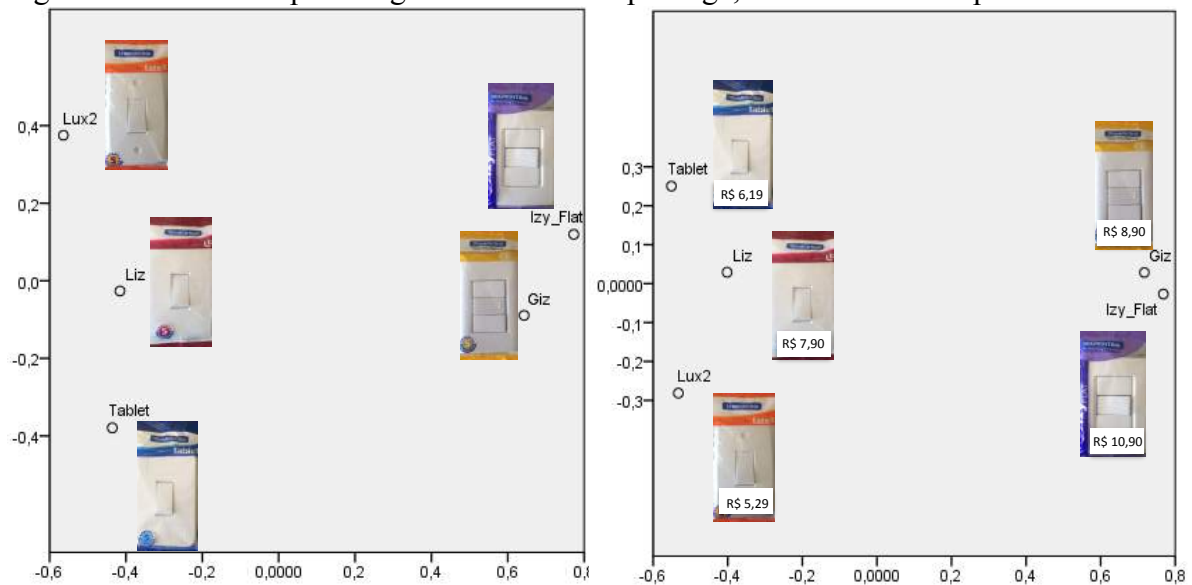
Four people conducted the pre test and they were all properly dressed with uniforms: a T-shirt of the university, a badge with the name of the person to identify that everyone involved was a student of the university. They also carried the same material: the questionnaires, pens and clipboards, where the similarity scale was attached. The survey was conducted in pairs, mostly because the interviewees did not have access to the questionnaires or the products, so they were asked by one of the researchers, which also filled out the question sheet. The other person of the pair was responsible for carrying and showing the product pairs to the interviewed person.

Each participant saw 10 different pair of products either light switches or outlets, presented in a randomized order. After seeing the product pair, each subject had to answered a single question: "How similar are these two products" in a 0 to 10 scale (0=not similar at all; 10=very similar); age and product knowledge were also asked afterwards (for data record purpose see Appendix A for the entire pretest questionnaire). As a result 400 people composed the pre-test sample, meaning that the pre test consisted of exactly 50 people for each one of the 8 conditions. All 400 subjects were randomly selected in the streets of Porto Alegre from December 2016 to January 2017.

The sample for the outlet covers was composed 52% by men; 53% of aging between 25 and 54 years old. The light switch sample, on the other hand, was composed 63% by men, and 65% aging between 25 and 54 years old.

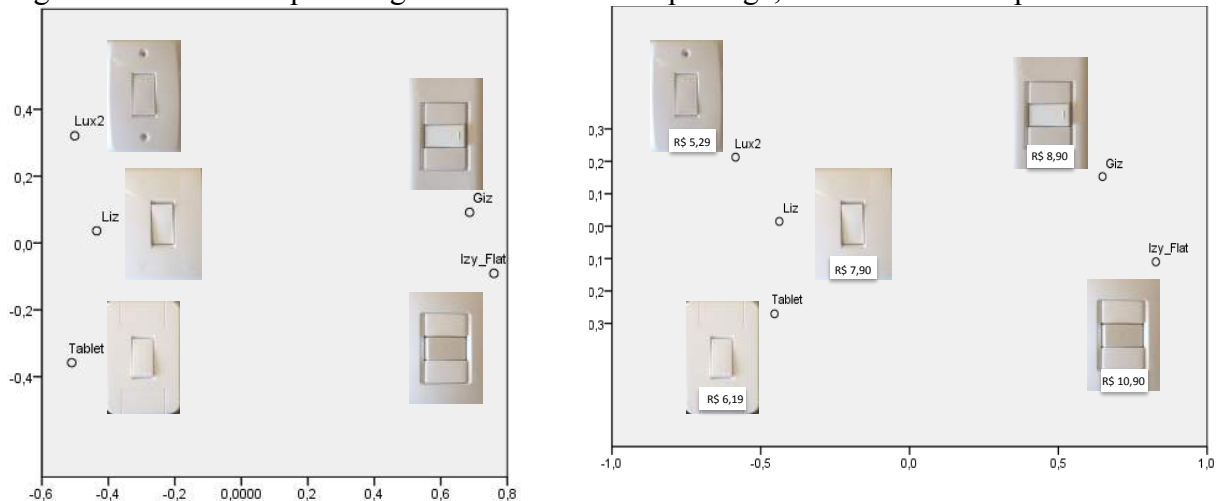
A *MDS* (Multidimensional Scaling) test was conducted to see the results of data collection. *MDS* is a statistic method developed to calculate similarity and distances between points. This method makes it possible to determine how two objects are related in terms of the respondents' perception of their dimensions (YOUNG, 2013), but it is important to clarify that in this pre-test no specific dimensions of the respondents were asked, as the goal was to study only the similarity between products. *SPSS* software was used to make the *MDS* test and as a result the program provides distance measures, as well as distance maps which are now presented in figures 1, 2, 3 and 4. These distance maps are a visual reference to understand how close or far two objects are and, in the case of this research, how similar are the objects.

Figure 1: Distance maps of Light Switches with package, with and without price



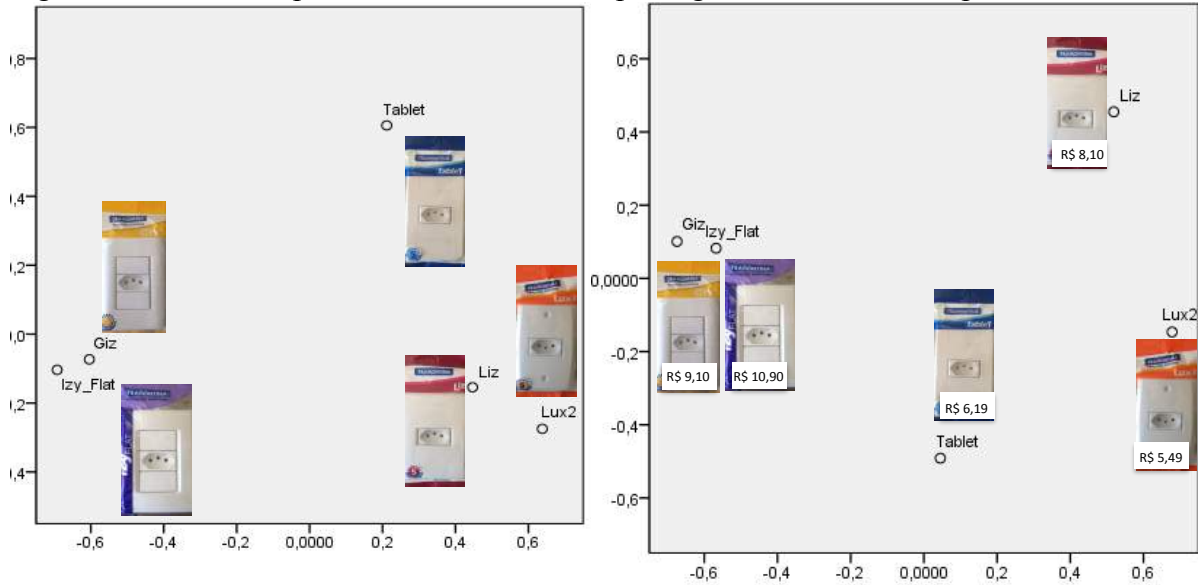
Source: the author - SPSS Output (2017)

Figure 2: Distance maps of Light Switches without package, with and without price



