Drivers of customer satisfaction in the grocery retail industry: A longitudinal analysis across store formats

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ABSTRACT

The design of satisfactory shopping experiences remains one of the main challenges for building long-term profitability in modern retailing. Therefore, companies are interested in identifying the key drivers of the service execution that shape customer shopping satisfaction. In this study, we developed a standardized questionnaire for evaluating the shopping experience, and conducted a large study in several grocery stores across different formats during a time span of five years. The resulting rich dataset enabled us to uncover interesting patterns using both individual and store-level analyses. Our results indicate that larger store formats are associated with greater satisfaction levels. When looking at the marginal effects of the various elements of customer service, we found that some specific elements of service execution present significant differences across store formats. In addition, we identified loss aversion on shopping experience, since poor performance impacts more on customer satisfaction than superior performance. Finally, our store-level analysis sheds light on how changes in the service performance determine changes in the shopping experience in the same store. These implied results may guide store and chain managers to evaluate the role of the store execution elements better, and to design the customer shopping experience successfully.

1. Introduction

Retail competition has intensified in the last few decades and grocery retail chains now constitute a significant percentage of the market (Traill, 2006). Indeed, modern retail accounts for as much as 70–90% of all grocery sales in developed countries (Euromonitor, 2015). Furthermore, the competitive landscape is becoming more complex with a variety of store formats, such as supercenters, dollar stores, and convenience stores attracting customer demand (Volpe et al., 2017). In addition, the rise of new digital platforms is starting to draw customers away from traditional stores (Pookulangara et al., 2011). In this context, the design of satisfactory shopping experiences is one of the main challenges to strengthening customer retention and sustaining long-term profitability in modern retailing (Terblanche, 2018). However, the

appearance of new and more complex customer dynamics has created additional challenges to delivering excellence in customer service. For example, manufacturers have enlarged customer assortments, thereby increasing operational costs, and making consumer choices more difficult (Gourville and Soman, 2005). Similarly, the availability of more and better product information, as well as customer reviews, creates higher expectations that are sometimes difficult to fulfill (Floyd et al., 2014). Thus, the importance that customers put on the different elements of service execution[1] is a primary input to a firm's resource allocation strategy (Gustafsson and Johnson, 2004).

One of the most important transformations that modern retail has undergone in the past few decades is the diversification of store formats (Gonzalez-Benito, 2005; Grewal and Levy, 2007; Kamran-Disfani et al., 2017). Traditional supermarkets are still a very common store format,

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[1] In this research we investigate how different elements of the service execution correlate with an overall evaluation of customer satisfaction. In the customer satisfaction literature, service execution is typically summarized as service quality. Given that we focus on the managerial implications of the service elements, we prefer the use of service execution although both terms are used interchangeably in this paper. Similarly, we use the terms customer satisfaction and customer shopping experience interchangeably in this paper.

but now they compete with the larger assortments in hypermarkets (also known as supercenters), and the speedy service of convenience stores. While these alternative store formats share common aspects in their value proposition, they have differentiated strategies for attracting customers. For example, taking advantage of their massive sales volume, hypermarkets compete on price, and offer a wide variety of categories. On the other hand, convenience stores that typically offer a merchandise mix of frequently consumed items can leverage their simplified layouts to offer a faster shopping experience.

As is pointed out by Esbjerg et al. (2012), customers pursue different goals depending on their motives for embarking on a particular shopping trip. Moreover, as (Kahn and Schmittlein, 1989), and Walters and Jamil (2003) concluded, grocery-shopping behavior may be different depending on whether consumers are on a major trip to the store, or just on a fill-in trip. We therefore expect that shopping motivation and behavior make customers assign different weights to the multiple components of the shopping experience depending on the store format. For example, inconsistent price offerings could be more harmful for a customer visiting a hypermarket compared to a customer visiting a traditional supermarket. Similarly, longer lines at the checkout could have a greater effect on the shopping experience for convenience stores compared to the shopping experience at stores with other grocery formats. However, in spite of the large body of research on customer satisfaction, current research in marketing provides little guidance to retail managers about developing and sustaining shopper satisfaction across different store formats (Kamran-Disfani et al., 2017).

Since customers might visit more than one store format over time, to identify the critical service execution elements properly, by store format, and eliminate possible memory biases, the measurement has to be conducted soon after the shopping experience. However, most customer satisfaction studies present results using mailed surveys based on past experience (Gómez et al., 2004; Huddleston et al., 2009), telephone interviews (Bolton and Drew, 1991; Dabholkar et al., 2000), or online surveys (Parasuraman et al., 2005; Terblanche, 2018). There are only a few studies in which surveys are conducted in person and close to the shopping experience as is done in our evaluation (Bernhardt et al., 2000; Orel and Kara, 2014; Vasquez et al., 2001). More importantly, previous research investigating customer satisfaction does not specifically consider the various grocery store formats.

Consequently, the primary objective of this research is to identify and compare the key service execution drivers of customer satisfaction for each store format. We use the conceptual framework of Esbjerg et al. (2012) for analyzing customer shopping experiences in grocery retailing to guide the investigation. Due to the increasing relevance of inter-store-format competition (Reutterer and Teller, 2009), and the identified research gaps, our work aims to identify the role of purchase motivations operationalized by shopping at different store formats as a moderating variable on customer satisfaction in a grocery retailing setting. To perform the comparison across formats, we took advantage of a large and novel dataset in which diverse store formats were measured repeatedly using the same instrument.

In the customer satisfaction literature, most previous studies have assumed that the relationship between customer satisfaction and customers' responses to service execution can be characterized using a linear function. However, some studies suggest that a non-linear response function that incorporates loss aversion (Tversky and Kahneman, 1991) may represent the effects of customer-perceived service quality more accurately (e.g., Suzuki et al., 2001). The loss aversion concept suggests that the effect of service execution is asymmetric with respect to a reference point (i.e., a customer's expectation), such that a customer's response to service execution would be steeper in the loss region (below a customer's expectation) than in the gain region (Suzuki et al., 2001). In addition to putting more weight on some attributes, depending on the store format, we expect that shopping motivations also induce different degrees of loss aversion for different store formats. Accordingly, in this paper we investigate whether the magnitude in which positive and negative evaluations affect customer satisfaction varies by store format. Then, through this study, we uncovered the drivers of customer satisfaction in the grocery retail industry, and addressed three main research questions: How much do customer satisfaction levels depend on the store format? What is the relative importance of each service execution element in each format? Does loss aversion depend on the store format?

To address these questions in the context of grocery retailing, we use data obtained from a large study conducted in several grocery stores across different formats in a time span of five years. The availability of multiple evaluations for each store in the dataset allows us to control for unobserved store heterogeneity. Moreover, as we observe individual-level characteristics, we can also control by demographics and other contextual effects, such as the size of the basket, and whether or not the customer was accompanied. In general, our results indicate that store formats play an important role in terms of satisfaction levels, the relative importance of the execution of various service components, and how customers incorporate their negative evaluations in their overall satisfaction.

The rest of this article is organized as follows: The related literature is described in Section 2. The study design, the instrument, and some initial descriptive analysis of the collected data are presented in Section 3. Our modeling approach and the formalization of our analyses are presented in Section 4. The conclusions of our study are given in Section 5.

2. Literature review

Customer satisfaction is one of the key metrics that retailers use to monitor the performance of the company, and diverse studies have demonstrated that overall satisfaction correlates well with a firm's profitability (Bernhardt et al., 2000; Gomez et al., 2004). Fundamentally, customer satisfaction is an aggregated construct that summarizes the customers' perceptions regarding diverse elements of their relationship with the company (Gustafson and Johnson, 2004). Customer satisfaction has typically been studied from either a transactional or a cumulative perspective. In a transactional perspective, customer satisfaction considers the customer evaluation of a particular service encounter, whereas in a cumulative perspective the customer satisfaction is comprised of all the experiences of a customer during past visits to a particular supermarket (Johnston, 1995). While previous research has demonstrated empirically that the cumulative perspective is a superior predictor of loyalty (Nam et al., 2011; Loureiro et al., 2014), the transactional perspective may be better at assessing the importance of particular elements of the shopping experience (Johnston, 1995). Unlike previous research in grocery retailing that uses the cumulative perspective (e.g., Gustafson and Johnson, 2004; Loureiro et al., 2014; Hunneman et al., 2015), we use a transactional perspective to address the research goals.

Our work rests on three research streams. First, we build on the literature of customer satisfaction, and, in particular, on how consumers evaluate their in-store shopping experience based on the relative importance they assign to different attributes of the service execution. Second, we consider the literature on shopping motivations to explore how customer satisfaction may vary across store formats. And thirdly, we consider how shopping motivation may moderate the existence of loss aversion across store formats.

2.1. In-store shopping experience

Customer shopping experience can be conceptualized in three phases: pre-sales, in-store interaction, and after-sales (Birtwistle et al., 2005; Terblanche, 2018). During the pre-sales phase the customer develops expectations about the service encounter. The second phase is the sale itself, the customer's experience in the store in terms of both the products and services. In the third phase, post-sale, the customer appraises services after the shopping trip, such as support, replacement, refund, repair, and reactions to complaints. In our research, we interview a customer just after completing a shopping trip, and, therefore, the present study focuses on the second phase.

In the grocery retail industry, the customer relationship relies heavily on the in-store shopping experience. During a shopping trip, customers interact with diverse elements of the service that affect the overall performance. Consequently, various studies have investigated the relationship between the quality of the execution of these elements and the overall performance, summarized as customer satisfaction (see Terblanche (2018) for a recent study). Following previous research (Sirohi et al., 1998; Gómez et al., 2004; Gustafsson and Johnson, 2004; Hunneman et al., 2015), our conceptual framework assumes that the evaluations of store attributes drive a consumer's overall satisfaction. Despite the widespread acceptance of this conceptual relationship, most studies consider only an indirect link between recent experiences with the service execution and their resulting overall customer satisfaction. Since they evaluate the perception considering the cumulative shopping experience that occurred in the past, this relationship can be attenuated or contaminated with other elements including memory bias.

