ENHANCING CONSUMERS' CATEGORY-KNOWLEDGE. AN EXPERIMENTAL STUDY IN A RETAIL SETTING

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Ph.D. in Business Administration and Management
Bocconi University – Milano

February, 2004

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ACKNOWLEDGEMENTS

I gratefully acknowledge the advice and support I received from the members of my dissertation committee: prof.s Stefano Podestà, Chiara Mauri, Giorgio Tassinari and Sandro Castaldo.

I am appreciative of the encouragement and support prof. Podestà gave me: when someone has just a few items of a puzzle, with only a vague idea of the picture to create, every confident and encouraging word, reflecting personal interest, has a great motivating impact.

My dissertation has heavily benefited by prof. Tassinari's invaluable comments and suggestions as well as kind moral support, especially in later stages of the empirical research.

I am particularly indebted to Chiara and Sandro for reading the drafts of this dissertation and, more importantly, for their friendship, guidance, assistance and especially patience as well as full confidence placed in me during the entire time I was doing research at SDA Bocconi.

I am indebted also with the Faculty and Staff of the Marketing Department of the Warrington College of Business Administration at University of Florida, in Gainesville.

Above all, I must thank prof. Alan Sawyer (Chair-Marketing Department) and Christopher Janiszewski (Graduate Coordinator-Ph.D.) for having allowed me to spend six months as a Visiting Scholar, also attending classes in their leading Ph.D. Program in Marketing. I also appreciate the special kindness of prof. Bart Weitz (Director of the David F. Miller Center for Retailing Education and Research) and Richard Lutz (JC Penney Prof. of Marketing), who have spent their time listening to my initial rough ideas for the dissertation, and encouraging me to continue. Prof. Alan Cooke, with his class on experimental design, has engendered my willingness to explore a research approach I had never experienced before. Prof. Sawyer's help extended over my visiting period, giving me some "brilliant" advices for research design and continuous friendly encouragement, even at distance.

A special thought is deserved by all the Marketing Ph.D. Students I've met there: Elise, Qiong, Els, JoAndrea, Qj, Wouter, Baler, Yubo, Marcus, Tim, Eduardo, Jun, as well as other Visiting Scholars, especially Alexandra, Anne and Pakize. Together with their relatives, they have embedded me in a social environment that was really helpful in feeling not alone and letting time spent in searching for and reading hundreds of papers goes on smoothly.

Two other Ph.D. Students at University of Florida, from the Finance and Health Education Departments, have played a critical role in enriching the emotional quality of my visiting period: Randa and Ying. I thank Randa for making her representative Italian warm friendship available any time I needed. I will never forget the experience of daily living (especially shopping and movies!) with Ying, as well as the endless discussions about similarities and differences between our cultures which have engendered a strong tie that I hope will resist, despite distance.

I thank all my friends and colleagues of the Ph.D. in Business Administration and Management at Bocconi University, with whom I have spent a significant part of my life, sharing enjoyable moments and facing occasional disappointments, made more bearable with their help.

How not to mention my colleagues at SDA Bocconi: I have to thank them for stimulating me to attend the Ph.D. Program, as well as for showing interest in my research project and giving me useful feedback, especially in recent occasions of public presentation at internal seminars.

A special thanks is owed to my colleagues who collaborate in pre-testing the experimental procedure, particularly, Stefania B. and Stefano P. who have devoted plenty of their precious free time in discussing with me or participating to my trial-interviews which were then improved, based on their experiences. The refinement of some measure instruments (especially questionnaire to assess personal expertise) has greatly benefited by the expert knowledge of some friends I heartedly thank, especially Stefania S. and Teo.

The empirical investigation wouldn't be possible with the concrete support of other friends (namely, Alessandro, Monica and Sonia) who provided me with otherwise unavailable technological equipments, as well as the help of some undergraduate students at Bocconi University who cooperated with me in pre-testing and carrying out the study. An important thanks is due to the Master students who participated to the experiment, letting my data collection feasible, and to Lidy whose help was appreciated to cope with some last-minute emergencies.

I want to express a special thank also to all those persons who have answered "I'm sorry, I can't help you": thanks for having stimulated me to find out new solutions by myself, thus practicing lateral thinking, and becoming more autonomous.

At last, a big thank to all those persons, not mentioned explicitly here, who have helped me, in some ways!

RINGRAZIAMENTI

Per chi si impegna in una carriera accademica è quasi inevitabile che la sfera professionale invada e a volte, purtroppo, finisca per dominare anche la sfera privata.
E' proprio a chi mi è stato particolarmente vicino, non solo nel periodo di frequentazione del Ph.D. e di studio per la tesi, condividendo gran parte della mia vita, che devo infiniti ringraziamenti.

La tesi, in sé, non rappresenta nulla [...solo altri alberi abbattuti.... oltre a mesi e mesi di sforzi] per raggiungere un traguardo che, di fatto, è solo un inizio nel percorso professionale che ho intrapreso.
La conclusione del Ph.D. rappresenta però un momento di bilancio personale, ideale per guardarsi indietro e rendersi conto, tra l'altro, di quante persone vantano "crediti affettivi" nei propri confronti.
Approfittando di queste pagine iniziali per ringraziare tutti voi, voglio fare in modo che la tesi acquisti almeno un valore personale, veicolando sensazioni e pensieri che raramente ho modo di esprimere a voce.

...pagine personali dunque, dedicate solo ad alcune persone, ecco perché scritte in italiano in una tesi in inglese, e soprattutto scritte dando libero sfogo ai sentimenti, senza badare troppo alla forma, dalla "Katia" che conoscete e non dalla Ph.D. Candidate...

Grazie ai miei genitori, esempio raro di dedizione completa agli altri, anche a costo di sacrifici personali. Il vostro affetto è l'unico sostegno su cui so di poter sempre contare.
Se spesso mi sentite lamentare un'insoddisfazione personale è proprio per le difficoltà che incontro nell'emulare il vostro esempio. Mi vedo incapace, almeno al momento, di raggiungere nella vita traguardi paragonabili ai vostri, oltretutto sapendo di partire da condizioni avvantaggiate, grazie all'aiuto morale e materiale che mi avete sempre dato.
Purtroppò, studiando non si può imparare tutto.....quello che vorrei scoprire presto è come rendere la vostra vita quotidiana più serena, come meritate, alleggerendovi delle preoccupazioni per me....
Il mio maggior rammarico è sapere che non potrò mai ripagarvi per tutto quello che avete fatto per me e che continuerete a fare.

Grazie a Pierfrancesco, "compagno di vita" per quelli che giudico tra gli anni migliori dalla mia nascita. Grazie per la pazienza che hai avuto con me, accettando di dare priorità ai miei impegni di studio e ascoltando i miei lunghi sfoghi telefonici e non, senza mai lamentarti. Grazie per l'entusiasmo con cui mi hai contagiato e di cui ancora spesso difetto, e soprattutto per avermi insegnato a non prendermi troppo sul serio e ad essere maggiormente flessibile. Entusiasmo, auto-ironia e capacità di sdrammatizzare, flessibilità sono stati indubbiamente d'aiuto anche nell'affrontare il Ph.D. Per non parlare poi dell'attesa ansiosa o del ricordo malinconico di fantastici weekend trascorsi insieme che hanno fatto passare le settimane di studio rapidamente, almeno nelle percezioni...

Spero tu possa perdonarmi per non esserti stata sempre vicina e d'aiuto nei momenti più difficili che hai dovuto affrontare.

Grazie agli zii e ai cugini, che formano la mia famiglia "allargata": quante volte siete stati partecipi delle emozioni che hanno accompagnato i miei piccoli traguardi e le mie difficoltà momentanee! Perdonatemi per avervi trascurato per motivi di lavoro, nei rari momenti di riunione familiare al completo, appartandomi per leggere un articolo o scrivere qualcosa.... Sembra impossibile che quando chiunque è in vacanza, io abbia lavori urgenti da consegnare!
Grazie anche ai miei nonni che mi sono sempre "vicini" e tifano per me!!! Se ho una famiglia così splendida, lo devo a voi.

Grazie agli amici di sempre, che dai tempi delle scuole superiori e dell'università non mi hanno mai abbandonata, facendomi sentire di aver sempre qualcuno su cui poter fare affidamento, anche quando le mille attività quotidiane sembrano allontanarci.
Grazie agli amici più recenti che rendono l'attività di studio e lavorativa emotivamente appagante, oltre che intellettualmente stimolante.

Conserverò preziosamente i ricordi di ogni attimo passato insieme a voi e delle emozioni vissute.

Un grazie infine (e qui do' sfogo a un po' di acidità...) anche ai parenti e conoscenti "meno vicini" che sono convinti che io non abbia ancora finito l'università e si chiedono come sia possibile che alla mia età io stia ancora studiando, limitandosi a criticare, senza mostrare un minimo di curiosità per le ragioni che potrei fornire.....Grazie perché la vostra reazione non fa altro che rafforzare la mia ammirazione per i miei genitori, che non hanno mai opposto alcuna obiezione, incoraggiandomi in ogni scelta, dimostrando un'apertura mentale e un'empatia che sono doti personali innate che mi auguro di aver ereditato e di saper mostrare alle persone che mi capiterà di incontrare nella mia vita.

A chi mi è stato «vicino» durante gli anni del Ph.D., rendendoli indimenticabili.
Grazie!

INTRODUCTION

"The changing marketplace is demanding strategic changes by retailers and manufacturers so they can improve their understanding of today's consumers and align product categories with their diversified needs. (...)"
"You [the retailer] must define each category, a task that isn't as easy as it might sound. The way you define a category might differ from the way a manufacturer or market research company sees it, and the way your customers perceive it might be something else entirely. You should collect all of these opinions, but give the most weight to customers' perceptions"
(Nielsen and American Marketing Association, *Category Management. Positioning Your Organization to Win*, NTC Business Book, 1997: p. 24 and 33)

Category management has emerged in the retail and marketing literature of the Nineties, as well in practitioners' common beliefs, as an innovative managerial approach which could prove valuable to face the tough market context in the fast-moving-goods supply chain, yielding potential improvements in business performance.

Implementing effective and efficient assortment management practices, centered around product categories, is a key component of category management projects. A critical starting point is defining product categories by taking into proper consideration the customers' perspective. Category definition is linked to important strategic, organizational and operational retailers' decisions, with significant effects also on vertical relationships within the channel with both suppliers (e.g., responsibility of gate-keeper roles) and customers (e.g. variety for choice, store layout and shelf-display), and on horizontal relationship in terms of competitive differentiation (i.e., degree of overlapping between retailers' offerings).

Available literature – either academic or managerial – appears to be characterized by disproportionate emphasis placed on different aspects of an efficient and effective assortment management. Great attention has been devoted to assortment composition problems (i.e., selection of items characterized by a proper degree of variety) and to quantitative issues in assortment presentation (i.e., optimization of the display-space to be assigned to the items), almost disregarding qualitative issues (i.e., whether the criteria followed in segmenting and grouping assortment to be displayed in-store in categories at different level of inclusiveness are useful to customers in their buying process). Only few studies have addressed the issue of product-assortment presentation in-store by categories, usually suggesting that mapping on customers' mental categorization processes should result in layouts and displays which are easily understandable and appreciable by store patrons.

The intended contribution of the dissertation can be summarized as:

- Presenting a review of the international literature on categories and categorization, from disciplines such as Cognitive Psychology and Marketing, in order to provide a theoretical background to retailers' efforts to obtain an assortment presentation by categories in line with their customers' perspective [part I]. A comprehensive literature analysis on this topic is, at our best knowledge, still lacking in the Italian context. Furthermore, categorization research from a marketing perspective has sparely been applied to retail setting and problems.
- Suggesting practical ways of managerially exploiting such literature review to drive retailers' assortment presentation by categories, also investigating the potential effects.

  In particular, a conceptual framework is developed which proposes a dynamic approach to achieve a cognitive fit with customers' mental representations of product-categories when presenting assortment in-store [part II], and a first empirical test, in an experimental setting, of its feasibility is performed [part III].

CHAPTER 1

IN-STORE VISUAL ORGANIZATION OF PRODUCT ASSORTMENT BY CATEGORIES: PROS AND CONS OF A CUSTOMER PERSPECTIVE

1.1. THE RESEARCH TOPIC

Faced with a tough evolving market context, retailers are under increasing pressure to improve their competitive position and performance, by adopting new managerial approaches and re-thinking their traditional role, functions, activities and relationships (e.g., Dussart, 1998).

Assortment management[1] plays a key role in achieving differentiation from competitors and in influencing retailers' economics and usual performance indicators. Some recent trends and projects in the consumer-packaged-goods supply chain – particularly Category Management[2] – have even emphasized the perceived relevance of assortment management for retailers (e.g., Lugli, 1997; MN, 1992a). **Category management** has been introduced as "a process of managing categories as strategic business units" (Nielsen, 1992) and it **has been advanced as a way to improve performance, for both manufactures and retailers, by "enhancing delivered consumer value"** (e.g., FMI, 1993; ECR, 1995; Lugli, 1996), **and to achieve differentiation from competitors** (e.g., Pellegrini, 1997).[3] **The retailer's focus in assortment management should be on categories.**

[1] "The process by which a retailer attempts to offer the right merchandise, in the right place and at the right time" (Levy and Weitz, 1992).

[2] Data of a Food Marketing Institute (FMI, 1997) research show that 86% of manufacturers and retailers in USA were operating, in 1997, according to category management, which was introduced as an evolution of space management. Castaldo and Bertozzi (2000) highlight a lower and later diffusion of this approach in Italy.

[3] Some examples of expected benefits from category management for the involved firms are: a high value offered to the customer with an improvement in customer satisfaction and a development of the business (i.e., increase in sales, margins, profitability due to a development of the entire categories).

There are both empirical and anecdotal evidence showing that expected improvements were hard to gain, also because of experienced difficulties in the practical implementation of category management (e.g., Hoffman, 1995; Mathews, 1995; Mc Cann, 1995; Discount Store News, 1995; Chain Store Age, 1996; Dussart, 1998; Gruen and Shah, 2000; Kaipia and Tanskanen, 2003), inherent in its complexity.

Category management, as a matter of fact, is a **complex managerial approach**, that implies setting goals, adapting marketing mix tools, measuring performance effects etc., at "the category-level", in a reiterated manner (e.g., MN 1992b; Gnau, 1994; Harris and McPartland, 1986; Pastore, 1997; Kaipia and Tanskanen, 2003). Furthermore, all these activities may be executed with varying degrees of involvement and influence from the retailer's suppliers and external consultants (i.e. data providers) with implications for the retailer's external relations, besides internal organization (e.g., Bertozzi, 1997; Cristini, 1996, 1998; Higgins, 1989; Lugli, 1993; Mazzoni, 1997; McLaughin and Hawkes, 1995; Schlossberg, 1993).

Sometimes retailers found themselves «stuck in the middle» in their efforts of category management implementation, moaning also the lack of a sound and shared methodological support in the literature at their disposal.

With respect to assortment – a key component of category management – it appears that managerial and academic contributions have given disproportionate amounts of attention to different aspects of an efficient and effective assortment management process.

A lot of attention has been dedicated to space management problems (i.e. development of conceptual frameworks and decision support systems), to assure that the retailers allocate the right quantity of space to the items within a store, also building sophisticated mathematical and statistical models (e.g., Borin and Farris 1995; Bultez and Naert, 1988; Corstjens and Doyle, 1981; Drèze, Hoch, Purk, 1994).

Slightly less, but sufficient, attention has been given to assortment selection problems, to ensure that the retailers have the right selection of items for their stores, often suggesting criteria for optimizing the carried assortment (e.g., Anupindi, Gupta, Venkataramanan, 1997; Borin, Farris and Freeland, 1994; Broniarczyk, Hoyer, McAlister, 1998; Hoch, Bradlow, Wansink, 1999; McIntyre, Miller, 1998; Schiller, 1993, 1996).

Relatively **less attention** has been deserved **to the right presentation of the selected items**, to guarantee that the customers are at ease when looking for and choosing a product (i.e. category configuration, patterns of sub-category adjacencies, suggested "reading-keys"). [4]

Both assortment composition and presentation require retailers' care, as suggested by the analogy proposed by Mauri (2000: p. 228): to provide an ideal menu (assortment composition) is necessary but not sufficient, its communication appeal (assortment presentation within stores) is also necessary to obtain the customer's preference.

As far as assortment presentation is concerned, the focus in the literature seems to have been placed on a «quantitative» issue, that is assuring the right amount of shelf-space dedicated to each item, in order to maximize sales and profitability, avoiding stock outs, and promoting the purchase of the references with higher margin and turnover. **Less attention seems to have been devoted to a** «qualitative» issue, that is **ascertaining whether the logic underlying the visual organization of assortments displayed in-store** (i.e., criteria for placing some items into the same grouping and separating them from others) **is clear and useful or not for the customers.**

As a matter of fact, shelf-space management software are based on detailed store data (i.e. inventory, sales data) and assist the retailer in arranging the display, so that the profitability of each category is maximized. However, they require and assume an a-prior «proper» categorization of the items selected to be included in the assortment (Desrochers, 1999: p. 14). But **the issue of which is the right way of organizing and displaying the selection of assortment to carry, within the store and amongst the shelves, in particular as far as assortment categorization and**

[4] Some empirical researches have investigated the impact of different display solutions on the buying behavior, mostly for the implications for manufacturers, rather than for giving suggestions to retailers. For example, the impact of product display on brand evaluation and choice has been analyzed in the following studies: Areni, Duhan, Kiecker, 1999; Buchanan, Simmons, Bickart, 1999; Desai and Ratneshwar, 2003; Hsee and Leclerc, 1998; Simonson and Winer, 1992.

sub-categorizations is concerned, is mostly left to the retailers' sensibility to the market.[5]

There is empirical evidence of some retailers experiencing problems of «mass confusion» while trying to offer a «mass customization» (Huffman and Kahn, 1998), with negative effects on the buying behavior (such as, frustration, dissatisfaction, delay or deny of the purchase) and, ultimately, on the retailers' and manufacturers' performance (e.g., Sethi and Lepper, 1998; Narisetti, 1997; Osnos, 1997; Purpura, 1998). Increasing manufacturers' product ranges[6] as well as retailers' assortments has represented a viable competitive strategy to satisfy specific customers' needs in these last years. But, it has soon shown some shortcomings: the risk to replace variety with redundancy (problem related to assortment composition) and to confuse customers (problem related to assortment presentation), making their choices less easy, with shelf crowding which obscures variety (Mauri, 2000: p. 183, 184).

Mass confusion may be caused by both a sub-optimal selection of the items to carry, and a wrong presentation (e.g., FMI 1993, 1997). «Sub-optimal» and «wrong» when taking into consideration the shoppers' perceptions. Some examples should be a proliferation of products included in the assortment selection by the retailer and considered similar and duplicated instead of differentiated by the customers (e.g., FMI 1993), display criteria not consistent with consumers' product search, evaluation and choice criteria (e.g., Mauri, 2000).

A category management approach implies a rationalization and simplification of both assortment composition and presentation, <u>but</u> considering the customers' perspective.

