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Sales impact of servicescape's rational stimuli: a natural experiment

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Abstract:

Environmental psychologists suggest that people feelings and emotions determine what they do and how they do it. We used the stimulus organism response model (SOR) as an inspiring theoretical basis for our empirical contribution. We conducted a natural field experiment in six stores, settled in six different Italian cities, of a Swedish-founded Dutch-based multinational group, that designs and sells ready-to-assemble furniture, kitchen appliances and home accessories. We provided empirical evidence about the effects of a rational-functional stimulus, i.e. the availability of a new tool for collecting items that is more comfortable and less cumbersome for consumers. Through both a non-parametric and parametric testing, we found a positive effect of the stimuli in terms of sales.

Keywords: Servicescape; sensorial stimuli; functionality; shopping tool.

1. Introduction

Most of the marketing literature showed how the role the environmental situation plays on purchasing and consumption activities has been overlooked and usually considered as a random factor (Lim and Razzaque, 1997). This orientation seems to be justified in some contributions where, from a consumer analysis standpoint, attitudes are said to be the only fundamental driver in explaining purchasing behaviors (Thurstone, 1931; Katz, 1960; Sherif and Hovland, 1961; Anderson, 1971). Attitude is a state of mind, organized through experience, able to exert some influence on individuals' responses to all objects, people and situations (Allport, 1954). In this perspective, attitudes are considered relatively stable over time and transversal to situations, being generalizable to other objects, situations or people. However, according to Belk (1975), the influence of situation represents the largest or the second largest explanatory factor for individuals' preferences towards products or services. Mischel (1969) argues that the influence of situations is a determining driver of human behavior since they can induce uniform thoughts on appropriate responses. Lim and Razzaque (1997) go even further, arguing that people do not react to situations only on the basis of personal characteristics (such as personalities or attitudes) but on the basis of some environmental cues-induced behavior. In this perspective it is easy to suppose that the situation is the most important source of behavioral influence (Bitner, 1992). For this reason, the marketing literature started to better understand the most innovative trends in retailing, such as the extension of the core service (primary purpose of transactions like proximity, warehousing and product mix) and the search for an emotional dimension in shopping activities being able to prompt some responses from customers. The core service widening led to ever-increasing investments in services in which retailers were only occasionally involved, such as catering, banking, recreational and fuel distribution services (McDougall and Levesque, 2000). The increasing attention to emotional shopping thus implied a gradual transformation of traditional brick-and-mortar stores in emotions-based places. Consequently retailers have increasingly used product mix and recreational services as a means of making the stay and browsing in stores more pleasant and engaging (Wakenfield and Baker, 1998). Furthermore, it has been widely confirmed that in various scientific fields, customer relationships with the surrounding physical environment (servicescape) are closely related to their emotional states, particularly in the context of consumption for hedonistic purposes (Wakenfield and Blodgett, 1996; Baker et al., 2002; Wirtz et al., 2007). Based on the well-known "Stimulus-Organism-Response" model by Mehrabian and Russell (1974), the above mentioned contributions started to investigate the servicescape as a single environmental parameter as well as its effect when some environmental stimulus were offered to elicit emotions and produce behavioral intentions. Although, a number of studies on the relationships between customer perceptions and actual behavior in the commercial services sector have been conducted (Bitner, 1990; Boulding et al., 1993; Zeithaml et al., 1996; Cromin et al., 2000), little research focused attention on the theme of restaurants and their induced-effects within the store (Ryu and Jang, 2007; Weiss et al., 2004). Now, since consumers are placed in a sort of "factory" where services are produced and consumed simultaneously, it is very likely that they will also experience the full service of the overall physical structure being considered. Moreover, to the extent that the store can have a strong impact on the customer's perception of the shopping experience, one cannot disregard any analysis of the likely effects of the surrounding "factory" in which everything happens (Bitner, 1992). Our hypothesis is that through the services, commercial enterprises can not only make the attributes of their own offer abstract, but also manage store's environment in such a way as to positively influence customers' emotional structure and behaviors.