The literature on in-store experience has identified a number of different store values as being potentially significant for the consumer's evaluation of stores, such as merchandise assortment, merchandise quality, service in general, personnel, store lay-out, convenience, cleanliness, and atmosphere (Mazursky and Jacoby, 1986; Baker et al., 1994; Bucklin et al., 1996; Finn and Louviere, 1996). In the case of grocery retailing, Vasquez et al. (2001) identified four underlying factors that contribute to customer satisfaction: physical aspects, reliability, personal interaction, and policies. Similarly, Terblanche (2018) established six factors that constitute the in-store customer shopping experience construct: merchandise value, internal shop environment, interaction with staff, merchandise variety, presence of and interactions with other customers, and customer in-shop emotions. We consider these constructs to develop our instrument to measure in-store customer experience. (See Section 3).

2.2. Shopping motivation and store formats

In addition to the elements that the retailer can control (e.g., service and products), there are also elements that are outside retailer control (e.g., purpose of shopping), (Verhoef et al., 2009). Although most previous research has considered some of these elements to inform customer satisfaction (Mittal et al., 1999; Van Kenhove et al., 1999; Slotegraaf and Inman, 2004; Hunneman et al., 2015), we focus on investigating the influence of shopping motivations on the perception of the service elements. In particular, we assume that purchase motivations determine store choice (Solgaard and Hansen, 2003), and investigate how these motivations may moderate the relationship between in-store service execution and customer satisfaction.

Some authors propose situational shopping purposes to distinguish different shopping trip types (Walters, 1994; Walters and Hanrahan, 2000; Walters and Jamil, 2003; Bell et al., 2011). Thus, when shopping for groceries, customers could be buying products for immediate or same-day consumption, might be either filling in daily essentials, or on a major shopping trip, or may be looking for special offers and promotions (Bell et al., 2011). Therefore, these situational motives are associated with specific purchasing needs that shape the formation of expectations for that particular shopping trip. As a consequence, the choice of a store may depend on these situational shopping purposes and specific goals (Bell et al., 2011). For instance, the selection of a particular store may depend on price image perceptions (Hansen and Singh, 2009), breadth and depth of assortment (Briesch et al., 2009), location convenience (Huff, 1964), the ability to do one-stop shopping (Messinger and Narasimhan, 1997), or store services (Lal and Rao, 1997). However, there is no evidence showing how these store-specific goals affect the shopping experience. Consequently, differently from previous research that is focused on how such motives determine a store choice (e.g., Solgaard and Hansen 2003; Van Kenhove et al., 1999), or recent research studies that explored how responses to marketing mix depend on store formats (Jindal et al., 2020), we focused on understanding how these shopping motivations may modify the importance of the service execution elements in determining customer satisfaction. In the context of grocery retailing, we assumed that the store-specific goals will determine the store format the consumers will choose in which to make their grocery purchases.

Similarly to Reutterer and Teller (2009), and Solgaard and Hansen (2003), we consider three types of grocery stores: hypermarkets, supermarkets, and convenience stores. Supermarkets are retail food stores with a particular focus on groceries. They are characterized by high-low pricing, wide assortments, and some service. The assortments are sometimes supplemented with health and beauty items, and some other general merchandise (Levy et al., 2010). Hypermarkets offer a wider range of consumer products in addition to food and groceries, such as appliances, furniture, and electronics. Hypermarkets, are characterized by lower prices (because of operating efficiencies and higher bargaining power when dealing with manufacturers and wholesalers), and can provide one-stop shopping convenience for their customers (González-Benito, 2005; González-Benito et al., 2005; Koistinen and Järvinen, 2009). While supermarkets charge higher prices than hypermarkets, and carry a more limited product assortment which makes one-stop shopping more difficult, they usually provide more personalized service and a more customized experience to compete with larger establishments (Levy et al., 2010). In contrast, convenience stores are characterized by a narrow assortment and fast purchasing, with typically higher prices than the other two formats.

Therefore, purchasing at a particular store format may affect the evaluation of the service execution and the resulting customer satisfaction. Reutterer and Teller (2009) found that consumers' utilities are significantly higher for hypermarkets when conducting major trips. Contrarily, supermarkets are preferred for fill-in trips. Furthermore, merchandise-related attributes of store formats have a higher impact on the utility formation regarding major-trips, whereas service- and convenience-related attributes do so on fill-in trips. In addition, customers exhibit different purchase frequency at these store formats, and this frequency may also affect the customer's perception of the service execution. That is, higher purchase frequency may induce customers to pay more attention to certain attributes rather than to others. For example, customers may visit convenience stores more frequently than superstores. As a consequence, when buying at convenience stores, they may focus on fast accessibility and speedy checkout, whereas when buying at superstores, consumers may place importance on low prices and stock availability. In the case of regular purchases at typical

supermarkets, consumers might value store proximity, low prices, and sufficient stock (Van Kenhove et al., 1999), and may put more weight on those elements. Finally, on some trips, shoppers could choose a store format to avoid crowds. For instance, the larger space of hypermarkets may help the shopper to buy with an open mind-set and take in the store environment; while the less crowded space of convenience stores means less time waiting, and less exposure to the service elements. Thus, we expect that these different expectations modify the importance of service elements.

2.3. Loss aversion across store formats

One of the key principles of prospect theory is that gains and losses are defined in terms of a reference point (Kahneman and Tversky, 1979). As mentioned above, we expect that different shopping motives lead to different reference points for each service element, and that these points are used to evaluate the in-store service execution and shopping experience. In addition to the reference point, prospect theory introduces the concept of loss aversion, and suggests that perceived evaluations below the reference point (losses) loom larger than perceived evaluations above the reference point (gains). Past research suggests that positive experiences and negative experiences can have different impacts on customer satisfaction (Krishnamurthi et al., 1992; Mittal et al., 1998; Bell and Latin, 2000; Finn, 2012).

Previous research has identified evidence of loss aversion when evaluating service quality in car manufacturing plants (Mittal et al., 1998), airlines (Suzuki et al., 2001), transportation (Lin et al., 2008), restaurants (Chang et al., 2010), and logistics (Hsu et al., 2010). In the grocery retailing context studied, we expect that shopping motivations determine the expectation of the service encounter, and that these reference points would be different for different store formats. For example, a negative experience regarding the waiting time at a convenience store, or difficulty in finding some products on the shelf in a supermarket, might be enough to lead to a negative evaluation of the whole experience. In sum, consistent with prospect theory, we expect that the existence and magnitude of loss aversion not only vary across service elements (Ting and Chen, 2002), but also vary across store formats.

2.4. Expected contributions of this study

We departed from previous research in several ways. First, we measured several stores at the same time using the same instrument. This cross-sectional aspect of our study design allows us to control for shocks at the time of the measurement that are not related to their service execution, and cannot be isolated if only one store were measured. For example, previous research has shown that economic growth affects consumer satisfaction (Frank and Enkawa, 2008). To isolate such an effect, we must consider the simultaneous evaluation of several stores. Second, we measured different store formats to determine if the critical elements of service execution depend on the format. Using the same instrument across formats is key to conducting an accurate comparison of the drivers of customer satisfaction. Third, we have done multiple measurements of each grocery store over time. This longitudinal aspect of our analysis allows us to account for unobserved heterogeneity associated with customers of each chain. Fourth, the diversity of our measurements allows us to evaluate how various characteristics of the shopping trip (e.g., time of the day, gender, group purchase, stated loyalty) may affect service quality. Finally, unlike most previous research that has focused on obtaining a general customer satisfaction construct based on mailed surveys or phone calls, we conducted the surveys in the store right after the purchase experience using a transactional approach for measuring both service execution and customer satisfaction. As previously mentioned, the cumulative approach to measuring customer satisfaction has proven to be particularly important when explaining customer loyalty, but not necessarily

for characterizing the shopper's service execution experience. In addition, from a managerial perspective, store managers must identify the critical elements of the service execution, and continuously monitor their performance to successfully design customer experience at the store level. A transactional perspective allows us to provide better identification of these critical elements.

Therefore, we expect to contribute to the customer satisfaction and service execution literature by providing supporting evidence of the critical elements of service execution in shaping customer satisfaction across various grocery retail formats. To the best of our knowledge, this research is the first in providing evidence across formats by using a longitudinal analysis of cross-sections that helps to control for elements not related to the evaluation of service execution.

3. Research methodology

In this research, we collaborated with four major grocery retail chains in a large city in Latin America. These retailers not only allowed us to collect data in their stores, but they also provided continuous feedback on in which ways the instrument could help them to evaluate their customer service. The data were collected using a standardized questionnaire that we gave to shoppers across multiple store formats right after different shopping occasions.

3.1. Survey and service execution elements

The main purpose of the questionnaire was to evaluate the customers overall shopping satisfaction and the performance of various service elements at the store. There are multiple and complementary methodologies for measuring customer satisfaction and perceived service quality. A seminal framework for studying customer satisfaction was proposed by (Oliver, 1981), and it has evolved since then to the development of standardized evaluations. For example, Parasuraman et al. (1988) proposed the SERVQUAL scale in which service quality is conceptualized as a linear combination of the differences between expectations and perceived performance on a list of customer service elements. Later, Cronin and Taylor (1992) argued that expectations and performance could be collapsed into a single performance component to create what has been referred to as the SERVPERF scale. In our research, these well-established methodologies have been adapted for studying customer transactional satisfaction. Given that we needed to implement the same questionnaire across formats, we accommodated the wording

Table 1
Elements of the service execution included in the questionnaire.