The variety of the assortment should be guaranteed, by reducing redundancies and providing to the customers real (that means distinct and differentiated) alternatives

[5] Given the decision about the selection of merchandise to include in the assortment (which product classes and items to carry), a retailer has then to decide how to categorize and display it. Desrochers (1999: p. 13) explains: "Because retailers organize several product classes into a category and display them together in one area of the store, the categorization of products and items determines their location in the store". The categorization is the basis for other assortment display decisions, that include "which product classes and items to place near each other", "how much space to allocate to each" and "when to change the shelf arrangement". While for the latter two decisions a retailer can benefit of different space allocation software, the first decisions must be assumed before employing such decision support systems.

[6] For example, in 1995, in the United States, 22000 new references were launched (+ 26% 1994), of which 17000 (77%) were line extensions. Only 1200 were kept, and most of them disappeared after 2 years (AC Nielsen, 1997).

for choice (Mauri, 2000: 184). Many empirical researches have demonstrated an improvement in retailers' performance ensuing a rationalization of assortment composition, which has required a reduction in the array of items carried (e.g., Broniarczyk et al., 1998). Different category management practically implemented projects have followed such suggestions, with simplifications of assortment composition (Mauri, 2000: p. 211). **Adjustments in assortment composition appear to be taken into proper consideration, by academics as well as by practitioners operating in the retailing industry.**

A rationalization of assortment presentation, by acting on merchandising tools, however, seems to be required too, in order to let the consumer see and understand the existent variety of choice. An empirical research in the Italian context (cited in Mauri, 2000), for example, compared purchase intentions when entering the store with actual purchases when exiting, for the product category "hosiery", of a sample of 322 females visiting a mass retailer (supermarkets and hypermarkets). The results showed that a low percentage of the planned purchase (most at brand level) were translated in effective purchases, and, more interestingly, the in-store merchandising (especially product display) has heavily changed customers' plans.[7] The «reasons for discomfort during shopping» provided by the interviewees suggests that such a situation was due to the way the product category was presented in-store to the customers: the gap between what they were looking for and what they saw on the shelves led them to change their brand choice or to deny the purchase.

Lack of or somehow inadequate customer-focus should represent one of the major causes of practical problems in category management implementation. In fact, a deep knowledge of one's own customers, for both the retailer and the supplier, has been advanced, in academic (e.g., Bertozzi, 2000; Castaldo and Bertozzi, 2000), as well as practitioner literature (e.g., Blattberg and Fox, 1995; Cotrell, 1995; Mathews, 1995b; Nielsen, 1997; Radice, 1997), as a fundamental pre-requisite to successful category management.

[7] Intentions to purchase the product category were expressed by 10.56% of the interviewees (82% of which were already specified at the brand level). Only 29% of the intentions gave rise to purchase. Furthermore, the planned vs. [effective] brand choices were as follows: 14 [2] for brand A, 7 [10] for brand B, 4 [2] for brand C, 3 [0] for brand D, 0 [9] for brand E; 7 out of the 14 planned purchases for brand A were not translated in any purchase.

AC Nielsen's (1997) interpretation of category management is centered around the recognition that the business success cannot leave out of a clear positioning in the consumer's mind-space and in the retailer's shelf-space. The retailers' assortment as well as the manufacturers' portfolio of offer should be moulded on the consumers' needs and the store should reflect their explicit and implicit requests. On the retailers' shelves the consumers should find an offer they recognize as right, since it allows an optimized choice which reflects their expectations (AC Nielsen, 1997). **Another objective of category management,** however, **is to make processes of shopping/purchasing and of understanding the store easier for the consumer. This translates, as far as assortment is concerned, into creating categories which are readable and easy to interpret for the customers** (AC Nielsen, 1997).[8]

The firm's knowledge of the behavior as consumer (possessed by manufacturers) **and as shopper/purchaser** (possessed by retailers) **is considered to be the key variable in the category management implementation process** (AC Nielsen, 1997).[9]

Understanding the meaning and the content of a category – according to the customer's perspective – is reported by Castaldo and Bertozzi (2000: p. 9) as a **fundamental step in category management processes**, given the consequences it has for, on the organizational (e.g., responsibility assignments) and operational (e.g., layout and display solutions) grounds. Bertozzi (2000: p. 113) argues that a customer-based approach to category management requires a **category definition which starts from the customer. A fundamental question to be answered is: how would the customer define the category, the sub-categories and the segments according to her/his needs and his buying behavior?**

Actually, category management implementation guides – prepared by consultancy and market research companies – provide some suggestions to outline a "category tree", that is a classification of the entire assortment into

[8] For Benkiser's (as an advisor for the retailers) category management project, for example, the ultimate objective was to have a consumer who, when in front of the retailer's shelf, makes a choice which is easy, quick, complete, so that he can be an "every day happy customer" (AC Nielsen, 1997).

[9] It's important to consider both behaviors, since the product is purchased in the store, chosen in front of the shelf, and consumed at home. For example, according to Colgate Palmolive, how the consumer segments the market, what he has in his mind when he enters the store, which in-store stimuli may change his behavior are all dimensions of consumer knowledge a manufacturer should develop to support the implementation of category management in retailers' stores (AC Nielsen, 1997).

categories of different inclusiveness (e.g., macro-categories, categories, sub-categories). The characteristics of the product (i.e., shape, size, components, package, price etc.) and of the target-customer (e.g., male vs. female, adult vs. children etc.) have frequently been suggested as the main criteria for classifying retailers' assortment at an operational level, which means also for defining shelf-display (Bertozzi, 2000: p. 117).[10]

The main problem, however, is that most retailers haven't considered these categorization instantiations as examples. Rather they have simply followed and applied them, thus creating a high degree of homogeneity in the assortment organization (e.g., Cescom and IRI, 1999; Castaldo and Premazzi, 2000: p. 275), without exploiting a potential source of differentiation from competitors heavily based on the ability to understand their customers (Pellegrini, 1997).

As Bertozzi (2000: p. 113, 114) notices, assortment clusterization has unavoidable consequences on merchandising (i.e., in-store layout and shelf display) and on negotiations (i.e., buying responsibilities). In fact, **for a retailer, categories** (at different levels of aggregation, ranging from macro-categories to sub-categories) **have a display valence, meaning that they should be visually represented within the store**. Macro-categories are basilar in defining store-layout (i.e., departments), whereas categories and sub-categories are critical in defining shelf-display.[11]

As far a macro-categories and store-layout are concerned, a customer-based approach to category management requires their definition according to the consumptions processes, that is, the activities a consumer performs to completely satisfy a need, considering relationship of substitutivity and complementarity between products (e.g., Bertozzi, 2000: p. 114; Busacca and Castaldo, 2000: p. 73; Mauri, 2000: p. 214; Pellegrini, 2000: p. 101).

Categories, sub-categories and further segmentations – useful in defining shelf display arrangement – should reflect the criteria ranking used by customers when analyzing the items belonging to the product category (Bertozzi, 2000: p. 116).

[10] One exemplification referred to the category "ready-to-eat cereals" is its decomposition into "for adult", "for children", for "family" based on the target-customer; and into "with sugar added" vs. "without sugar added" based on the product composition, which can be considered the most important criteria followed by customers interested in or looking for this product category.

[11] An example of macro-category may be "ready-to-eat meals". Examples of categories within this macro-category may be appetizers, pasta, rice, vegetables, meat etc. Within pasta, examples of sub-categories may be: bran pasta, plain egg pasta, egg pasta with filling etc.

The planned purchases which were unfulfilled in the hosiery example previously mentioned seem to be due to a lack of tuning between consumers' product choice criteria and retailers' criteria underlying product category display. Mauri (2000: p. 209), when interpreting such findings, concludes that the assortment visual arrangement is not reflecting the sequence of criteria the consumer is following when approaching the product category for choice, that reasonably are the criteria of shelf-scanning (Chandon, Hutchinson, Young, 2002),[12] with negative consequences for the category sales as well as for the sales of some brands of the category (of both retailer's and manufacture's interest).[13]

In summary, **given a certain assortment composition, different criteria in visually organizing it on the shelves of the store may influence the ability of the consumers to "read" the offer, by perceiving the implicit variety, and to find out the item which is most suited to their needs, thus ultimately influencing the shoppability of the category.**

In other words, having rationalized assortment composition, by selecting an appropriate variety of choice for the store's customers could not translate in enhanced value transferred to the customer and be of no benefit for the retailer, if he is not able to adequately communicate, through assortment presentation, such variety and guide the customer to exploit it for finding the most suitable item.

Important variables to be considered, are shopping involvement and the degree of purchase planning. Such variables can moderate the effect of display organization (especially confusion) on consumers' purchase behavior. In fact, as Mauri (2000: p. 211) explains, they influence consumers' willingness to "study" retailers' assortments to find out exactly what they are looking for. This willingness, in turn,

[12] "When consumers quickly scan a typical supermarket shelf display, they are exposed to a large number of brand names that are embedded in an even larger number of non-brand, product-related words. It seems likely that only a small portion of these words are even read" (Alba and Hutchinson, 1987: p. 429).

[13] According to the results of the interviews, two sequences of search criteria appeared to be very common when looking for an item within the product category hosiery (in the particular season when the study was done - Autumn) and approaching the shelf: color-brand-texture weight and brand-color-texture weight. The data about the shelf-display of the hosiery category in the stores where consumers were shopping demonstrate that one of the most important criteria for search (color) was neglected in display arrangement. There were a lot of variations in color, both vertically and horizontally along the shelf. With respect to this important factor of search and selection, the assortment visual organization therefore obscured the real variety which was implicit in its composition. Consumers were grouping items in their minds in a different manner than in-store display.

affect the strategies consumers will follow to deal with the mental cost of matching what they see in-store and what they are interested in. Such strategies may involve purchase den or visit to another store, thus ultimately impacting on retailers' and manufacturers' performance.

Assortment presentation – obtained mainly through store layout, display arrangement and other POP merchandising supports – **has a communication valence.** In fact, it carries – more or less explicitly – information when the consumer is in-store for shopping and has to make a purchase decision with respect to the selection of products available. It may be included among the main forms of non-personal communication at the retailer's disposal.

The content and the format of the information transmitted through assortment presentation can either favour (by orienting it) or make complex and even inhibit (by disorienting it) consumers' product information search, acquisition, processing, as well as their in-store decision making.

One significant anecdotal evidence about the communication potential of in-store visual merchandise organization through categorization refers to the European hypermarkets experiencing consumers bewilderment and confusion when they first re-organized the display according to universes or worlds, thus grouping categories (i.e., according to usage occasion) that before were usually separated on the basis of the merchandise nature (e.g., Charrier 1996 and 1997). By providing additional information (on printed brochures and in-store directories) about the criteria underlying the layout and display revision, retailers were able to overcome the initial cognitive resistance by their loyal customers.

Exploring the potential of assortment presentation through product categorization as a consumer information – and education – instrument, actionable in-store, might be of particular interest given the recent trend in the retailing industry for packaged goods toward category management and **the scarcity of empirical research suggesting how to realize in practice a customer-oriented categorization which allows a differentiation from competitors.** It means, in other words, exploring the potential of a different way of acting on assortment – especially on its effectiveness, rather than efficiency – within a category management framework, to assure that the variety of choice inherent in assortment composition (by categories and sub-categories) should be easily understood and appreciated by the customers (for example, exploiting variety to select an alternative fitting their specific needs).

Given the same composition of the assortment carried, a well-thought presentation might act as a powerful differentiation source for the retailer (e.g., FMI, 1995 about the impact of store layout and display on store-loyalty), thus leading to performance improvement. For example, the fit between the display criteria for the product categories and sub-categories carried on a shelf and the criteria followed by the consumer when approaching the displayed products (e.g., collants grouped by color and by size in the cited case of hosiery) could facilitate the analysis of the available offer, clearly understanding the relevant (for the customer) differences between the variants available, and choosing the preferable item.

1.2. THE INTENDED CONTRIBUTION

This thesis speculates on the basic idea that the knowledge of one's own customers' knowledge is extremely important in order to jointly improve assortment selection and presentation, in a category management implementation process. The **focus**, however, will be only **on the relationship between customers' knowledge and retailers' assortment presentation implying a categorization process.**

This idea draws on the realization that **assortment view may represent a learning opportunity for a shopper** (retailer's customer). Looking for updated information about the product offering may be an important shopping motivation (e.g., Tauber, 1972; Donovan and Rossiter, 1982; Bloch and Richins, 1983) and most of the consumers' knowledge about the product variety is acquired by analyzing in-store display, especially for novice consumers (Mauri, 2000).

In particular, **understanding how the shoppers interact with the displayed assortment during the learning process**, and which are the intervening variables (that may be, for example, involvement and prior knowledge), **should offer insights on the ways a retailer could manage assortment presentation, in order to**

favourably influence the buying behaviour which is, at least partially, based on what customers have learnt.

The expected managerial implication should be a **customer-knowledge-based approach to assortment management by categories, where enhancing customers' knowledge could be the starting point** towards an improvement of the retailer performance (i.e., customer satisfaction, sales).

Enhancing customers' knowledge is intended as exploring their knowledge structures and learning processes as a basis to grasp insights on the way of coherently configuring and framing retail assortments, therefore improving the "shop (p) ability" (i.e. the probability of satisfying purchases because of a better comprehension and analysis of the offer by the retailers' customers).

The heterogeneity of the retailer's customers, however, may make this approach more complicated, given the possibility of individual differences in the way in-store browsing and learning can take place. In fact, it is reasonable to expect shoppers to differ in their knowledge of product categories, for example, due to their idiosyncratic previous experience (Alba and Hutchinson, 1987). This, in turn, can be related to their way of interacting with displayed assortment and to their learning effort, since both involve information processing which is highly affected by existent knowledge (e.g., Bettman, 1979, Brucks, 1985).

The thesis aims at empirically exploring the feasibility of a solution to turn the complexity related to the customers' knowledge-heterogeneity into an opportunity for the retailer, by taking a dynamic perspective and considering the heterogeneity as temporary.

In a certain point in time store patrons may differ in their product-category knowledge, but knowledge can evolve over time, and shopping may represent an experience which may transform consumers' knowledge, by exploiting learning opportunities (e.g., by analysing available assortment of products, by reading information aids or by asking advice to sales assistants). In this sense, assortment presentation – given its communication valence – can be thought of as a means that can be used by a retailer to try to affect consumers learning taking place in-store, and, ultimately store patrons' product-category knowledge.

Enhancing customers' knowledge might have the additional meaning of leveraging on more expert customers' knowledge (i.e. higher complexity of product-related cognitive structures) **to improve in-store learning processes of less expert customers'.**

For example, a retailer can try to make expert consumers' knowledge about products explicit through various techniques (such as focus groups, protocol analysis of in depth interviews, basket analysis), and then re-use such revealed knowledge to define assortment configuration in a way which is coherent with their cognitive structures. The same insights (i.e., relationships between functional and performance product attributes which make some benefits expectable out of consumption) can be used by the retailer to prepare proper information aids (i.e., brochures and posters) which can help less expert consumers to understand the variety of the assortment and its visual organization on the shelves in a self-service retail setting.[14]

If consumers learn during shopping, then adopting an orientation to shoppers' information and education (by favouring this process) could be valuable for a retailer, in terms of opportunities to properly influence shoppers' choices based, at least partially, on such learning activity.

Presenting the selected assortment so that the customers can learn their own preferences by analyzing the variety-bases for a certain category (i.e., when they are not expert) or can easily identify the alternative with the specific characteristics they are looking for (i.e., when they are expert or have well-established preferences) might be recognized as a source of retailer's added value by store patrons.

Building on some research insights (e.g., Busacca and Castaldo, 2000: p. 67; Desrochers, 1999: p. 12[15]), the Psychology-grounded literature analyzing consumers' cognitive processing implied in purchasing and consumption behavior – especially those related to information processing and learning – will be considered as a

[14] Something similar has been proposed in the marketing field to exploit expert consumers to drive product and service innovations (e.g., Von Hippel, 1986) and to create and develop brand communities (see, for example, Prandelli and Von Krogh, 2000; Sawney and Prandelli, 2000; Premazzi, 2002). About knowledge management, see also Rullani, 1997, 2000 and Troilo, 2001.

[15] Desrochers (1999: p. 12) claims that the retailer must identify the best location(s) for each product class and its various items by deciding a proper categorization of the carried assortment, and that understanding how consumers use categorizations when making their decisions is of fundamental importance for making good assignment decisions (categorization for items, brands, and product classes).

fundamental reference in exploring the potential of assortment presentation through categorization as an informative and educational tool.

More precisely, **the literature on categorization seems to be particularly suitable as theoretical background framework, since:**

a) **retailers' assortment presentation could be interpreted as implying a categorization process (namely, a classification by categories);**
b) **assortment view during shopping may imply an in-store product information processing by consumers, that can therefore influence their existing product knowledge, which may be organized in memory by categories.**

a) Retail marketing literature on merchandising, visual merchandising, and category management maintains a display organization, ultimately implying a classification or categorization process (e.g., Collesei, 1986, Sabbadin, 1993). The items «in-sigth» in-store for customers' choice should be grouped on the shelves and usually a label to identify each merchandise grouping should be made available on the shelf, to help consumer understanding.

The retailers, therefore, have to define the boundaries and the content of macro-categories, categories and sub-categories obtainable by differently aggregating the items in their assortment (how the boundaries of each category are defined), to choose a label to name the categories, which level of inclusiveness to label and how (for which groupments a name is provided on the aisle or on the display and which kind of POP material is employed), to figure out a physical representation (how each group is displayed; which information is provided for each group and for each instance belonging to the group). All these merchandising choices involve information that consumers may process – to a lesser or greater extent – when they are in-store.

b) Consumer behavior literature posits that consumer's knowledge about products can be stored in long-term memory for subsequent retrieval in cognitive structures which are frequently in categorical form (e.g., Alba and Hutchinson, 1987; Cohen and Basu, 1987; Ross and Murphy, 1999). Such consumer's product knowledge results from information-processing (e.g., Barsalou, 1992; Jacoby et al., 1998) and ultimately impacts on it (e.g., Bettman, 1979; Bettman and Park, 1980; Brucks, 1985; Johnson and Russo, 1984; Sujan, 1985), as the stream of research about the differences between experts and novices has demonstrated (e.g., Alba and Hutchinson, 1987; Mitchell and Dacin, 1996; Walker, Celsi, Olson, 1987).

Information processing constitutes the object of study of cognitive psychology, where categorization has emerged as a major component of human cognition (e.g., Barsalou, 1992; Eysenck, 1984; Mervis and Rosch, 1981; van Gelder, 1993) which influences thought, perception and action, and has been thoroughly investigated in literature.

The **research question** underlying this thesis can therefore be expressed as: "**does the retailer's assortment categorization matters for the customers visiting the store, meaning,** for instance, **that it can ultimately affect consumers' cognition and behavior?**

More precisely, "does the assortment categorization suggested by retailers through display solutions interact someway with consumers' product knowledge and with their decision making process while purchasing within a store?".