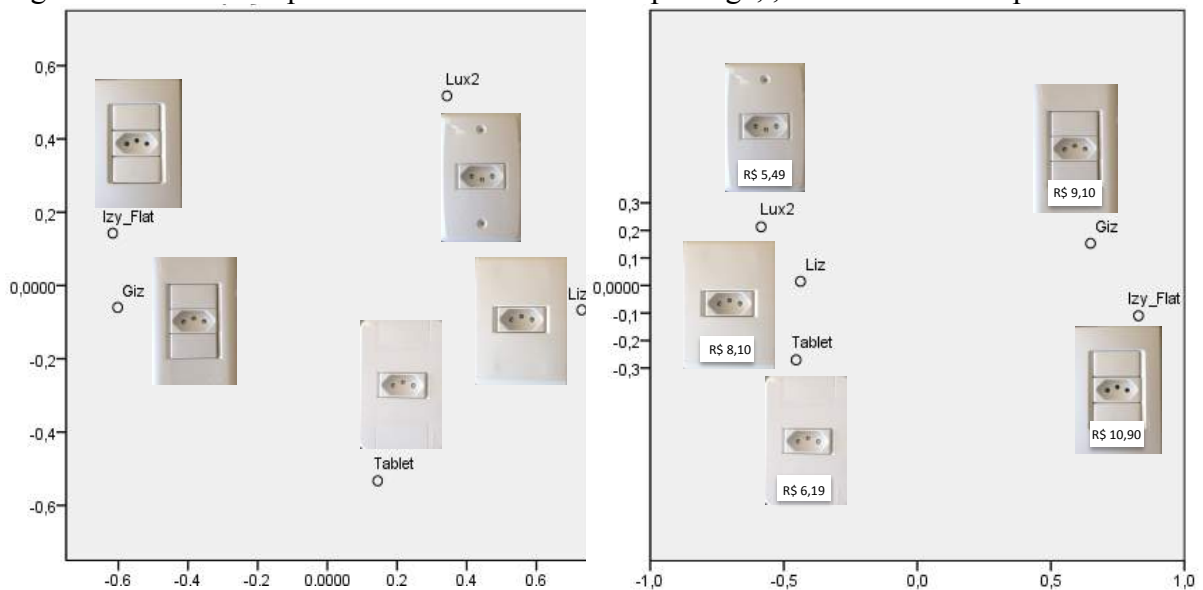
Source: the author - SPSS Output (2017)

Figure 3: Distance maps of Outlet Covers with package, with and without price



Source: the author - SPSS Output (2017)

Figure 4: Distance maps of Outlet Covers without package, with and without price



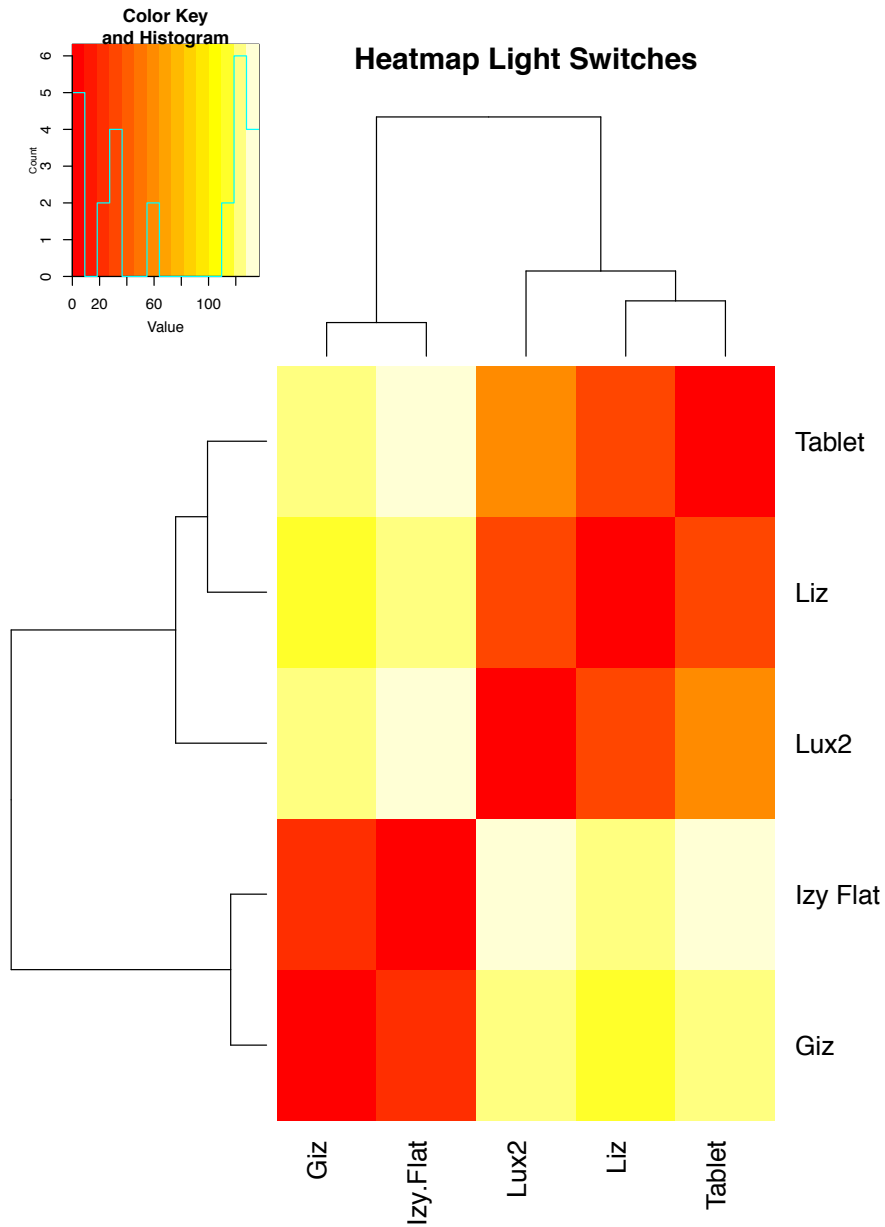
Source: the author - SPSS Output (2017)

Through the distance maps it is possible to notice that although there are differences between the tests made with (or without) and with (or without) prices attached to the products, in general, they formed two groups of similarity: Liz, Lux2 and Tablet always grouped in A point on the map, and Giz and Izy Flat on the other side.

Later, to better understand and visualize how close all these products were in matters of similarity, and to confirm that there were two groups of similarity among the five products, two heat maps with the overall distances for light switches and outlet covers were made. The

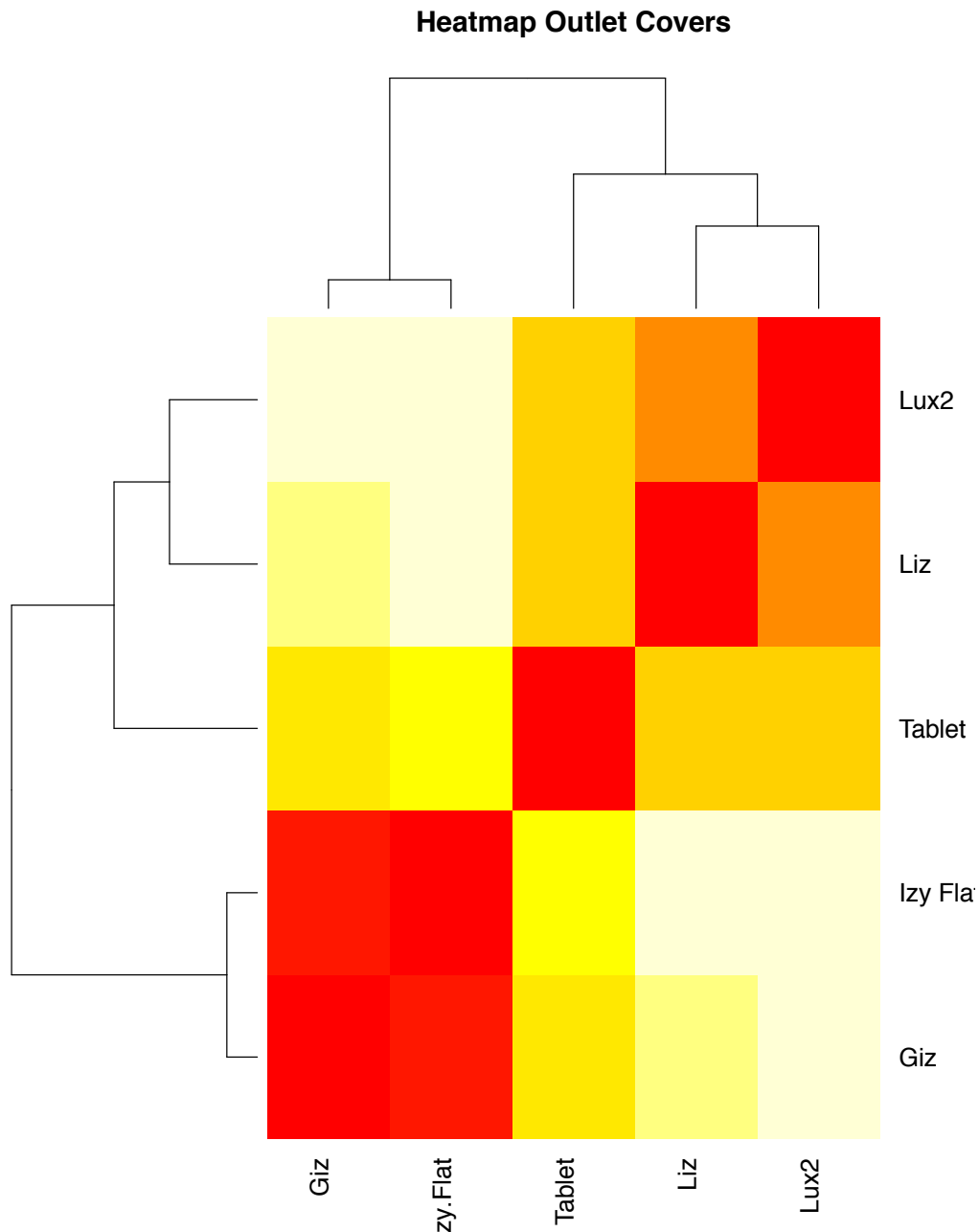
heat maps are a graphical representation of a matrix of mean distances made for the products, with their overall mean distances, so in figures 5 and 6 it can be seen how close two products are to each other through the color representation.