Item	Questions
Accessibility	The access to this store is easy
Availability	This store always has what I am looking for
Feature	Brochures and catalogs are useful for my purchasing
Price Information	There is a clear indication of the prices and promotions
Prices	The prices at this store are convenient
Product Quality	The products of this store are of good quality
Ease	The products are easy to find
Variety	The store offers a wide variety of products
Cleanliness	The store is clean
Store Information	The signage of diverse sectors of this store is clear
Security	The store is safe for making purchases
Competence	The sale representatives of this supermarket transmit confidence and knowledge about the products
Helpfulness	The sale representatives of this store are always willing to help me
Cashiers	The cashiers are always willing to help customers
Waiting	The waiting time in the checkout is acceptable
Post Purchase	The post purchase service is good

Note: Respondents are asked to evaluate their agreement with each statement using a 5-point Likert scale (on which 1 = strongly disagree, …, 5 = strongly agree with the statement).

to fit any grocery store regardless of its format, and presented our proposal to the collaborating retail executives to validate our instrument.

We relied on past research on store choice and shopping motivations to determine the service elements to evaluate. (See Section 2.2 and Section 2.3). Our selection of the store execution elements is similar to that of Terblanche (2018) who evaluated service quality in six factors (i) merchandise variety (availability and variety), (ii) merchandise value (prices and product quality), (iii) interaction with staff (cashiers, competence, helpfulness, and post purchase), (iv) internal shop environment (ease in finding products, features, price and store information), (v) convenience (accessibility and waiting time), and (vi) store atmosphere (cleanliness and security). We did not consider interactions with other customers, but added the factor convenience, to measuring how easy it is to access the store, and to finish the purchasing process. As a result, we finished with a list of 16 items for evaluating the most relevant aspects of the shopping experience across store formats as is shown on Table 1.

In addition to evaluating each of the 16 elements shown in Table 1, shoppers were asked to give an overall evaluation of their satisfaction with their shopping experience. In particular, we asked for the level of agreement with the statement indicating that the store *is an excellent place to buy*. Unlike the SERVQUAL scale that requires customers to give their expectations and performance of each element, we asked the customers to provide only their perceived service evaluation of each item following a SERVPERF approach (Cronin and Taylor, 1992). More specifically, the shoppers rated their degree of agreement with each of the statements on a 5-point Likert scale to evaluate the service received at the store, as well as their overall satisfaction with the shopping experience.

Beyond the moderating role of the shopping format, we also investigated the role of consumer characteristics (e.g., age, gender), and purchase occasion characteristics (e.g., purchasing alone, time of day) in satisfaction formation. This is consistent with previous research that explored the effect of these factors on customer satisfaction (see e.g., Cooil et al., 2007; Hunneman et al., 2015).

3.2. Longitudinal approach

The majority of the empirical studies measuring service quality and customer satisfaction in the grocery retail industry have studied only one store (e.g., Vasquez et al., 2001; Terblanche, 2018), or a cross section of stores but for only one time period (e.g., Solgaard and Hansen, 2003; Kumar et al., 2013), limiting their ability to study the evolution of customer satisfaction over time. However, recent papers have called for more research that would use a longitudinal structure to obtain further consumer insights (Kumar et al., 2013; Chintagunta and Labroo, 2020).

Longitudinal research is a type of correlational research that involves looking at correspondences among variables collected over an extended period of time (Chintagunta and Labroo, 2020). Longitudinal analyses investigating service quality have been shown to be relevant in a variety of business environments. For example, Bolton and Drew (1991) formulated a longitudinal model to investigate the effect of a service change on customer attitudes about service quality in a telecom context. In the food industry, Bernard et al. (2000) contrasted cross-sectional with longitudinal data to study the impact of a change in overall customer satisfaction on the restaurant's profits. In an advertising context, Dabholkar et al. (2000) conducted a longitudinal analysis in which they measured expectations before the service was delivered, and perceptions after the service had been provided. In grocery retailing, Hunneman et al. (2015) used multiple evaluations of different stores to determine the moderating effect of consumer confidence on satisfaction.

In our work, similarly to Hunneman et al. (2015), we have repeated cross-sections of grocery stores over time instead of having longitudinal data on individual customers. Unlike Hunneman et al. (2015), who used a cumulative approach for satisfaction, we measured service execution performance and customer satisfaction immediately after the shopping experience. Our transactional approach is key to addressing the research questions and properly determining the relationship between the service execution elements and the shopping experience.

As will be further described in the next section, our data structure allows us to conduct a longitudinal analysis of customer satisfaction that accounts for relevant dynamics in retail service. To properly investigate these dynamics using store-level data, it is crucial to account for heterogeneity to distinguish between cross-store heterogeneity and dynamics. To control for observed heterogeneity we include the demographics and situational information collected at the purchase encounter. (See e.g., Cooil et al., 2007; Hunneman et al., 2015). To control for unobserved heterogeneity at the store level, we include store fixed effects. These fixed effects allow us to control for elements related to the stores, but unrelated to any variation in service execution. For instance, it allows separating service satisfaction from store location, competition, or loyalty (Francioni et al., 2018). Not controlling for such heterogeneity may lead to incorrectly attributing changes to dynamics.

3.3. Data collection

We collected data for four major grocery retail chains that offer multiple formats in which to sell their products to their customers, including small convenience stores, traditional supermarkets, and large hypermarkets. Since these chains may use different brands to promote their formats in this market, we therefore analyzed ten different brands in our study. Note that one brand may be present in more than one format, as is the case for two brands that operate in both hypermarket and supermarket formats.

One of the main objectives of our study is to compare service quality across grocery retail formats. Since location is one of the main strategic decisions, various store formats have different strategies for locating their stores, and, consequently, may serve different customer segments (Gonzalez-Benito et al., 2005). To minimize the effect of having different customer characteristics in the evaluation of service execution, we selected three geographical zones where all brands were present. In our design, we included 60 stores clustered in three zones of the city: the most affluent west side, the less affluent east side, and the downtown area with a large concentration of nonresidential buildings. Within each geographical zone we included two stores associated with each brand. Except for temporary renovations of some stores, or a few store closings, the analyzed set of stores stayed relatively stable during the entire research measurement period. As described above, when giving the questionnaire, customers are interviewed inside the store just after finalizing their purchases, thus making their evaluations related to their current shopping experience. It is important to emphasize that the main questions of the questionnaire did not change across formats, or over time. This instrument was applied three times a year in 2013 and 2014, and twice a year from 2015 to 2018, which generated more than 25,000 valid responses.

4. Drivers of customer satisfaction

One of the main objectives of this study is to identify the key drivers of customer shopping satisfaction for different grocery retail formats. For this purpose, we first formulated a linear model to analyze the relationship between the overall satisfaction ratings and the evaluations

Table 2
Descriptive statistics of the respondents.

Variable	Categories	Hypermarket	Supermarket	Convenience Store	Total
N observations		8337	11,254	6871	26,462
Gender	Female	58%	55%	54%	56%
	Male	42%	45%	46%	44%
Age	<20	3%	4%	4%	4%
	[20,25)	15%	17%	22%	18%
	[25,40)	34%	29%	38%	33%
	[40,60)	36%	36%	28%	34%
	≥60	12%	14%	8%	12%
Accompanied	Yes	48%	38%	31%	39%
	No	52%	62%	69%	61%
Recent visits to this Store[a]	Never	7%	7%	13%	9%
	Once	12%	13%	20%	14%
	Twice	22%	22%	27%	23%
	Three times	18%	17%	16%	17%
	Four times	42%	40%	24%	37%
Purchase amount [US$]		44.56	22.83	7.28	25.64

Note: [a]In this question, we asked how many times the customers visited the store on their four previous shopping occasions.

of the different components of the service execution at the respondents' level. Then, we explored the existence of loss aversion when evaluating the service execution elements, and its impact on overall satisfaction. Next, we exploited the longitudinal structure of the data by aggregating the information at the store level, and evaluated whether aggregated variations in individual components of the customer service could generate significant variations in the overall satisfaction with the shopping experience. To conclude, we used the same structure to estimate a set of complementary models at the store level that can provide insights for chain managers in making decisions affecting multiple stores of the same chain.

4.1. Descriptive statistics

Before analyzing the evaluation of the service execution, it is useful to characterize the shoppers in our sample. Table 2 reports descriptive statistics of the complete dataset.

In general, we observed a larger participation in the survey of female shoppers (56%), and that most of the customers were between 25 and 60 years of age (84%). Most of the customers shopped alone (61%), although a relevant number of them visited the store accompanied (39%). Lastly, in terms of store loyalty, we saw a great deal of persistency in store choice, because only 9% of the customers purchased at the store for the first time, whereas as many as 37% of the shoppers reported having made purchases at the same store on their last four shopping occasions.

Since one of the focuses of our investigation is the comparison across formats, we also report descriptive statistics by format on Table 2. In terms of demographics, there are a few notable differences. For instance, male and younger consumers go to convenience stores more compared to their trips to hypermarkets. In addition, as expected, the purchase amount grows with the size of the store. For example, the average purchase amount in hypermarkets was about $44.56, which is about six times more than the average purchase amount in convenience stores ($7.28). In addition, the majority of customers made their purchases alone at convenience stores (69%), whereas at hypermarkets almost half of the subjects made their shopping trip accompanied (48%). Making the shopping trip with other people may influence the elements customers pay attention to, which should be reflected in how consumers evaluate the different elements of the service execution (Luo, 2005; Borges et al., 2010). Store loyalty also varies by store format. That is, whereas 42% of hypermarket customers reported having made purchases at the same store on their last four shopping occasions, only 24% of convenience stores customers reported doing so.