Environmental psychology research suggests that the physical environment can influence human behavior in many ways. In this respect, servicescape design must aim to identify the most likely human behaviors, focusing on those that are desirable in order to inform retailers strategic goals. The physical factors that can be appropriately manipulated to facilitate consumer actions are many. Among others, environmental cues usually include lighting, color, signage, textures, quality of materials, style of furniture, layout, wall decor, temperature and music. But also floorplan, layout

of equipment and equipment design have also proven to produce a significant effect in aiding customers carrying out tasks and achieving goals (Turley and Milliman, 2000). In self-service environments, where consumers are called to perform tasks on their own, spatial layout and functionality of the environment can play a pivotal role. As already mentioned, spatial layout refers to the ways in which machinery, equipment and furnishings are arranged, the dimensions and shape of these elements and spatial relations between them. Differently, functionality refers to the ability of such objects to facilitate performance and achievement of goals. While much empirical research focused on the effects of spatial layout and functionality in an employee perspective (De Croon et al., 2005; Lee and Brand, 2005; Tian and Belk, 2005; Alexander, 2013), few empirical contributions have been published on the effects of layout and functionality in a customer perspective (Surcshchander et al., 2002). Furthermore, the functionality of the equipment is likely to influence customers even in purely physiological terms (not only cognitively and emotionally). When the noise is too loud, the temperature is too high or low, the glare of the lighting is insufficient, the consumer may feel physical discomfort and become intolerant to the surrounding environment. In this way, the induced physiological state can discourage subjects from remaining and enjoying shopping. For example, it has been shown that the relative comfort of seating in a restaurant influences time consumers spend therein (this is particularly true in the case of fast-food restaurants where most customers leave the service within a short period). A line of research in engineering and design analyzed physiological responses to equipment design and more generally to environmental conditions (Petroski, 1985; Sanders and McCornick, 1993; Savendy, 2012; Stanton et al., 2018). These researches fall within a field of study most commonly known as “Human Factor and Ergonomics” (HF & E). The HF & E is the practice of designing products, systems and processes to take the proper account of the interaction between them and people capabilities and limitations. More commonly, ergonomics research has found applications in the military, space programs, computer design, automotive and employees work stations. A further development with enormous potential would lie in the application of such methodologies to the design of commercial environments thus paving the way for new empirical insights about layout and functionality effects on customers behaviors. For example, a pioneering study of human activity in public spaces demonstrated how even marginal changes in the design of particular urban elements (such as adding plants and flowers or arranging perches along sidewalks or streets) led to a stark increase in human activities and utilization. This logic would be successful in commercial environments where appropriate changes in the layout and furnishings of the service facility could accelerate customer traffic flow and their transaction volume. In this perspective, we introduce a new and more comfortable tool for customers use in collecting purchased furniture. This new tool has been configured as a larger shopping bag having wheels to facilitate transport throughout the store. Unlike other widely used tools, such as shopping carts and shopping bags, the new tool could be more comfortable and less cumbersome for consumers as long as it facilitates visiting and browsing the store. Therefore, we hypothesize the following:

H1: the average receipt of the new tool should be larger than other tools.

2. The experimental design, results and discussion

Our natural field experiment was conducted in six stores, settled in six different Italian cities (Torino, Padova, Villesse, Ancona, Porta di Roma, Catania), of a Swedish-founded Dutch-based multinational group, that designs and sells ready-to-assemble furniture, kitchen appliances and home accessories. We implemented a geographically-based randomization procedure. More specifically, we considered non-overlapping geographic regions very likely to be served by one store. In this way, stores have been randomly assigned to either a treatment group (stores equipped with the new tool) and a control group (stores without the new tool). Geographic randomization ensured that the effects of some nuisance variables are equally distributed across out treatment an

control conditions preventing us to obtain potentially biased results. The experiment was run in two days, the 29th and 30th of march 2017. All together 1123 customers participated in the experiments.

Prior to addressing our research hypothesis, we offer a preliminary descriptive analysis in Figures 1A and 1B. Figure 1A depicts the average receipt for the purchased furniture subdividing the sample by geographical area (North, Center, South). The South has a higher average receipt being 16,49% greater than the Center and even 45.19% higher than the North. Of course the histogram only reflects averages and normally for receipt data there can be more noise around the middle of each distribution.