Figure 5: Heatmap of Overall Distances – Light Switches



Source: the author – R output (2017)

Figure 6: Heatmap of Overall Distances – Outlets Covers



Source: the author – R output (2017)

As the two figures above demonstrate, the most similar product lines are Giz and Izy Flat (with overall similarity scores of 0,21 for Light Switches and 0,18 for Outlet), and in second place Liz and Lux2 could also be considered very similar (with overall similarity scores of 0,33 for Light Switches and 0,57 for Outlet).

After the pre test was completed and similarity among products better understood, the research could advance to the studies. Next, study 1, which tested the relation between price

arrangement and choice easiness will be described, which tested the effects of price exhibition on choice easiness.

3.2 STUDY 1: The effects of price exhibition on choice easiness²

After conducting the pre test, the main experiment of study 1 was conducted to test H1. Price logical distribution was manipulated, and this experiment was a factorial, between-subject 2 (price exhibition: yes vs. no) x 3 (price order: increase left to right, increase right to left vs. random order) experimental study. Data for study 1 was collected using Amazon's Mechanical Turk.

3.2.1 Manipulation

The same five product lines were used from the pretest – Giz, Liz, Lux2, Tablet and Izy Flat, however only light switched were used this time, as region singularities regarding outlet covers (i.e. the difference of outlet covers in the USA and Europe) could confuse the *turkers*.

Participants were randomly assigned to one of the six conditions and were asked to simply choose one product from the five available. After choosing the product, participants were asked about choice easiness with a single question ('How easy was it to choose your option') and about their prior knowledge, also with a single question, ('Compared to average people, how much do you know about light switches and outlet covers'). Just after those two questions, demographic information was asked about each participant. Finally, after that participants were debriefed and thanked.

² Study 1 was also a part of one undergraduate student conclusion paper, Cassiane Carvalho, and it was conducted with her assistance

3.2.2 Measures

Dependent Measures: choice was measured by the decision itself, so the final choice of each participant was the actual measure of choice. After that, choice easiness was measured with a single question ‘How easy was it to choose your option’ with a ten point scale (0 = “Not easy at all”; 10 = “Very easy”).

Covariate Measures: as a covariate only prior knowledge was used and it was addressed with a single question ‘Compared to average people, how much do you know about light switches and outlet covers’ also with a ten point scale (0 = “Not at all”; 10 = “Very much”).

The study measures how long the participants took to finish the experiment, manipulation check was measured with a single questions ‘Did you notice any price order in the way products were presented?’ with nominal answerers connected to the scenarios. For registration, the entire experiment is presented in Appendix B.

3.2.3 Results

To run the analysis of the first experiment R Software and SPSS were used. The sample for the main study consisted of 177 responses; see table 1 for detail information of the sample per condition. The average age was 36 years old and 55% of the sample was men. As for the income, 14.7% of the participants had an annual income between \$ 10,001 and \$ 20,000 and 14.7% of the participants between \$ 20,001 and \$ 30,000. Outliers were searched using boxplots, although some outliers were found in knowledge, age and discretionary income, they were not significantly expressive for any changes in the sample, as the literature states that their sum must consist in 5% of the sample (HAIR et al, 2013). Still, outliers were withdrawn of sample to check if there was any change of results, which did not happened.

Table 1 - Sample per condition

	Number of Respondents per Condition		
	Increasing Price Position	No order	Decreasing Price Position
With Price	30	33	29
Without Price	28	32	25

Source: the author (2017)

The first test conducted was an analysis of variance (ANOVA) to test if the manipulations had any effect on easiness of choice, therefore the variables price (i.e. the existence of price or not) and price arrangement (i.e. increasing price arrangement, decreasing price arrangement and no order) were used as independent variables and easiness of choice was used as dependent variable. As displayed in Table 3, the test was not statistically significant and, therefore, no relation between price arrangement $F(1,173) = 0,914$, $p=n.s$ or price $F(1,173) = 1,446$, $p=n.s$, and easiness of choice could be proven.

Table 2 – ANOVA (Easiness of Choice x Price and Position)

	Easiness of Choice		
	Mean Square	F Value	<i>p</i>
Price	6,997	1,446	0,231
Price Arrangement	4,420	0,914	0,304
Price*Price Arrangement	1,498	0,310	0,579
Error = 173			

Source: the author – R output (2017)

After this first test, another ANOVA test was conducted, but this time to address the relation between knowledge and easiness of choice. Table 4 contains the results from this ANOVA and, as expected, consumers' prior knowledge is significantly related to their perception of easiness of choice $F(1,175) = 6,235$, $p<0,05$.

Table 3 – ANOVA (Easiness of Choice x Price and Position)

	Easiness of Choice		
	Mean Square	F Value	<i>p</i>
Knowledge	29,235	6,235	0,0135
Error = 175			

Source: the author – R output (2017)

Afterwards, a moderation analysis was conducted to check if there were any changes of behavior and further understand the effect of knowledge on easiness of choice. It was

tested if prior knowledge moderated the relationship between price arrangement and easiness of choice and also the relationship between price and easiness of choice. However, as table 4 presents, there was no significant result for this moderation.

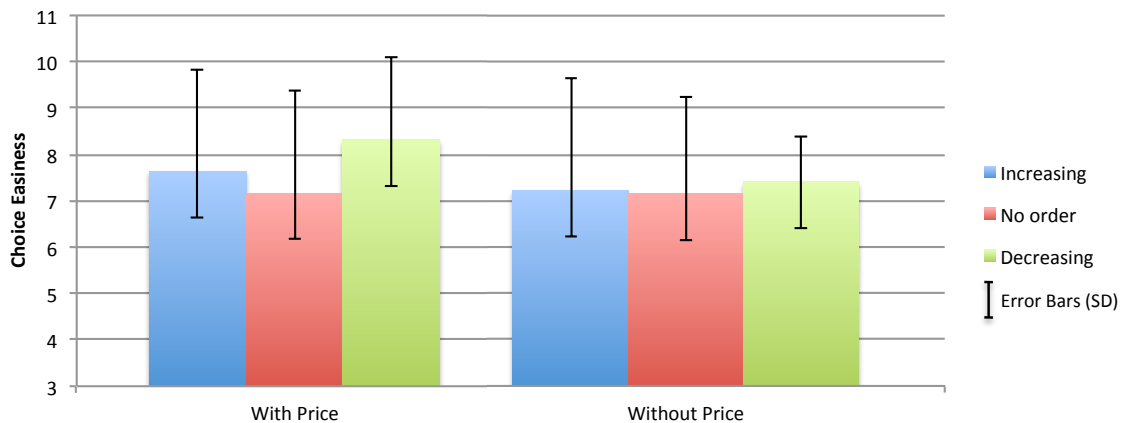
Table 4 – Moderation Analysis

	Coefficient	Std. Error	T Value	p	95% Confidence Interval for	
					Lower Bound	Upper Bound
Intercept	6,797	0,339	20,059		458,622	1747,572
Price	0,266	0,345	0,771	0,442	0,660	2,578
Price Arrangement	0,362	0,438	0,825	0,411	0,604	3,410
Knowledge	0,165	0,072	2,282	0,024	1,023	1,360
Price*Knowledge	-0,022	0,073	-0,293	0,770	0,847	1,131
Price*Arrangement	-0,048	0,091	-0,533	0,595	0,797	1,139

Source: the author SPSS output (2017)

After these two tests, simple descriptive analyses were also conducted to check the mean differences of easiness of choice for the manipulations price and price arrangement. Figures 3 and 4 present graphically the differences of mean and the standard deviation. In this analysis it is possible to see that, on the Without Price scenario, it was slightly more difficult to choose when no specific price order was available (M=7,15; SD=2,09), then when price arrangement was increasing from left to right (M=7,23; SD=2,42) or decreasing from right to left (M=7,41; SD=2,32). The same result can be observed on the With Price scenario as it was also slightly more difficult to choose when no specific price order was available (M=7,16; SD=2,24), then when price arrangement was increasing from left to right (M=7,64; SD=2,18) or decreasing from right to left (M=8,32; SD=1,8).

Figure 7 – Descriptive Statistics for Choice Easiness



Source: the author (2017)

Next, it was tested if price arrangement affected consumer choice itself and, to seek this result, multinomial logistic regression was used. MLR is mainly used to explain the relationship between one nominal dependent variable (i.e. price arrangement) and one or more continuous or nominal independent variables (i.e. product choice), and it was used in this case precisely because this experiment had 5 product options (i.e. more than two options). The difference between linear regression and multinomial regression is: the first one assumes normal distribution of the probability of the event, when logit assumes the log distribution.