Table 3 shows the mean evaluation for each service execution element, and for the overall shopping experience by store format. Recall

that the degree of agreement with the statements in the questionnaire is evaluated on a 5-point Likert scale, where 1 represents *Strongly Disagree* and 5 represents *Strongly Agree.* Considering that all statements have been worded positively, the mean value reported in Table 3 can be interpreted as a partial quality score associated with each service execution element. For example, in the case of hypermarkets, the score for Price Information was 4.0. This means that the average hypermarket customer agreed with the statement that the store where they shopped had *a clear indication of prices and promotions.* Considering the mean scores in Table 3, we can conclude that, in general, customers had positive evaluations of the service elements, as well as with their overall shopping experience. Moreover, these evaluations are comparable to those of previous research that evaluated shopping satisfaction in the grocery market (Slack et al., 2020).[2]

The service elements with the most positive evaluations in all the formats are accessibility, product quality, and ease in finding products. By contrast, feature advertising, post-purchase service, and waiting times are the service execution elements with the worst ratings. Most of the service elements, despite the positive evaluation of all items, present some notable differences in performances across formats. For example, prices, product quality, ease, variety, and store information present significant differences across formats, but accessibility is evaluated similarly across them.

4.1.1. Temporal evolution of overall satisfaction by store format

As mentioned above, a distinctive feature of our study is that we used the same instrument to measure service quality across formats for five consecutive years. Since we used our standardized questionnaire fourteen times during this time frame, it is worth exploring whether the evaluations showed persistence over time. We are particularly interested in describing how the overall evaluation of the shopping experience varied over time for each format. For this purpose, we classified customers as *satisfied* if they rated the overall shopping experience question with a 4 or 5. Similarly, we classified customers as *dissatisfied* if they responded to that question with a 1 or 2. Fig. 1 shows the percentage of satisfied and dissatisfied customers over time. Note that these proportions do not add up to 1 because the neutral score of 3 is excluded from this figure.

In Fig. 1 we note that the percentage of satisfied customers is stable over time. In particular, the mean evaluations for hypermarkets and traditional supermarkets remained relatively unchanged during the

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[2] For example, Slack et al. (2020) report that on a 5-point scale the overall satisfaction for a supermarket in Fiji is 3.934 which is remarkably similar to the 3.948 we report for our comparable supermarket format.
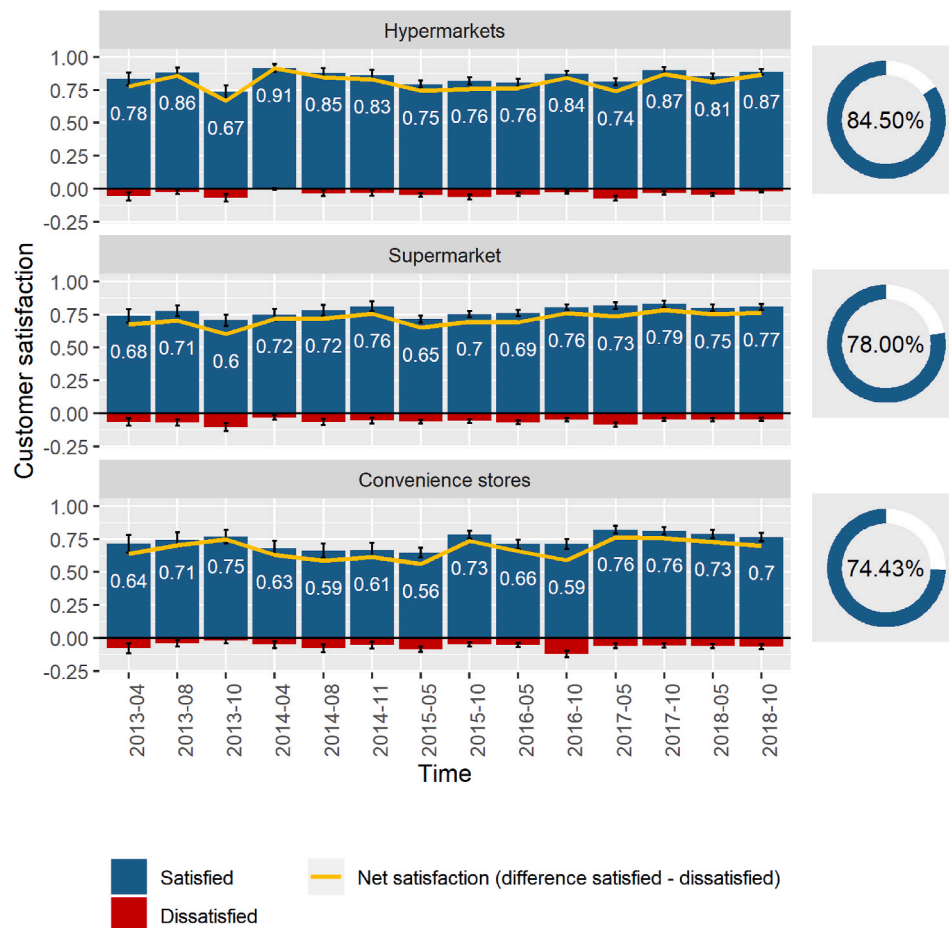
Table 3
Mean evaluation of service execution elements and overall satisfaction by store format.

Variable	Pooled	H	S	C	F-value	phS_{HS}	phS_{SC}	phS_{HC}
Accessibility	4.423	4.421	4.418	4.437	1.1			
Availability	3.845	4.111	3.719	3.731	350.0	***		***
Feature	3.335	3.374	3.371	3.227	29.0		***	***
Price Information	3.993	4.001	3.970	4.020	4.8	.	**	
Prices	3.835	3.877	3.920	3.646	145.8	**	***	***
Product Quality	4.390	4.504	4.358	4.302	145.5	***	***	***
Ease	4.255	4.297	4.219	4.264	17.5	***	**	*
Variety	3.961	4.427	3.800	3.658	1200.9	***	***	***
Cleanliness	4.363	4.476	4.416	4.141	314.2	***	***	***
Store Information	4.150	4.314	4.189	3.888	367.7	***	***	***
Security	4.334	4.435	4.367	4.160	191.2	***	***	***
Competence	4.074	4.107	4.064	4.048	7.3	**		***
Helpfulness	4.141	4.182	4.139	4.095	14.0	**	**	***
Cashiers	4.241	4.276	4.247	4.191	15.5	*	***	***
Waiting	3.773	3.760	3.680	3.941	107.0	***	***	***
Post Purchase	3.725	3.867	3.738	3.532	203.8	***	***	***
Overall Satisfaction	4.075	4.228	4.041	3.948	206.1	***	***	***
N observations	26,462	8,337	11,254	6,871				

Notes: We use H, S, and C to denote Hypermarket, Supermarket, and Convenience Store, respectively. Positive statements evaluated on a Likert scale from 1 = strongly disagree to 5 = strongly agree. *** indicates significance at $p < 0.001$, **$p < 0.01$, *$p < 0.05$,.$p < 0.1$. F-value is the F statistic for one-way ANOVA comparing differences between the three store formats. When the F-value is significant, we report the post hoc Scheffe test significance between Hypermarkets and Supermarkets (HS), Supermarkets and Convenience Stores (SC) and Hypermarkets and Convenience Stores (HC).

analyzed period (coefs. of variation of 0.08 and 0.07, respectively), whereas the evaluations for convenience stores presented larger fluctuations (coef. of variation of 0.10). In the next section, we analyze the role of this variation further in the evaluation of service execution. Beyond temporal variations, we observe that hypermarkets consistently present the highest level of satisfaction with 84.5% of the customers

Fig. 1. Temporal evolution of overall satisfaction and dissatisfaction by store format.

Table 4
Drivers of satisfaction at the individual level.

	Pooled		Hypermarket		Supermarket		Convenience stores	
Service execution elements								
Accessibility	0.04	***	0.05	***	0.05	***	0.01	
Availability	0.11	***	0.11	***	0.10	***	0.12	***
Feature	0.02	***	0.02	**	0.03	***	0.02	*
Price Information	0.04	***	0.04	***	0.04	***	0.04	***
Prices	0.09	***	0.07	***	0.10	***	0.11	***
Product Quality	0.09	***	0.09	***	0.09	***	0.07	***
Ease	0.02	***	0.02		0.03	**	0.03	*
Variety	0.09	***	0.10	***	0.10	***	0.08	***
Cleanliness	0.10	***	0.08	***	0.09	***	0.13	***
Store Information	0.06	***	0.06	***	0.05	***	0.06	***
Security	0.07	***	0.09	***	0.06	***	0.06	***
Competence	0.06	***	0.05	***	0.05	***	0.08	***
Helpfulness	0.07	***	0.05	***	0.08	***	0.06	***
Cashiers	0.06	***	0.05	***	0.06	***	0.07	***
Waiting	0.08	***	0.08	***	0.08	***	0.07	***
Post Purchase	0.08	***	0.08	***	0.08	***	0.08	***
Demographics and purchase characteristics								
Age [25–40]	−0.00		0.03		−0.00		−0.02	
Age >40	0.04	***	0.08	***	0.02		0.03	
Female	0.02	*	0.01		0.02	.	0.01	
Morning	0.04	***	0.03	*	0.03	*	0.05	**
Accompanied	−0.00		0.00		0.01		−0.04	*
Payment amount	0.01	***	0.00		0.02	**	0.01	
Intercept	−0.48	***	−0.31	**	−0.54	***	−0.38	***
N	26,462		8,337		11,254		6,871	
Adj-R²	52.75%		52.97%		50.80%		53.85%	

Notes: ***p < 0.001, **p < 0.01, *p < 0.05,.p < 0.1. Store and time-fixed effects are not reported. Pooled corresponds to a general regression that distinguishes among formats. The base levels for all categorical dummy variables are Age <25, measured in the afternoon, and purchasing alone.

being satisfied. Hypermarkets are followed by traditional supermarkets with 78% satisfied customers, and then convenience stores with 74.4%. These figures are also similar to those reported by Juhl et al. (2002) for European food retailers.[3]

