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Abstract

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Keywords

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Introduction

Imagine you are looking for a pack of spelt in a grocery store that you are not very familiar with. You begin searching within the pasta-category shelves, where the grocery store you are loyal to usually stocks the product, but you do not find it. You do not surrender but move to the rice and cereal aisle (you think that spelt, being a cereal, could have been shelved close to its twins). Again, no spelt in sight. You begin to feel frustrated but continue searching for the item near the canned soups (you remember that a retail chain close to your office once stored the spelt there, albeit it was never clear why): no spelt. You look for a store employee and, having found one, ask her about the spelt location in the store. She apologizes, but she does not remember. She is anyway very kind and brings you to the customer assistance desk: they check their computer records and eventually redirect you to a new section dedicated to vegetarian food. You mentally point out that you are not vegetarian at all, you simply eat spelt because you like it more than pasta; but you know better and keep silent. You thank them and turn your cart to the vegetarian aisle.

You can substitute spelt with (almost) any fast-moving consumer good and find yourself in the same situation depicted above. You may also leave the walls of grocery stores and enter a bookstore (or drugstore, or wine specialty store) and find yourself in a similar situation: one in which you experience a deep misalignment between the conceptual schemata used by the retailer to define the logical borders of a product category (and the physical shelving of the items belonging to that category) and your own representation of the cognitive and physical space it spans.

In other words, what likely happened in this example is that the retailer was adopting an industry-based categorization criterion which is focused on product features

and/or industrial classifications (e.g., ECR) rather than a customer-based categorization criterion which consists, instead, of grouping products according to perceived similarities between the products as perceived by consumers. The concept of "cognitive categorization" is well rooted in the consumer behavior literature; a stream of studies has contributed to the broader debate on the boundaries of product markets by taking the perspective of the consumer as opposed to that of the industry (Day, Shocker, and Srivastava 1979; Shocker, Zahorik, and Stewart 1984; Porac and Thomas 1990). The basic assumption of this stream of studies is that the set of alternatives that constitute the consideration set for consumers does not necessarily overlap with the set of products considered to be competitors from the standpoint of the industry (Belk 1975). According to these studies, product similarities cannot be defined a priori because of some intrinsic properties of the product themselves but should rather be derived from consumers' judgments of substitutability between the products (Day, Shocker, and Srivastava 1979).

The concept of substitutability has been shown to be itself a multifaceted construct that can be operationalized adopting many alternative approaches, such as free associations, the "dollarmetric," direct grouping of products, products-by-use analysis, and substitution-in-use (Day, Shocker, and Srivastava 1979). According to the substitutability perspective, product substitutability can be associated with perceptual distance between products, so that products seen as substitutes are perceived at closer distances from each other (Huh, Vosgerau, and Morewedge 2016). With these regards, the literature has proposed the implementation of categorization tasks to infer the perceptual distance between products on the underlying assumption that the higher the number of times objects are grouped together, the lower the perceptual distance from

the objects (Blanchard et al. 2012). What has been neglected, to the best of the authors' knowledge, is the direct translation of the concept of perceptual distance into more straightforward marketing actions based on a definition of physical distance between products when they share the same physical space, such as on retail shelves.

Focusing on physical distance is not a trivial issue, because shelf layout has been shown to heavily influence consumers' in-store behaviors and reactions, their satisfaction with stores, and, ultimately, store profitability (Garaus, Wagner, and Kummer 2015). A shelf layout more consistent with a consumer-based categorization of one (or more) product class(es) is more likely to positively affect customer satisfaction (Morales et al. 2005), via higher product accessibility and lower search costs (Kim, Lee, and Park 2014)

These studies witness the increasing attention that customer orientation is receiving in retailing research and practice (e.g., Geuens, Brengman, and S'Jegers 2003), so that the current literature is witnessing our in-depth knowledge of the antecedents of customer evaluations about a retailer. Surprisingly, as highlighted by Diehl, Van Herpen and Lamberton (2015), acknowledgement of the existing relationship between store satisfaction and shelf layout has not generated a backward interest in the customer-based definition of shelf layout, that is, a shelf layout whereby the physical distances between products on the shelves match the perceptual distances between products as they are stored in the minds of consumers. In this vein, previous studies advanced the idea that assortment evaluation is positively affected by the extent to which the items' display on the shelves matches how the same items are mentally organized by consumers (Mantrala et al. 2009). However, the question is still open on the extent to which consumers exhibit different reactions whether the shelf layout – that determines