Despite prior research regarding the influence of product display context on consumers' categorization is very limited (e.g., Areni et al., 1999; Desai and Ratneshwar, 2003: p. 23; Desrochers, 1999), these recent empirical studies investigating the impact of point-of-purchase display and product organization on consumers' mental categorizations and brands evaluation, indicate that assortment categorization does matter. By changing the assignment of the same item to different and alternative in-store categories, the way in which the item is perceived and evaluated by the same customer can be affected (e.g. Desrochers, 1999; Desai and Ratneshwar, 2003). Thus, changing the assortment categorization can ultimately impact on shoppers' purchase behavior (e.g., Areni et al., 1999).

Once developed the conceptual framework, an empirical investigation – through an experimental method – will be conducted aiming at enriching such stream of research, **by focusing on the impact the retailer's display arranged by categories may have on consumers' product knowledge organized in categorical form (category structures and representations).** Rather than investigating the possibility to impact on item evaluation through in-store categorization implied in merchandising (of higher interest for manufacturer's positioning), the **attention** here will be **on the possibility to influence the knowledge a consumer possesses with respect to a certain product category (category concept), which may be retrieved and used during purchasing to guide choice.** This could be of greater **interest for retailers** – especially for those pursuing a customer-oriented or a consumerist positioning. The possibility to learn while shopping may be a motivation underlying store patronage, and the feeling of cognitive comfort while choosing in front of the shelf or the ease with which the customer may find out the desired product may lead to store loyalty.[16] Competitive differentiation may therefore be achieved by acting on the cognitive comfort store patrons feel when browsing a store, with a consequent inertia in their shopping destinations.

The potential of customer education through assortment presentation, if empirically demonstrated, could be even more interesting for retailers selling – with self-service techniques – products with a high personal risk perceived by the customers (e.g., health-related products such as food or medicine), who are left the responsibility to choose the item most appropriate for their need; or for retailer with a specific positioning (e.g., natural grocery), or in general for self-service sale of complex products.

Furthermore, a potential benefit for the retailer – which should be deserved further investigation – is the impact that increased customers' knowledge may exert on the trust they have in the retailer. When a retailer pursues an information and educational effort, which is perceived and exploited by his customers (through in-store learning), he is, as a matter of fact, empowering his customers who will be therefore more equipped to evaluate the retailer's offer and his ability to perform his economic functions (e.g. product selection). In essence, the retailer is making his activity vulnerable to an expert judgment made by store patrons. This can affect customers' perceptions related to retailer's ability and competences, transparency, lack of opportunistic motivations, equity, all potential antecedents of trust (Castaldo, 2002: p. 221-230).

[16] Merchandise (including assortment) and convenience (including ease of finding items) are among the attributes more frequently used by consumers to evaluate stores (Lusch, 1982: p. 116).

Acting on customers' knowledge, by leveraging it through a dynamic exploitation of the differences between expert and novice consumers with respect to various product categories, retailers should try to increase their intangible resources based on knowledge (e.g., related to assortment composition and presentation) and on trust, thus activating a self-poietic process (Vicari, 1991).

The findings may also have public policy implications, since retailers might play a role in consumer education (e.g., nutrition education). Such a role, with social positive consequences, may result compatible with the retailers' profit-making orientation and specific positioning strategies, due to the benefits in terms of image and reputation.

The contents of the dissertation can be articulated as follows:

Part I – Literature Review

This part outlines the theoretical background for the empirical investigation.
Chapter 2 reviews the literature about categories and categorization from the Cognitive Psychology field, and Chapter 3 from the Consumer Behavior and Marketing fields.

Part II – Conceptual Framework

This part contextualizes the theoretical background to the research question of interest.
In Chapter 4, drawing insights from the reviewed inter-disciplinary literature, the research question will be interpreted within a categorization framework, thus deriving more specific research propositions.

Part III – Empirical Research

This part describes the design and the results of the empirical study.
In Chapter 5 an experimental design to investigate the research question will be outlined, and specific hypotheses to be tested will be specified.
In Chapter 6 the results of a pilot experiment will be described and interpreted with respect to the research questions.

In the Conclusions section the theoretical contribution and the managerial implications – especially for retailers – of the empirical results will be summarized, and the research limitations discussed, suggesting future improvements and directions of study.

PART I

LITERATURE REVIEW

> "There is nothing more basic than categorization to our thought, perception, action, and speech (...). Without the ability to categorize, we could not function at all, either in the physical world or in our social and intellectual lives. An understanding of how we categorize is central to any understanding of how we think and how we function, and therefore central to an understanding of what makes us human" (Lakoff, 1987: p. 5-6)

Categories and categorization represent a topic and a perspective of conceptual and practical importance in several fields, including marketing and consumer behavior (Cohen and Basu, 1987: p. 471).

As a matter of fact, **a variety of disciplines bear relevance to categories and categorization** (Rosch and Lloyd, 1978) – e.g., linguistic (regarded as bases for the language learning), social cognition (useful to understand social perception), consumer behavior (especially for information processing) - **and they all draw some insights from the literature in cognitive psychology**, since this discipline can be considered the traditional and original field of inquiry on this topics.

The aim of this part is to review the available and relevant literature on categories and categorization, by considering the theoretical and empirical contributions in cognitive psychology first (chapter 2), and the echoes and developments engendered within the marketing and consumer behavior streams of research, later (chapter 3).

CHAPTER 2

THE COGNITIVE PSYCHOLOGY LITERATURE ON CATEGORIES AND CATEGORIZATION

2.1. THE REASONS OF THE INTEREST OF COGNITIVE PSYCHOLOGY IN CATEGORIES AND CATEGORIZATION

Cognitive psychology studies information processing in humans, aiming at describing how humans acquire, store, retrieve, transform/manipulate, and use information to perform intelligent activity (Barsalou, 1992: p. 8).

The major advances in cognitive psychology took place in the last half of the Twentieth century. In the late '50s, in fact, Cognitivism replaced Behaviorism as the dominating view in Psychology, and different internal constructs were proposed to explain human behavior and information processing in particular.[17]

The cognitive constructs (that are internal constructs of cognitive psychology) typically do not represent conscious mental states, but rather unconscious experiences. They **tend to describe how the human brain processes information,** by investigating and specifying the mechanisms through which humans pick up information from the environment, store and transform information in memory, and send information back into the environment (Barsalou, 1992: p. 9).[18]

[17] Behaviorist psychologists considered internal constructs as unscientific and their theoretical explanations of human behavior were conceived by as functional laws expressing mathematical relationships between observable (regarded as arbitrary systems) stimuli and responses, without considering the organism (Barsalou, 1982: 5, 6). This approach is known as a stimulus-response paradigm, where the focus is on such a connection. Classical and operant conditioning represent examples of the laws proposed by Behaviorist psychologists.

[18] "The primary purpose of cognitive constructs is to represent psychologists' theoretical understanding of the brain as an information processing system. (...) To the extent that cognitive constructs correspond to the actual state of affairs in the brain, psychologists should be able to use them to predict human behavior. (...) As the predictions of a cognitive construct receive increasing empirical support, confidence that it corresponds to structure in the brain increases. If its predictions fail, confidence decreases. Most importantly, cognitive constructs could predict many empirical findings but not look anything like the physical contents of the brain" (Barsalou, 1992: 56-57).

Cognitive constructs have strongly influenced other areas of the academic world beyond cognitive psychology, and have had applications in several industries and practical activities, such as communication and education (Barsalou, 1992: p. 11).

Categories and categorization are among the most investigated cognitive constructs, and they are characterized by a widespread influence on other disciplines.

Categorization is a major component of human cognition (e.g., Cohen and Basu, 1987: p. 456; Mervis and Rosch, 1981; Kellogg, 2003: p. 204; van Gelder, 1993: p. 469) and the most ubiquitous of cognitive activities (e.g., Bruner, Goodnow, Austin, 1956). It is considered a critical component of cognitive processing which is fundamental in the interaction of mind and world (Medin and Coley, 1998: p. 403), since **it plays a critical role in perception, thinking,[19] language, and action** (Harnad, 1987: p. 1; Lakoff, 1987: p. 5, 6).

Categorization has been defined as the process by which people

- **assign objects to categories** (Smith, 1990: p. 33), by recognizing them as belonging together **in virtue of some relevant commonality** (van Gelder, 1993: p. 474),

and

- **treat those objects in some unified and appropriate way, with a certain response** (van Gelder, 1993: p. 474).

A **category** can, consequently, be defined **as a class of objects that are believed to belong together** in virtue of some relevant commonality and treated in a very similar fashion (Smith, 1990: p. 33), guiding subsequent cognition and behavior (Eysenck, 1984: p. 314).

Actually, a certain ambiguity surrounds the term category (Barsalou, 1992: p. 170) in the cognitive psychology literature, since it is frequently used

According to Palmer (1978), who reasons in terms of representations, cognitive psychology aspires to informational equivalence between its models and the actual mental representation inside the head. Therefore its theories are concerned with the nature of the information represented about the external world and the models should be as equivalent to the mental world as possible in terms of the information contained about the world.

[19] Thompson (1989) observes that the ability to categorize has been early described by James (1890) as the "keel and backbone of our thinking".

interchangeably as a synonym of concept or, on the contrary, as a separate theoretical construct. The term concept, in turn, has been defined in several different ways.
Smith and Medin (1981: p. 8) refer to concepts as "pattern recognition devices, not necessarily using only perceptual information, that are used to classify novel entities and to draw inferences about such entities". Medin and Coley (1998: p. 404) define a concept as a mental representation of a category serving multiple functions, one of which is to allow for the determination of whether or not something belongs to the class, whereas a category is the set of entities picked out by the concept. Barsalou (1992: p. 153, 154) defines a concept as information useful to interact with an entity, since it allows people to identify what something is, by discriminating members of a category from non-members, comprehending their characteristics, predicting their behavior and how acting with them.

In the present work, the term category is intended to reflect the general meaning, stated above, of class of objects characterized by some relevant commonalities and adequate and unique responses. The term category concept is intended to refer to the knowledge (information stored in an organized way in human memory) a subject has about a category (i.e., about the relevant commonalities useful to identify the category's members and about the adequate responses when interaction with the category).

For reasons of simplicity, however, the term category will be used here to subsume both the category's (as class of objects) and the category-concept's (as associated knowledge) meanings.[20] In other words, the focus in this work will be mainly on knowledge categories, which are the ones involved in information processing and those studied by Cognitive Psychology.[21] The reference will often be to a class of objects with the focus on the associated knowledge.

[20] This is not uncommon. For example, Macrae and Bodenhausen (2000: 96) observe that in social cognition "the term category is used to describe the totality of information that perceivers have in mind about particular classes of individuals, and this knowledge can take many forms (e.g., visual, declarative, procedural)".

[21] Medin and Barsalou (1987: 456, 457) explain how Generic Knowledge Categories can be distinguished operationally from Sensory Perception or Perceptual Categories, even though it is difficult to find a definition and it is only possible to describe their characteristics.
"Generic knowledge categories are studied by investigators interested in semantic analysis, memory organization, and abstract thought. Work on generic knowledge categories is often closely tied to cognitive science issues concerning knowledge representation and processing", whereas "sensory perception categories are studied by investigators interested in sensory processes and perception".

Both **the objects and the responses** can be, and have been, **interpreted in a broad sense**, thus justifying the widespread influence of the categories and categorization cognitive constructs **in several and diverse disciplines.**

Objects can be events, individuals, concrete entities, abstract ideas (Harnad, 1987: p. 1), visual stimuli, social situations, linguistic patterns (Van Gelder, 1993), and so on.

Responses can take many forms (strictly related to the issue of the use or functions of the categories): detection, identification through verbal labeling and description, judgment (Harnad, 1987: p. 1; Van Gelder, 1993: p. 474), and so on.
For example, social cognition researchers have been interested in investigating the cognitive dynamics of categorical social perception, where objects are individuals and response are perceptions and behavioral reactions (e.g., stereotyping). In marketing studies employing a categorization perspective, objects are usually products or brands and responses are conceived both at a cognitive level (i.e., perceptions, information stored in memory and retrieved when listening to a verbal label or viewing an exemplar) and at a behavioral level (i.e., physical - visual, tactile, olfactory – exploration, purchase, use).

Various disciplines, then, tend to apply the constructs of categories and categorization, originally developed in cognitive psychology, as well as the theoretical principles which have been empirically validated through experimental studies, to different kinds of objects, in an attempt to understand responses of specific interest, given their respective subjects.

An understanding of the achievements of categorization research in Cognitive Psychology appears as a useful and essential starting point for a proper appraisal of the studies in other disciplines.

The first extensive and significant studies on categories and categorization in Cognitive Psychology date back to the '70s. Previously categorization was believed to be arbitrary (Rosch and Lloyd, 1978: p. vii) and, therefore, unexplainable and unpredictable. The earlier studies were therefore limited to the investigation of the functions and uses of categories – hypothesized as existing a priori segmentations of the real world, recognized by the individuals (Rosch and Lloyd, 1978: p. 2).

For further comparisons between knowledge and perceptual categories, see Medin and Barsalou (1987).

Only later, a considerable effort has been deserved to the analysis of the nature of the categories and their mental representations, as well as of the processes through which they are formed, changed and applied by humans.
In the '70s categories were, for the first time, considered as arising from the interaction between the stimuli in the environment and the human organism, giving rise to investigations of the processor's contribution in making sense of the real world and of the stimuli surrounding him.[22]

Cognitive psychology can be considered still in its infancy as a science, owing also to the complexity of cognition as a topic (Barsalou, 1992: p. 14). **Experimental studies on categories/concepts and categorization in cognitive psychology reflect such a status**: they have been burgeoning, but an adequate and shared theory of categorization is far to be developed yet, even though much have been learned about categorization (and the problems in developing a powerful theory) on a theoretical and empirical fronts, and methodological and technical advances have been achieved too (Barsalou, 1992: p. 51; Medin and Coley, 1998: p. 403, 431). Although individuals typically perform categorizations effortlessly and unconsciously, being often aware only of the outcome (namely, categories of entities present in the current environment), a great amount of cognitive processing and mechanisms underlie categorization and are now beginning only to be appreciated by cognitive psychologists, rather than being completely understood (Barsalou, 1992: p. 16).[23]

Another important characteristic of categorization research in Cognitive Psychology is the multiplicity of approaches adopted (Barsalou, 1992: p. 14; Medin and Coley, 1998: p. 404). Medin and Coley (1998: p. 422) argue that "progress is cumulative, but difficult (...). Any shift in theoretical orientation does not nullify previous research or the potential insights growing out of it (...) even when a theoretical orientation does not survive intact, some of its insights may be passed on".

[22] This is consistent with the shift from a stimulus-response paradigm, apt to the behaviorist view, to a stimulus-response-organism paradigm, proposed by the cognitivist view.
[23] As a demonstration of the fact that a complete understanding of human categorization remains distant Barsalou (1992: p. 17) observes that the current categorization abilities of artificial systems do not begin to approximate the same abilities in humans.

The following paragraphs of this chapter are intended **to provide an overview of the main and different perspectives** that - beginning in the '70, up to now - have been adopted in analysing categories and categorization in the Cognitive Psychology discipline.

The focus will be on highlighting the underlying assumptions, the recognized contributions in terms of theoretical explanations and empirical findings about human information processing, the more severe critics that undermine their explanatory power, the research questions which remain to be answered.

In trying to organize the review of such a vary, somehow controversial and unsettled debate, a **temporal perspective will be mixed with a content perspective.** In particular, **contrasting arguments about the same important issues involved in human categorization will be reported as they came over the years.**

The key components of any categorization can be considered (van Gelder, 1993: p. 473):

1) a category = a class of objects that are believed to belong together
2) a process of categorizing = recognizing that a given object belongs to that class by virtue of its relationship to other members (i.e., some forms of commonality), and producing for it the single response that is appropriate for any member of that class.

Thus, **structural, representational and processual aspects should be essential ingredients of any theorizing effort**, since they are strictly interrelated.

Describing a category structure means identifying the objects that are believed to share some commonality as well as the nature of this commonality (i.e., shared properties).

A mental representation of the category structure should also be specified. A representation is something that stands for something else, a sort of model of the thing(s) it represents. Therefore, there are a represented world and a representing world, with the representing world reflecting in some ways some aspects (but not all) of the represented world. The function of a representing world is to preserve information about the represented world, by specifying certain kinds of relationships between the two functionally separate worlds.[24] Therefore, "the representing world can be used for certain purposes instead of the represented world, (since there are) processes to operate on the represented world (processes to determine whether or not a particular relation among the object elements holds)" (Palmer, 1978: p. 264). The same aspect of a represented world can be modelled using different representing worlds[25] (i.e., a rule or a template for a category structure), and some aspects of the representing world may be irrelevant to its modeling function. A mental representation is an unobservable internal code for information (Kellogg, 2003: p. 8).

A category is a structure in the cognitive system that stands for perceived entities in the environment (that are the stimuli of different nature), it doesn't need to look like its referents,[26] and it can be manipulated. In particular, the representations assigned to entities during categorization play central roles in subsequent cognitive processing, since they may be stored in memory, combined with other representations or transformed into new representations (Barsalou, 1992: p. 16). Stated differently, the representational aspects can be considered a way to store, retrieve and use the categorical knowledge, that is the knowledge associated to a category (what Barsalou, 1992 defines concept; see above). Mental representations provide the basis for all cognitive abilities: all that a subject knows about the world and the basis for acting on the world reside in mental representations (Kellogg, 2003: p. 8).

Processual aspects refer to category formation, modification and use. Fundamental and strictly interrelated questions to be answered in this regard are:

- How categories are first developed? (i.e., innate vs. acquired through experience)

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[24] "The nature of representation is that there exists a correspondence (mapping) from objects in the represented world to objects in the representing world such that at least some relations in the represented world are structurally preserved in the representing world" (Palmer, 1978: p. 266, 267).

[25] "The information contained by the representing worlds can be quite different, yet can reflect the same information about the represented world" (Palmer, 1978: p. 264).
When two representations represent the same relations but in different ways, they are information-equivalent representations. When two representations differ in the objects and/or the relations they represent, they are non-equivalent representations (Palmer, 1978: p. 267).

[26] "The neuronal structure of the brain is capable of establishing systematic correspondences between subsets of its structure and subsets of structure in the physical environment. (...) The neuronal structure doing the representing looks nothing like the environmental structure being represented. By no stretch of the imagination do the neurons that represent a visually perceived chair look anything like the chair itself. Instead, the essence of the representation is a particular correspondence between the two domains" (Barsalou, 1992: p. 56).

- How do categories evolve? That is, how categorization of new or novel entities is performed? (i.e., according to rules, central tendencies, ideals, exemplars) are categories stable or flexible between and within (during time and across situations) subjects?

Psychologists recognize that some categories are innate in humans, meaning that they are born knowing such categories. The most important examples of innate categories, however, are perceptual categories (rather than the knowledge categories to which cognitive psychologists are interested); in particular, those for the primitive perceptual properties that constitute more complex stimulus configuration[27] (Barsalou, 1992: p. 23). Such primitive forms of knowledge, that humans have at birth, facilitate and influence later acquisition of knowledge. Most categories – and all the knowledge categories – are built by humans through experience with the environment, that is they are learnt (Barsalou, 1992: p. 25). Even innate categories are shaped, to various extent, by subjective experience. In fact, humans spend much time learning categories when they are children and refining categories throughout all their life.

All these issues are interdependent with the use of the categories: understanding which are the functions categories may accomplish is fundamental in understanding structural, representational, and processual aspects.