4.2. Individual-level analysis

Our main objective is analyzing the relationship between the performances of different service execution components and the overall shopping satisfaction. Thus, we use the overall satisfaction of customer i at store s and time t, SAT_{ist}, as the main dependent variable in the analysis. In our model we describe the satisfaction SAT_{ist}, as a linear function of the service performance on each attribute k, SP_{kist}. It is important to note that different stores may cater to different types of customers. The reason is that store location may reflect differences in income and competition levels (Hoch et al., 1995), and because individual stores can create a specific store image that leads to relevant store loyalty (Martenson, 2007). Thus, we control for unobserved heterogeneity across stores by including store fixed effects, α_s. Similarly, since the instrument was given at different times over the course of each year, there may be unobserved shocks that may have shifted satisfaction levels across stores. For this, too, we allowed for unobserved longitudinal components by including time effects α_t. We also controlled for observed respondent and shopping trip heterogeneity by including customer demographics and individual-level purchase characteristics, such as age, gender, purchase amount, and time of the day (DEM_{ist}). Finally, we added iid error components, ε_{ist}, that represent unobserved shocks at the time of measurement for respondent i at store s, and assume $\varepsilon_{ist} \sim N(0, \sigma^2)$. With all these elements, the proposed regression model can be written succinctly as:

$$SAT_{ist} = \alpha_s + \alpha_t + \sum_k \beta_k SP_{kist} + \beta_D DEM_{ist} + \varepsilon_{ist} \quad (1)$$

Since we focused on the relationship between diverse elements of service execution and overall satisfaction across formats, we estimated both a pooled regression model, and individual regressions for each store format. The Breush-Pagan test indicates the presence of heteroskedasticity, and, we therefore estimated the model using robust standard errors. Results are shown in Table 4. As an alternative, we estimated a hierarchical model with store format interactions. Since the number of observations per format is large, this model yields similar results to the independent format models. Results of the hierarchical specification can be obtained from the authors upon request.

Table 4 shows that almost all the service execution elements considered in the study, without regard to the format, are highly significant and positively associated with overall shopping satisfaction. These results are not only consistent with the previous literature on service quality (Dabholkar et al., 1996; Sweeney et al., 1997; Juhl et al., 2002), but they also confirm the internal validity of our research design. When looking at the relative weights of each item in shaping customer satisfaction, we found that there are important commonalities across store formats. Indeed, the Pearson correlations among the regression coefficients across formats are larger than 0.7. As expected, the largest correlation is between hypermarkets and supermarkets (0.85). By contrast, the smallest correlation is between hypermarkets and convenience stores (0.71), which differ the most in both size and value proposition.

Each parameter estimate reflects the marginal impact of the performance evaluation of the corresponding service execution element on the overall shopping satisfaction. The estimate can be considered to be a proxy of the relative importance that a given component of the service execution has in shaping the overall satisfaction. Despite the significant correlation among the regression coefficients across formats, there are also some notable differences. This indicates that the relationship between the service execution elements and the overall shopping satisfaction depends on the store format. For instance, having a clean store is

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[3] Considering retailers across different industries (not only grocery), Juhl et al. (2002) reported similar satisfaction levels in Denmark, Portugal, Switzerland, and Finland (in the 71–75% range). However, they reported lower satisfaction levels in France (69%).

more important at convenience stores than at hypermarkets and supermarkets. Accessibility is not relevant for convenience stores but has a considerable impact at hypermarkets and supermarkets. Security is more important at hypermarkets; sellers' competence is more relevant at convenience stores; and prices are more important at convenience stores and supermarkets than at hypermarkets. Thus, the most relevant service elements for shaping customer satisfaction depend on the store format. For example, for hypermarkets, the most relevant service execution elements are availability, variety, product quality, and security. In traditional supermarkets the most relevant elements are availability, prices, and variety. Finally, for convenience stores, the most important elements are availability, prices, and cleanliness.

Table 4 also demonstrates some regularities in how overall satisfaction may be affected by customer shopping behavior, regardless of the service execution. For instance, the shopping experience in the morning is evaluated more positively than in the afternoon across formats. Additionally, customers purchasing at convenience stores are more satisfied with their shopping experience when purchasing alone than when purchasing with a companion. Regarding customer demographics, in general, age and gender do not play relevant roles in customer satisfaction, although older customers appear to be more satisfied with the hypermarket shopping experience.

We investigated whether or not the main insights derived from Table 4 are robust to the diverse specifications and estimation methods of our main model. In particular, a LASSO regression generated similar results, and penalized model fit compared with our full specification, because it only eliminated a few demographic variables while all service execution elements remained in the model. We also conducted a confirmatory factor analysis (CFA), that verified that the variables we used in our study present a similar factor structure to those reported previously in the literature (Terblanche, 2018). However, aggregating to a factor level provides no clear gains with respect to our disaggregated analysis. More importantly, from a managerial perspective, we focused on the importance of specific service execution elements. Therefore, we display below only the results that use the 16 components of the service execution. More details of this CFA are presented in Appendix C.

4.2.1. Variance decomposition

To better understand the sources of variation in customer satisfaction, we used a variance component analysis (Harville, 1977; Elberg and Noton, 2019). The fundamental idea was to identify the percentage of the observed variability in customer satisfaction that can be explained by the various components of the regression model of Equation (1). Specifically, we considered four groups of components: store fixed-effects (α_s), time fixed-effects (α_t), customer and purchase characteristics (DEM_{ist}), and the perceived performance of the different service execution components (SP_{kist}). Note that the panel structure with several stores, measured on multiple occasions, allowed us to conduct this analysis. Results of the maximum likelihood estimation of this variance decomposition are presented in Table 5, which displays the proportion of the variance explained by each component across formats.

Table 5 shows that, as expected, the largest proportion of the variance is captured by the evaluation of service execution, followed by the store fixed effects. In contrast, time fixed effects and customer demographics explain a relatively small part of the variation in customer satisfaction. This pattern is consistent across store formats, but the store-fixed effects account for a larger percentage of the variance in customer satisfaction in the case of hypermarkets. From a methodological standpoint, the large proportion of the variation captured by the evaluation of the service execution is another sign of the validity of the instrument.

Table 5
Results of variance decomposition.

Store format	Model Components			
	Store FE	Time FE	Customer Demographics	Service Performance
Hypermarket	10.2%	5.4%	2.2%	82.2%
Supermarket	4.1%	2.0%	1.4%	92.4%
Convenience Stores	6.7%	2.3%	0.8%	90.2%

And from a managerial point of view, these results suggest that, regardless of the format, and store and customer demographics, the overall satisfaction is mainly determined by the service execution at the store level, which can be managed successfully by the company.

4.2.2. Asymmetric effects of positive and negative evaluations of service execution

The model formulated in Equation (1) assumes a linear relationship between the evaluation of each service execution element and the overall customer satisfaction. However, past research suggests that positive experiences can have different effects on customer satisfaction compared with negative experiences (Krishnamurthi et al., 1992; Bell and Latin, 2000; Finn, 2012). Consistent with prospect theory (Ting and Chen, 2002), we expect that a negative evaluation in one service component has a greater effect on customer satisfaction than a positive evaluation on the same component due to loss aversion. That is, perceived losses with respect to an expected service may loom larger than perceived gains. For example, a negative experience regarding the waiting time, or difficulty in finding some products on the shelf, might be enough to lead to an evaluation of the whole experience as unsatisfactory. In such a case, we would expect that negative evaluations on waiting time have a larger effect on the overall satisfaction than a positive evaluation of that service element. To verify the existence of these asymmetries and potential nonlinear effects on satisfaction, we disaggregated the performance evaluation indicator of our individual-level model into dummy variables corresponding to the evaluation level of each service element. The impact of each service evaluation level on satisfaction is estimated following Equation (2).

$$SAT_{ist} = \alpha_s + \alpha_t + \sum_{k,l} \beta_{kl} SP_{istlk} + \beta_D DEM_{ist} + \varepsilon_{ist} \quad (2)$$

Equation (2) is similar to the individual level model presented in Equation (1). However, we operationalized each evaluation level with a dummy variable, SP_{istlk}, that takes the value 1 if respondent i gives a score of l ($l = 1, ..., 5$) on the Likert scale for item k at store s, and time t, and 0 otherwise. The Breush-Pagan test indicates the presence of heteroskedasticity, and, we therefore estimated the model using robust standard errors. In this model, we assume that the evaluation of a service element is made with respect to a reference point that represents an expected service level, such that a positive evaluation reflects a performance that exceeds the reference point, while a negative evaluation reflects a performance that fails to meet expectations. On the 5-point Likert scale used in this research, we used the neutral evaluation (scale = 3) as the reference point, thus scores of 4 or 5 represent performances above the expectations, whereas scores of 1 or 2 represent performances below the reference point. Consequently, in Equation (2) we fixed $\beta_{kl=3} = 0, \forall k$. The corresponding parameter estimates of this model are summarized and presented in Fig. 2, on which the thickest black line represents the mean value across all service execution
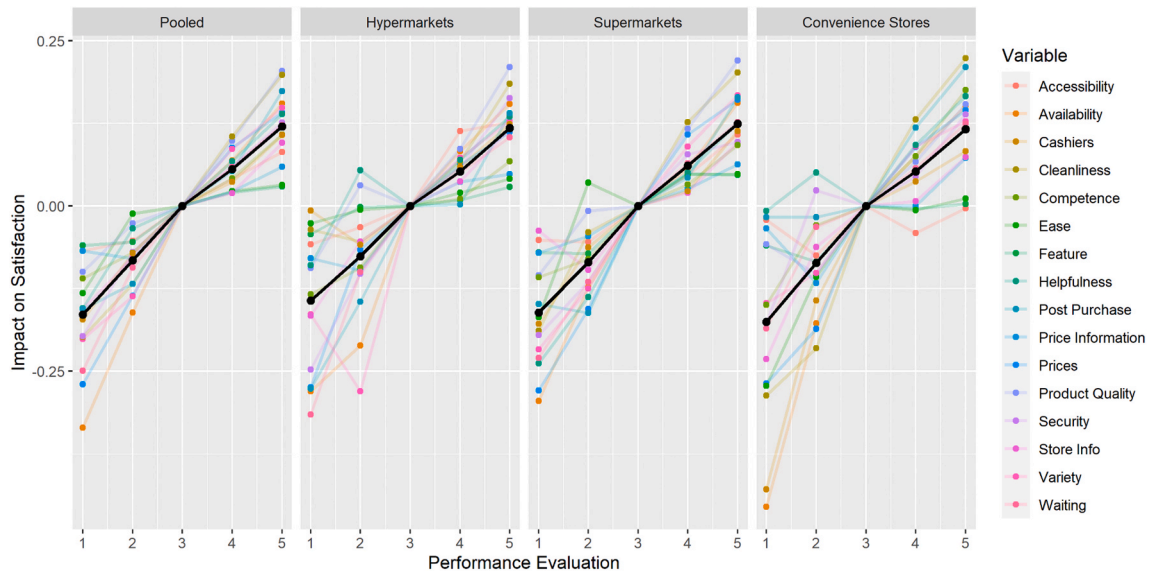
Fig. 2. Asymmetric effect of performance evaluations on overall satisfaction across store formats.
Note: The leftmost panel illustrates the results for the pooled regression across formats. The black indicators (dots and lines) represent the average coefficients, β_{kl}, of Equation (2) for each regression.