the physical distance between the products according to their shelf placement – is more or less consistent with the perceptual distances between the same products as identified by the category "piles" yielded by the implementation of a categorization task (Blanchard, Aloise and De Sarbo 2017). Accordingly, the goal of the present research is twofold: on the one hand, to propose a methodological approach based on a categorization task that allows to derive a customer-based shelf layout in which the higher the number of times products are categorized together, the closer they will be on the shelf. On the other hand, the present research aims to empirically test if adopting such a consumer-based shelf layout significantly affects consumers' in-store perceptions and reactions, eliciting greater store satisfaction when there is a high level of fit between how products are organized on the shelves and how consumers mentally sort the same set of products. In doing so, the present research relies on one of the most recent methodological techniques proposed by the extant literature to derive consumer-based perceptual differences between products from a categorization task, namely the card sorting technique (Blanchard, Aloise and De Sarbo 2017). The technique has been validated and cross-checked through a field study which provides empirical evidence supporting the notion that consumer-oriented shelf layouts positively affect consumers' in-store perceptions and behaviors.

Overall, this paper aims to stimulate the adoption of a consumer-based perspective in retailing research and practice, especially in the domain of category management. Results from this research suggest that card sorting can be an appropriate tool to design a shelf layout closer to the way consumers mentally represent the product category: actually, a consumer-based shelf layout is associated with higher levels of satisfaction with the store, lower time spent in front of the shelf as a consequence of the greater

simplicity in visually scanning the shelf, and higher sales volume compared with a more traditional, industry-based approach.

Theoretical Background

Category Management and Assortment Perceptions

Marketing literature has traditionally dealt with category management by adopting either the retailer, the manufacturer, or the marketing-research provider perspective (Cil 2012). It is self-evident how this approach has led to overlooking, at least partly, the consumer perspective. This is not a trivial issue, since the concept of category employed by retailers has shown only a partial overlap with the mental representation that consumers develop with respect to the same product category (Piris and Guibert 2015).

The assumption of an incomplete overlap (to say the least) between consumer- and industry-based categorizations rests on two separate streams of literature, scarcely cross-fertilized so far. The first stream encompasses studies focusing on the assortment levels and shelf layouts that maximize retailers' sales and SKU profitability. In this regard, the literature has focused on competing criteria that retailers can adopt to display products on shelves (Huffman and Kahn 1998): some studies have addressed attribute-based layouts (e.g., Hoch, Bradlow, and Wansink 1999; Kahn and Wansink 2004), and others have explored benefit-based layouts (e.g., Poynor and Wood 2010; Pizzi and Scarpi 2016). Interestingly, this distinction can be distilled to the concepts of *taxonomic* and *script* categorization criteria advanced by Ross and Murphy (1999). Specifically, previous studies have attempted to examine different grouping criteria that retailers can adopt to organize the items on the shelves, addressing the role of product attributes (e.g. Dreze, Hoch, and Purk 1994), benefits (e.g. Lamberton and Diehl 2013) or consumer

goals (e.g. Morales et al. 2005). Either way, the criterion has always been ascribed to intrinsic product characteristics that can be identified a priori by the retailer, on the underlying assumption that consumers will be able to detect it and to assess the extent to which such a criterion is in line with their own mental structures. The present research challenges this assumption by advancing that retailers might benefit from incorporating consumer-based product similarity perceptions to determine product grouping. Indeed, the independence of industry-based and consumer-based categorization criteria is contradicted by empirical results by Mogilner et al. (2008), who found how the categorization criterion adopted by the retailer affects, in a reciprocal pattern, consumer demand. In this vein, some recent studies have underscored that consumers develop different perceptions of the same assortment as a function of the display criterion adopted by the retailer (Lamberton and Diehl 2013; Pizzi and Scarpi 2016). Accordingly, a deep comprehension of the criteria that consumers use to cognitively classify a product assortment into many subsets corresponding to the merchandise categories is consequently not a mere academic exercise.

Consumer-based Categorization Studies

The stream of literature highlighted in the previous paragraph has traditionally aimed to providing an empirically actionable insight on how to manage product categories, albeit disregarding the consumer perspective. Instead, a second stream of literature has focused on the mental processes that individuals employ to categorize a set of objects according to internally coherent subsets. According to this second stream of studies, product similarities do not come as an intrinsic property of the product themselves. Rather, they reflect the perceptual distance between products (Huh,

Vosgerau, and Morewedge 2016) which can be derived from consumers' judgments of substitutability between the products (Day, Shocker, and Srivastava 1979).