An intriguing question for the researchers has been "why individuals have the categories that they do (and not others)?" and the usefulness of the categories seems to be the most suitable answer. Eysenck (1984: p. 317) argues that, in general terms, "we construct those categories that are maximally useful for the purposes of perception, thought, and action".

The category functions and uses are another content aspect along which to contrast different pieces of literature.

Different functions and uses have been ascribed to categories, and every taxonomy will not be exhaustive. Furthermore, a neat separation of different functions of categories represent an oversimplification, useful only for exposition clarity, since usually various functions are performed simultaneously.

[27] For example, detectors for lines, planes and solids for visual perception are considered innate.

Widely recognized functions are:

- **perception,**
- **memory,**
- **classification,**
- **inference,**
- **action.**

1) Perception

Categorization allows a simplification, gives structure and streamline perception, thus giving humans the ability to deal with both expected and unexpected stimulus information.

"Categorical perception occurs when the continuous, variable, and confusable stimulation that reaches the sense organs is sorted out by the mind into discrete, distinct categories" (i.e., color and sound categories, elementary perceptual and psychophysical categories) (Harnad, 1987, preface: p. ix).

When an individual encounters an entity, the perceptual system provides information about the entity's primitive perceptual properties. The attributes that will be perceived, given the human ability to perceive them, are dependent on many factors, including the functional needs of the knower interacting with the physical and social environment. Rosch and Lloyd (1978: p. 1) argue that "humans come with the propensity to pay attention to certain features of the perceptual environment and to form complex connections between perceptual events, their own needs, and functions". The output of the perceptual system is a structural description that specifies not only (a list of) properties, but also the relationships between properties (Barsalou, 1992: p. 24). Such perceptual categories may provide the basis for higher-order cognitive activities.

For example, social cognitive psychologists argue that "in attempting to make sense of other people, perceivers regularly construct and use categorical representations", which simplify and streamline the person perception process (Macrae and Bodenhausen, 2000: p. 93). This means that, rather than considering individuals in terms of their unique mix of attributes, perceivers construe them on the basis of some social categories (e.g., race, gender, age) to which they belong, categories for which a wealth of related material has been stored in long-term memory.

2) Memory

Human intelligence is characterized by an impressive **ability to acquire, store, and use – also after manipulation** (i.e. to formulate predictions, make decisions, etc.) – **an enormous amount of complex knowledge** (Barsalou, 1992: p. 148).

Knowledge is primarily acquired through extensive experience and interaction with the environment. On the other hand, it can have a biologic basis (that is possessed at birth) or it can be constructed during instruction (i.e., taught) and inference (i.e., applying procedures to existing knowledge to produce new knowledge). The **knowledge** possessed by humans is **stored in memory in a relatively permanent form** (Eysenck, 1984: p. 305).

Philosophers have distinguished between declarative knowledge (knowing what) and procedural knowledge (knowing how),[28] and memory theorists, in turn, have proposed a sub-division of long-term memory in declarative and non-declarative memory (Kellogg, 2003: p. 150), that can function or fail independently of one another.

Tulving (1972: p. 386) have proposed a **distinction between semantic and episodic memory**, two sub-sets of declarative memory (Kellogg, 2003: p. 153). Episodic memory consists of an experiential record of events and occurrences (i.e., perceptual properties), whereas **semantic memory** registers cognitive referents of input signals (i.e., concepts) and **can be considered the organized knowledge a person possesses. Semantic memory concerns factual and conceptual knowledge**

[28] Declarative knowledge has been distinguished from procedural knowledge, mainly on the basis of its accessibility, flexibility, automaticity (Barsalou, 1992: p. 13). Important differences between declarative and procedural knowledge listed by Barsalou (1992: p. 150) are:

- declarative knowledge can be readily examined by people, while procedural knowledge to a lesser extent, if at all;
- declarative knowledge can be adapted readily to a wide variety of specific situations, whereas procedural knowledge is much more rigid and tailored to specific contexts;
- declarative knowledge requires much time to be accessed and applied, whereas procedural knowledge is found and applied rapidly;
- declarative knowledge is processed strategically (by executive productions), whereas procedural knowledge is implemented automatically (by learned automatic productions).

He also notices that declarative knowledge can become procedural through practice, and that both types of knowledge are often intertwined in cognitive processes.

about the world, without any reference to specific episodes in time and space, and the words used to symbolize such knowledge. Kellogg (2003: p. 153) exemplifies the differences between the two sub-sets of declarative memory: when a subject spots a bicycle, the recognition of the two-wheeled object as a member of a category illustrates the use of semantic memory (activation of the concept and the word used to refer to the object) as well as thinking about the properties of bicycles in general (e.g., they have two wheels, a seat, and handle bars); whereas recalling the bicycle received as a birthday gift at a certain age, the memories of learning to ride it and the related accidents are episodic memories located at places and moments in the past.

Semantic and episodic memory are strongly independent: when receiving extensive processing in episodic memory (through repetition, elaboration, and organization) an information has a high probability of becoming stored permanently in semantic memory (Barsalou, 1992: p. 149).[29] Furthermore, knowledge in semantic memory is constantly updated with episodic memories to reflect (by encoding them) changes in the environment (Barsalou, 1992: p. 185).

In order to successfully face complex social environments, two complementary cognitive skills characterize human minds (Macrae and Bodenhausen, 2000: p. 93, 94):

- Creating stable internal representations of the environment = invariant properties of the subjects' immediate stimulus worlds, that engender expectations;
- Flexibility = being responsive to the presence of unexpected stimulus inputs.

Semantic memory is involved in most cognitive processes (Eysenck, 1984: p. 306).

Different terms have been used to refer to such organised knowledge structures: concepts, schema, frames, scripts, all existing as a result of extracting/detaching the common elements from a range of situations or events (Eysenck, 1984: p. 322) so that individuals cannot remember the particular circumstances in which learning took

[29] As Eysenck (1984: p. 306) explains, "if we ask how information usually gets into semantic memory, the answer is that such information initially forms part of episodic memory". "In ways that remain unclear, repeated exposure to certain kinds of information seems to produce a shift from episodic to semantic memory".

place. Human knowledge is closely related to memories of specific episodes, but generalizations are usually constructed in long term memory so that they can be retrieved for future use. **Categories** and concepts **are believed to play a major role in the organisation of semantic memory** (Eysenck, 1984: p. 320), and it is through semantic memory that we categorize the world (Kellogg, 2003: p. 204).

3) Classification

A basic task of all organisms is a segmentation of the environment into classifications. **Through classifications the diversity of non-identical and potentially infinite stimuli in the world is reduced so that they can be treated as equivalent and dealt with by the limited capacities of the organism** (Bruner, Goodnow, and Austin, 1956: p. 235; Rosch and Lloyd, 1978: p. 1). Instead of treating each object as unique, it is considered as an instance of a class or category for which something is already known about (i.e., already mastered ways of reacting).

An important issue is how does the mind deal with the problem of multiple category membership [see later, par. 2.2.2.1]. This question has been debated, for example, in social cognition. An earlier hypothesis was that, since a person offers often multiple opportunities for classification (i.e., social categories such as sex, age, race, profession etc.), the target may be categorized in all the possible categories which are simultaneously activated. A recent, and more plausible, hypothesis states that the target activates all applicable categories in parallel and a competition for mental dominance follows, with factors such as category salience and goal relevance influencing the results (i.e., Bodenhausen and Macrae, 1998).

4) Inference

Medin and Barsalou (1987: p. 465) observe that, although the most obvious use of knowledge categories is to classify various entities, **classification seems to serve the purpose of inference and prediction**. In fact, most classification situations involve some inferences as well (Smith and Medin, 1981: p. 9).

When a subject classifies an entity into a category, he has access to the entire knowledge associated with the category (i.e., adequate responses), which can be used to draw inferences.

Usually, once an entity has been assigned to a category, for example on the basis of its perceptible attributes,[30] something can be inferred about its non-perceptible attributes (Smith and Medin, 1981: p. 1) and how to interact with it. For example, classifying an entity as a car on the basis of its appearance allows inferences about what it is made of, how it operates, how to maintain it, how to sell it, and so on (Medin and Barsalou, 1987: p. 466). In social cognition, subjects use the activated categorical knowledge (e.g., trait and behavioral expectancies associated with a certain social stereotype) to derive evaluations and impressions of the person they encounter.

In an experimental context, when an object is hidden from view and the subject is told that the object is a x (name of a category to which it belongs), he is able to say something about the object even if he hasn't seen it. The subject's statements about the properties of the object will be inferences – drawn by gaining access to the category concept he has, that is activated when hearing the name of the category (Smith and Medin, 1981: p. 9).

Furthermore, categorical knowledge, once activated, provides the subject with expectancies that can guide the processing of subsequently encountered information (i.e., biased judgments with assimilation or contrast effects), and it can also engender some behavioral tendencies.

5) Action

Categories can influence behavior, since "category activation is but one such routes through which automatic action can be elicited" (Macrae and Bodenhausen, 2000: p. 107).

The activation of a category representation may trigger – even without consciousness – some behavioral tendencies which in long-term memory are

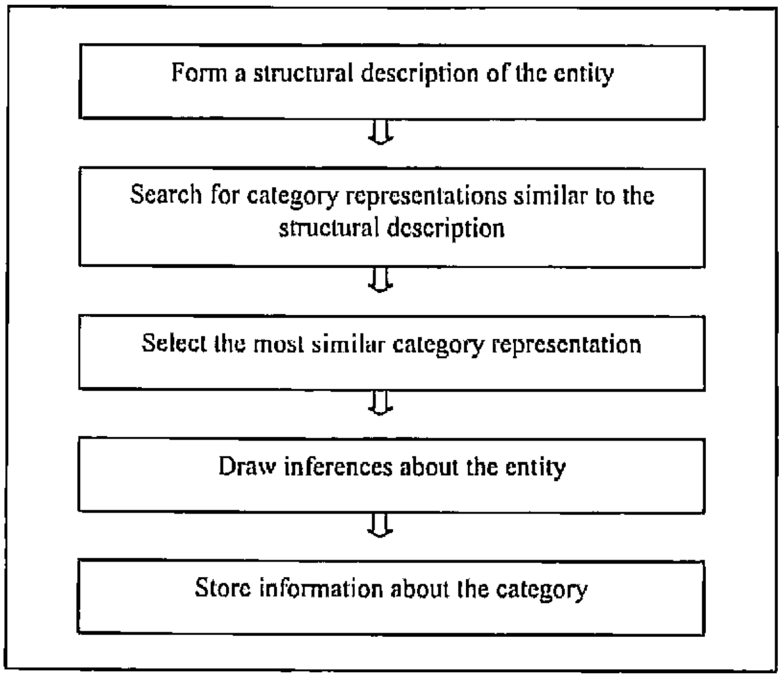
[30] For example, in folk biological classifications, diverse organisms are grouped into named classes (i.e., plants and animals) primarily on the basis of overall perceptual similarities (i.e., gross features of morphology and behavior that represent perceptually distinct/natural discontinuities in the biological world recognizable by subjects), whereas classifications based on the function of the organisms (e.g. in food, medicine etc.) are present but are not so basic (Berlin, 1978: p. 10).

associated with that category. A combination of both exogenous (e.g., environmental cues) and endogenous (e.g., perceiver goals) forces temperate the influence of category representations on individual behavior. This function has been studied especially in social cognition, for the important consequences it can have on social behavior.

Some researchers analyze the processual aspects of categorization by referring to **some phases/stages** which remind the different functions categories may have.
In social cognition, Macrae and Bodenhausen (2000: p. 96) have proposed a distinction between category identification, category activation and category application.
Category identification involves recognizing the objects as belonging to a certain category, which is, in essence, the classification function. **Category activation** concerns the retrieval of the knowledge associated to that category, thus exploiting the function of categories as memory storage devices.[31] For example, in early writings in social cognitive psychology, category activation was believed to be an inescapable and unconditionally automatic mental process in person perception[32]: the triggering of the categorical representation automatically implying the triggering of its associated cognitive contents. On the contrary, according to recent research, category activation might be a conditionally automatic process, occurring only under certain triggering conditions or moderating factors (such as, the availability of attentional resources or the perceiver's temporary processing goal), besides mere exposure. However, the issue of unconditionally vs. conditionally automatic category activation, remains an open research question in the field of social cognition (Macrae and Bodenhausen, 2000: p. 101). **Category application** is the use of categorical knowledge so that it is of some value, for example to pursue particular goals (i.e., inference function of categories, important in problem solving).
Barsalou (1992: p. 26) proposes a flowchart (Figure 2.1) to summarize the typical processing activities underlying categorization, that reminds the most important category functions.

[31] Category activation is strictly linked to priming effects (see below 2.2.2.3.).
[32] "The human mind must think with the aid of categories (...) we cannot possibly avoid this process" (Allport, 1954: p. 21).

Figure 2.1 – Processing during categorization



(Source: Barsalou, 1992: p. 26)

The formation of a structural description of an entity (i.e., for a chair) reminds the role of categories in perception; the storage and retrieval of information refer to the role of categories as memory devices; the selection and assignment of a category involve categorization as a classification mechanism, strongly related to the inference generation role.

Actually, work on categorization has first addressed the classification function of categories (Barsalou, 1992: p. 25), and only later more attention has been deserved to other functions (Medin and Coley, 1998: p. 425), such as inference (i.e., category-based induction model of Osherson and Smith 1981, inspired by Rips 1975). The other functions have been almost neglected.

To summarize, **when reviewing the available literature cumulated through years of research, different positions emerge with reference to structural, representational and processual (including functions and uses) aspects of categorization.**

A **significant area of divergence** among different researchers, **which affects all of these aspects, refers to the nature of the "relevant communality" to be**

considered by humans as the basis of the clustering of objects into categories (what drives the inclusion of some objects in the same category).

Similarity-based approaches, which suggest a feature matching/mismatching mechanism and dominated until the late '80s, seem to be increasingly questioned by **theory- or explanation-based approaches which argue a theoretical justification** (i.e., more abstract and causal properties instead of perceptible features) for object clustering, despite their apparent overt dissimilarity (e.g., Goldstone, 1994, 1995; Medin, Goldstone, Gentner, 1993).

According to similarity-based approaches, categories are formed such that their members are highly similar to one another, but highly different from the members of other categories. Similarity-based grouping is coherent with categories' functions, since, for example, it optimizes the discriminability of categories which become more informative thus facilitating classification of specific entities and category-based induction (Barsalou, 1992: p. 171, 172).

Similarity-based approaches, however, differ in various respects, so that **different views are usually contrasted.** First of all, the theoretical views within the similarity-based approach differ in the kind of similarity they posit for category members.[33] As far as functions are concerned, all the views have placed a higher emphasis on the classification and inferential uses (which are acknowledged as twin fundamental functions), but they vary with respect to the confidence that can be placed in performing these functions (Smith and Medin, 1981: p. 9). Classification is completely confident for the Classical view (since it posits sufficient conditions for class membership) and uncertain for the other views (given that there aren't sufficient conditions). Inferences (i.e., about properties) are deductions for the Classical view (since the inferred properties are necessary ones) and probabilistic for the other two views (Smith and Medin, 1981: p. 9, 10).

Furthermore, **each** theoretical view is **consistent with many models**. Each model is a concrete embodiment of the theoretical view, and various models differ in some of the underlying assumptions.

The similarity-based approach has been challenged (e.g., Rips, 1989), arguing that it is too flexible and situations when similarity and categorization decisions diverge

[33] The exploration of such differences will constitute the objective of par. 2.2.

are common (Chakravarti, 2001: p. 55). Similarity-based approaches have been criticized for not working unless constraints specify the properties relevant to similarity (Barsalou, 1992: p. 173). According to Murphy and Medin (1985) subjects' intuitive theories could play an important role in categorization, since they may guide the selection of relevant properties and their interpretation. Such intuitive theories sometimes are linked to scientific theories.[34] However, they point out that theories underlie categorization only in limited circumstances, for example to classify very unfamiliar items or borderline cases which subjects are not sure about.

Next paragraphs are dedicated to the analysis of the most important views and of some representative models. All the content aspects (category structure, representation, functions and categorization processing) are inter-connected,[35] and will be treated separately only as a narrative *escamotage*.

[34] For example, "people might typically distinguish salt and water primarily in terms of perceptual and functional properties, but if asked to describe the fundamental difference between them, might invoke their respective molecular structures" (Barsalou, 1992: p. 173, 174).

[35] For example, according to Medin and Barsalou (1987: p. 465), "understanding the uses of categories plays an important role in understanding their structure". "Depending on the relative extents to which categories are used for classification versus inference, their representations may be biased toward information high in cue or category validity" (Medin and Barsalou, 1987: p. 483). Attributes that are highly diagnostic for category membership have high cue validity (that is, the probability that something is a category member given that it has the attribute = cue). Cue validity is central to classification. Attributes that are highly inferable from category membership have high category validity (that is, the probability that something has an attribute given that it is a category member). Category validity is central to drawing inferences from category membership.

2.2. Research During the '60s, '70s and '80s: Different Perspectives

By jointly considering the time when theoretical speculations and empirical studies have been done together with their specific contents, it is possible to map earlier contributions in Cognitive Psychology, establishing the groundwork for later critics and more recent developments as well as "categorizing" all of them according to the position or view they express.

2.2.1. Theories about Structural, Representational and Processual Aspects: the Classical, Probabilistic, Exemplar, and Mixed Views

A lot of research activity has accompanied the development, throughout the years, of **three alternative views of categories/concepts**, known as Classical, Probabilistic and Exemplar Views (Smith and Medin, 1981).[36]

Each view is characterized by specific assumptions concerning the structure and the representations of the categories, as well as some processual assumptions.[37]

Structural and representational assumptions refer, respectively, to:

- the nature of the commonalities characterizing the members of a category (i.e., necessary and sufficient properties for the Classic view vs. criterial or probabilistic properties for the Probabilistic view vs. previously experienced exemplars' properties for the Exemplar view);

[36] Actually, Smith and Medin (1981) use the term "concept", but their considerations can and have been regularly cited with reference to the term "category" too. Since, as we stated previously, we will use the term category in a broad sense, which includes also the meaning generally assigned to the term concept, it seems appropriate to refer to the work of Smith and Medin and others about concepts when talking about knowledge categories. Furthermore, all the marketing studies about categorization cite this reference when describing the theoretical background.

[37] Smith and Medin (1981: p. 4), referring to the classical view, specify that it "is a theory about representations; only by adding processing assumptions to it, the theory about concepts will be converted in a model about categorization", which can be confronted with empirical findings.

- the nature of the mental representation created by subjects for storing the specific information (knowledge) about the category and the graphic representation model of the structure of the category used by theorists.

Processual assumptions refer to the categorization process, and can be basically related to category formation, evolution, and use. However, in this review the focus will be on how subjects decide about category membership (boundaries? members?), the more debated topic which has given rise to differentiated positions between the views.