elements. A detailed list of parameter estimates for each of these models is given in Appendix B.

As expected, on average, most service evaluations below 3 have a negative impact, while most evaluations above 3 have a positive impact on satisfaction. More importantly, and consistent with prospect theory, the slope is steeper for negative evaluations and, therefore, in most cases, the impact of these negative evaluations is greater in magnitude than the impact of positive evaluations, showing evidence of loss aversion. This result is particularly strong in the case of convenience stores. To better establish the existence of an asymmetric effect on each dimension k, we compared the impacts of service evaluations associated with levels 1 and 5, and tested whether or not these impacts are statistically different in absolute terms. More precisely, following Mittal et al. (1998), we tested that $|\beta_{kl=1}| > |\beta_{kl=5}|$ against the null hypothesis that $|\beta_{kl=1}| \leq |\beta_{kl=5}|$. Our results indicate that several factors exhibit asymmetric effects. For example, in the case of the pooled regression, 7 of the 16 dimensions exhibit statistically significant asymmetric effects.

For the pooled regression, the service execution element that exhibits the highest loss aversion is availability. Indeed, the negative effect of a

score of 1 on that dimension is more than two times greater than the positive effect of a score of 5 ($\beta_1 = -0.34$ vs. $\beta_5 = 0.15$, p-value<0.01). In the case of hypermarkets, waiting time is the dimension with the highest asymmetry ($\beta_1 = -0.32$ vs. $\beta_5 = 0.10$, p-value<0.01), followed by Prices ($\beta_1 = -0.27$ vs. $\beta_5 = 0.11$, p-value<0.01). But, for the supermarket format, availability is the dimension with the highest asymmetry ($\beta_1 = -0.30$ vs. $\beta_5 = 0.16$, p-value<0.01), followed by Prices ($\beta_1 = -0.28$ vs. $\beta_5 = 0.16$, p-value<0.05). Finally, cashiers is the dimension with the highest asymmetry in convenience stores, ($\beta_1 = -0.43$ vs. $\beta_5 = 0.08$, p-value<0.01), followed by Availability ($\beta_1 = -0.45$ vs. $\beta_5 = 0.15$, p-value<0.01). Consequently, store managers working in each format are advised to pay special attention to the service attributes that have consistently had the worst evaluations because these can have a disproportionately stronger impact on customer satisfaction than service attributes that are evaluated positively.

4.3. Store-level analysis

So far, our analysis at the customer level provides interesting insights into how various elements of the retail service impact customer satisfaction, and how these effects vary depending on the store format. Since many of the service execution elements are evaluated at the store level, store managers are continuously monitoring the overall customer satisfaction, and introducing changes in service elements to improve their shopping experience. Thus, to obtain actionable insights at the store level, it is useful to analyze how a store's performance is affected by changes in the performance of the service execution elements. Furthermore, as large grocery retailers typically operate dozens, or even hundreds of stores, store managers might also be interested in evaluating the performance of their stores using aggregated performance measures. Such evaluation requires not only the performance of multiple stores, but also multiple measurements per store to conduct cross-sectional comparisons, controlling for longitudinal elements. In our study, we collected data from several stores on multiple occasions, which provided a unique opportunity to conduct this type of analysis.

A store-level analysis can provide valuable insights to chain managers through the identification of the most relevant aggregated measures for comparing the performance across stores. In previous sections we have shown that customer satisfaction is relatively stable at the aggregate level, (see Fig. 1 for each store format), but that this is not

Fig. 3. Proportion of satisfied customers for two stores of the same chain.

Table 6
Store-level regression results with temporal differences.

	Pooled		Hypermarket		Supermarket		Convenience stores	
Service Execution elements								
Accessibility	0.08	*	0.16	*	0.09	.	0.08	
Availability	0.20	***	0.11		0.23	***	0.35	***
Feature	0.02		−0.05		0.05		0.06	.
Price Information	0.03		0.09		0.16	*	−0.20	*
Prices	0.11	***	0.02		0.12	*	0.23	***
Product Quality	−0.03		0.14		−0.14		−0.02	
Ease	0.06		−0.01		−0.02		0.18	
Variety	0.07	.	0.12		0.05		−0.01	
Cleanliness	0.12	**	0.05		0.12		0.19	*
Store Information	−0.00		0.03		−0.07		−0.09	
Security	0.16	***	0.10		0.20	**	0.30	***
Competence	0.20	**	0.30	*	0.22	*	0.11	
Helpfulness	−0.10		−0.21		−0.17	.	0.01	
Cashiers	−0.05		−0.08		−0.00		−0.09	
Waiting	0.06	*	0.10	*	0.11	*	−0.09	
Post Purchase	0.14	***	0.14	*	0.13	**	0.18	**
Demographics and purchase characteristics								
Age [25–40]	0.06		0.08		0.40	.	−0.13	
Age >40	−0.05		0.21		−0.01		−0.32	
Female	0.24	**	0.37	*	0.37	**	−0.17	
Accompanied	−0.05		0.02		−0.17		−0.14	
Payment amount	0.07	**	0.05		0.06		0.04	
N	544		173		227		144	
Adj. R²	72.82%		69.79%		72.86%		71.26%	

***p < 0.001, **p < 0.01, *p < 0.05,.p < 0.1.

necessarily the case at the store level. For instance, Fig. 3 displays the percentage of satisfied customers for two stores over the entire evaluation period. While Store 2 presented consistent service, Store 1 exhibited a larger variation in customer shopping satisfaction, especially during the first two years of our analysis. These differences in customer satisfaction over time motivated us to investigate the drivers of such variability further.

To investigate how temporal variations in the evaluations of the service execution affect customer satisfaction at the store level, we formulated a store-level regression model (instead of the individual-level analysis discussed in the previous section) in which we included temporal differences, as indicated in Equation (3):

$$\Delta SAT_{st} = \alpha_s + \alpha_t + \sum_k \beta_k \Delta SP_{st} + \beta_D \Delta DEM_{st} + \varepsilon_{st} \qquad (3)$$

In Equation (3) ΔSAT_{st} represents the difference between the mean customer satisfaction of each store with respect to its previous measurement. Similarly, ΔSP_{st} and ΔDEM_{st} correspond to the differences in service performance and sample characteristics between two consecutive measurements, respectively. Finally, we assume $\varepsilon_{st} \sim N(0, \sigma^2)$. In this specification, we also took advantage of the panel structure of our dataset with multiple evaluations over time for each store. The parameter estimates for this model are shown on Table 6.

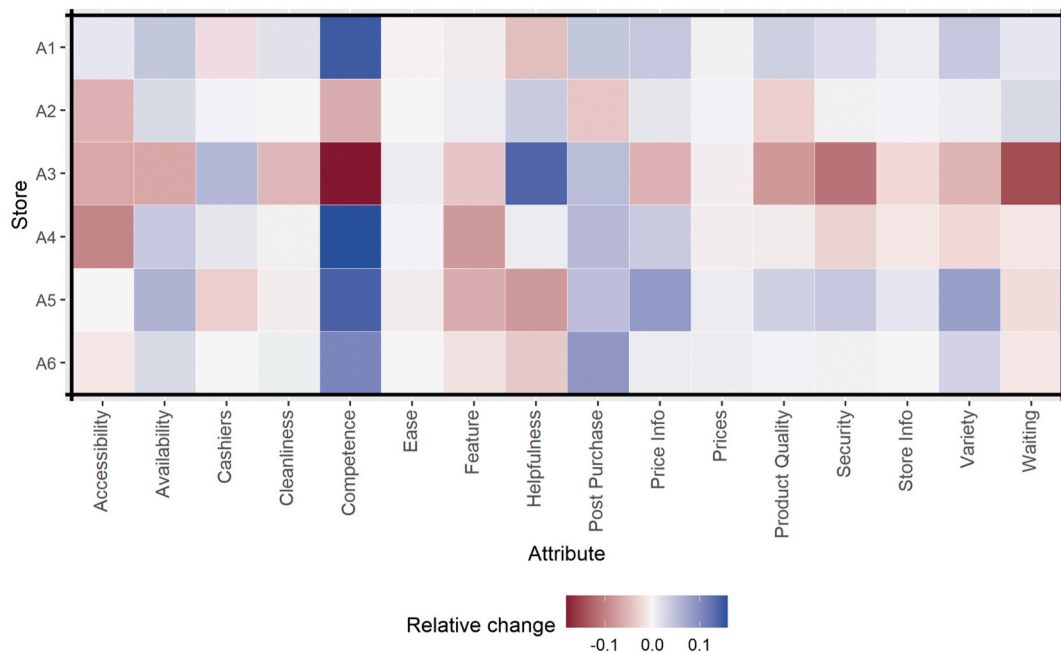In contrast to the individual-level analysis, this store-level analysis

Fig. 4. Heat map of the relative impacts of service performance for all hypermarket stores of a single retail chain.
Note: For each store, a comparison of the last performance with its previous result is shown.

identifies fewer significant parameter estimates. This result is expected not only because the aggregation at the store level reduces the sample size dramatically, but also because it reduces the variability of the performance scores. In the pooled regression that includes all stores regardless of their format, not all coefficients associated with the service elements are significant, but all significant parameters are positive. It is interesting to note that service execution elements such as product quality and helpfulness of cashiers are very relevant in the individual-level analyses, but do not produce significant effects in the store-level analyses. That is, changes in the performance of those elements do not translate into significant changes in the overall performance of the store on two consecutive measurements.