Among the analytical tools that can be adopted to investigate individuals' mental categorization processes, the *card-sorting* technique allows the definition of consumer-based, bottom-up categorization trees (Fincher and Tenenberg 2005). The key advantage of this approach is that it prevents the potential recursivity typical of procedures that infer the category boundaries by observing the behaviors (e.g., cross-elasticities) displayed by individuals facing the shelf: the main weakness of elasticity based approaches is that the observed behaviors are not determined by consumers' mental structures and categories, but are the result of the *ex-ante* categorization choice made by the retailer. Conversely, the card-sorting technique allows an *ex-post* estimation of the number, and internal structure, of categories through which individuals cognitively represent the assortment. Furthermore, the clustering procedure that can be adopted to analyze the *card-sorting* data provides the researcher quantitative measures of perceived similarity between the categories themselves (Blanchard, Aloise, and De Sarbo 2012).

With regards to the conceptualization and measurement of perceptual distances, a recent stream of research on categorization processes has provided meaningful indications on how to deal with the heterogeneity that characterizes the way consumers mentally form product categories (Blanchard et al. 2012) through card sorting tasks (Blanchard et al. 2012; 2017). However, the mere application of the card-sorting technique does not guarantee per se that a consumer-based categorization will positively affect individuals' reactions to a shelf layout that reflects the cognitive structure captured by the technique itself. In other words, this stream of research on product

categorization has adopted the consumer perspective to capture how individuals sort products or objects but has not translated it into a proper approach to the definition of the grouping criteria behind shelf layout, which is at the core of the stream of research highlighted in the previous paragraph.

Therefore, the integration of these two theoretical perspectives into a common frame might allow us to measure the effect, if any, of shelf layout on consumers' in-store behavior. The present study extends the boundaries of the stream of research about consumers' cognitive categorization of objects/products by showing that the consumer-based categories identified by means of a card-sorting study lead to shelf layouts which determine more positive consumers' in-store perceptions and behaviors. In doing so, the present research addresses this issue by running a field experiment that focuses on consumer reactions to consumer- versus industry-based shelf layouts in a real retail setting, thereby increasing the external validity of the results (Roggeveen, Nordfält, and Grewal 2016).

Table 1 below summarizes the different streams of literature and highlights the incremental contribution of the present research.

Place Table 1 about here

Table 1. Related Literature and the Incremental Contributions of This Study

Conceptual Framework and Hypotheses

Past research has addressed the most relevant antecedents of service quality and store satisfaction. Among these, a prominent role has been found to be played by stores'

physical aspects, such as the shelf layout that "enables customers to easily find the products they need," and the extent to which "the products are appropriately displayed on the shelves" (Vazquez, Bruce, and Studd 2003) or customers are "able to locate merchandise easily" (Kim, Lee, and Park 2014). In this vein, a large body of literature has focused on how an assortment is displayed on shelves, with the underlying assumption that it is not just the value and amount of the merchandise that affect consumers' in-store perceptions and behaviors but rather the clarity of the visual display (Reutskaja et al. 2011). This stream of studies has evidenced that consumers tend to process the same assortment differently as a function of the relative position of the products on the shelves (Valenzuela, Raghubir, and Mitakakis 2013) that, in turn, affects the perceived clarity and consistency of the display criterion (Pizzi and Scarpi 2016). As a consequence, consumers have been found to draw different inferences about product quality (Valenzuela, Raghubir, and Mitakakis 2013), price (Inman, McAlister, and Hoyer 1990), and popularity (Valenzuela and Raghubir 2009) depending on the shelving criterion.