MLR tests through a reference category, what is the probability of a behavior change because of the independent variable, in the case of this research, through MLR it was tested if price and price position changed consumer' choice from Lux2, which was the reference chosen because it is the cheapest option, to any other four options. For a better understanding of the results of the first study, it is important to highlight that the prices of the product lines increase according to the list: Lux2, Tablet, Liz, Giz and Izy Flat.

Table 5 presents the model fitting and it shows that the final model significantly predicts the dependent variable (product choice) better than the intercept-only model. Later, Table 6 presents the parameters estimate, showing that the variables price arrangement and price changed customers' choice from Lux2 to other products.

Table 5 – Model Fitting- Multinomial Logistic Regression

Model	Model Fitting Criteria		Likelihood Ratio Tests	
	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	106,021			
Final	62,049	43,971	12	0,000

Source: the author – SPSS output (2017)

More specifically when every other variable on the model are constant and no prices were showing, choice changed significantly from Lux 2 to Tablet ($b = 1,089$; $p < 0,05$), Liz ($b = 0,782$; $p < 0,05$) and marginally significantly to Izy Flat ($b = 1,009$; $p = 0,167$); and Increasing Price Arrangement marginally significantly changed choice to Liz ($b = 0,809$; $p = 0,07$) and significantly changed choice to Izy Flat ($b = 17,609$; $p < 0,000$). The results for each MLR conducted can be seen on tables 6 (Tablet products), table 7 (Liz products), table 8 (Giz products) and table 9 (Izy Flat products).

The overall fit of this model tested was a bit small (McFadden $R^2 = 0,09$), but as this research aimed to understand how price and price positioning affected consumer choice, and not all aspects related to choice, it does not represent any damage to the overall results.

Table 6– Multinomial Logistic Regression – Tablet

	b	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
							Lower Bound	Upper Bound
Intercept	-1,655	0,519	10,154	1	0,001			
Increasing Price Arrangement	0,157	0,677	0,054	1	0,816	1,171	0,311	4,409
No Price Order	0,668	0,563	1,407	1	0,236	1,950	0,647	5,879
Decreasing Price Arrangement	0 ^b							
No Price	1,089	0,505	4,659	1	0,031	2,973	1,105	7,993
Price	0 ^b							

a. The reference category is: Lux2

b. This parameter is set to zero because it is redundant.

c. Floating point overflow occurred while computing this statistic. Its value is therefore set to system missing.

Source: the author – SPSS output (2017)

Table 7 – Multinomial Logistic Regression – Liz

	b	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
							Lower Bound	Upper Bound
Intercept	-0,401	0,355	1,277	1	0,258			
Increasing Price Arrangement	0,809	0,454	3,166	1	0,075	2,245	0,921	5,471
No Price Order	0,152	0,440	0,119	1	0,730	1,164	0,491	2,758
Decreasing Price Arrangement	0 ^b							
No Price	0,782	0,371	4,451	1	0,035	2,187	1,057	4,524
Price	0 ^b							

a. The reference category is: Lux2

b. This parameter is set to zero because it is redundant.

c. Floating point overflow occurred while computing this statistic. Its value is therefore set to system missing.

Source: the author SPSS output (2017)

Table 8 – Multinomial Logistic Regression – Giz

	b	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
							Lower Bound	Upper Bound
Intercept	-20,090	4026,284	0,000	1	0,996			
Increasing Price Arrangement	19,607	4026,284	0,000	1	0,996	3,275	0,000	. ^c
No Price Order	18,225	4026,284	0,000	1	0,996	8,223	0,000	. ^c
Decreasing Price Arrangement	0 ^b							
No Price	0,703	0,618	1,294	1	0,255	2,019	0,602	6,776
Price	0 ^b							

a. The reference category is: Lux2

b. This parameter is set to zero because it is redundant.

c. Floating point overflow occurred while computing this statistic. Its value is therefore set to system missing.

Source: the author SPSS output (2017)

Table 9 – Multinomial Logistic Regression – Izy Flat

	b	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
							Lower Bound	Upper Bound
Intercept	-20,666	0,572	1306,545	1	0,000			
Increasing Price Arrangement	17,609	1,118	247,997	1	0,000	4,440	4,961	3,973
No Price Order	19,440	0,000		1		2,771	2,771	2,771
Decreasing Price Arrangement	0 ^b							
No Price	1,009	0,731	1,907	1	0,167	2,743	0,655	11,485
Price	0 ^b							

a. The reference category is: Lux2

b. This parameter is set to zero because it is redundant.

c. Floating point overflow occurred while computing this statistic. Its value is therefore set to system missing.

Source: the author SPSS output (2017)

Another interesting finding of the MLR is shown in table 10 is the difference between observed and predicted frequency of choice. In the predicted column, it is possible to see the mean frequency of choice that the model forecasted, meaning that if prices were available how much would be the average of products chosen by brand for each condition, and in the observed column it is shown what was the actual frequency of choice for each product, namely the average of products chosen by the responses of the experiment for each condition.

For the increasing price arrangement (i.e., products ordered from the less to the most expensive), it is possible to notice that there was a change of choice. More closely observing

these results, it is possible to conclude that Lux 2 and Tablet, which are the two less expensive products, would be less chosen according to the model prediction, but more importantly Liz, Giz and Izy Flat would be more chosen according to the model prediction, and these three last brands are the more expensive brands consecutively.

Table 10 – Observed and Predicted Frequencies

		Frequency			
		Observed	Predicted	Pearson Residual	
With Price	Increasing Price Arrangement	Lux 2	9	8,258	0,308
		Tablet	2	1,847	0,116
		Liz	12	12,413	-0,157
		Giz	5	5,094	-0,046
		Izy Flat	0	0,388	-0,628
	No Price Order	Lux 2	13	12,306	0,252
		Tablet	5	4,585	0,209
		Liz	8	9,591	-0,614
		Giz	2	1,906	0,070
		Izy Flat	4	3,612	0,217
	Decreasing Price Arrangement	Lux 2	12	13,436	-0,576
		Tablet	2	2,567	-0,374
		Liz	11	8,996	0,835
		Giz	0	0	0
		Izy Flat	0	0	0

Source: the author – SPSS output (2017)

Analyzing this table, it is noteworthy that when prices are available, and the products are displayed in an increasing price position, Liz, Giz and Izy Flat have an impact and could be chosen more often. Next, all the finding of the study 1 will be discussed under the light of the theories mentioned above in the Theoretical Framework chapter.

3.2.4 Study 1 Discussion

The results of Study 1 provide support to some of the behaviors that were expected. More specifically, H1, which stated that logical price arrangement (increasing from left to right) would increase choice easiness, was not supported by the experiment.

The mean for logical price distribution, when prices were available, for increasing, no order and decreasing were different – were respectively 7.64 (2.17), 7.16 (2.24) and 8.32 (1.8); and also when prices were not available – were respectively 7.23 (2.42), 7.15 (2.09) and 7.41 (2.32), the results of the ANOVA test were not statistically significant for the explanation of choice easiness by price arrangement $F(1,173) = 0,914$ $p=n.s$ and price $F(1,173) = 1,446$, $p=n.s$,

Therefore, choice easiness did not have any proven relation with price arrangement, as it was expected due to the mental map that was accounted to western societies and established that people are used to read information horizontally and increasing from left to right (DENG et al., 2016; CASASANTO, 2009; 2011; ROMERO; BISWAS, 2016) on the theoretical framework.

These results could have happened due to the small sample size, roughly 30 people per experimental condition collected. Also, another reason for the non-significance of results could be the difficulty itself, as it was accounted on the similarity among products the main problem to choose on of the products.

Later, it was also tested if price arrangement (increasing from left to right) would change consumer choice; this hypothesis was supported by the experiment as the results of the MLR (Multinomial Logistic Regression) pointed that respondents changed their probability of choice due to increasing price position from the cheapest option (Lux2) to more expensive options Liz ($b = 0,809$; $p=0,07$) and Izy Flat ($b = 17,609$; $p<0,000$) as it is possible to see on Table 6 and 7. As the mentioned in the theoretical framework chapter, Cai, Shen and Hui (2012) showed that there is a cognitive association between numerical magnitude and left-right position and, therefore, the location of a product influence consumers' numerical estimate; this statement is proven by the results of the MLR as consumer choice in the experiment changed according to the numerical location of the products (i.e., products placed according to their numerical increase).

Thus, even though logical price arrangement didn't make choice easier for consumers, it changed the final decision to a more interesting one for the company (i.e., a more expensive product). Therefore, it is possible to affirm that logical price arrangement did alter consumer action, and so it is still possible that this disposition made choice more fluid for the respondent, as theory from psychology and marketing researches had pointed, consumers read information better in an horizontal and increasing way (VALENZUELA; RAGHUBIR; MITAKAKIS, 2013; VALENZUELA; RAGHUBIR, 2015; DENG et al., 2016; ROMERO; BISWAS, 2016).