By contrast, post-purchase service shows a relatively greater impact at this level compared to the individual-level analysis. Regarding management, actionable service elements by the store manager, such as maintaining product availability, cleanliness, security, and employee competence show important effects on customer satisfaction in contrast to other elements, such as product quality, store information, features, and price information, among other factors that are typically decided upon at a higher organizational level.

Results also show how the variations in some components are more relevant for specific store formats. For example, variations in waiting times, and the competence of the store personnel are associated with significant changes in overall satisfaction for hypermarkets and traditional supermarkets, but not for convenience stores. By contrast, variations in product availability, price information, prices, and security are associated with variations in the ratings of overall performance of traditional supermarkets and convenience stores, but not for those of hypermarkets. Finally, variations in accessibility or cleanliness are associated with variations in customer satisfaction only in the case of hypermarkets and convenience stores, respectively. These results can be explained by the nature of the purchases made at each store format. For example, the average basket in convenience stores is smaller and more homogeneous than that in other market formats, and is typically comprised of only a few products. Therefore, we expect that variation in prices in some key items might have a substantial impact on satisfaction. By contrast, shoppers at other market formats purchase larger quantities, and, therefore, it is less likely that the total cost of the purchase would be affected by price changes in one particular product. As mentioned above, some components of the service are mostly determined by the store-level management (for example, product availability and cleanliness), whereas other attributes are managed by the chain-level management (for example, accessibility and prices).

Thus, corporate management could be interested in monitoring how different attributes vary in each store, and in identifying commonalities across stores. From our experience collaborating with the four grocery retailers who participated in this study, seeing how each store performed compared with its previous evaluation is a primary concern for marketing management. By using our modeling framework, we can estimate the changes in the relative impact of each factor as $\widehat{\beta}_k \Delta SP_{kst}$. In this case, the variation in the performance of item k of store s at time t is weighted by its relative importance ($\widehat{\beta}_k$ of Equation (3)) for capturing that small variations in key attributes can be more influential than larger variations in less critical items. These estimates can be used to build useful visualizations to help managers understand dynamic changes in performance, and to communicate those changes in an effective manner within the organization (Ambler et al., 2004; Pauwels et al., 2009). The heat map presented in Fig. 4 illustrates the magnitude of these changes for a set of representative stores of a particular chain in our sample, for the last instance of evaluation in our sample. In this figure, each row

represents a particular store of the chain, and each column represents a specific service element. Each cell represents the change in the impact of the service element with respect to its previous measurement for a particular store.

Fig. 4 illustrates some interesting aspects for chain managers. For instance, we can observe that the competence of store personnel shows important variations for most stores in this chain. The variations are mostly positive, but stores A2 and A3 exhibit a negative change with respect to their previous measurement in this service element. Therefore, by using this visualization, chain managers can become aware that the execution of store personnel had a major impact on the variation observed in this period, and act accordingly by focusing on the lower performance stores. This visualization also indicates that some attributes, such as cleanliness, ease in finding products, and acceptable prices show only minor variations. This implies that these elements may not be major drivers of changes in satisfaction in the current application of the instrument. By looking at the rows, we find that store A3 presents large variations, that are mostly negative, on many dimensions which suggests that this specific store should be more assiduous in order to provide consistent service. Therefore, these results can be helpful to managers when they are making resource allocation decisions, by directing their focus on those aspects that impact the shopping experience, and present important variations across stores.

5. Conclusions and managerial implications

Our study was aimed at investigating the key drivers of customer shopping satisfaction in the grocery retail industry, and evaluating how they differ across three store formats. To address this issue, we analyzed an extensive dataset from a service quality survey given to customers who had just shopped at several food market stores. It included more than 25 thousand responses in a time span of 5 years. The structure of the panel data, with repeated measurements for multiple stores, allowed us to conduct a rich statistical analysis that brings some novel aspects to the service quality literature. Our collaboration with the grocery retailers in this study along five years showed that having an instrument that monitors service execution and customer satisfaction across brands simultaneously, constitutes a useful competitive tool that help (chain and store) managers to design shopping experiences.

Our analyses provide additional empirical evidence substantiating some well-established results in the customer satisfaction literature. For instance, all the service execution elements included in our instrument exhibit a positive correlation with customer service. However, the exploitation of our longitudinal data structure, and the decomposition in store formats introduce new insights to this field. In fact, we provide compelling evidence that the relevance of some service elements depends on the store format. For example, store cleanliness is more important in convenience stores than in hypermarkets and supermarkets. By contrast, the quality of the products is less relevant for convenience stores than for hypermarkets and supermarkets. Additionally, a variance decomposition analysis allowed us to conclude that the performance of the service execution elements accounts for most of, but not all, the explained variation in customer satisfaction. But store-fixed effects play a significant role, and, therefore, they need to be taken into account to determine the effects of service quality accurately. These findings can help managers in the grocery market to allocate resources to improve the service execution of the key elements corresponding to each format to better define the intended positioning for each brand.

The large dataset we used in this study facilitates the investigation of several complementary analyses. For instance, the evaluation of service performance shows an asymmetric impact on satisfaction in the case of a

poor performance, compared to a good performance, which provides evidence of loss aversion. This result suggests that customer satisfaction is determined to a large extent by poor execution in some of the components of the service. This indicates that when customers have a bad experience involving one service attribute, they are very likely to evaluate the whole experience as unsatisfactory. By contrast, having only one attribute of a good experience may not be enough to rate it as an overall satisfactory purchase experience. The evidence of loss aversion is present across all formats considered in this study, but it is strongest in the case of convenience stores.

The identification of the elements with large loss aversion can guide store managers to initiate supporting mechanisms to counteract failures in the shopping experience. For instance, bad evaluations in product availability appear to be a strong predictor of low customer satisfaction at convenience stores. In this case, managers are advised to revise their assortment and inventory levels, or to take advantage of information technology to share inventory availability with customers in advance (e. g., Cui et al., 2019).

In this research, we also considered the perspective of a chain or store manager in charge of monitoring and controlling the service execution and gauging its effect on customer satisfaction at the store level. The results again show variations in the most important service elements across store formats. In hypermarkets, the most important service attributes are competence, accessibility, and post purchase service. In the case of supermarkets, the important drivers are availability, competence, and security. Finally, for convenience stores, availability, security, and prices are the most relevant service attributes at the store level. Therefore, our analyses that consider time, store, and service execution components simultaneously can be informative to companies that operate multiple stores, because they can improve the decisions that should be decided at the chain level, store level, or for each specific shopping occasion.

Our evaluation is fairly comprehensive and includes what we consider to be the most important factors determining customer satisfaction of the shopping experience. Indeed, the large percentage of explained variance in customer satisfaction is a strong indicator of the robustness of our method of evaluation. However, there are some directions in which this research could be expanded. For example, Verhoef et al. (2009) proposed a general framework in which to study customer experiences in services. In our study we considered most of the factors listed by Verhoef et al. (2009), including assortment, price, and service interface, but a few others of them were not considered, and their inclusion might help to enhance the explanatory power of our instrument. For example, they considered the evaluations on previous shopping

trips, and the experience that a customer has had in other channels. More generally, our framework can be expanded to include a broader description of the customer journey (Lemon and Verhoef, 2016) to understand how multiple interactions affect customer satisfaction. Following the classification of Voorhees et al. (2017), in this research we have focused on the *core service encounter*. This is justified because during our evaluation period the electronic channels in the grocery market were not well-developed, accounting for less than 4% of the total sales.[4] However, this has been changing rapidly in recent years,[5] and it is expected that digital channels will provide richer information for enhancing our understanding of the whole customer journey.

Similarly, our dataset could be augmented with store-level covariates, such as competition, or the population density in the area where the store is located. The inclusion of these covariates could help to better refine the accuracy of the model, and to provide even further characterizations of customer satisfaction in this industry.

Rapid changes in the retail environment have introduced new dynamics to the shopping experience. For example, recent studies are measuring new elements in service execution, such as self-checkouts (Orel and Kara, 2014), or investigating the relationship between employee satisfaction and customer satisfaction (Vella et al., 2009). We believe that by including these elements, future studies could provide an even deeper characterization of customer satisfaction. From a methodological point of view, our data can help researchers to test whether customer satisfaction in this context is the result of compensatory or non-compensatory processes. To evaluate a purchase experience positively, individual specific thresholds across service elements need to be determined. We propose this as an interesting topic for further research. A final limitation of our study is that our data were collected in only one large city. Previous research has shown that national culture can play a role in how consumers evaluate customer service (Kanakaratne et al., 2020). In spite of our evaluations of customer satisfaction being similar to those reported in other regions (Juhl et al., 2002; Slack et al., 2020), we believe that actually analyzing the role of store formats in customer satisfaction in other regions would be an interesting avenue for future research.