Overall, previous literature has focused on the positive effects exerted by a shelf layout that displays products according to a criterion that customers rate as logical and consistent. For instance, Van Herpen and Pieters (2002) found that consumers prefer comparing attributes across product units to develop assortment variety perceptions, with the relevant implication that the shelf layout should facilitate such attribute-based comparisons. However, there is still a lack of consensus in the extant literature on whether and to what extent a shelf layout where shelf adjacencies mirror the perceptual similarities between products in the mind of the consumer positively affects consumer evaluations of the store. Since consumers have been found to evaluate more positively

an industry-based shelf layout (i.e. reflecting a categorization criterion defined by either the retailers or the manufacturers) when it is consistent with their consumer-based internal categorization (Morales et al. 2005), and that the card sorting technique allows to elicit the consumer-based categorization processes adopted by consumers through the identification of perceptual similarities between products, one might argue that the closer the shelf layout to product perceived similarities, the better the store evaluation. In this vein, research has pointed out that consumers perceive different levels of actual assortment size (Mogilner, Rudnick, and Iyengar 2008; Townsend and Kahn 2014) as a function of how the assortment is organized and displayed (Hoch, Bradlow, and Wansink 1999; Kahn and Wansink 2004).

Accordingly, the present research hypothesizes that:

H1: Consumers will perceive higher shelf display logical consistency when choosing from a shelf arranged according to consumer- rather than industry-based criteria

H2: Consumers will perceive lower choice difficulty when choosing from a shelf arranged according to consumer- rather than industry-based criteria

Furthermore, literature documented that the positive effects of a consumer-based shelf layout go beyond assortment size perceptions, ultimately affecting product sales (Needel 1998; Van Nierop, Fok, and Franses 2008; Chandon et al. 2009) and post-sales evaluations such as store (Briesch, Chintagunta, and Fox 2009) and decision (Iyengar and Lepper 2000) satisfaction. Accordingly, the present research posits that consumers

will display greater satisfaction with a store or with their choice within a particular category when shelves are arranged according to a criterion which is more consistent with their mental structures (i.e., derived from a consumer-based approach, such as the card sorting technique) rather than to industry-based criteria (i.e., the specific and tangible attributes defining the product). More formally, the present research also hypothesizes that:

H3: Consumers will purchase a higher amount of products when choosing from a shelf arranged according to consumer- rather than industry-based criteria

H4: Consumers will display higher decision satisfaction when choosing from a shelf arranged according to consumer- rather than industry-based criteria

H5: Consumers will display higher overall satisfaction with the store when choosing from a shelf arranged according to consumer- rather than industry-based criteria

Empirical Analyses

The following paragraphs report the results of two empirical studies conducted to (a) obtain a consumer-based categorization of products within a given category through the card-sorting technique (Study 1), and (b) test whether the implementation of shelf layouts more consistent with the consumer-based categorization criteria identified in Study 1 affects consumers' in-store perceptions and behaviors (Study 2).

Study 1

Study 1 was aimed to map the criteria adopted by consumers to categorize a set of products within a category by using the card-sorting technique and to assess whether and to what extent such a cognitive categorization overlaps with the industry-based categorization. The product category under investigation was industrial confectionery. The rationale for the choice of this product category was twofold: there is a huge heterogeneity between the products commonly classified within this target category, and these products are typically purchased on impulse in front of the shelf. Ninety-five SKUs were selected as stimuli for this study: of these, 45 products are already included in the product category according to industrial classification codes, and the remaining 50 were identified based on a focus group conducted with 10 individuals, plus the contribution from a category manager of a large retail chain and the marketing manager of one of the leading companies in the industry, who were asked to list all the products they connected with the category "industrial confectionery."

Next, 100 respondents (aged 25–64; 60% females) were randomly gathered from a large consumer panel managed by a professional company that sells consumer samples for academic and market research purposes to participate in an online card-sorting study implemented on Qualtrics. Eligibility criteria were being in the 25–64 age range and having purchased at least one industrial confectionery product in the last 6 months. Participants' task was to drag and drop the 95 target products into as many groups they wished. After sorting all 95 products, each respondent was asked to assign a label to each category s/he created.

Interestingly, 76% of the 50 products that at the time of this research were not included in the industry-based classification of the industrial confectionery category

have been actually clustered with products that belong to the industry-based definition of the category. This initial finding corroborates the idea that there is little overlap between industry- and consumer-based assortment categorizations and that card-sorting can be a suitable methodology to reconstruct consumers' cognitive categorization schemes.

To obtain insights into the piles produced by participants, the procedure proposed by Blanchard, Aloise and De Sarbo (2017) was used to analyze the sorting task data. From sorts by many individuals, the procedure produces a set of "summary piles" - piles that best describe a collection of heterogeneous sorts. In addition to summarizing the main piles individuals make, the procedure illustrates the differences between consumers' sorting criteria and highlights the most prevalent ones.