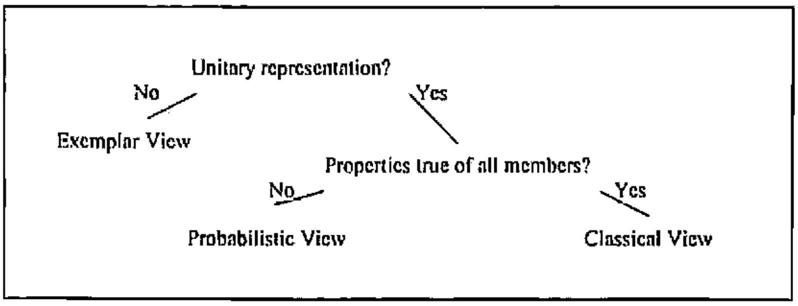
The following outline of the peculiarities of each view is based on Smith and Medin (1981)'s and the more recent Medin and Coley (1998)'s remarkable systematic review-works, that represent essential references for every researcher interested in the psychological categorization literature. Other psychological works have been sparely considered for specific aspects (i.e., Medin and Barsalou, 1987). A contribute in the consumer behavior literature – Cohen and Basu (1987) – has also proven useful to clarify the different perspectives existent in the categorization literature.

Smith and Medin (1981: p. 3) suggest two fundamental questions concerning category structure and representation that can be useful in distinguishing and understanding the peculiarities of the various views (Figure 2.2):

1) Is there a single or unitary description for all members of the class?
2) Are the properties specified in a unitary description true of all members in the class?

The Classical View posits an affirmative answer to both questions; the Probabilistic View argue an affirmative answer to the first question but not to the second; and the Exemplar View posits a negative answer to the first question so that the second one becomes irrelevant (Smith and Medin, 1981: p. 3).

Figure 2.2 – Category structure and representation according to the three views of concepts



(Source: Smith and Medin, 1981: p. 4)

Drawing jointly on Medin and Barsalou (1987: p. 462) and on Cohen and Basu (1987: p. 456) – which refer to Alba and Hutchinson (1985) - it is possible to suggest that all the views assume comparison as the basis for the categorization process. All the views, in fact, can be ascribed to the similarity-based approach to category formation.

The nature of the comparison which underlies categorization – defined by the type of representation considered as a reference (rules, prototypes, exemplars) and the degree of analyticity[38] of the comparison – can be proposed as the main difference between the three views (Figure 2.3).

Figure 2.3 – Processual aspects according to the three views of concepts

<table>
<tr><td colspan="2"></td><td colspan="3">Type of representation considered as reference</td></tr>
<tr><td colspan="2"></td><td>Rule</td><td>Prototype</td><td>Exemplar</td></tr>
<tr><td rowspan="2">Degree of analyticity of the comparison</td><td>Analytic</td><td>Classical View</td><td rowspan="2">Probabilistic View</td><td rowspan="2">Exemplar View</td></tr>
<tr><td>Non Analytic</td><td></td></tr>
</table>

Cohen and Basu (1987: p. 462) propose an interesting example of the different categorization processes in a marketing context, by referring to the evaluative

[38] Cohen and Basu (1987) use these terms in a slightly different sense than Alba and Hutchinson (1985), who consider analytic processes as implying rule-defining or identifying criterial aspects of a category definition, and non-analytical processes as implying judgment of category membership based on similarity to one or some other category members. Cohen and Basu (1987) considers analytic as a feature-by-feature comparison and non analytic as a holistic or overall similarity comparison.

category «department stores I love to shop in». They suggest that such a category may be mentally represented by individuals in the form of:

- abstract features extracted from prior experiences (i.e. high-quality merchandise in contemporary styles, distinctive environment in terms of lighting, aisle space, expensive decorative fixtures) = prototype (probabilistic rule);
- concrete stores they have encountered in the past = exemplars.

When a consumer encounters a new instance (i.e. an unfamiliar department store), she/he can adopt – deliberately or as a quasi-automatic response to contextual stimuli – different categorization strategies:

- o bring to mind a criterial set of features that define the category or the category prototype, compare the new instance to them, use the number of tests about individual features surpassed as a basis for the categorization judgment = prototype or probabilistic rule as a reference and analytic comparison process;
- o bring to mind one or several exemplar(s) of the category, select focal features, compare the features of the target/new instance to those of the category exemplars and use the number of individual features tests surpassed as a basis for the categorization judgment = exemplar as a reference and analytic comparison process;
- o bring to mind a category prototype or construct a category prototype based on representative performance on individual features, evaluate the degree of overall similarity of the new instance to the prototype as a basis for the categorization judgment = prototype or probabilistic rule as a reference and non-analytic comparison process;
- o bring to mind one or several exemplars of the category, evaluate the overall similarity of the new instance to a focal exemplar or the match against a criterial number of exemplars as a basis for the categorization judgment = exemplar as a reference and non-analytical comparison process.

Another issue related to the comparison process refers to property/attribute weighting. People may weight the properties equally – so that a match on any property would count an equal amount toward categorization - or may weight properties differently – so that a match on one property would count more than a match on another. Barsalou (1992: p. 36) argues that "across a variety of experiments, researchers generally found that people weight attributes unequally; rarely do they assign equal weights to attributes when performing categorization (Goodman, 1955; Medin and Schaffer, 1978; Nosofsky, 1984; Ortony, 1979; Sutherland and Mackintosh, 1971; Trabasso and Bower, 1968; Tversky, 1977).[39] Furthermore, a number of experiments have shown the use of correlations between properties when individuals are performing categorization[40] (Billman and Heit, 1988; Malt and Smith, 1984; Medin and Schwanenflugel, 1981; Martin and Billman, 1991; Wattenmaker, Dewey, Murphy, Medin, 1986). Both probabilistic and exemplar models can incorporate property weighting and correlations.

The logic of such contrasts may be fully understood going through the following paragraphs, where each view is examined in more detail.

[39] Among the reasons why individuals weight some properties differently, there are:

- the salience of the properties, perceptual (i.e., shape and color in visual categories, thus people focus on them at least initially) or in theories about the physical word (i.e., bacteria and virus, central to diseases, in diagnostic categories),
- familiarity (i.e., instrument played instead of musical form in classifying a piece of music),
- cue validity in predicting category membership than other attributes (i.e., view on taxes for political affiliation, instead of view on campaign spending).

[40] "Values of attributes may act together, however, to determine categorization decisions, with the weight of one attribute depending on the value of another attribute" (Barsalou, 1992: p. 38).

2.2.1.1. The Classical View

The **origins** of the Classical view of the nature of categories can be ascribed to a series of studies carried out by Bruner, Goodnow and Austin **in the '50s** and this view was **dominant until the end of the '70s** (Eysenck, 1984: p. 315).

The modal[41] structural and representational assumptions of the Classical View of categories are as follows (Smith and Medin, 1981):

- Unitary and summary representation
- Defining properties, nested in sub-sets.

The Classic View **posits a unitary description of all category members**, since the classification is based on a **defining rule consisting of a set of single necessary and jointly sufficient properties,** that every member must have. Single necessary properties mean that all members possess each of them; and jointly sufficient properties involve that only members of the category possess all such properties and every entity having such a set of properties must be an instance of the category. Therefore the defining rule is conjunctive in nature: all the instances of the category share common properties; each and every property must be present for an object to fit the concept. For example, being adult, never married, eligible, living, male, and human are jointly sufficient and singly necessary properties for membership in the category «bachelors».

The properties can vary according to their perceptibility, with true **perceptual** (i.e., the presence of a line or of a certain degree of curvature) and **abstract** properties (i.e., manufactured with the intent of human usage for the concept of clothing) as extremes. A category description can contain both abstract and **functional** properties as well as perceptual ones (Smith and Medin, 1981: p. 18).[42]

The defining rule, thus, identifies all the members of a category and only its members. Not only **membership can be unambiguously determined by reference to a rule**, but membership **is all or none** (Medin and Barsalou, 1987: p. 461). This

[41] Meaning that they are not the only assumptions used by proponents of the Classical View, but they are the ones accepted by most significant studies in Psychology done until the late '70s.
[42] "To determine whether an abstract feature is perceptually instantiated in an object, one must have recourse to ancillary knowledge about the relation between abstract and perceptual features".

argument is valid especially for well-defined categories, where the boundaries are clear.

According to the Classic View, **all instances are equal in category membership**, since they all share common and defining properties.[43]

Furthermore, if concept/category x is a subset of concept/category y, the defining features of y are nested in those of x. This means that the more specific concept/category must also include some defining features that are not shared by its super-set. The judgment about whether a category is a sub-set of another is considered clear-cut, since it requires a mere comparison of defining features.

The representation is a summary description of an entire category, rather than a set of descriptions of various subsets or instances of that category (Smith and Medin, 1981: p. 23). It often results from an abstraction process, it doesn't correspond to a possible specific instance, and it applies to all possible instances. Smith and Medin (1981: p. 23) exemplify that a summary representation for fruit is often based on induction from specific instances (and on facts one has been told about fruits in general), it might contain fewer features than would be found in the representation of any possible instance, it is always retrieved and examined whenever one is asked whether or not a test item designates an instance or subset of fruit.

The categorization process is assumed to be by rule, since it requires that an instance meets the defining criteria associated with the category to be considered as one of its members (Medin and Barsalou, 1987: p. 462). If an entity possesses the right set of defining properties in the right combination, it is a member of the category, whereas if it lacks even one of the defining properties, it is not a member of the category (Cohen and Basu, 1987).

For example, by testing if an instance is adult, never married, eligible, living, male, human, a subject can decide whether the entity belongs to the category «bachelor», answering yes if and only if every test gives a positive outcome.

[43] In other words, all stimuli which fit the definition of the category (by possessing the relevant properties in the right combination) are equivalent good members of the category (Eysenk, 1984: p. 315).

The comparison process is assumed to be analytical, where the reference is a rule which defines the category (piecemeal comparison against a property-based rule).[44]

Thus, learning a category according to the Classical View implies discovering its defining properties, which are true for all the category members. Category acquisition involves a search for single necessary and jointly sufficient properties (Cohen and Basu, 1987).

The Classical View has been severely criticized. Smith and Medin (1981: p. 4) suggest a distinction between "in principle criticisms" - when opponents question its absolute inability (never) to handle a particular problem - and "empirical criticisms" – when a temporary failure (thus far) of the view in handling a particular problem is highlighted.

An example of in-principle criticism related to the structural and representational assumptions of the Classical View refers to its inherent **inability to handle all concepts/categories**, in particular by denying disjunctive categories that, in reality, do exist. For example, Rosch et al. (1976) asked subjects to list the features of concepts/categories varying in their level of inclusiveness (i.e., kitchen chair, chair, furniture). They found out that the more inclusive or super-ordinate categories may be disjunctive, since subjects listed few if any features, when compared to basic and less inclusive level categories.

Smith and Medin (1981: p. 28) suggest an alternative interpretation, which saves the Classical view. They (1981: p. 20) distinguish between the core of the concept and the ancillary knowledge, called the identification procedure. For example, the abstract features of human, male, and young will be included in the core of the concept "boy", whereas perceptual features such as height and weight and an indication of their instantiation of the feature of young will constitute the identification procedure. Whereas the properties of the identification procedure are used for categorizing objects of the real world, the properties in the core reveal certain relations between concepts (i.e., between boy and girl). They argue that the features that people listed in Rosch et al. (1976)'s study may have been part of the identification procedures, not the core, and that identification procedures could be

[44] Basu (1993: p. 99) observes that this process is similar to that implied by the multi-attribute-attitude framework, commonly employed in marketing.

disjunctive only for super-ordinate concepts because they contain abstract features which can only be instantiated disjunctively at the perceptual level.

Mervis and Rosch (1981) criticized the classical view as completely **inadequate with respect to natural categories,**[45] and tailored only for artificial categories studied in the laboratory by cognitive psychologists, **which** are neat, logical, and well-defined. Natural categories **are often fuzzy**, that is, it is impossible to specify a rule that identifies all of its members and only its members. In addition, category membership is often not all or none as argued by the Classical View (Medin and Barsalou, 1987: p. 461)

Another example of in principle criticism refers to the **existence of unclear cases** – that is divergences in the subjective assignment of an instance or a sub-set to a category, across situations or individuals – which is incompatible with the assumption of nested defining properties. Smith and Medin (1981: p. 29, 32) counter-criticized this remark, arguing that unclear cases are not necessarily inconsistent with a Classical-view. Their argument is that the nesting of defining features does not imply a clear-cut subset relationship judgment, since **incomplete or multiple** (i.e., a common and a technical one[46]) **subjective definitions of a category may exist.**

A widespread empirical criticism is the **failure** of researchers **to specify the defining features** of many categories/concepts. While Wittgenstein (1953) early concluded that this happened because many categories do not have defining features, Smith and Medin (1981: p. 30) restated the critique arguing that researchers seem to be looking to the wrong kind of defining features. Smith and Medin (1981: p. 22, 23) distinguish between the core of the concepts/categories and their identification procedures. Researchers have concentrated their attention on perceptual features –

[45] Natural categories are those occurring in the real-world, whereas artificial categories are purposely created by the researcher for empirical studies in laboratory settings. As Medin and Coley (1998: p. 405) explain, usually in cognitive psychology "Some ideas/conjectures about natural or real-world categories are developed, on the basis of observation, intuition or argument. These ideas can be associated with theories concerning both mental representations people develop and the process to create and operate on these representations of categories. These ideas/theories about category representation and processing are usually tested by constructing artificial categories in the laboratory and analyzing the subjects' performance with them. These studies with artificial categories are often run in parallel with studies with natural categories, so that if findings also parallels there is increased confidence of the researchers – about the generalizability of the findings with artificial categories to real-world or natural categories". Thus, artificial categories are used in laboratory studies, but with the aim of understanding the natural categories.

[46] One example they provide is «tomato» which meets the technical definition of a fruit (i.e., it has seeds), but not the common definition of a vegetable (i.e., its particular role in meals).

part of the identification procedures – rather than on abstract, relational and functional features – forming the core.

Other criticisms to the Classical View have been raised on the basis of its inconsistency with some empirical findings [see also par. 2.3]:

⇒ Use of non-necessary properties in categorization tasks – inconsistent with the assumption concerning the nature of the defining properties (all necessary)

⇒ Asymmetric similarity judgments for super-ordinate and sub-ordinate categories – inconsistent with the assumption of nested properties for sub-sets.

Several empirical studies have shown the **use of non-necessary properties in categorization** (e.g., Hampton, 1979[47]; studies adopting multidimensional scaling) Smith and Medin (1982: p. 44) revised the severity of this critique by questioning the underlying assumption that subjects are able to list true defining properties, suggesting their context-sensitivity and difficulty to be verbalized easily. Their argument is that categorization performance might be linked to non-necessary properties (relatively easy to report), with the mediation of defining properties (relatively inaccessible or at least difficult to report or introspect).

According to the assumptions of the Classical view (nested properties), a sub-set should always be judged more similar to an immediate super-ordinate than to a distant one, and a probe concept which is a distant super-ordinate (versus an immediate one) should be categorized faster (Smith and Medin, 1981: p. 46, 47). Empirical **findings about similarity judgments and categorization of nested triples of categories/concepts** have (sometimes) disconfirmed the Classical view's predictions.

Taken together, all those criticisms[48] have threatened categorization models based on the Classical View. Some attempts have been taken to defend it:

[47] In an experiment a group of subjects were asked to list features that characterize concepts (i.e., bird, fruit, tool) and to rate the extent to which sub-sets of these concepts had the features listed. Hampton used these ratings to predict categorization times for another group of subjects. Some features listed for a concept were non-necessary and these non-necessary features were correlated with categorization performance. The implication is that non-necessary features are used in categorization.

[48] Another important reason for criticism was the failure to explain other systematically observed empirical effects, as described in the following paragraph (see par. 2.3.).

- by challenging the basis of the evidence against the Classical view (i.e., questioning the assumption that individuals are able to list defining features);
- by making minimal additions to the Classical view (i.e., by inserting new assumptions);
- by changing some of the modal assumptions (i.e., dropping the assumption of nested sub-sets[49]) of the Classical view.

All those attempts, however, have their problems (Smith and Medin, 1981: p. 60) **and haven't prevented a shift in perspective and the emergence of new views.**

The Classical View has long been successful in elucidating many classification phenomena. But, at the beginning of the 80's, the strongest critics experienced by the Classical View and its unsatisfactory alterations led to a replacement by new alternative views (Smith and Medin, 1981: vii), known as the Probabilistic –first – and the Exemplar – later – views.

[49] A category/concept is assumed to be a summary representation containing necessary and sufficient properties, but in this version, at least some properties of a particular category/concept do not have to be identical to those in the category/concept's subsets, and there are rules or relations for directly or indirectly translating one property into another when using properties to determine sub-set categorization.

2.2.1.2. THE PROBABILISTIC VIEW

The most prominent alternative view is named **Probabilistic view** (or sometimes prototype view).

The main structural and representational assumptions are:

- Summary and unitary description with probability (critical) properties[50]
- Some common and some unique/distinctive properties characterizing the members, that are non-necessary as well as necessary properties.

This view was particularly motivated by a series of studies by Rosch and had, as important consequence, another series of studies by Rosch and colleagues about the hierarchical structure of natural categories (see later, par. 2.2.2.1.).

The Probabilistic view posits **a unitary description of a concept/category** (which applies to all its instances), but the **properties** in this description – named critical – are **true of most though not all members**.

The representation isn't restricted to a set of necessary and sufficient conditions as in the Classical view; rather, it **is some sort of measure of central tendency of the instances' properties or patterns** (Smith and Medin, 1981: p. 61).

Concept categories are organized in terms of properties that are only characteristic of category instances, and an instance belongs to the category if it has enough of these characteristic properties (**some of which are necessary** – i.e., feathered for bird – **and some of which are not always present** – i.e., flies for bird).

Therefore, information about specific instances is lost during encoding in long term memory, and only information about the properties and their relations is stored to be retrieved in the future.

Instances of a concept/category vary in the degree to which they share certain properties, and, consequently, vary in their degree of representativeness or typicality (see later, par. 2.2.2.2.): **the instances with most critical properties seem more representative or typical** (Smith and Medin, 1981: p. 3).

The properties have been variously expressed as features or dimensions by the proponents of the the Probabilistic view; and some of them have rejected property

[50] This means that the properties which enter the description need only to be probabilistically related to concept/category membership.

descriptions altogether in favor of holistic patterns, thus resulting respectively in the **featural, dimensional, and holistic approaches to the Probabilistic view** (see below par. 2.2.1.2.).

Garner (1978) has distinguished between component and holistic properties of an object concept. "A **component property** is one that **helps to describe an object** but does not usually constitute a complete description of the object" (this **may describe**, for example, **parts of the object** like having wheels for a car, **global aspects of the entire object** like having a certain average shape for a car, **or the purpose or function of the object** like having a transportation function for a car); "**a holistic property offers a complete description of the object**" like template of an ideal car. **Components used to represent object concepts may be characterized as qualitative or features, and quantitative or dimensions.** Features indicate qualitative variations (i.e., one concept has a feature whereas another has not), whereas dimensions refer to quantitative variations, both continuous and discrete (i.e., one concept may have more or less of a particular dimension than another concept) (Smith and Medin, 1981: p. 12).

The feature and dimension approach share various similarities and can be combined into the component approach to the Probabilistic view.