3.3 STUDY 2: The Effects of Price Exhibition and Sales on a Field Experiment³

After conducting the online experiment in MTurk, a field experiment was managed in a real Hardware Store at Downtown Porto Alegre. In this field experiment, hypothesis 2 was tested and it aimed to understand the relationship between price arrangement and overall sales. The Hardware Store where the field study was conducted was indicated by Tramontina Eletrik, as the result of a long-term B2B relationship between them. This particularly retail store works with three of Tramontina's light switches and outlet covers product lines: Liz, Lux2 and Liz Flex (this last line was not studied in study 1).

Therefore study 2 had one main goal: to test hypothesis 2 which states that a logical price distribution would increase overall sales volume. Three different manipulations were conducted: first, no price order was established, next logical price order (increasing from left to right) was tested and, last, decreasing price order (decreasing from left to right). It is important to affirm that the manipulations were made among the products within the lines, so the products were rearranged by price in each line, but the lines space was not altered during the experiment.

3.3.1 Manipulation

The Hardware store where the experiment happened is a small size business based downtown Porto Alegre; its opening hour is from 8am to 6pm, from Monday to Friday, and from 8am to 4pm on Saturdays. The store has 9 employees, including salesman, back office and administration. The shelves, where the products were available, are located near the entrance since September 2016, and this position was not moved on the experiment.

As mentioned above, the manipulation was only regarding the price arrangement and three different scenarios were tested: 1) no price arrangement established – in this case, no particular order was tested (the habitual type of organization). 2) Logical price arrangement –

³ Data for Study 2 was collected with the collaboration of the graduate students from UFRGS Cassiane Carvalho and Giovanna Deparis

all products were positioned with price increasing from left to right. 3) Illogical price arrangement – so all the products were organized with prices decreasing from left to right. It is important to highlight that the height of the products on the shelf was not changed; they were only reorganized by price as the main attribute for relocation. Just below, table 11 that presents the calendar of manipulations. Later on, in figures 8, 9 and 10 it is possible to see exactly how the shelves were distributed by brands on the store and how products were displayed in these shelves

Table 11 – Field Experiment Scenarios Distribution

Scenario	Day of start
No price order	April 8th
Increasing order	May 8th
Decreasing order	June 07th

Source: the author (2017)

Figure 8 – Photograph of Lux2 Shelf



Source: the author (2017)

Figure 9 – Photograph of Liz shelf



Source: the author (2017)

To ensure that there was less differentiation between the manipulations as possible, what can be very common in a field experiment, some special care was taken: during the two months of manipulation, every day that the store was open, a student responsible for this experiment went there to verify if the quantity of products remained the same, if the prices and products were in the correct order and if there was any product at risk of being out of stock soon. If anything different happened during their visit, this was reported to the researcher in charge, but fortunately this special care this special care helped no problem with the study to happen.

In this particular Hardware store the consumers themselves can access all products, just like any other retail store, where the consumers can freely look and compare products.

Figure 10 – Photograph of Liz Flex shelf



Source: the author (2017)

3.3.2 Measures

Dependent Measures: sales volume was measured with the total number of products sold per week, this number was collected using the sales control system owned by the company. This system collected daily sales for the three brands by products, it was accessed two Saturdays per month and sales for each product was copied into an excel template. When all data was collected, the excel template was transformed into another file, with the sales volume by day – not by product anymore – for each brand.

It is important to mention that before the experimental data was collected, data from all sales months (since September 2016, which is the date that the shelves were at the same place) were collected to search for seasonality of sales.

Covariate Measures: as covariates rainy days were counted using the city hall counting data. Later, holidays and weekends were counted as dummy variables.

For the field experiment, no manipulation check or attention check was used.

3.3.3 Results

Data collection resulted in a homogeneous distribution of manipulations, which had 28 days for increasing (left to right) price arrangement, 23 days for habitual type of price arrangement and 25 days for decreasing (right to left) price arrangement. No order and decreasing price arrangement had 5 Saturdays, while increasing price arrangement had only 4 Saturdays, leaving 18, 20 and 24 work days for each manipulation, respectively.

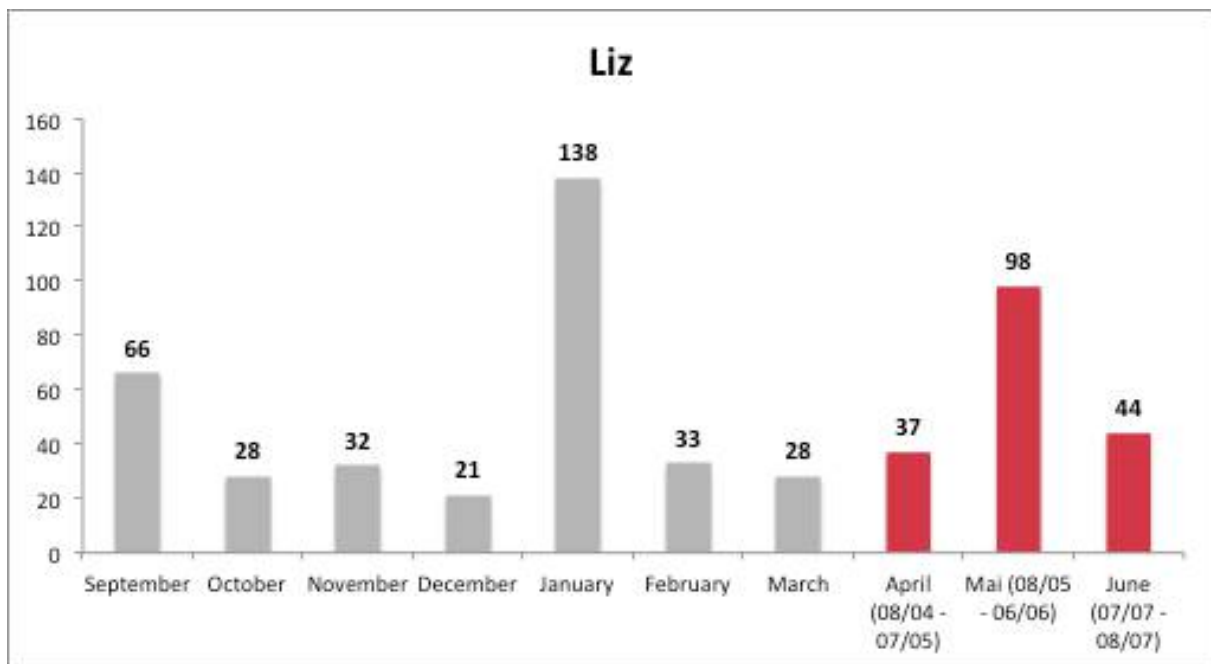
Front line employees suggested that raining days could affect sales, as their experience showed that rainy days diminish the number of clients and sales. Therefore, this variable was accounted to see if it would alter later results. During data collection, Porto Alegre had only 22 days of rain, equally distributed among the three scenarios, roughly 7 days of rain per manipulation; which did not present any harm to the results. The two months of data collection (May and June) had five weeks, however, the weeks of the month that the purchases occurred did not present any effect to the results, just like rainy days.

As in study 1, outliers were searched using boxplots; although some outliers were found in overall sales they were not significantly expressive for any changes in the sample, as the literature states that their sum must consist in 5% of the sample (HAIR et al, 2013). The only treatment that the data collection received was withdrawing Sundays and holydays, as the store was not opened in these days and therefore did not have any sales record for this particular days.

Since the study had one independent variable (price arrangement) and one dependent variable (sales volume), a one-way ANOVA was used to access the relation between these variables. Therefore three different ANOVA tests were made, one for each product (Liz, Lux2 and Liz Flex).

Figure 11 presents the overall sales for Liz products and later table 12 presents the results of the ANOVA for Liz branded products, which was the only predictive model with significant results.

Figure 11 – Overall Sales Liz



Source: the author (2017)

Table 12 – One-Way ANOVA – Liz branded products sales

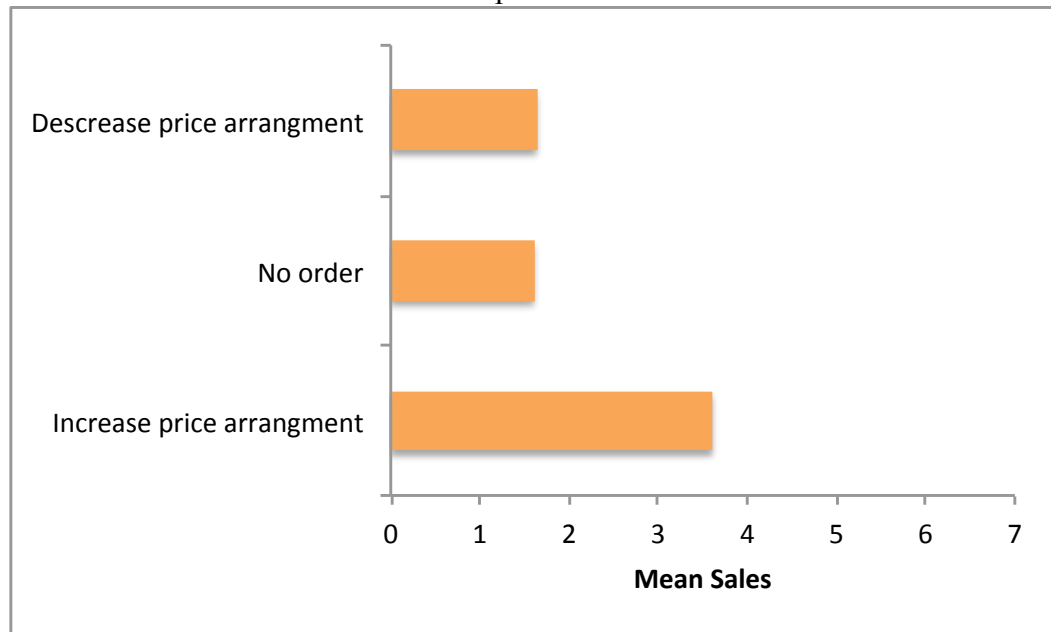
	Sum of Squares	Df	Mean Squares	F Value	p	95% Confidence Interval of Difference	
						Lower	Upper
Residuals	1.082,2	72	14,280			0,618	77,797
Price Arrangement	53	1	52,99	3,711	0,058	0,122	0,995
Days of the Week	2,7	1	2,74	0,192	n.s	0,260	2,436
Week	3,5	1	3,52	0,246	n.s	0,580	2,471