To identify the summary piles that best represent the sorts made by individuals, the recommendations by Blanchard Aloise and De Sarbo (2017) were followed via the software available at cardsorting.net. Specifically, the procedure was sequentially executed 3 times for 300 seconds for each value of K=1...12 where K is the number of summary piles to be identified. The results showed minimal effects of local optima, such that executions including more summary piles did not produce a significantly better fit.

Investigating the reduction of the number of mispredictions as the number of summary piles increases, the common approach of looking for an "elbow in the curve" via a scree plot was adopted. That is, the scree plot helps identifying the model where the addition of more summary piles did not significantly improved model fit. It was thereby determined that the model with 6 summary piles was the most appropriate based on the

results of the analyses since it produced a 12% improvement with respect to the 5-pile solution, and yielded smaller improvements if adding further piles. The model with 6 summary piles produced 7,409 mispredictions with 88% of accuracy. Table 2 below summarizes the results for the six piles extracted.

Place Table 2 about here

Table 2. Study 1: Summary of the six category piles extracted

The results of the analysis reveal that the two piles containing the majority of the confectionery products are pile 2 and pile 3 that account for forty-seven and thirty-four products respectively. The smallest cluster is constituted by pile 4 that contains only one product that is considered as being different from all the other products. Product membership to the piles is defined through the accuracy rate that defines, for each product, the level of agreement between individuals in including the product into each pile. A product is assigned to a pile when its accuracy rate for that given pile is higher than 70%, that is to say when at least 70% of the respondents agree in clustering that given product within that given pile. Basing on this criterion, 82 out of the 95 (86%) products included in the analysis were univocally assigned to one of the six piles, thus supporting the accuracy of the analytical method in identifying unambiguous clustering of the products. The remaining 13 products were either perceived to belong to more than one summary pile (12 products) or excluded from all the six summary piles (1 product) due to low values of accuracy rate, and therefore excluded from subsequent

analyses in order to obtain unambiguous summary piles. These 13 products were originally included in the industry-based categorization of confectionery products, but are likely to have been perceived by respondents to belong to a different category, so that their exclusion supports the fact that industry- and consumer-based categorizations do not fully overlap.

The covering rate defines the percentage of total piles made by respondents that are approximated by the summary pile created by the software. With reference to the covering rate, Table 1 shows that 5 out of 6 piles have relatively low and similar rates (between 6% and 15%), suggesting high levels of heterogeneity in the clustering criteria adopted by respondents. Silhouette average indicates the average fit of each product to the summary pile. The silhouette average is high for piles 1 and 6 (respectively 61% and 56%), which are those that are most clearly defined in terms of membership. For the rest of piles, the products fit is lower, but acceptable considering in particular that the second, third and fifth piles are the most heterogeneous and numerous ones.

Once defined the exact composition of the clusters, the labels used by respondents during the sorting task were analysed by observing the relative frequencies of the labels being associated with each pile. According to the analysis of the labels, the six piles can be interpreted respectively as respectively “Cakes”, “Biscuits”, “Chocolate snacks”, “Traditional pastry to offer”, “Filled Biscuits”, and “Healthy snacks”. The six labels identified as the most frequently used in association with each pile highlight the fact that consumers use different criteria underlying their categorizations, based both on product type (cakes, biscuits, filled biscuits), ingredients (chocolate) and consumption occasions (traditional pastry, healthy snacks).

In the next study, the results of a field experiment are presented where shelf layout is manipulated according to the consumer-based categorization criteria highlighted in Study 1.

Study 2

Results of Study 1 provide support to the development of a consumer-oriented categorization methodology. However, the results of this study do not allow any understanding of whether and to what extent managing a category by adopting a consumer-based perspective actually affects consumers' in-store behaviors and perceptions.

Therefore, in Study 2 shelf layout was manipulated (industry- vs. consumer-based) to test whether consumers exhibit different reactions (i.e., decision satisfaction, perceived assortment, and time spent in front of the shelf) to retail shelves as a function of shelf layout, which was manipulated consistently with the results of the piles emerged from the card-sorting analysis in Study 1.