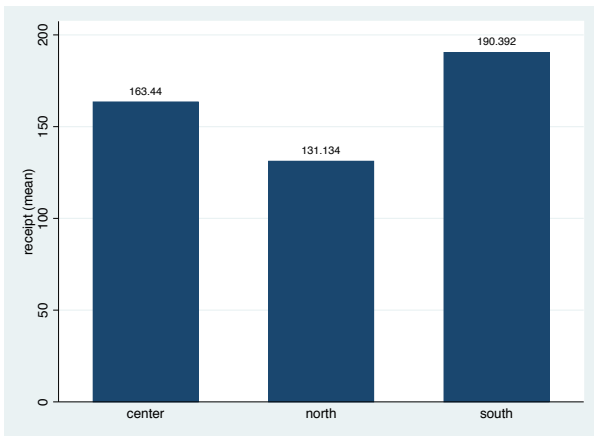


Figure 1A

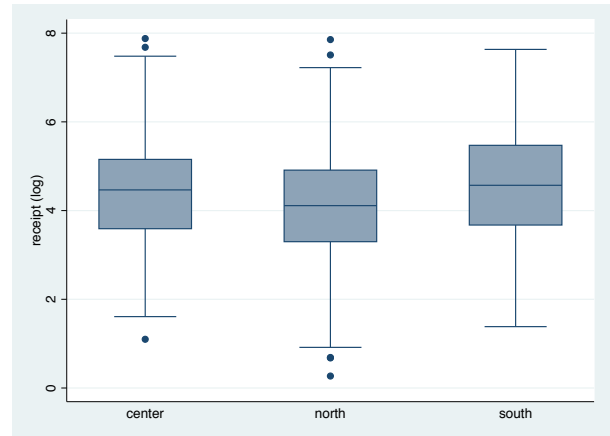


Figure 1B

In Figure 1B we show box plots for the logarithm of receipt distributions. Expressing our dependent variable in logarithms we are able to provide a better adjustment, since it reduces its variability (the log-transformation of the dependent variable reduces its variance). Furthermore, taking logs lessens the possible existence of heteroskedasticity although it could not definitively eliminate such a problem. In addition, considering logs we are able to mitigate potential drawbacks coming from some influential outliers. The distributions appear to be substantially similar although Southern receipts have a higher median than the others and Northern median is lower than that of the Center. However, this conclusion must await a more formal statistical analysis. Table 1A displays results from the Kolmogorov-Smirnov and the Wilcoxon rank sum tests. Both are non-parametric tests comparing the cumulative distributions of two independent samples.

	Kolmogorov-Smirnov Test		Wilcoxon Rank Sum Test		
	D-statistic	P value	Z-statistic	P value	P first > second
Center vs. North	0.130	0.001	3.887	0.000	0.572
North vs. South	0.176	0.001	-3.853	0.000	0.398
Center vs. South	0.123	0.052	-1.274	0.203	0.466

Table 1A

While the former is stronger in detecting changes in the shape of distributions, the latter has more power in assessing shifts in the median. Moreover, it is able to estimate the probability that a random draw from the first distribution is larger than a random draw from the second (see last column in Table 1A). We remind the reader that throughout the paper we will refer to a significance level of 5%. We note that for the first two pairwise comparisons (Center vs. North and North vs. South) the distributions are statistically different. The results seem consistent in both tests. Moreover, the probability of having a larger receipt is 57% for the Center compared to North and about 60% for the South compared to North. Since non-parametric tests do not rely on Gaussian

distributions or any other statistical distributional assumption, we provide a robustness check by running ANOVA to compare means across pairwise comparisons. Particularly, we run a one-way ANOVA to determine if the average receipt was different according to different geographic areas. The results show a statistically significant difference between geographic areas [F (2,1120) = 12.97, p value = 0.000]. Particularly, a Tukey post-hoc test revealed that receipts were statistically significantly 33% higher in Center compared to North and 46% higher in South compared to North (see Table 1B).