Most probabilistic models (Barsalou, 1990b; Elio, Anderson, 1981; Hayes-Roth, Hayes-Roth, 1977; Home, 1984; Posner, Keele, 1968; Reed, 1972; Reitman, Bower, 1973) assume a category prototype, that is a single, centralized, category representation (by abstracting properties representative of the category members).

The prototypes contain centralized category information that may be:

- averages of particular dimensions across category members (i.e., average height and weight of dogs)
- the most frequent properties (mode) across category members (i.e., brown for color of dogs)
- average or frequent relations between the properties of category members (i.e., correlation between small and sing, for bird)
- distribution of properties (brown, black, white; all frequent colors for dogs).

The main processual assumption of the Probabilistic view is that **categorization is a property-matching process**: the subject matches the properties (components or holistic) of the test item and of the target concept/category until a certain threshold amount of probabilistic evidence is accumulated.

Both analytic and non-analytic (in the meaning of Cohen and Basu, 1987) **categorization processes have** thus **been suggested** within a Probabilistic view.

In particular, a **probabilistic category-defining rule has been proposed as reference in the comparison process. This rule can be specified in terms of characteristic properties of a prototypical category member, as well as an overall representation of an hypothetical category member (that reflects the central tendency in the properties of the category's members).**

In the analytic version a property-matching process between an entity and the category prototype is at the basis of the categorization; in the non-analytic version, a comparison between the configuration of the properties of an entity and a configuration accessible in memory (abstracted) is performed.

The Component Approach to the Probabilistic View

The Component Approach to the Probabilistic View includes a featural and a dimensional approach. Both the featural and the dimensional approach can work with discrete and continue properties, the difference is in the treatment (Smith and Medin, 1981: p. 120).

In the Featural Approach to the Probabilistic View the representation is assumed to be a summary description, resulting of an abstraction process (learning) and not necessarily realizable as an instance. Critical features are salient ones (either perceptually or conceptually) that have a substantial probability of occurring in instances of the concept/category.

Since features can vary in both their salience and their probability of occurring with a category member, the graphical representation of a category must explicitly indicate these variations: each feature of a category/concept is accompanied by a weight which reflects its combined salience and conditional probability - of the association between the feature and the category/concept, and not the necessity of that association (i.e. a high weight when a feature is salient and always occurs with category members).

If the learning process (abstraction) of a category/concept is conceived as a formation of hypotheses about the content, which are based on the salient features of the instances encountered by the subject, the modal values of this distribution of experienced instances are most likely to enter the summary representation of the concept, since they have the higher probability of occurring with a member. In this sense, the representation ends up to be a measure of central tendency of the instances' properties (Smith and Medin, 1981: p. 64). As Smith and Medin (1981) explain, modal feature is not the same as modal instance: the modal features of a class of instances may not be true of any particular instance; a representation of modal features will, however, be closer to some instances than others - a critical aspect of probabilistic representations.

This is strictly linked to a processing assumption: in the featural approach to Probabilistic view an entity x is categorized as an instance or sub-set of a concept/category y, if and only if x possesses some critical sum of the weighted features of y.

Smith and Medin (1981: p. 66) exemplify the categorization process according to the featural approach. To determine whether a specific instance (e.g., an apple or a picture of an apple) is a member of the concept/category of fruit, an individual first finds a feature match between the two representations (either directly if the category's feature is perceptual, or via identification features if the category's feature is abstract), next the weight of the matching feature is taken and put in an accumulator or counter, and then this process is repeated over other features, until the counter reaches some criterion value.

A general feature model – based on the assumptions specified previously – is too general and unconstrained since, for example, it doesn't say a lot about the categorization process (i.e., how to decide that one concept/category is not an instance or subset of another). For this reason, other more specific models within the featural approach have been proposed which specify more precisely the categorization process (Smith and Medin, 1981: p. 74). Two interesting and widespread specific models are: the spreading activation model of Collins and Loftus (1975) and the cue validity model of Rosch and Mervis (1975).

Collins and Loftus (1975) proposed a specific featural model – known as the Spreading Activation Model - which details the matching process underlying the categorization decisions. Their focus was on the evidence that individuals consider when deciding whether or not a test item is a member (instance or subset) of a target concept/category. Instead of representing a concept/category as a list of features, they suggested to use a network (usually hierarchically organized): the inclusion of a certain feature is represented by the connection of the concept/category to that feature through a labelled link showing the criteriality of that feature (that is, its importance in conferring concept/category membership). There are thresholds which are the critical amounts of activation necessary to assign a category to an entity.[51]

Rosch and Mervis (1975) proposed a specific featural model (probabilistic approach) – known as the cue validity model – building on the evidence that categorization of an instance depended on its similarity to rival concepts (higher categorization efficiency and effectiveness – in terms of time and accuracy - whenever feature sharing/overlapping with contrast concepts was low). Cue validity of a feature x is the validity of a given cue x as a predictor of a given category y (in statistical terms, it is the conditional probability of y|x). Cue validity increases as the frequency with which cue x is associated with category y increases and decreases as the frequency with which cue x is associated with categories other than y increases (Rosch et al. 1976; Beach, 1964a, 1964b; Reed 1972).[52] Cue validity of an entire category is given by the summation of the cue validities for that category of each of the attributes of the category (Rosch, 1978: p. 30). Therefore, a category with high cue validity is more differentiated from other categories than one of lower cue validity.

As it was stated, those described earlier are modal assumptions and different ones can be found. A specific probabilistic model which is not an instantiation of the general featural model – just outlined - is the feature comparison model of Smith, Shoben and Rips (1974). This model assumes that a category/concept is a summary

[51] Different versions of spreading activation models have been proposed; they can be adjusted to account for individual sensitivity to property salience (by making some pathways stronger than others) and correlated properties (by including pathways from one property detector to another).

[52] "Cue validity of a particular feature, vis-à-vis a particular target concept, is such that it increases with the probability that the feature occurs with instances of the target concept, and decreases with the probability that the feature occurs in instances of a concept that contrast with the target one" (Rosch and Mervis, 1975: p. 79).

representation which weight non-necessary features, but assumes a processing not based on a weighted feature sum. A two stage process is proposed where, in the first stage, all weights are ignored and only the number of feature matches is considered. The number of features shared determines whether a second stage is needed, where the subject uses the feature weights. According to Smith and Medin (1981: 82) the feature comparison model may be preferable to the general featural model when the stages handle different kinds of information (i.e., only necessary features required in the second stage of the feature comparison model instead of both necessary and non-necessary features processed in the first stage). The different models can also be evaluated on the basis of the experiments aimed at testing predictions from either of the models. McCloskey and Glucksberg (1978) run an experiment to test the two-stage assumption of the feature comparison model, and their findings seemed not to offer support to this assumption.

The featural approach implies a sensitivity to and the use of many more features, when compared to the Classical view, since **features that are only "generally" true of category's instances are used in determining category membership,**[53] thus requiring higher skills in abstracting information.

In the Dimensional Approach to the Probabilistic View the representation is assumed to be a summary description which includes salient (that is, with a substantial probability of occurring in its instances) dimensions with a value that is the (subjective) average of the values of the concept/category's subsets or instances on that dimension (Smith and Medin, 1981: p. 102). Departing from the Featural Approach, the Dimensional Approach requires the knowledge of the particular value of each property (dimension).

In the representation, weights can be used to indicate the importance of variations in the associate dimension for category membership, similarly to the featural approach where weights are used to show the contribution of each feature to category membership.

As in the Featural Approach, **the representation is a measure of a central tendency**, but in the Dimensional Approach a mean or average value is assumed

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[53] "When a concept is being built, few if any useful features will be discarded because of the presence of an occasional outliner or exception (i.e., penguin) to a generalization (i.e., all birds can fly)".

whereas in the Featural Approach a modal value is considered (Smith and Medin, 1981: p. 103, 104).[54]

Some researchers have assumed a representation in multidimensional metric space: concepts/categories with the same relevant dimensions are represented as points and distance computations (instead of probability computations characteristic of the featural approach) can be employed in the categorization models.

In a model without the metric assumption, every concept/category should be represented by a list of its relevant dimensions, the associated weights, and the average value of each dimension, and the relation between any pair of concepts is determined by the proximity of their values along all dimensions.

Different categorization models can be built which are compatible with a dimensional approach to the probabilistic view:

a) without the metric assumption

- A featurization of the dimensional approach: a subject compares corresponding dimension-values of a target concept/category and a test item (i.e. average size of bird and robin) and determines if the difference between the values is within some tolerable limit. If it is, the values match, if it doesn't the values mismatch. Thus an entity x is categorized as an instance or subset of concept/category y if and only if the weights of the dimensions of y matched by x exceed some critical sum (Smith and Medin, 1981: p. 106).
- Assuming that each comparison between dimensions yields a number that reflects the actual difference in values.

b) with the metric assumption

- A simple distance model: the relation between any pair of concepts/categories or instances is given by the distance between the corresponding pair of points, and it could be assumed that an entity x is categorized as an instance or subset of concept y if and only if the metric distance between x and y is less than some threshold distance (Smith and Medin, 1981: p. 107). The closer the pair, the faster and more accurate is assumed to be the categorization. This model

[54] The implications of this difference are clearly explained with an example by Smith and Medin (1981: p. 104): if an instance has totally novel properties but happen to match the average values for a class, it would be considered maximal similar in the dimensional approach (a concept contains average properties) or maximal dissimilar in the featural approach (a concept contains modal properties).

implies that concepts/categories are processed as units since they are not decomposed in their component properties during categorization: the dimension values are not considered because they are implicit in the location in the metric space.

- A comparative distance model: it adds to the simple distance model the assumption that categorization considers not only the distance between the test item and target concept/category, but also the distance between the test item and concepts that contrast with the target (Smith and Medin, 1981: p. 110). An entity x is categorized as an instance or subset of concept y if and only if the metric distance between x and y is less than that between x and any concept that contrast with y, and the greater the difference in distance between x and y on the one hand, and x and any contrast of y on the other, the faster and more accurately x will be categorized as a member of y (Smith and Medin, 1981: p. 111).

To summarize, **in the component approach to the Probabilistic view categorization is assumed to be by prototype,[55] where the category prototype expresses the central tendency in the characteristic properties of the category members (mode for the featural approach and mean for the dimensional approach).** For example, the properties «is heterosexual, goes to single bars and drives a sport car» could constitute a prototype for the category «bachelor», since they can be true for most but not all bachelors.

The component approach has proven able to handle all the problems that embarrassed the Classical view:

- It is not incompatible with the existence of disjunctive concepts.

In the featural approach the same weighted sum (used to determine category membership) can be achieved by various combinations of features, various feature sets can be used to determine category membership, and disjunction is allowed. In the dimensional approach, different combinations of properties can yield the same threshold quantity in terms of distance or difference between distances.

- It accounts of unclear cases.

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[55] In the literature the term prototype has been employed with different and ambiguous meanings.

In the featural approach unclear cases can arise when the weighted feature sum accumulated by the potential instance is near but not exceeding the criterion value and/or it is comparable with other concepts/categories).[56] In the dimensional approach they happen when instances do not reach a category/concept's threshold or are equally close to the threshold of more than one category/concept.

- It doesn't require the specification of necessary and sufficient (defining) features.

Non-necessary features are part of the representation and used during categorization.

- It is consistent with all data on nested concepts/categories.

The featural approach can accommodate the usual and exceptional cases in similarity judgments and categorization tasks of nested triples, although at the price of ad hoc assumption about non-necessary features and their weights.[57]

Some shortcomings have been attributed to the component models used to instantiate the Probabilistic view throughout the years (•), and some attempts have been made to overcome them:

- Failure to represent all the knowledge in concepts – i.e., property variability and relations between properties, both well documented as important in empirical studies (Smith and Medin, 1981: p. 83).

Individuals seem to know that a certain variation is permissible for a feature or a dimension and they have a rough idea of its range. For example, Walker (1975) asked subjects to respond true or false to statements such as «a typical watermelon is 20 inches long», with systematic variation of the size information (i.e., 16, 18, 22, 24 inches). Walker's findings showed that subjects would accept a range of size values as true characterization of the object, thus suggesting that the size feature is accompanied by some indication of permissible variability (Smith and Medin, 1981: p. 86). Furthermore, the studies on artificial concepts have provided strong empirical evidence that individuals use some correlational information (that is relations between properties) in categorization decision (Smith and Medin, 1981: p. 84). For

[56] For example, tomato can be an unclear case of fruit because it matches a comparable number of features of fruit and vegetables, and the weighted feature sums may be less than the criterion values for both target concepts.

[57] For example, assuming that the properties of most concepts are more similar to those of their immediate than their distant super-ordinate, with some reverse exceptions, thus accounting for data on nested triples.

example, Neumann (1974) found out that categorization was more efficient for instances containing correlated features.

According to Smith and Medin (1981: p. 85, 86, 87) the models of the component approach to the probabilistic view can be easily adjusted to include feature variability. In featural models, it is sufficient to insert in the representation a specification of a relatively abstract feature (i.e., size) and of the range of values that it can take (i.e, 16-24 inches), as well as labelled relations between correlated features. The variability in permissible dimension values can be included in the representation through a distribution of possible values on each relevant dimension. Krumhansl (1978) suggested that the psychological distance between two points depends not only on the metric distance between them, but also on the density of points in their region. According to Smith and Medin (1981), this can be useful to represent correlations between dimensions, since two points with correlated dimensions will form certain clusters or dense region in the metric space.

- Failure to constrain possible properties, since any property which tends to occur with the concept can be considered (Smith and Medin, 1981: p. 87)

Smith and Medin (1981: p. 88, 89) suggest that some properties in a probabilistic representation may be constrained and required to be necessary but not sufficient, and that non-necessary properties may be required to be sufficient (that is, to have maximal cue validity = 1, since it occurs only with the target concept/category) or part of a sufficient set (that is, they conjunction should have maximum cue validity).

- For some models of the dimensional approach, difficulties in reconciling aspects of metric spaces and distances with known aspects of concepts and categorization, when the metric space assumption holds.

Smith and Medin (1981: p. 115) observe that, while lacking evidence for semantic concepts, there is extensive evidence that visual and auditory concepts are not processes as a unitary whole, as assumed by the metric space model.

The computations of the distance between a concept and one of its members – at the basis of categorization in simple and comparative distance models – imply that a concept and its members can be represented in the same space without violating the assumptions of the metric space. Some empirical findings challenge this notion.

Smith and Medin (1981: p. 123) raise the interesting question: "A property is more naturally represented as a feature or as a dimensional value?" and they conclude that it seems that "we will need both features and dimensions to characterize natural concepts".[58]

The Holistic Approach to the Probabilistic View

According to the holistic approach **the representation is based on a single holistic property**. The most commonly investigated instantiation of an holistic approach to the Probabilistic view is **the template**. A template is an isomorphic, unanalyzable, and inherently relational representation. It is usually construed as a matrix of cells, with each cell defined by its position and color (Smith and Medin, 1981: p. 132). The position is given by the horizontal and vertical coordinates of a cell, while the color is either black or white corresponding to filled or unfilled and it is the most frequent or probable value found in the corresponding cells of its instances.[59]

As in other approaches to the probabilistic view, **the representation is a summary[60] and does not require necessary conditions.[61]**

The categorization process argued by the template approach to the Probabilistic view is **a template matching**. A subject establishes whether or not a particular object belongs to a class by determining whether or not the object provides an overall or holistic match to the template representing the class/category. Assuming that a concept template is constructed by picking the most frequent values, an entity x is categorized as an instance or subset of concept/category y if and only if the templates for x and y match to some criterion degree, that is if and only if a criterial number of

[58] Some experimental techniques well developed and largely applied for discovering properties of object concepts (p. 121) are:

- multidimensional scaling, to find dimensions;
- clustering, to discover features;
- attribute-listing procedure, for both dimensions and features.

[59] "A template is (a representation with) a figure that displays a digitalized pattern overlapping to a certain extent with an input pattern" (Palmer, 1978: p. 279).

[60] It is the result of an abstraction process and it is applicable to all relevant test items. Nevertheless, it may not always meet the criterion, meaning that it doesn't need to correspond to a particular instance.

[61] The template for a concept need not perfectly match every or even any instance (since the color of a concept cell need not be identical to the color of a corresponding cell in a particular instance).

x's cells match those of y which amount to computing a correlation coefficient between concept and test-item templates (Smith and Medin, 1981: p. 136).

The holistic approach to the probabilistic view accounts for most of the empirical findings which troubled the Classical view, but it **has been criticized because of its assumptions.** The representational and structural assumptions (especially the isomorphism) restrict the applicability of the approach to concrete concepts/categories, while the processual assumptions (the template matching process) give rise to a categorization process which is too rigid (for, example, various transformations of an object can block the categorization process).

Smith and Medin (1981: p. 140) argue that a more realistic possibility is that "the core of a concept can be represented in terms of features or dimensions or both, and that for some concepts of concrete objects one can use the core information to generate a template for that class, with the template being used to identify presented objects".

In general, the Probabilistic view has been criticized for the following reasons.

- ⇒ The assumed representations discard too much information that has been empirically shown to be relevant to human categorization (Medin and Coley, 1998: p. 412, 413).

According to the Probabilistic theory the only information abstracted from categories is central tendency, whereas other information (such as property variability or correlation among properties) is discarded.

Eysenck (1984: p. 320) argues that Osherson and Smith (1981) provided a severe attack on prototype theory, by claiming that it is necessary to distinguish between the core of a concept and its identification procedure. Prototype theory considers the identification procedures, but provides few insights about the core.

- ⇒ Failure to predict categorization process output, such as which category structures should be easy or difficult to learn (Medin and Coley, 1998: p. 413).

2.2.1.3. The Exemplar View

Different specifications of the Exemplar-view, emerging during the '80s, have been proposed (e.g., Brooks, 1978, 1987; Estes, 1986; Hintzman, 1986, 1988; Jacoby, Brooks, 1984; Medin, Schaffer, 1978; Nosofsky, 1984).

The critical representational assumption for the Exemplar view is that **there is no a single description of an entire category/concept, but only separate descriptions for various specific exemplars (either instances or subsets) experienced and known to be its members** (Smith and Medin, 1981: p. 2, 3). For example, the category of «bachelor» is represented by encoding in long term memory all the specific instances of bachelor the subject has known.

The term exemplar has been used ambiguously by the proponents of this view to refer either to a specific instance of a concept/category or to a subset.

Thus the exemplars have been represented in different ways (Smith and Medin, 1981: p. 145):

- if the exemplars are subsets ⇒ either other exemplars or a description of the relevant properties or both;
- if the exemplars are instances ⇒ a property description.

Some researchers neglected a summary representation,[62] **whereas other researchers argued that at least a certain degree of abstraction is possible**, thus stating that concepts/categories are represented – at least in part – by their exemplars. In this latter case, representations are not really restricted to specific exemplars.[63]

In some exemplar models (but not in all) all representations (exemplars) are realizable as specific instances, thus departing from the probabilistic models.

In the Exemplar view a **property can be part of a representation if it is characteristic of a single instance**, thus diverging from the probabilistic view where

[62] As explained by Barsalou (1992: p. 26), "People do not abstract generalizations from exemplar memories to form abstract category knowledge", rather they form a simple "loose collection of exemplar memories, each associated to the category name". In the proposed example, individuals do not abstract from experienced exemplars of bachelors the generalization «unmarried adult, human, male», rather the experienced exemplars of bachelors are stored as autonomous memories.