253 participants were recruited (quota sampling, 56% females, 67% aged 25–64) upon their exiting the industrial confectionery aisle (regardless of whether they had actually purchased something) in two superstores, owned by a large Italian retail brand, representative of the average Italian superstore. Half of the participant was recruited when the shelf layout was industry-based, the remainder was recruited three months after the shelf layout was turned into consumer-based. The time lapse between the two data collections was set in order to give customers enough time to familiarize with the new layout. By doing so, it is possible to rule out the possibility that consumer reactions to the consumer-based layout are influenced by a scarce familiarity with the layout

rather than to the different display criteria. Apart from the shelf layout, there were no changes in the product assortment, which overlapped 100% the SKU tested in Study 1, nor on price levels and promotional activities.

Time spent in front of the industrial confectionery shelf was measured as dependent variable alongside participants' overall satisfaction with the store, perceived assortment size, clarity of the shelf layout adopted by the retailer in the industrial confectionery category, and their decision satisfaction. The time spent in front of the industrial confectionery shelf was measured by two research assistants equipped with professional stopwatches. The stopwatch was activated only when consumers were actually facing the shelf, that is to say, it was stopped and re-started in case a consumer moved between different areas of the aisle. Satisfaction with the store was measured as overall satisfaction by means of an adapted version of the three-item scale originally developed by Lockshin and Innis (1993) anchored to "1-Extremely Dissatisfied" and "5-Extremely Satisfied". Then, respondents had to evaluate the shelf layout adopted by the retailer through a bidimensional scale purposely developed for this study consisting of four 7-point Likert scale items (Factor 1, "Choice Difficulty": "It is easy to find the products I am looking for", "It does not take me a long time to find the products I am looking for"; Cronbach's $\alpha = .73$; Factor 2, "Shelf Logic": "The logic behind the way products are placed on the shelf is clear", "The shelf is messy"; Cronbach's $\alpha = .80$), and their decision satisfaction ("I am satisfied with the choice(s) I made for products displayed on this shelf" anchored to 1 – Completely Disagree and 7- Completely Agree) adapted from Fitzsimmons (2000).

Participants were also asked whether they noticed any change in shelf layout and, if so, whether they felt that the new layout was better, the same as, or worse than before.

To prevent biases due to participants getting accustomed to the change in shelf layout, we waited 6 weeks after the change in shelf layout before surveying customers.

Results from Study 2 reveal that a consumer- versus an industry-based shelf layout leads individuals to perceive higher levels of display logical consistency in the shelf ($M_{Industry} = 4.48$ vs. $M_{Consumer} = 4.71$;$F = 22.31$; d.f. = 1;243; $p < .001$; $\eta^2 = .08$) and in ease of finding the product they are looking for ($M_{Industry} = 4.34$ vs. $M_{Consumer} = 4.65$;$F = 27.23$; d.f. = 1;244; $p < .001$; $\eta^2 = .10$) thereby supporting H1 and H2 respectively.

The behavioral information collected about the amount of time spent by customers in front of the shelf corroborates the finding that the consumer-based layout favors a more effective and faster browsing of the shelf: customers spent on average less time in front of the consumer-based shelf ($M = 45.92$ sec) than in front of the industry-based shelf ($M = 63.92$ sec, $F = 9.858$; d.f. = 1;385; $p = .002$; $\eta^2 = .03$). This finding per se, however, might be quite undesirable for retailers willing to stimulate unplanned purchases on the part of customers when confronted with the shelf: however, despite the difference in time spent by customers, the average value of the purchases in the category (in Euros) was not significantly decreased by a consumer-based shelf ($M = 8.03$) compared with an industry-based shelf ($M = 7.50$; $F = .394$; d.f. = 1;685; $p = .531$; $\eta^2 = .001$). This finding seems to contradict H3 which predicted a larger amount of products being purchased by consumer exposed to a consumer- rather than an industry-based shelf. However, it might be that consumers kept their mental budget for the category constant, and used the in-store slack (Stilley, Inman, and Wakefield 2010) to purchase a higher number of products. Being the dataset for the present study based exclusively on the monetary value of the purchases from the category, the present

research does not allow to disentangle the value from the amount of purchases that might potentially provide partial support to H3.

Nonetheless, results from this study show that customers were more satisfied with their choice ($M_{Industry}$ = 4.31 vs. $M_{Consumer}$ = 4.82; F = 41.79; d.f. = 1;245; p < .001; η^2 = .15) when they chose from a consumer- than from an industry-based shelf. This result supports H4 regarding the existence of a positive effect exerted on consumers' perceptions by a shelf layout where product adjacencies are determined from the distances between products perceived by consumers and elicited by means of the card sorting technique in Study 1.