	Contrast	Std. Err.	t statistic	P value	
	North vs. Center	-0.334	0.079	-4.24	0.000
	South vs. Center	0.130	0.112	1.16	0.245
	South vs. North	0.464	0.112	4.14	0.000

Table 1B

Now, we aim to check whether the introduction of a new tool for collecting purchased furniture could have a positive effect on the average receipt. The shopping bag with wheels (from now on shoppbagwheels) represents an intermediate tool in terms of maximum transport volume: it can be placed between the yellow shopping bag and the more bulky shopping cart (shopcart) and flat shopping cart (flatshopcart). While the shopping bag has a maximum volume of 71 liters, the shoppbagwheels has a usable space of 119 liters (approximately + 67%). To the extent that consumers use shopping bags for non-binding purchases, it is easy to assume that the shoppbagwheels can also be perceived as "not binding" at the entrance of the store (shopping preliminary phase). In addition, it seems to be more comfortable, as it is equipped with a wheels underlying structure allowing shoppers to easily carry heavy weights throughout the store. Furthermore, it appears to be advantageous for the seller as well. The shoppbagwheels (1) does not require employees for collecting them outside the store and for the repositioning at the entrances (2) does not need a monthly maintenance as for the two types of shopping cart and (3) allows a reduced and more rational usage of tools parking spaces into the store.

In Figure 5A we report the average receipt based on tool usage. We note the dominant role of the flatshoppingcart with an average receipt of € 323.14 whereas much lower values are shown for other tools and for the no-tool case. It is remarkable to consider that the shoppbagwheels and the shoppingcart have substantially similar averages.

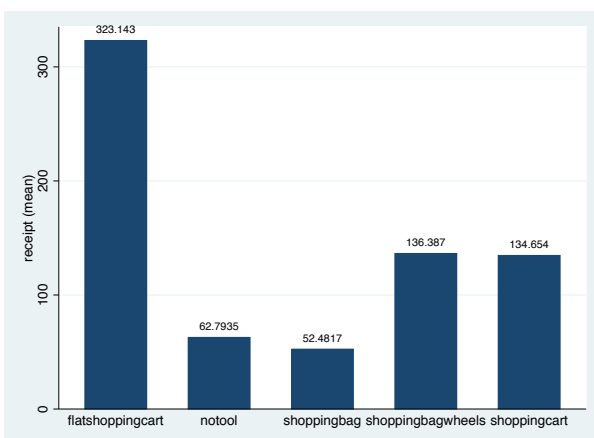


Figure 5A

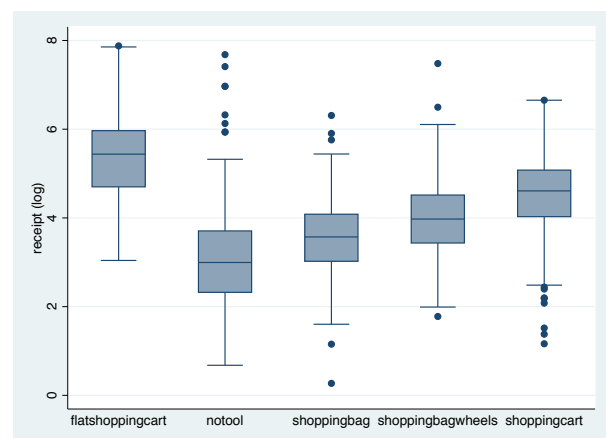


Figure 5B

Being mean values uninformative, in Figure 5B we represent receipts distributions for all tools and for the no-tool case. The box plots are very dissimilar from each other and confirm a

single difference of the flatshoppingcart with a significantly higher median. In addition, the shoppingcart and shoppingbagwheels distributions offer a different picture from what is shown by averages and a depressing effect seems at work for the shopping cart respect to shopping bag due to some influential outlier.