[63] This "moderate" view recognizes that individuals know numerous abstractions about categories that they induce from exemplars.

a property must have a substantial probability of occurring among the concept/category's instances to be included in the representation.

In the exemplar view, the properties of the category exemplars (members) play the dominant role in categorization - presumably because they are more accessible than the summary information.

Actually, **there is empirical evidence indicating that people frequently uses exemplars when making decisions and categorizations** (e.g., Kahneman and Tversky, 1973).

Both analytical and non-analytical comparison processing have been suggested within this view (Cohen and Basu, 1987).

To make categorization decisions, subjects consult the stored array of exemplars and compare them to the newly presented item (to be categorized) to determine their similarity. **More precisely, individuals retrieve specific category exemplars from their memory (with high accessibility) and**

a) compare in an aspect-by-aspect matching process an entity and the retrieved specific concrete exemplar/s (usually salient good examples of the category) $\Rightarrow$ analytical comparison process;

b) compare overall (holistic similarity) an entity and the retrieved specific concrete exemplar(s) $\Rightarrow$ non-analytical comparison process;

the higher the similarity, the more likely the entity will be assigned to that category.

For example, an entity is classified as «bachelor» if its structural description is most similar to the memory of (a) previously experienced exemplar(s) of bachelor.

According to most models, parallel search is used, with a comparison of the structural description of the unknown entity to all exemplar memories across all categories simultaneously. On the other hand, serial search would imply a comparison to all exemplar memories of one category after another.

Whether or not the same information is always accessed when determining category membership depends on the specific exemplar model considered. For example, the proximity model assumes that a concept/category is represented by all of its instances that have been encountered and the presentation of a novel test item automatically retrieves the item in memory that is most similar to it and will be categorized as an instance of the target concept/category if and only if the retrieved item is a known instance of that concept/category. But, the assumption that each instance would be a separate part of the representation seems not plausible because of the consequent memory load (Smith and Medin, 1981: p. 146). Other models, more plausibly, restrict the exemplars in the representation. For example, the «best exemplars» model assumes that the representation is restricted to exemplars that are typical of the concept (focal instances).

The exemplar models account for most of the empirical phenomena that concerned the Classical view:

- the use of non-necessary properties and the difficulty of specifying defining ones are explained by placing no requirements on properties other than they characterize at least one exemplar;
- the allowance for disjunctiveness, which is explicitly built into each representation.

The Exemplar view **has been subjected to some criticisms, similar to those of the Probabilistic view**:

- failure to represent all knowledge in concepts;
- failure to constrain possible properties: a lack of constraints on the properties associated with any exemplar, and a lack of constraints on the relations between exemplars included in the same representation.

Furthermore, the critical assumption that a concept is represented by a disjunction of exemplars has been questioned for its failure to specify principled constraints on the relation between exemplars that can be joined in a representation.
Some interpretations of the Exemplar view have been criticized for their assumption about the high amount of idiosyncratic category exemplar information that the cognitive system stores, that seems at odds with the limited capacity of human memory (Barsalou, 1992: p. 27).

Some **concluding remarks on the different views** can be expressed.
Smith and Medin (1981: p. 165) express some judgments about the relative strength of the different views. **The Classical view with all its alterations and the holistic**

approach to the Probabilistic view can be considered unsuccessful because they led to severe problems.

Some critics (e.g., Barsalou, 1992) stressed that classical models are not as widely applicable as the alternative probabilistic and exemplar models, since many categories do not have a clear definition (i.e., speech and artifact categories without properties individually necessary and jointly sufficient); and even when categories do have definitions, prototypes often seem more important that rules (for example, monks and gay males are usually not included in the bachelor category, even though these exemplars fit the necessary and sufficient conditions, they are not similar to the prototype).

The component approach to the Probabilistic view (combining the featural and dimensional approaches) and the Exemplar view seem to offer two viable proposals, but they have some problems too: the lack of constraints in the posited representations and their inability to explain some empirical phenomena observed in categorization processes (i.e., context effects – see later par. 2.2.2.3.).

According to Medin and Coley (1998: p. 415), one challenge to both the probability and exemplar view is represented by some empirical findings from laboratory studies of category learning: subjects often report that they are looking for and use rules.[64]

Another limitation of all models stressed by Medin and Coley (1998: p. 415) is that they do not address the inter-property relationships, thus being of limited generalizability. They argue that the debate between Probabilistic and Exemplar views has been about how property information is integrated across examples and not about the nature of the properties themselves. Indeed, predictions of the categories depend crucially on being able to specify what the properties are, and such properties are usually interrelated rather than independent and unrelated to each other as those usually used in the laboratory experiments.

Barsalou (1992: 31) observes that "researchers have performed numerous experiments to evaluate exemplar, prototype, and classical models. Across this large body of research, **evidence can be found for the use of exemplars, prototypes, and**

[64] As Medin and Coley note: "The structure of ill-defined categories is typically such that no simple rules are valid, but people may resort to more complex rules and strategies (i.e., memorizing exceptions)".

rules in categorization. **"Categories often appear to have multiple representations, each of which operates in certain settings"**. As he clearly exemplifies, individuals can remember specific exemplars of bachelors they have met, and use these memories to classify similar people by analogy at later times; they know prototypical properties of bachelors that may be useful in reasoning about them following the categorization; and they also know the rule for bachelor and can use it to minimize errors when correct categorization is important.

This raises the issues of identifying the conditions surrounding each type of category representation and empirically determine which type of representation an individual is using. He concludes that the variety of possible category representations and accompanying processing assumptions further increases the difficulty in studying categorization.

2.2.1.4. THE MIXED VIEW

Smith and Medin (1981: p. 182) suggest that **some form of integration between the views should be useful**. They note that "there will likely be no crucial experiments or analyses that will establish one view of concepts as correct and rule out all others irrevocably", and suggest the possibility for a comprehensive theory of concepts which could include all the concept views.

Assuming that both Probabilistic and Exemplar views have some truth, and that some concepts/categories are in probabilistic form and others in exemplar form, Smith and Medin (1981: p. 170/172) suggest that **at least two kinds of factors might determine the type of representation: learner factors** (i.e., development stage,[65] task orientation[66]) **and concept factors** (its structure in terms of distribution of properties,[67] the level[68]).

Furthermore, **the representation for a single concept/category might be mixed, that is containing both probabilistic and exemplar components** (both a summary representation and exemplars).

Smith and Medin (1981: p. 172) speculate around the possibility that when adults learn a new concept, they first represent it in terms of exemplars, but with additional experience they form a summary representation as well.

This mixed representations raises the questions about the circumstances that influence the accessibility of summaries and exemplars, and about the possible interactions between the summary and exemplar components of a concept.

Cohen and Basu (1987) – actually within the consumer behavior literature, but drawing on the psychological literature – propose a **contingency-based mixed model of categorization**, where categorization shows flexibility in response to contextual factors.

They assume that individuals could construct descriptive or hypothetical property-level as well as entity-level representations of category members, and could perform the comparison process, at the basis of the categorization decision, in an analytical – that is, property-by-property – and/or non-analytical fashion – that is, based on correlated properties and configural properties – (Cohen and Basu, 1987: p. 462; 464).

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[65] "Since exemplar representations are relatively concrete, and since they may require only simple operations such as retrieval, they may be more prevalent than probabilistic representations at early developmental stages. All other things being equal, the preference for probabilistic over exemplar may increase with age" (p. 170).

[66] In some experiments it has been shown that "any manipulation of task orientation in a concept-learning task that favored storage of information about individual instances seemed to increase the likelihood that the learner would construct an exemplar representation" (p. 171).

[67] "All other things being equal, if the instances of a concept share numerous (non-defining) properties, that concept will likely be represented in probabilistic form; if the instances share few properties, that concept is likely to be in exemplar form. The greater the intra-class similarity, thus, the more likely the representation will be in the form of a summary rather than of exemplars" (p. 171, 172).

[68] Superordinate concepts (i.e. furniture) are likely to be described by exemplar representations, whereas subordinate concepts (i.e., director's chair) are likely to be described by probabilistic representations, and basic level concept (i.e., chair) may fall somewhere in between. But a mixed representation can also be suggested: superordinates probably have no common perceptual properties, but they may well have common abstract or functional properties (which the listings are insensitive to); thus a super-ordinate's perceptual properties may be represented in exemplar form, while its non perceptual properties are described in probabilistic form (p. 172).

The mixed and contingent nature of their model is linked to their assumption that the information processor has the flexibility to adopt one or another categorization mode, or both sequentially, as a function of contextual factors.

Cohen and Basu (1987: p. 463) suggest that **categorization processes (strategies) can be mixed in two senses:**

- **being included in the individual's repertoire** and used depending on contextual variables;

- **being used in the same categorization instance**: a first cut with the most efficient means of making a quick judgment is followed by processes which give more precision, if these are deemed necessary.[69]

As Basu (1993: p. 100) states, **individuals may engage in different categorization processes** (in different categorization instances or in a given categorization instance), **depending on process-relevant contingencies, such as enduring characteristics of the individual** (i.e., processing style, nature of experience in learning about a category) **and characteristics of the context in which the categorization decision is made.**[70]

[69] For example, an evaluation of the overall similarity of the new instance/target to category exemplars or prototypes available in memory for the first cut judgment, without using category-defining rules, even when available, should be considered sufficient, if there is a low motivation or high costs associated with a delay in the categorization judgment.
[70] Cohen and Basu (1987), for example, investigated some of the contextual factors that can influence the type of categorization process in which people engage (see later, par. 3.2).

2.2.2. The Empirical Effects Emerged and The Challenges to the Different Views

Empirical studies conducted during the last years have revealed some interesting effects in the use of categories – especially when performing classification and inference functions – which have stimulated a rethinking and updating of the theoretical views, questioning some of their tenets about category structure, representation and processing.

From a methodological perspective, different techniques have been employed to analyze how and why subjects use categories in experimental settings. In particular, different tasks have been assigned to subjects, such as category learning, category verification or recognition, categorization, exemplar generation or recall, category-based inference, etc..[71] The richness of data collected with such **an array of experimental investigations has provided fruitful insights about some tendencies**. Such observed empirical effects – that can be summarized as hierarchical, typicality and contextual – have engendered new theorization efforts about categorization, both from a static and a dynamic perspective. From a static perspective, those effects have suggested both a vertical (hierarchical effects) and horizontal (typicality effects) articulation of categories. From a dynamic perspective, they have given rise to investigations about the stability of categories between and within subjects (contextual effects).

The most significant empirical effects are described in the following paragraphs, together with a discussion of their impact on the theoretical views described so far.

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[71] In a category learning task subjects are required to learn the rule or the exemplars of a category; in a category verification or recognition task, subjects are given some items and asked to accept or reject them as members of a category; in a categorization task, subjects are given some items and asked to categorize them providing labels and reasons for every category created; in an exemplar generation or recall task, subjects are asked to recall as many exemplars as possible of a certain category; in category-based inference tasks, subjects are told that an item is a member of a certain category and are asked to describe its properties, without seeing the item.

2.2.2.1. *Hierarchical Effects: The Vertical Dimension of (Taxonomic) Categories*

The empirical investigations on the way subjects use categories for classification purposes have highlighted the issue of possible **multiple category membership**. Individuals prefer to classify entities in the environment initially with common taxonomic categories (e.g., Rosch, Mervis et al., 1976), which represent the primary form of categorization (e.g., Barsalou, 1992: p. 174) and the most investigated. However, numerous other cross-classifications are then possible[72] (see later, par. 2.2.2.3, goal-derived categories) and can prove useful for other purposes (i.e., inference and action).

The multiple categorization issue involves that the same entity/instance (i.e., an object in the external world) can be included into categories belonging to a same taxonomy,[73] but characterized by a different level of inclusiveness or abstractness.

Such a finding highlights a **vertical articulation of categories** (e.g., Rosch, 1978): **taxonomic categories can be arranged in different hierarchical levels according to their inclusiveness**. Three levels are commonly distinguished, with an increasing level of inclusiveness and abstraction, which are called: **the sub-ordinate level, the intermediate or basic level, the super-ordinate level** (e.g., Rosch et al., 1976). Some examples in the product domains may be: easy chair-chair-furniture (Eysenck, 1984: p. 317) or Granny Smith-apple-fruit (Barsalou, 1992: p. 182).

Considerable efforts have been devoted to the attempt at demonstrating that one of these hierarchical levels plays a more fundamental role (Eynsenck, 1984). The studies of Rosch and colleagues showed the **primacy of the intermediate level**, which can be considered the most important in some respects, given its properties, so that it has been named "basic".

[72] Rosch (1978: p. 43), for example, argues that the basic level is the level of abstraction in a taxonomy that is appropriate for using, thinking about, or naming objects in most situation in which they occur (e.g., when a specific context is not specified).

[73] Rosch (1978: p. 30) explains that a category can be considered as a number of objects that are considered equivalent, whereas a taxonomy is a system by which categories are related to one another by means of class inclusion: the greater the inclusiveness of a category within a taxonomy, the higher the level of abstraction.

In a particular culture or sub-culture, objects tend to be spontaneously grouped and named by adult subjects at a certain level of generality. **This basic level becomes the predominant and easier way of structuring and differentiating things** (Alba and Hutchinson, 1987).

Learning by children or in a particular domain has been shown to be related first to basic level categories. **Only as learning increases** (i.e., with increasing experience), **subjects develop the ability to structure and differentiate objects at levels above** (super-ordinate categories) **and below** (sub-ordinate categories) **the basic level**. Therefore, much of the knowledge subjects normally possess about the world is in the form of basic level categories (Eysenck, 1984: p. 318).

Other properties which have been demonstrated for basic level categories (Barsalou, 1992: p. 183; Eysenck, 1984: p. 317-318) are related to being the level at which:

- objects are characterized by similarity in overall shapes and can be reflected in a mental image;
- objects are recognized more quickly;
- subjects use similar motor movements for interacting with the object;
- short and similar names are used in different cultures.

The primacy of basic-level categories have been explained by reference to two contrasting principles:

- o the efficiency or economy principle (strictly linked to the number of categories to consider when making a categorization decision);
- o the informativeness principle (related to the information implied in the categorization).

Basic level categories maximize within-category similarity relative to between-category similarity (e.g., Mervis and Rosch, 1981; Rosch et al., 1976). One example of basic level category is «car» (Rosch et al. 1976): the objects included in this category are rather similar to each other and quite different from other vehicles, with different possibilities of transferring experience in accomplishing related tasks.

Basic-level categories guarantee the best balance between economy and informativeness, when compared to the other levels (Rosch et al. 1976; Tversky and Hemenway, 1984).

When moving toward the highest level of the hierarchy, informativeness is lacking (because within-category similarity decreases and between-category similarity increases, due to the higher inclusiveness and abstractness of super-ordinate categories); whereas, when moving toward the lowest level, economy is missing (since there is a higher number of alternative categories to be considered when making a categorization judgment). Since sub-ordinate levels yield very little gain in informativeness over intermediate/basic levels (Rosch et al, 1976), the higher processing costs of intermediate categories when compared to super-ordinate levels (which are less numerous) are worthy.

Taxonomic categories and especially the basic level categories have constituted the main focus of the interest of all the theoretical views.

2.2.2.2. Typicality Effects: The Horizontal Dimension of Categories

Another issue raised by experimental investigations about categorization is related to the degree of membership to a category, which involves an horizontal articulation of categories.

A series of empirical studies driven by the work of Rosch (1973, 1974; 1975; 1976; 1977; 1978), have demonstrated several **typicality** (or prototypicality) **effects, revealing** that categories have a **graded** internal **structure** (meaning that all members are not equal in their membership, representativeness, goodness as example), that favors more typical members over less typical ones in various ways.

Graded structure or typicality or goodness of exemplar is nowadays **considered** by general consent, given the wide empirical support available (e.g., Barsalou, 1985, 1987; Cantor and Mischel, 1979; Homa, 1984; Mervis and Rosch, 1981; Medin and Smith, 1984; Posner and Keele, 1968; Rosch and Mervis, 1975; Smith and Medin, 1981), **a central and ubiquitous characteristic of categories, reflecting an important aspect in the way individuals represent and process categories** (Barsalou, 1992: p. 175).

The graded structure of categories can be considered a significant finding of the categorization research in the psychological field during the '80s (Barsalou, 1985: p. 629).[74]

Every category that has been studied has exhibited a graded structure, that is instances varying in how typical, representative, good as example are of that category. In the United States, for example, pop corn and potato chips are considered more prototypical of snack foods than are olives and tomatoes (Ward and Loken, 1986). Therefore, the members of a category are not equivalent. Rather, **there is a continuum of typicality,[75] beginning with the most representative members (better examples),[76] through atypical members,[77] ending with non-members.[78]**

Graded structure has been shown to account for categorization performance in different tasks, such as category acquisition, exemplar production, category verification (Mervis and Rosch, 1981; Smith and Medin, 1981; Medin and Smith, 1984).[79]

More typical exemplars are acquired and categorized[80] faster and earlier (Loken and Ward, 1990; Mervis and Rosch, 1981; Rosch, 1975, 1977; Sujan, 1985; Ward and Loken, 1986, 1988).

[74] The significance of perceptions of typicality differences is stressed by the fact that in Rosch's studies (1974, 1975) individuals overwhelmingly agreed in their judgements of goodness as an example or clearness as members of a category, even when they disagreed about the boundaries of the category.

[75] Cohen and Basu (1987) argue that the degree of typicality corresponds to people's judgments of how well various entities fit the meaning implied to them by the category label.
Barsalou (1983) refers to items with different degrees of typicality as prototypical member, unclear cases, prototypical non-members (p. 211); building on Zadeh (1965), as well as instances, unclear cases and non-instances of a category (p. 212).

[76] For example, chair is a more typical example of furniture than bookcase (Barsalou, 1983: p. 211).

[77] Atypical cases may be unclear examples, whose category membership might be uncertain; for example, people may be not sure if radio belongs to the category furniture (Barsalou, 1983: p. 211).

[78] They can be considered complements to that category; with a different degree of similarity with the category under consideration. For example, chair is more dissimilar from bird than bat is, and therefore in a category verification task it takes longer to reject bat as a member of the category "birds" then does chair (Barsalou, 1983: p. 211).

[79] Category acquisition is equivalent to learning a category. In an exemplar production task, subjects are given a name of a category and asked to list its members. In a category verification task, subjects are given an instance and they are asked to decide whether it belongs to a certain category or not.

[80] The typical members of a concept are the first ones to be learned by children.
Some experiments have shown that subjects may classify an exemplar not seen previously – during the training phase – better than an exemplar seen previously. The higher degree of match between the un-seen test exemplar (vs. the previous seen) and the prototype of the category – that subjects acquire during the training phase - is responsible for the observed difference in categorization performance.