Furthermore, results show that the effects of the shelf-layout manipulation spill over the boundaries of the category under investigation, affecting also customers' judgments of the entire store and determining a significant, albeit marginally, difference in overall satisfaction with the store. Participants displayed higher levels of satisfaction with the store when they were exposed to a consumer- (M = 4.86; S.D. = .42) rather than industry-based (M = 4.66; S.D. = .74) shelf-layout, all other categories' shelf layouts being equal (F= 7.63; d.f. = 1;251; p = .006; η^2 = .03), thus supporting H5.

Interestingly, most (77%) participants in the study realized that there had been a change in the shelf layout from their previous store visits. Among those who identified the change in shelf layout, 80% were fidelity card owners ($\chi^2(1, N = 151) = 3.03$, p = .08). This finding might sound somehow obvious, as it suggests that heavy users of the store are more likely to identify changes in shelf layouts. However, quite surprisingly, no differences emerge in decision satisfaction ($M_{Acknowledge}$ = 6.63 vs. $M_{NotAcknowledge}$= 6.57; F = .282; d.f. = 1;149; p = .59; η^2 = .002), nor in display logical consistency ($M_{Acknowledge}$ = 4.88 vs. $M_{NotAcknowledge}$= 4.82; F= .646; d.f. = 1;144; p .42;

η^2 = .004), nor in ease of locating the products ($M_{\text{Acknowledge}}$ = 4.74 vs. $M_{\text{NotAcknowledge}}$= 4.70; F= .153; d.f. = 1;144; p .69; η^2 = .001) between those who acknowledged and did not acknowledge the change in visual layout. This finding suggests that shelf layout might exert an unconscious effect on consumers' reactions regardless of whether consumers recognize or not that products are arranged more consistently.

Finally, regular customers might be more familiar with the industry-based layout of the specific store, resulting in higher preferences for industry-based shelf layout, loyalty program membership was added as a covariate in the ANOVAs. No significant univariate effect emerges for loyalty program membership on decision satisfaction (F = 1.578; d.f. = 1;149; p = .21; η^2 = .01) as well as in overall store satisfaction (F = 2.928; d.f. = 1;149; p = .09; η^2 = .01), nor in display logic (F = .323; d.f. = 1;149; p = .571; η^2 = .002), nor in ease of locating the products (F = .120; d.f. = 1;149; p = .73; η^2 = .001) between those who acknowledged and did not acknowledge the change in visual layout.

Overall, these findings support the hypothesis that a shelf layout consistent with consumers' cognitive representation of the focal category improves the performance of the key indicators that drive consumer satisfaction with the store.

General Discussion

Theoretical Implications

This research aimed to investigate if a shelf layout defined by consumer perceptions of product similarities – detected by means of the card-sorting technique – affects consumers' reactions to the store in terms both of satisfaction and assortment

perceptions and time spent in front of the shelf. With these regards, the present research challenges the assumption of independence between industry- and consumer-based assortment categorization criteria by advancing that retailers might benefit from incorporating consumer-based product similarity perceptions to determine product grouping. In doing so, this research addresses two main research gaps that have not been fully covered by the extant literature: first, it provides an empirical investigation of the applicability of the card-sorting technique to category management. Indeed, the vast majority of extant studies have relied on card-sorting to understand how consumer preferences are articulated both in terms of individual- (e.g. Alba and Chattopadhyay 1986) or group-level (Hamilton, Puntoni and Tavassoli 2010) categorizations. The present research shows that card sorting can be a useful research tool also for studying how consumers perceive similarities between products in assortment and to map the cognitive structure that underlies consumers' categorizing of retailers' assortments. Results from this research extend the findings by Blanchard, Aloise and De Sarbo (2017) who developed an innovative method to cope with potential heterogeneity in sorting data, by showing that card sorting results allow the identification of category boundaries and product similarities starting from consumer perceptions. Results from Study 1 support the appropriateness of the card-sorting methodology for studying how target customers cognitively categorize the assortment provided by a retailer and show that industry- and consumer-based categorization criteria do not overlap. Second, this research contributes to the broad stream of literature about the impact of shelf layout on consumer in-store perceptions. Prior research has extensively documented that consumers perceive higher levels of satisfaction when confronted with a shelf which is well-organized (Bauer, Kotouc, and Rudolph 2012), especially when the criterion used