	Kolmogorov-Smirnov Test		Wilcoxon Rank Sum Test		
	D-statistic	P value	Z-statistic	P value	P first > second
Notool vs. Shopbag	0.280	0.000	-5.360	0.000	0.342
Notool vs. Shopbagwheels	0.451	0.000	-5.349	0.000	0.243
Notool vs. Shopcart	0.607	0.000	-15.246	0.000	0.137
Flatshopcart vs. Notool	0.785	0.000	17.013	0.000	0.942
Shopbag vs. Shopbagwheels	0.262	0.018	-2.995	0.003	0.352
Shopbag vs. Shopcart	0.502	0.000	-11.428	0.000	0.197
Flatshopcart vs. Shopbag	0.725	0.000	15.121	0.000	0.931
Shopbagwheels vs. Shopcart	0.328	0.000	-3.576	0.000	0.334
Flatshopcart vs. Shopbagwheels	0.599	0.000	6.846	0.000	0.825
Flatshopcart vs. Shopcart	0.370	0.000	10.660	0.000	0.740

Table 3A

Table 3A reports non-parametric tests results. We show that all pairwise comparisons are statistically different at maximum significance levels. These results are confirmed by an ANOVA analysis [$F(4,1118) = 208.16$, $p \text{ value} = 0.000$]. Table 3B present the post estimation contrasts they represent the average percentage contribution to the receipt of the first tool compared to the second in each comparison. The biggest contrast has been estimated for the flatshoppingcart (about 223% compared to the no tool) although shopping bag and shoppingbagwheels perform well compared to smaller tools.

	Contrast	Std. Err.	t statistic	P value
notool vs. flatshopcart	-2.232	0.084	-26.50	0.000
shopbag vs. flatshopcart	-1.784	0.092	-19.34	0.000
shopbagwheels vs. flatshopcart	-1.257	0.154	-8.18	0.000
shopcart vs. flatshopcart	-0.816	0.073	-11.16	0.000
shopbag vs. notool	0.448	0.096	4.68	0.000
shopbagwheels vs. notool	0.975	0.156	6.26	0.000
shopcart vs. notool	1.416	0.077	18.33	0.000
shopbagwheels vs. shopbag	0.527	0.160	3.29	0.001
shopcart vs. shopbag	0.967	0.086	11.27	0.000
shopcart vs. shopbagwheels	0.442	0.150	2.95	0.003

Table 3B

So far we analyzed the contribution of each tool to store's turnover in terms of absolute receipt. Now, considering the shoppingbagwheels volume advantages both for shopper and seller, we aim to verify how it performs in relative terms. Since three out of five tools have a maximum quantifiable volume, it is possible to compute the receipt they produce for every 100 liters of their volume. This ratio will represent a measure of average profitability as well as a relative performance indicator. The store manager is thus endowed with a new powerful indicator able to prompt new operational marketing strategies within the store. The three tools with a quantifiable

volume are: shoppingbag (max 71 liters), shoppingbag wheels (max 119 liters) and shopping cart (max 375 liters).