Source: the author – R Output (2017)

As mentioned above, an univariate analysis of variance (ANOVA) was carried out in order to check if price position also affected Liz Flex sales and Lux2 sales. The results indicate that the specific day of the week that the sale happened ($F(1,72)=0,192$; $p=n.s$) and the week in the month ($F(1,72)=0,246$; $p=n.s$) had no significant relation with overall sales for Liz products. However, the manipulation of the experiment, price arrangement, marginally significantly had an impact on sales volume ($F(1,72)=3,711$; $p=0,058$) and sales mean (i.e., overall sales mean sold in each manipulation time) was bigger for Increasing Price Arrangement ($M = 3,61$) than for No Price Order ($M = 1,61$) or Decreasing Price Arrangement ($M = 1,64$), as figure 8 shows bellow.

Figure 12 bellow shows the difference of means of overall sales per condition (for Liz products only). Sales mean in increasing price position (M=3,60) was bigger than the mean for decreasing price position (M=1,64) and no order price position (M=1,60). Therefore, increasing price position affected positively overall sales for Liz products, as it was expected by hypothesis 1 and the literature review.

Figure 12 – Mean differences between manipulations



Source: the author – R Output (2017)

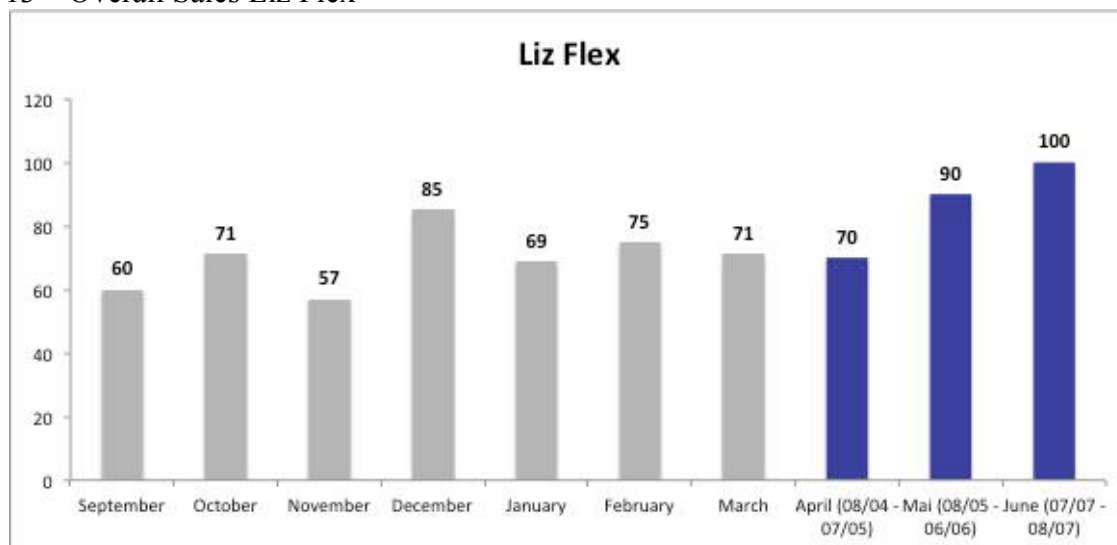
Continuing with outcomes from the research, findings bellow in table 13 demonstrate that price arrangement did not have an effect on sales for Liz Flex products ($F(1,72) = 0,306$; $p=n.s$), nor did the week of the month ($F(1,72) = 1,123$; $p=n.s$); but it was found a marginally significant result for the day of the week ($F(1,71)=3,704$; $p=0,1$), meaning that the day of the week which the sale happened (Saturday or week days) affected sales for Liz Flex products. Later, figure 13 presents the overall sales for Liz Flex products.

Table 13 – One-Way ANOVA – Liz Flex branded products sales

	Sum of Squares	Df	Mean Squares	F Value	p	95% Confidence Interval of Difference	
						Lower	Upper
Residuals	919,3	72	12,770			5,704	551,973
Price Arrangement	3,9	1	3,91	0,306	n.s	0,323	2,349
Holydays	39,3	1	39,25	3,704	0,1	0,849	7,046
Week	14,5	1	14,46	1,132	n.s	0,350	1,376

Source: the author – R Output (2017)

Figure 13 – Overall Sales Liz Flex



Source: the author (2017)

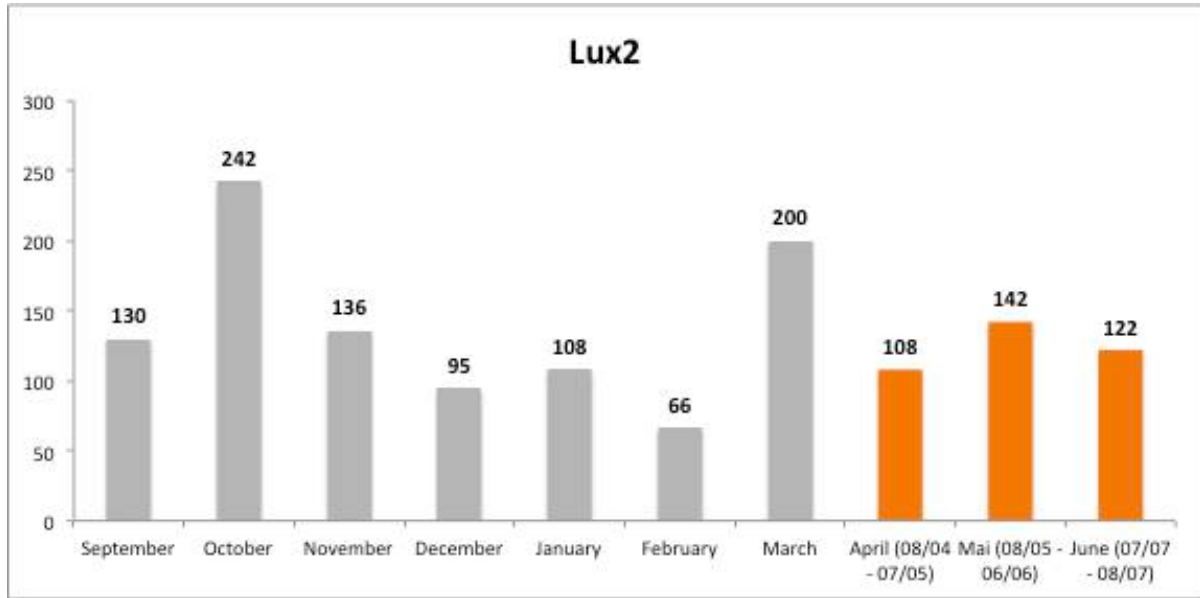
Finally, table 14 shows the results for the ANOVA test performed on Lux2 products, where it is possible to see that price arrangement did not have an effect on sales ($F(1,72) = 0,309$; $p=n.s$), nor did the day of the week ($F(1,72) = 1,379$; $p=n.s$) or the week of the month ($F(1,72) = 0,24$; $p=n.s$). Figure 14 presents the overall sales for Lux2 products, where it is possible to notice that sales did increase when logical price arrangement manipulation happened (May 08/05 – 07/06), having a similar behavior to Liz products. However due to the lack of significant statistic results no affirmation can be presented about the relation between the increase of sales and the manipulation.