to place the items on the shelves is consistent with the way consumers mentally elaborate the assortment (Morales et al. 2005). In line with this stream of literature, the present research contributes to advance scholarly knowledge by showing that such a positive impact on consumer perceptions can be achieved by adopting a consumer-based approach, such as the card sorting, to determine the boundaries of the category and similarities perceptions among the products in assortment. In this vein, Study 2 provides external validity to the proposed methodology of card-sorting by implementing a field study revealing that shelves organized according to a consumer- versus industry-based criterion enhance relevant dependent variables, such as ease of visually processing the shelf and of finding the preferred products, and customers' satisfaction with their choice and, ultimately, with the store. This result might seem to contradict what Van Herpen and Pieters (2012) found with regards to consumers' preference for attribute-based assortments, which might yield to categorization criteria closer to the industry-based perspective. Indeed, results from the present research do not deny that attribute-based assortment organizations are positively evaluated by consumers, but, rather, that it is the consistency of the industry- and the consumer-based categorization that affects consumer perceptions. Accordingly, the two perspectives can be easily reconciled as long as the attribute-based criterion adopted to sort the assortment is not defined ex ante by the retailer relying exclusively on organoleptic features of the products, but, instead, it derives from the analysis of consumer similarity perceptions that can be based either on concrete attributes or goal-oriented considerations (Ratneshwar, Pechmann, and Shocker 1996). With these regards, the present research fill the gap between these streams of research about consumers' cognitive categorization of objects/products by providing theoretical and empirical support to the notion that the

consumer-based categories identified by means of a card-sorting study lead to shelf layouts which determine more positive consumers' in-store perceptions and behaviors.

Managerial Implications

This research could support category managers and visual merchandisers in their efforts to define product adjacencies on the shelves or product prices, depending on their cross-elasticity. Typically, the most popular approaches to layout optimization rest on a solid, proven profitability basis: the best layout is the one that maximizes category revenues. This study is not meant to disconfirm this strategy, but to complement it with a different, complementary view: the best layout is not just made of profitability but also of user experience, user comfort and ultimately user satisfaction. Rather, this study suggests that the application of consumer-based categorization methodologies, such as the card-sorting technique, can provide retail managers with helpful insights how consumers mentally perceive similarities among the products in assortment. Acknowledging how consumers categorize a given assortment can therefore help to organize shelves according to criteria that are more consistent with consumers' mental structure. With these regards, results from the present research encourage practitioners to shelf the products in assortment consistently with consumers' categorization criteria in that such a shelf layout enables enhanced customer perceptions of the assortment, and, more generally, their satisfaction with the store.

Also, market research companies might benefit from the results of this research if it prevents their falling into the typical circular reasoning that affects the definition of category boundaries: category boundaries based on customer preferences, as opposed as

conventional industry standard, can stand out from the mass and represent a potential differentiation tool for those retailers willing to try them.

Limitations and Future Research

This study is obviously not free of limitations. Among others, the present study mainly relies on self-stated customer perceptions as dependent measures; future studies might move further by focusing on more fine-grained behavioral data such as basket analysis and market shares of the products involved.

In addition, the analyses underpinning the present research are conducted in a specific product category characterized by a purchasing process denoted by low levels of involvement and high levels of impulsiveness, together with huge heterogeneity in product characteristics. Future research is needed to show if consumer-based assortment organization exerts similar effects on consumers' in-store evaluations of other product categories characterized by higher levels of involvement or higher levels of complexity. Relatedly, results from the field study show only a marginal, though positive, effect of consumer- versus industry-based shelf layout on overall store satisfaction. This might be due to the fact that in the period of data collection the only category whose shelf layout was re-organized following the consumer-based approach presented in this research was the target category for the present study (i.e. industrial confectionery). Accordingly, additional research would be needed to test if overall store satisfaction would significantly increase if the entire assortment of the store was re-organized according to consumer-based criteria.

Furthermore, no significant difference emerged on customers' purchases from the category between the consumer- and the industry-based shelf layout. This might be due to the fact that in the present research the data collected measured exclusively the monetary value of sales from the category and not the amount of SKUs purchased. Future studies might extend the range of dependent measures to the purchased quantity of items from the category.

Overall, this paper aims to stimulate the adoption of a consumer-based perspective in retailing research and practice, especially in the domain of category management, by proposing a methodology that enables scholars and retailers to capture the mental space of the product category and by empirically testing the advantage of such approach as opposed to a more traditional, industry-based one.

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