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Appendix A. Description of Covariates

Table A
Description of the variables related to the respondents' characteristics and the type of shopping trip.

Variable	Description
Recent visits to this Store	Considering your last four previous shopping trips, how many of them have been at this store? (1, 2, 3, 4)
Gender	Gender of the respondent (1 = Female, 0 = Male)
Age	Age range of the respondent (<25, 25–40, >40 years)
Accompanied	If the respondents were accompanied in their shopping by another person (1 = yes, 0 = no)
Payment amount	Total cost of the purchase made by the respondent ($)

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[4] https://www.mckinsey.com/industries/retail/our-insights/digital-disruption-at-the-grocery-store.
[5] https://www.offers.com/blog/post/online-grocery-delivery-pickup-trends/.

Appendix B. Regressions at the Individual Level for Determining Asymmetric Effects

Table B

OLS at the individual level. Pooled regression considers all respondents across store formats. Level = 3, in the 5-point Likert scale, is considered to be the base level.

Dimension	Level	Pooled		Hypermarket		Supermarket		Convenience stores	
		Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error
Accessibility	1	−0.07	0.05	−0.06	0.08	−0.05	0.07	−0.02	0.10
	2	−0.05	0.03	−0.03	0.05	−0.05	0.04	−0.08	0.07
	4	0.04	0.02	0.11	0.03	0.05	0.03	−0.04	0.03
	5	0.08	0.02	0.13	0.03	0.11	0.03	0.00	0.03
Availability	1	−0.34	0.04	−0.28	0.08	−0.30	0.05	−0.45	0.08
	2	−0.16	0.02	−0.21	0.04	−0.12	0.03	−0.18	0.03
	4	0.07	0.01	0.08	0.02	0.06	0.02	0.08	0.02
	5	0.15	0.01	0.15	0.03	0.16	0.02	0.15	0.03
Feature	1	−0.06	0.01	−0.04	0.02	−0.07	0.02	−0.06	0.03
	2	−0.05	0.02	0.00	0.03	−0.07	0.02	−0.08	0.03
	4	0.02	0.01	0.01	0.02	0.05	0.02	0.00	0.02
	5	0.03	0.01	0.03	0.02	0.05	0.02	0.00	0.02
Price Information	1	−0.07	0.03	−0.08	0.05	−0.07	0.05	−0.03	0.08
	2	−0.08	0.02	−0.10	0.03	−0.05	0.03	−0.12	0.04
	4	0.02	0.01	0.04	0.02	0.03	0.02	0.00	0.02
	5	0.06	0.01	0.05	0.02	0.06	0.02	0.07	0.03
Prices	1	−0.27	0.03	−0.27	0.06	−0.28	0.07	−0.27	0.05
	2	−0.14	0.02	−0.07	0.03	−0.16	0.03	−0.19	0.03
	4	0.09	0.01	0.06	0.02	0.11	0.02	0.09	0.02
	5	0.14	0.01	0.11	0.02	0.16	0.02	0.14	0.02
Product Quality	1	−0.10	0.08	−0.09	0.18	−0.11	0.14	−0.06	0.14
	2	−0.03	0.04	0.03	0.09	−0.01	0.06	−0.10	0.07
	4	0.10	0.02	0.09	0.03	0.12	0.03	0.07	0.03
	5	0.20	0.02	0.21	0.04	0.22	0.03	0.15	0.03
Ease	1	−0.13	0.05	−0.03	0.09	−0.17	0.08	−0.27	0.12
	2	−0.01	0.03	−0.01	0.05	0.04	0.04	−0.11	0.06
	4	0.02	0.01	0.02	0.03	0.05	0.02	−0.01	0.03
	5	0.03	0.02	0.04	0.03	0.05	0.02	0.01	0.03
Variety	1	−0.20	0.04	−0.16	0.12	−0.22	0.06	−0.15	0.07
	2	−0.14	0.02	−0.28	0.06	−0.13	0.03	−0.10	0.03
	4	0.09	0.01	0.07	0.03	0.09	0.02	0.09	0.02
	5	0.15	0.01	0.13	0.03	0.17	0.02	0.13	0.02
Cleanliness	1	−0.20	0.06	−0.04	0.14	−0.19	0.10	−0.29	0.08
	2	−0.12	0.03	−0.05	0.07	−0.04	0.05	−0.22	0.05
	4	0.11	0.02	0.07	0.03	0.13	0.03	0.13	0.03
	5	0.20	0.02	0.18	0.03	0.20	0.03	0.22	0.03
Store Information	1	−0.16	0.04	−0.17	0.09	−0.04	0.08	−0.23	0.06
	2	−0.08	0.02	−0.05	0.05	−0.10	0.04	−0.06	0.04
	4	0.02	0.01	0.04	0.03	0.02	0.02	0.01	0.02
	5	0.10	0.01	0.12	0.03	0.10	0.02	0.07	0.03
Security	1	−0.20	0.05	−0.25	0.10	−0.20	0.07	−0.18	0.09
	2	−0.07	0.03	−0.10	0.06	−0.12	0.05	0.02	0.05
	4	0.06	0.02	0.06	0.03	0.08	0.02	0.04	0.03
	5	0.13	0.02	0.16	0.03	0.10	0.02	0.14	0.03
Competence	1	−0.11	0.05	−0.13	0.08	−0.11	0.08	−0.15	0.10
	2	−0.07	0.03	−0.09	0.05	−0.08	0.04	−0.03	0.05
	4	0.04	0.01	0.01	0.02	0.03	0.02	0.08	0.03
	5	0.11	0.02	0.07	0.03	0.09	0.02	0.18	0.03
Helpfulness	1	−0.15	0.05	−0.09	0.08	−0.24	0.08	−0.01	0.11
	2	−0.03	0.03	0.05	0.05	−0.14	0.04	0.05	0.05
	4	0.07	0.01	0.07	0.03	0.05	0.02	0.09	0.03
	5	0.14	0.02	0.13	0.03	0.13	0.03	0.17	0.03
Cashiers	1	−0.17	0.05	−0.01	0.10	−0.18	0.08	−0.43	0.11
	2	−0.07	0.03	−0.06	0.05	−0.06	0.04	−0.14	0.06
	4	0.04	0.01	0.06	0.03	0.02	0.02	0.04	0.03
	5	0.11	0.02	0.12	0.03	0.11	0.02	0.08	0.03
Waiting	1	−0.25	0.03	−0.32	0.05	−0.23	0.04	−0.19	0.06
	2	−0.09	0.02	−0.10	0.03	−0.12	0.03	−0.03	0.04
	4	0.06	0.01	0.05	0.02	0.06	0.02	0.06	0.02
	5	0.12	0.01	0.10	0.02	0.13	0.02	0.12	0.03
Post Purchase	1	−0.16	0.03	−0.28	0.06	−0.15	0.05	−0.02	0.06
	2	−0.12	0.02	−0.14	0.04	−0.16	0.04	−0.02	0.05
	4	0.05	0.01	0.00	0.02	0.04	0.02	0.12	0.02
	5	0.17	0.01	0.14	0.02	0.16	0.02	0.21	0.02
N		26,462		8,337		11,254		6,871	
Adj-R^2		53.10%		53.60%		51.20%		54.70%	

Appendix C. Confirmatory Factor Analysis

We also analyzed our data using a confirmatory factor analysis to verify the robustness of the following dimensions developed by Terblanche (2018): merchandise variety, merchandise value, interaction with staff, internal shop environment, convenience, and store atmosphere. Specifically, we constructed the six dimensions from the 16 questions about the service execution of each store as follows:

Table C1
Dimension construction and parameter estimation.

Dimension	Item	Coefficient
Merchandise variety	Availability	1.000
	Variety	1.013
Merchandise value	Price	1.000
	Product Quality	1.158
Interaction with staff	Competence	1.000
	Helpfulness	1.056
	Cashiers	0.832
	Post Purchase	0.571
Internal shop environment	Feature	1.000
	Price Information	1.374
	Ease	1.318
	Store Information	1.401
Convenience	Accessibility	1.000
	Waiting	1.400
Store atmosphere	Cleanliness	1.000
	Security	1.069

Table C2
Fit indices of the CFA for the measurement model.

Degrees of freedom	89
Fit indices	
Chi-square statistic	6098.216 (p = 0.0)
RMSEA	0.051
X^2/df ratio	68.418
ECVI	0.234
NFI	0.950
NNFI	0.934

Table C3
Drivers of satisfaction at the individual level, using dimensions.

	Pooled		Hypermarket		Supermarket		Convenience stores	
Service execution elements								
Merchandise variety	0.21	***	0.20	***	0.18	***	0.27	***
Merchandise value	1.26	***	1.42	***	1.53	***	0.60	**
Interaction with staff	0.87	***	1.02	***	1.01	***	0.44	***
Internal shop environment	1.93	***	2.42	***	2.26	***	0.65	.
Convenience	−5.38	***	−6.79	***	−6.39	***	−1.65	.
Store atmosphere	1.22	***	1.53	***	1.33	***	0.58	**
Demographics and purchase characteristics								
Age [25–40]	−0.00		0.03	.	−0.01		−0.02	
Age >40	0.04	***	0.09	***	0.02		0.04	.
Female	0.01	.	0.01		0.02		0.01	
Morning	0.03	***	0.03	*	0.03	*	0.05	***
Accompanied	0.01		0.00		0.02	.	−0.03	.
Payment amount	0.01	***	0.00		0.02	***	0.01	
Intercept	3.79	***	3.95	***	3.80	***	3.93	***
N	26,462		8,337		11,254		6,871	
Adj-R^2	51.52%		51.80%		49.68%		52.33%	

Notes: ***p < 0.001, **p < 0.01, *p < 0.05,.p < 0.1. Store and time-fixed effects are not reported. Pooled corresponds to a general regression that distinguishes among formats. The base levels for all categorical dummy variables are Age <25, measured in the afternoon, and purchasing alone.

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