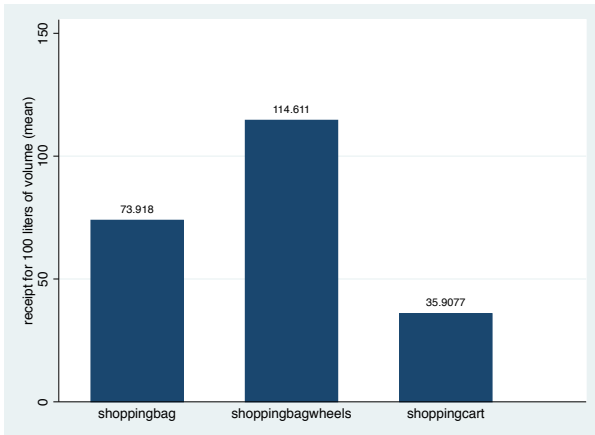


Figure 6A

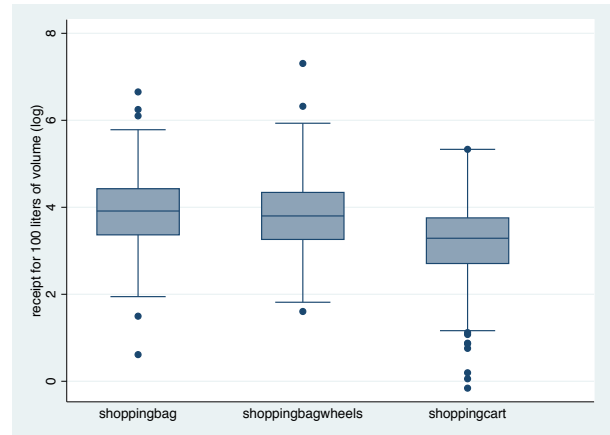


Figure 6B

Figure 6A depicts the relative receipt mean for each tool listed above. Immediately we note a surprising outcome: the new tool has a relatively larger average receipt with a value of 114.61 euro (+ 55% compared to the shopping bag and + 219% compared to the widely-used shopping cart). It seems that the shoppingcart perform very poorly in relative terms. But we need to carry out a more formal statistical analysis to corroborate such striking result. From Figure 6B we can obtain some additional insight on distributional properties of each tool. The new tool receipt distribution seems to be clearly different from the shoppingcart having a larger median. Yet the shoppingbag and the shoppingbagwheels box plots do not differ. Non-parametric tests seem to confirm that result (see Table 4A).

	Kolmogorov-Smirnov Test		Wilcoxon Rank Sum Test		
	D-statistic	P value	Z-statistic	P value	P first > second
Shopbag vs. Shopbagwheels	0.094	0.922	0.470	0.639	0.523
Shopbag vs. Shopcart	0.361	0.000	8.445	0.000	0.724
Shopbagwheels vs. Shopcart	0.327	0.000	4.077	0.000	0.689

Table 4A

Distributions are statistically different between shopping bag and shopping cart but, more importantly, between the new tool and the shopping cart. Particularly, the probability that the relative receipt of the shoppingbagwheels is larger than shoppingcart was estimated to be about 69%. The ANOVA parametric analysis strongly corroborated these results [$F(2,622) = 43.35$, p value = 0.000]. Interestingly, the Tukey post-hoc estimates show how effectively the relative receipt of the new tool is significantly 69% greater than the shopping cart thus supporting the non-parametric analysis (this means that for every 100 liters of volume the new tool brings a 69% higher turnover than the shopping cart)

3. Conclusion and managerial implications

The empirical evidence emerged in our natural experiment clearly shows that consumers can be induced to behave in certain ways according to atmospheric stimuli designed to purposely manage sales environments. According to the SOR model, the environment creates an emotional response in individuals that, in turn, induces approach or avoidance behaviors. We use the SOR model as an inspiring theoretical basis for our empirical contribution. Based on this theoretical framework, we

assume that the servicescape in the investigated stores can influence approach or avoidance behaviors consumers elicit towards one stimulus that we purposely provide. Particularly, we provide empirical evidence about the effects of a rational-functional stimulus. The rational stimulus was configured as availability of a new tool for collecting items that is more comfortable and less cumbersome for consumers. Through both a non-parametric and parametric testing, we found that our environmental stimulus has a positive effect in terms of sales. In a preliminary descriptive analysis on receipts means and distributions we show that, although, in terms of absolute receipt, larger tools such as flatshoppingcart and shoppingcart dominate their alternatives, they drastically lose their performance in relative terms. Thanks to the comfort and the greater functionality and capacity, the new tool performs much better than the more cumbersome and expensive shopping cart. Particularly, we demonstrate that the relative receipt of the new tool is 69% significantly greater than the widely-used shopping cart. Therefore, store managers are endowed with a measure of relative profitability working as a further performance indicator able to prompt the most appropriate operating strategies within the store. These results strongly suggest that with a careful and targeted service management, stores may be able to achieve high levels of economic performance through appropriate environmental stimuli. In our perspective, the servicescape can take on a facilitator role thus helping customers to execute tasks they consciously or unconsciously perform. By effectively widening ergonomics focus to commercial environments, researchers and managers can pave the way for new empirical insights on layout and functionality effects on consumers responses.

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