Table 14 – One-Way ANOVA – Lux2 branded products sales

	Sum of Squares	Df	Mean Squares	F Value	p	95% Confidence Interval of Difference	
						Lower	Upper
Residuals	2.395,0	72	33,260			3,900	6.255,05
Price Arrangement	10,3	1	10,28	0,309	n.s	0,146	3,592
Holydays	45,9	1	45,87	1,379	n.s	0,482	14,674
Week	8	1	8	0,24	n.s	0,252	2,301

Source: the author – R Output (2017)

Figure 14 – Overall Sales Lux2



Source: the author (2017)

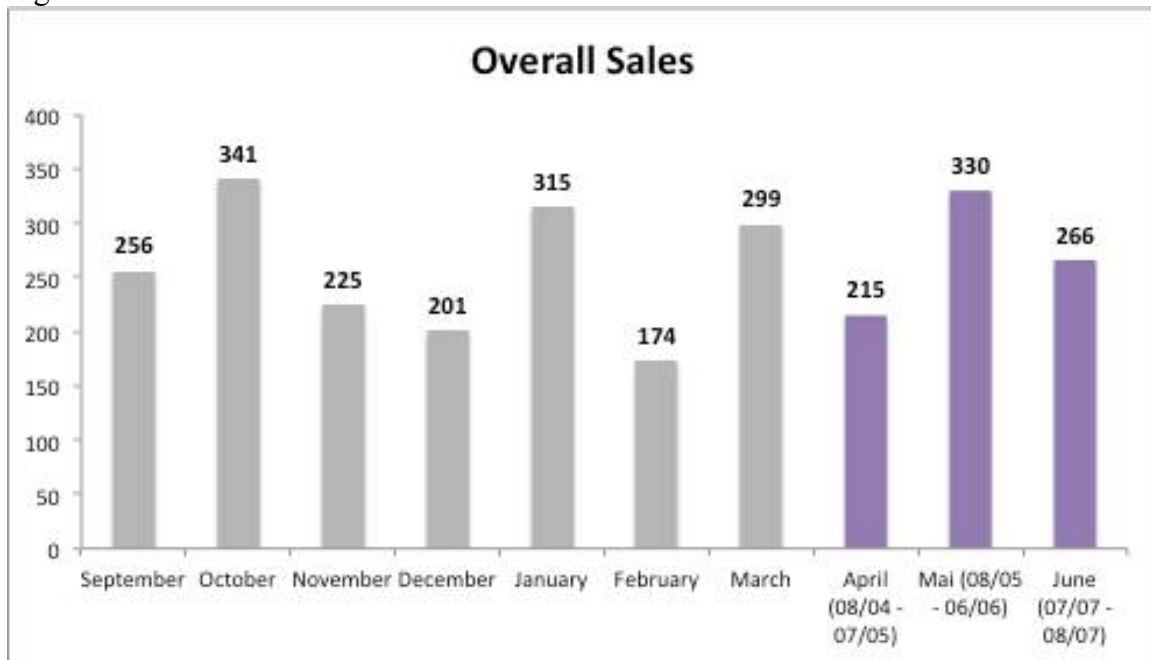
One more one-way ANOVA test was conducted to understand if there would be any significant result between the overall sales (i.e. sales from the three brands together) and the other variables (Price arrangement, holydays and week). But unfortunately no significant result was found between price arrangement and sales ($F(1,72)=1,972$; $p=n.s$), the day of the week and sales ($F(1,72)=1,645$; $p=n.s$) or the week of the month ($F(1,72)=0,287$; $p=n.s$), as table 15 presents. Just bellow table 15, figure 15 presents the overall sales chart, where it is possible to see that sales did increase in the increasing price arrangement, however with no significant results no relation between sales and manipulation can be concluded.

Table 15 – One-Way ANOVA – overall products sales

	Sum of Squares	Df	Mean Squares	F Value	p	95% Confidence Interval of Difference	
						Lower	Upper
Residual	5671	72	78,77			207,736	1776,95
Price Arrangement	155	1	155,33	1,972	0,165	0,019	2,583
Holydays	130	1	129,57	1,645	0,204	0,374	7,168
Week	23	1	22,62	0,287	0,594	0,116	3,469

Source: the author – R output (2017)

Figure 15 – Overall Sales



Source: the author (2017)

Next, a discussion connecting this second study results and theories addressed before will be presented.

3.3.4 Study 2 Discussion

As references previously suggested, positioning products in the way consumers expect may facilitate their choice and, therefore, increase sales (VALENZUELA; RAGHUBIR; MITAKAKIS, 2013; VALENZUELA; RAGHUBIR, 2015; ROMERO; BISWAS, 2016), also prior studies demonstrated that usually consumers connect the products placed on the left with sale products, or at least cheaper than the ones placed on the right (VALENZUELA; RAGHUBIR, 2015) and finally that consumers read any type of information more easily displayed horizontally (DENG et al., 2016).

Therefore Hypothesis 2 stated that placing products on the shelf from the cheapest products to the most expensive one – therefore in an increasing price position – would be more logical to consumers and, as a result, increases overall product sales. As the results from the second study demonstrated, this hypothesis is partially supported; as for only one of the three brands studied, Liz, organizing the shelf with an increasing price display affected

positively sales ($F(1,72)=3,711; p=0,058$). The One-way ANOVA test concluded that there was a significant change of mean due to the manipulation of price arrangement in this experiment, later it was accounted that overall sales mean (i.e., overall sales mean of products sold in each manipulation) was bigger for this brand in the Increasing Price Arrangement manipulation ($M = 3,61$) than in the No Price Order manipulation ($M = 1,61$) or Decreasing Price Arrangement manipulation ($M = 1,64$). However, for the other three ANOVA tests conducted, for Lux2 products, Liz Flex products and overall sales (i.e. sales from all three brands together) no significant results regarding the price arrangement manipulations was found, and that is why this study only partially supported H2.

Moreover, when Figure 14 is more carefully analyzed, it is possible to notice that only one month of the last ten months (January) had larger total sales (138) than the month in which the manipulation, of the increasing price (May), happened (98). It is interesting to notice that in fact there was an increase in sales in the month of increasing price manipulation (May) on Lux2 brand products, when compared to the other two months that were taken into account for this experiment, however statistically this difference could not be proven. Still, the sales increase of Liz products was a positive gain for the store, since the products of this particular brand are more expensive than the other two brands.

Nonetheless, this experiment cannot explain why this difference of results happened among the three brands sold, because they all present similar product characteristics and belong to the same product category, therefore it was expected that they would present akin results.

As study 1 in this research proved, and prior psychology and marketing researches had pointed (VALENZUELA; RAGHUBIR; MITAKAKIS, 2013; VALENZUELA; RAGHUBIR, 2015; DENG et al., 2016; ROMERO; BISWAS, 2016), organizing products in a fluid way altered consumer choice. Therefore, it is safe to say that in extension of study 1 results, study 2 demonstrated in a field experiment that this phenomenon is somewhat concrete and could be extended to a real-life situation, as it positively affected sales for one of the brands in the shelves.

4. GENERAL DISCUSSION AND CONCLUSION

This research aimed to better understand the relation between consumer choice and product placement, considering price arrangement as the main component to make shelf-positioning decisions. With the purpose to fill gaps in marketing literature regarding shelf positioning and price, the main goal of this research was to examine the effects and outcomes of organizing shelves according to price arrangement (i.e. consumer choice, choice easiness and sales).

After a careful study of the main literature regarding Consumer Choice, Choice Architecture, Assortment Perception Shelf Positioning and Price Positioning, hypothesis about the relationship between the two variables were built.

Hypothesis 1 stated that displaying products in a logical price order, therefore increasing from left to right, would enhance choice easiness. This first hypothesis was tested in Study 1, which was an online experiment especially design to test H1 and, as a result, this hypothesis could not be confirmed. Nonetheless, study 1 proved that price arrangement could change consumer final choice, even if this effect did not happen through easiness of choice. A multinomial regression was conducted to understand the probabilities of changing consumer choice by the manipulations, and confirmed that logical price arrangement (increasing from left to right) altered the probability of product choice for consumers, from Lux2 product (the cheapest one) to Liz ($b = 0,809$; $p=0,07$) and Izy Flat ($b = 17,609$; $p<0,000$) products (both more expensive than Lux2). As mentioned before, ANOVA test could not confirm if choice easiness is affected by price arrangement, leaving one possible explanation for this phenomenon not confirmed and many other optional explanations open.

Choice easiness was not affected by logical price positioning (i.e. increasing prices from left to right), as expected by theory inspection, however another variable must have been affected, because choice in the end did change according to price arrangement. Maybe another test should be done later to test other possible clarification, possibly as Thaler and Sustein (2008) suggested that choice could be affected by the degree of differentiation, benefits perceived, frequency of shopping and familiarity (THALER and SUSTEIN, 2008).

Later, another study was made to test hypothesis 2, which affirmed that a logical price arrangement (increasing price from left to right) would increase overall sales units. This second hypothesis was tested then in study 2, which was a field experiment, conducted in a Hardware Store downtown Porto Alegre. This experiment lasted three months and three

different price arrangements were tested: logical price arrangement (increasing from left to right), illogical price arrangement (decreasing from left to right) and no specific price arrangement (where price was not taken into consideration for the arrangement of products). As a result, study 2 partially confirmed hypothesis 2, as the logical price arrangement did enhance overall sales for one of the brands, Liz products ($F(1,72)=3,711$; $p=0,058$), in the Hardware Store.

By the conclusion of this research it is safe to say that there is still space for further investigation for the relation among price arrangement, choice and sales, since this research showed that consumer choice could be altered and sales increased by this specific heuristic, but it is certain that there are other phenomena to be studied related to this simplifying heuristic.

This research has academic contributions, as no research has examined the effect of price arrangement on consumer choice, choice easiness and overall sales. This findings are an extension of the casual relationship between location and number, previously studied but not entirely unveiled by other researchers (CAI; SHEN and HUI, 2012; VELNZUELA; RAGUBIR, 2015), mainly because their studied did not accounted real prices and therefore could only explain a consumers' perception and not their reaction to price arrangement. Moreover, this study contributes theoretically to marketing area by showing results from a field experiment, as previous studies on shelf positioning (VALENZUELA; RAGHUBIR; MITAKAKIS, 2013; VALENZUELA; RAGHUBIR, 2015; ROMERO; BISWAS, 2016) mainly used online data.

These research findings also have managerial contributions, by showing that price positioning, and more specifically logical price positioning (i.e. increasing from left to right), have a positive effect for managers, retailers and storeowners. Also proving with two different experiments and two different sources of information (i.e. online and field consumers) that the right shelf position and price have an effect over consumers, and they should both be accounted before placing any product on the shelves.

Nonetheless, it should be noted that other explanatory mechanisms must be involved with the results found here in this research. The product positioning strategy tested here were not related to the ease of choice, but to the final choice and number of items sold, still probably there is another explanation for the effect caused by the arrangement of products by price, such as satisfaction, uncertainty, perceived variety or perceived similarity

5. LIMITATIONS

Even though this dissertation contributes to marketing academy, it presents some limitations. Namely the limitations of this study are connected to the difficulties of conducting a field study, even though many different measures were taken to assure that no aspects would influence the scenarios, it is far more difficult to do that in a field study if compared to an online one.

During the field study, specific care was taken to assure that each day of manipulation would be exactly as every other day (i.e. the same number of products would be available, no missing products would happen and no change or alteration in the manipulation would happen), as the biggest problem of a field experiment is its internal validity. Another limitation related to study 2 (field experiment) was the difficulty of collecting data that could modify the relationship studied, such as demographic information of the participants, information about the process of choice (i.e. satisfaction with the purchase, difficulty to choose, knowledge) and other psychological influences that may affect choice (i.e. fast thinking).

Experimental scenarios were also limited to Hardware Store products and therefore we suggest that this research should be extended to other contexts and products types, as products that require greater involvement during consumption or are seasonally consumed (i.e. beach chairs). Also, longitudinal studies could reveal other aspects connected to price arrangement; the two studies here presented unveiled the initial relation between price arrangement and choice, a longitudinal study could discover other aspects related with this phenomenon.

Another limitation of this study was not collecting data referring to variables such as satisfaction, frustration, uncertainty, perceived variety and perceived similarity. It is still possible that one of these variables influence choice, directly or indirectly, when the products are organized in an increasing order of prices. Future studies could be developed to investigate whether these relationships exists.

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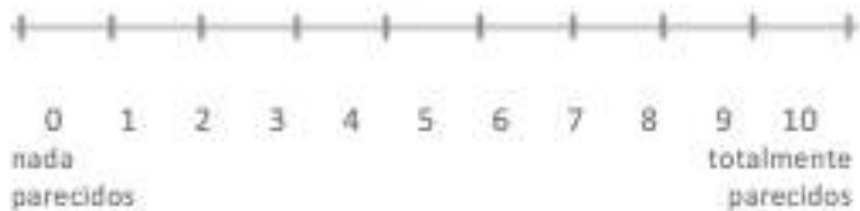
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APENDIX A – Study 1: Pre Test Questionnaire

Combinação

O quão parecidos são os produtos abaixo?

Código Par	Par	Escala
2	Giz X Liz	()
4	Giz x Tablet	()
7	<u>Izy</u> Flat x Tablet	()
8	Liz x Lux2	()
9	Liz x Tablet	()
5	<u>Izy</u> Flat x Liz	()
3	Giz x Lux2	()
10	Lux2 x Tablet	()
1	Giz X <u>Izy</u> Flat	()
6	<u>Izy</u> Flat x Lux2	()



Gênero: () feminino () masculino

Idade:

Data:

Local:

APENDIX B – Study 1 Survey

Intro

Dear participant,

This is a research about consumer behavior. You will be asked to answer a questionnaire, taking approximately 5 minutes.

This questionnaire must be answered in a computer. Please note that answering this questionnaire using cellular devices is not allowed and will invalidate your answers.

After answering the questionnaire, you will receive a security code at the end. This code must be copied and pasted at the Mechanical Turk activity page.

There is neither financial loss nor risk involved in participating in this research. Your participation is voluntary, which means that you are free to participate or not, as well as give up at any time. Your response is anonymous, and will be used for academic purposes. If you have any questions, suggestions or comments about the survey, please contact research.ufrgs@gmail.com. Your participation is very important.

Informed Consent Form:

I declare that I am 18 or over 18 and agree to participate in this research. I declare that I was informed that my participation in this study is voluntary and that I can leave this survey at any time without penalty, and all data is confidential. I understand that this study does not offer any risks.

I have read and understood the above consent form and desire of my own free will to participate in this study

Yes



No



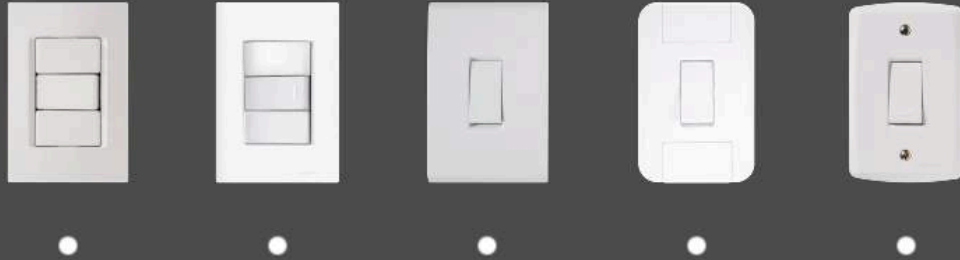
This is a study about your buying habits of electrical equipment, light switches and outlet covers. Please read the instructions on the following pages and answer the questions accordingly.

Imagine that you are looking for a new light switch for your home. You go into the nearest electrical supply store in search of the aisle for light switches and outlet covers. Then, you come across options as shown in the next page.

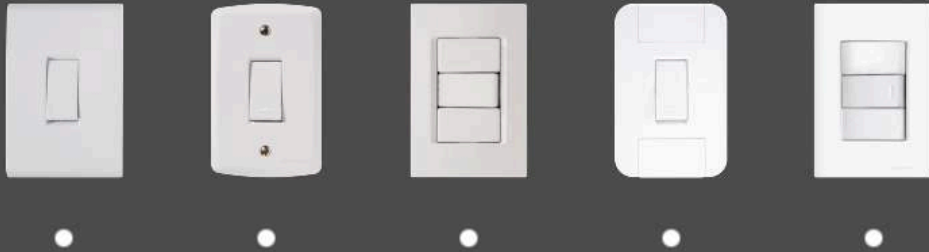
Please, pay attention to the images below. If you had to choose one of these light switches to your home, which one would you choose?



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Please, pay attention to the images below. If you had to choose one of these light switches to your home, which one would you choose?



\$7,90



\$5,29



\$10,90



\$6,19



\$8,90



Please, pay attention to the images below. If you had to choose one of these light switches to your home, which one would you choose?



\$5,29



\$6,19



\$7,90



\$8,90



\$10,90



How easy was it to choose your option?

Not easy at all Very easy

0 1 2 3 4 5 6 7 8 9 10

Did you notice any price order in the way the options were presented?

- Prices decreased from left to right
- There was no particular order
- Prices increased from left to right

Compared to average people how much do you know about light switches and outlet covers?

Not at all Very Much

0 1 2 3 4 5 6 7 8 9 10

How old are you?

What is your gender?

Female



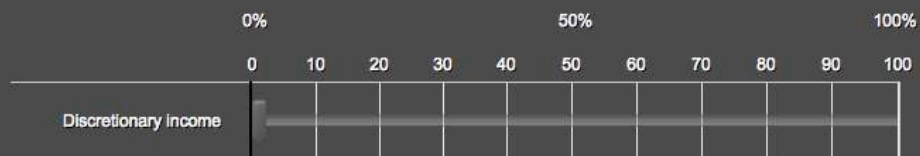
Male



What is your total annual household income?

Discretionary income is a portion of the total income available for saving, or spending on non-essentials. It is what remains after expenses for basics (such as food, clothing, shelter, utilities) and prior commitments (such as school fess and loans) are deducted.

The bar below is a percentage scale. Please, indicate approximately how much of your total annual household income can be considered discretionary, by placing the slider at the corresponding percentage.



Please answer the questions below. After you press the continue button, you will have access to a security code, which must be copied and pasted into the Mechanical Turk page.

Did you encounter any difficulties in the activity or you have any doubts or suggestions? If yes, please list them.

What do you think is the objective of this survey?

Thank you for taking part in this survey.

Your validation code for Mechanical Turk is $\${e://Field/mTurkCode}$

This code must be copied and pasted at the Mechanical Turk activity page.

Please, press on the continue button one more time.