Typical exemplars are generated earlier and more frequently (order and probability of item output[81]). **Inferences about properties are stronger for typical exemplar, the typical members of a category are more likely to serve as cognitive reference points than atypical members. The belonging category is recognized earlier and faster for typical exemplar.**

Increases in typicality are usually linked to better categorization performance, in the form of efficiency (i.e., shorter time for categorizing typical exemplars) and effectiveness (i.e., higher accuracy, confidence in categorizing typical exemplars).[82]

Several authors have investigated **the determinants of category graded structure**, trying to understand what determines which items are to be judged the most typical. For example, Labov (1973) demonstrated the role of both perceptual (i.e. the shape) and functional (i.e., characteristic functions or uses) attributes in determining the typicality of an object (i.e., cupness in his study).

The most influential explanation - given the effects engendered on the debate in the literature - is the family resemblance construct advanced by Rosch and Mervis.[83] In their study showing differences in typicality between category members,[84] Rosch and Mervis (1975) found out that the distribution of listed features could provide a basis for typicality.[85] Family resemblance is an exemplar's average similarity to other category members and dissimilarity to members of contrast categories. Thus, the more similar an exemplar is to other members of the category, and the more dissimilar it is to members of contrast categories, the higher its family resemblance.

[81] Item output is normally considered to reflect some aspects of storage, retrieval or category search. Rosch (1976b, in Rosch, 1978: p. 39) demonstrated that "the most prototypical items were the first and most frequently produced items when subjects were asked to list the members of the category".

[82] In many experiments people were asked to rate how typical or representative various subsets or members were of a category/concept. Individuals found this rating a natural task and the typicality ratings (i.e., robin has higher typicality as a bird than chicken) have been shown as good predictors of the efficiency (i.e., time) and effectiveness (i.e., accuracy) in a semantic categorization task.

[83] Tversky (1977) was the first to formalize the variable category resemblance as the weighted sum of the measures of all of the common features within a category minus the sum of the measures of all the distinctive features (those that belong to only some members of a given category as well as those belonging to contrasting categories). Two disjoint classes tend to be combined whenever the weight of the added common features exceeds the weight of the distinctive features.

[84] In their experiments, subjects were asked to list features of various sub-sets of a super-ordinate category (i.e. furniture) where the sub-sets varied in typicality (i.e., table as typical and lamp as atypical).

[85] The more prototypical of a category a member was rated, the more attributes it had in common with other members of the category and the fewer attributes in common with members of the contrasting categories. "Both representativeness within a category and distinctiveness from contrast categories are correlated with prototypicality in real categories. For artificial categories, either principle alone will produce prototype effects depending on the structure of the stimulus set" (Rosch, 1978: p. 38).

Family resemblance measures were very highly correlated with typicality ratings. More typical exemplars were characterized by high within-category similarity (that is, most features or attributes shared with the other members) and low between-category similarity (that is, few attributes common with members of other categories).

The empirical findings about typicality and its determinants have reduced the belief in the Classical view and have been used against it. The reasoning is as follows (Smith and Medin, 1981: p. 40):

- The variations in typicality are not consistent with the assumption of equivalence of all the members of a category.
- The variations in family resemblance scores - highly correlated with the typicality variations observed when people categorize members categories - are due to properties that are not common to all members. Typicality variations cannot be explained by variations in the defining properties of the category; rather they can be accounted for in terms of non-defining properties. One of the classical view's structural assumptions precludes non-defining features.

The studies about typicality **were the most powerful support for the establishment of the Probabilistic view** (Smith and Medin, 1981: p. 69), especially for the assumption of variations in the degree of membership due to the properties possessed by the instance. Various models, within the different approaches of the Probabilistic view, have been built to account for typicality effects.

In the component approach typicality effects and its determinants can be dealt with, by adding the assumption that the judged typicality of a member directly reflects

- the number of features it shares with its parent category or, better, with the weighted sum of these shared features, in the featural approach;
- the closeness of its dimensional values to the average values of its class, in the dimensional approach.

In the Exemplar view typicality effects are explained by assuming that the exemplars of a category representation are likely to be typical.

2.2.2.3. *Contextual Effects: The Dynamic Dimension of Categories*

Some empirical studies have investigated **the extent to which categorical systems are stable between individuals and stable within the same individual across time.**

For example, McClosey and Glucksberg (1978) have analyzed the stability of the boundaries of knowledge categories, Bellezza (1984) the stability of exemplar generation, and Barsalou (1987) the stability of typicality judgements.

Taken as a whole, the results suggest a high **flexibility** (at least, lesser stability than expected) **both between and within individuals** (Medin and Barsalou, 1987: p. 468).

For example, the flexibility of typicality gradients within knowledge categories is demonstrated by the effects of shifts in the point of view (i.e., from different cultures or subcultures) on judgments (e.g., Barsalou and Sewel, 1984).

Such findings have questioned the foundations of all the three theoretical views.

The Classic view, in fact, posits stability of category representations within and between subjects. Stability within a subject means that once a person has a concept/category, the same set of properties for the category will be always kept in mind (except for early developmental changes or physiological ones). Stability across individuals refers to the situation where any two people having the same concept/category have identical sets of properties in mind.

According to the Classical View concepts/categories are stable and very bounded unit of knowledge, such that an individual could have them completely, partially, or not at all (Smith and Medin, 1981: p. 10).

The Probabilistic and Exemplar views allow flexibility only of a certain type and to some extent. In fact, **these views postulate that category concepts are capable of constantly changing with individual experience.** For example, within the Exemplar view, frequent experience with a new exemplar (i.e., a derby hat) can alter the subject's category concept (i.e., hats), thus determining a breakdown in within-individual stability (Smith and Medin, 1981: p. 10). The role of idiosyncratic experience in category acquisition and evolution can account also for a certain flexibility between individuals. On the other hand, Medin and Barsalou (1987: p. 481) argue that most models assume that category representations are static within subjects, meaning that the same representation of a category is used on all occasions in which the category is processed.

But, there is **increasing empirical evidence showing that the representation of a category used in processing varies extremely across situations** (Barsalou 1987; Higgins & Lurie, 1987; Medin et al., 1987; Roth & Shoben 1983). Barsalou (1987) investigated and demonstrated the instability of category graded structures. Roth & Shoben (1983) found empirical evidence that typicality ratings expressed by the same subject (asked to comprehend a written text) were highly context-dependent (linked to the textual context).[86] Medin, Wattenmaker, and Hampson (1987) demonstrated that family resemblance was context-dependent, being related to the background knowledge brought to the judgment task.

Taken together, such studies suggest a **flexibility in category graded structures in response to the context where processing takes place.**
Higgins & Lurie (1987) analyzing categorization judgement tasks, found evidence of that comparison processes sometimes involving the to-be-categorized object and a contextually derived referent (rather than a stored mental representation). Since categorization judgements were based on comparisons with contextual information, by altering the contextual setting, they found systematic differences in subject's category judgments to occur.

In summary, **empirical studies have provided evidence suggesting that contextual effects affect categorization** (i.e., categorization judgments). Furthermore, contextual effects influence the use of categories (i.e., category activation for inference).

Some context effects hinge on the representation and use of single category concepts (i.e., temporary changes in the properties of a category concept, two different category concepts underlying the same term especially for super-ordinate terms), some others hinge on combined use of category concepts, usually for functions other than classification (Smith and Medin, 1981: p. 94).

[86] For instance, robin was rated as a typical bird when no contextual information was provided, but was considered atypical in certain contexts such as "the hunter shot at the bird flying overhead."

One of the most investigated contextual effect on category usage is priming: "the prime establishes a context that can facilitate the subsequent processing of the target concepts" (Smith and Medin, 1981: p. 78).[87] **The effects of priming have been demonstrated in different categorization tasks** (reflecting different uses and functions of categories).[88]

In exemplar generation tasks, priming a category name seems to facilitate retrieval of members of that category characterized by a certain stated property. Priming a property didn't produced the same effect. Loftus and Cole (1974) sequentially gave subjects two terms, one designating a category concept and the other a property (i.e., vehicle and red), and asked them to produce a member of the category that had that property (i.e., fire engine). The findings showed that subjects were faster in producing the desired member when the category concept preceded the property term, than with the reverse order of presentation of the terms (i.e., the concept term vehicle seemed to prime the desired response fire engine more than the feature red did).

Furthermore, producing an instance of a category will facilitate later production of another instance of the category (Loftus, 1973), since the first presentation of a category increases its accessibility, making retrieval easier the second time the category is presented. However, Herr et al. (1983: p. 334) argue that such activation can be assumed to decay gradually, with a decreasing accessibility of the primed category over time.

Through priming it seems possible to engender temporary changes in the accessibility of existing (in cognitive representations) properties of a category concept. Priming a specific property value versus another of an object-category was shown to affect the accessibility of the property and the associated knowledge retrieved (i.e., type of interaction with the object category).

For example, Barclay et al. (1974) presented subjects statements like «the man lifted the piano» and «the man tuned the piano» and they probed subjects' memories by cues such as «heavy» or «musical». «Heavy» was found to be a better cue than

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[87] As Mandel and Johnson (2002: p. 235) observe: "The psychology literature has used the term «priming» tp refer to several distinct phenomena that share the same underlying mechanism. Exposure to some prior event, the prime, increases the accessibility of information already existing in memory".

[88] As Herr (1989) explains, in categorical priming, a person's judgement about a person, product, or object is influenced by constructs that are activated in an earlier task".

«musical» for the sentence with «lifted», whereas «heavy» was more effective as cue for the sentence with «tuned».

Smith and Medin (1981: p. 96) interpreted such findings arguing that certain terms – especially those designating super-ordinate object-category concepts - seem to be ambiguous, denoting both a class and a specific subset of that class, and which concept gets activated is dependent on the context. As the authors clearly exemplify, «the planet has many plants» and «this apartment has many plants» are context sentences which activate two differently broad concept-categories of plant, namely all vegetation vs. house plants.

The use of the same category-concept in slightly different sentential contexts seems to make different properties temporarily differently accessible (i.e., more accessible).

In categorization judgment tasks Rosch (1975) found typicality to interact with priming. She asked subjects to decide whether two simultaneously presented words – which denoted instances of the same category varying in typicality – were physically identical or not (i.e., the pairs apple-apple, fig-fig). Prior to the presentation of a word pair, during some trials, the name of the relevant category-concept was presented as a prime (i.e., fruit). The category-concept prime was found to facilitate categorization judgments – relative to trials without a prime - only for word pairs naming typical instances (i.e., fruit speeded decisions for apple-apple but not for fig-fig).

The effect of priming in categorization tasks was also investigated by Herr et al. (1983). They employed an unobtrusive priming of a category by exposure to some of its exemplars, where unobtrusive means that priming and judgment were done in unrelated tasks.

Herr et al. found empirical support for the hypothesis that the nature or properties of the stimuli to be judged could determine whether an assimilation versus a contrast effect (both context effects[89]) would be observed following priming. More precisely, they took into consideration the degree of ambiguity of the stimuli to be judged and

[89] The effects of context on judgement (i.e., of a primed category on sub-sequent categorization judgement) have been shown to be either in terms of assimilation - that is, a judgement of the stimulus biased toward the context stimuli, i.e., the primed category - or contrast - that is, a biased judgement of the stimulus which is inversely related to the context stimuli (Herr et al., 1983: p. 325).

the degree of extremeness of the primed exemplars, thought as being important in predicting the effects (even interacting). The underlying logic is as follows:

- it may be that only when the category membership of a target object is ambiguous, it will be judged as a member of a recently primed, and thus highly accessible category, with an assimilation effect (meaning a judgment consistent with the primed category); whereas in judgments of an unambiguous stimulus (i.e., well known), the primed category may provide a context against which the target stimuli could be judged, with consequent contrast effects (meaning a judgment not consistent with the primed category);
- extremeness of the context-setting-stimuli with respect to the target-stimuli may lead to contrast effects;
- ambiguity and extremeness may interact, with contrast effects when ambiguous and extreme stimulus are primed.

In a first experiment Herr et al. primed participants-subjects with four different levels of ferocity during a color perception experiment (in this sense the priming was unobtrusive, not related with the task the subjects were asked to perform), and, later, they asked the same participants (in an apparently unrelated experiment) to judge the ferocity of both real (unambiguous stimuli) and unreal (ambiguous) animals. In a second experiment they primed participants subjects with four different levels of size during a color perception experiment (again, unobtrusive priming), and, later, they asked the same participants (in an apparently unrelated experiment) to judge the size of both real (unambiguous stimuli) and unreal (ambiguous) animals. This experiment was a conceptual replication conducted for providing more evidence, by using a "less ambiguous" dimension (size showed less within level variance than ferocity). Their findings showed an interaction between ambiguity of the judged stimuli and extremity of the primed exemplars: only when moderate exemplars were primed and ambiguous stimuli judged assimilation effects did occur.

Herr et al. (1983: p. 336) conclude that, in a categorization judgment task, the subject uses a reference to some standard along any dimension (a mean, a mode, or prototype, for example), which is not constant, rather changing depending on the particular context. They argue that priming is one way in which a particular standard may be provided, since recent activation render the primed construct more accessible. More generally, they state (Herr et al., 1983: p. 334) "priming a construct will increase the likelihood that it will be applied to new incoming information, provided that the construct is applicable to the stimulus".

Given such rising empirical evidence, **theorists** (i.e., Thompson, 1989) **are increasingly questioning if the influence of context on categorization can be adequately accounted for by either the Classic, Probabilistic, or Exemplar views.**

Some existing models within the Probabilistic and Exemplar views have been adjusted to account for some contextual effects (especially priming).

Within the Probabilistic view, for example, the feature comparison model of Smith, Shoben and Rips (1974), the spreading activation model of Collins and Loftus (1975) and the cue validity model of Rosch and Mervis (1975) can account for priming effects.

According to the spreading activation model, for example, the presentation of a prime leads to the activation of its associated category-concept, and this activation spreads along all property paths emanating from the concept, with the consequent activation of other members to the extent that they share properties with the concept. Loftus and Cole (1974)'s results can be explained by assuming that there are fewer paths emanating from a category-concept than from a properties, with the consequence that the lower sub-division of the activation emanating from a concept (vs. a property) will engender a higher activation of the path arising from the concept. Barclay et al. (1974)'s results can be explained by considering that a property will become the more accessible the more activations it receives in the contexts (through different concepts – mentioned in the context - to which it is linked).[90] Rosch (1975)'s results may be understood by arguing that typical members (vs. atypical) share more properties with the (primed) concept-category, with the consequence that typical members will be primed more by the concept-category, with a facilitation of the categorization judgment task.

[90] "When «the man lifted the piano» is presented, the concept of piano is activated along with its features «heavy weight» and «produces music». Another concept activated [by the sentence] is that of «lifted», an action concept, and one of its features could be «weight». A feature having to do with weight is activated by two concept mentioned in the sentence. The more activation a feature receives, the more accessible we can assume it is. In the sentence with tuned, a feature concerned with music is activated by two concepts in the same sentence – piano and tuned – and thus it is the most accessible in this context." (Smith and Medin, 1981: p. 94, 95)

In some exemplar models different parts of the representation (that is, different exemplars) are retrieved for different test items and this partial retrieval deals with the instability of some category concepts (Smith and Medin, 1981: p. 169).

The questions empirical studies on contextual effects tried to answer were summarized by Barsalou (1992: p. 165), referring to category activation, as follows: "upon having conceptualized one category on a particular occasion, do individuals always activate all of its associated knowledge simultaneously? Or do they only activate a subset? If they only activate a subset, is this content stable or does it vary from context to context?"

Existent empirical evidence suggests that the conceptualizations constructed for a category vary substantially across contexts, thus further implying that subjects don't always (in every context and occasion) activate all their knowledge associated to a category.

For example, the empirical findings about priming showed that the properties activated to form a category-concept are, at least to some extent, context-dependent. **Some properties are included in the category conceptualization across all contexts, regardless of whether they are relevant, whereas others will vary.** The always included properties provide stability across contexts, occurring in all conceptualizations of a category. The reasons for the stability vs. variability of the properties of a category-concept, however, need further study (Barsalou, 1992: p. 167).

The most convincing evidence refers to the assessment of individuals' conceptualizations of the same category or of the same person's conceptualizations of the same category over time, showing that the conceptualization constructed for a category varies substantially both between and within individuals.
For example, McCloskey and Glucksberg (1978) in an experiment presented subjects with various entities and asked them whether they belonged to a particular category (e.g., whether apple, banana, avocado, olive, corn, pumpkin, onion, and carrot belong to fruit). They found a high variability in the ways different subjects assigned the entities to each category, thus showing a variability of the category conceptualizations between subjects. They repeated the experiment one month later, and found out that some subjects have changed their minds about the categorization

of the same entity, thus showing a variability of the category conceptualization within subjects (across occasions).

Barsalou (1992: p. 168) notices that **understanding the ability to construct flexible category conceptualizations is far from being reached.**

Barsalou tried to study thoroughly flexibility in categorization (1983 etc.), providing considerable **evidence that individuals often spontaneously construct ad-hoc categories for use in specialized contexts where they are relevant for achieving novel goals.** Ad-hoc categories are a sub-set of goal-derived categories, characterized by the novelty of the goal. He also demonstrated that **subjects are able to readily cross-classify a given entity into a wide range of categories, usually with taxonomic categories as primary classification, and goal-derived categories as secondary classification.**[91]

A shared definition to distinguish common taxonomic and goal-derived categories is not available. Only some characteristic properties (not defining because not always valid) can be useful to contrast these two kinds of categories originally proposed and extensively studied by Barsalou (1985: p. 632).

⇒ Common taxonomic categories and goal-derived categories differ in the way they reflect the correlational structure of the environment, that is the co-occurrence of a given property with certain other properties but not with others.

Common taxonomic categories reflect (and maximize) the correlational structure of the environment: they refer to sets of entities that share clusters of co-occurring or correlated properties that rarely occur outside the category, although they need not to be true of all its members (Rosch and Mervis, 1975; Barsalou, 1983: p. 214).

Goal-derived categories cut across the correlational structure of the environment: they usually include some members from several common taxonomic categories or subsets of one particular common taxonomic category (but never all of its members). Thus, many non-category members are highly similar to category members (because they share many correlated properties with goal-derived category's members). Examples of common taxonomic categories are fruit, birds,

[91] A chair, for example, can be cross-classified as something to hold a door open, something to stand on to fix a light bulb, something to sell at a garage sale, and so on.

furniture, medications, vehicles (Alba and Hutchinson, 1987: p. 417); whereas examples of goal-derived categories are things to eat/not to eat on a diet, birthday presents, things to take from home during a fire (Barsalou, 1985: p. 632), things to buy at a department store and at a grocery store, food to be eaten at a pic-nic (Alba and Hutchinson, 1987: p. 417).[92]

⇒ **Goal-derived categories are** not very salient and do not stand out as "natural". Individuals perceive goal-derived categories (which become salient despite their violation of the correlational structure of the environment) when and because they are **instrumental to the achievement of currently relevant goals** (Barsalou, 1985: p. 632).

Goal-derived categories are unusual sets of entities, created spontaneously by individuals for use in specialized contexts in everyday life whenever they are instrumental to achieve a goal (i.e. things to sell at a garage sale for achieving the goal of selling unwanted possession).

⇒ Common and goal-derived categories are similarly structured (in a graded manner, that is with typicality gradients which result from similarity comparison but has different determinants). They differ in their representation (Barsalou, 1983: p. 224).

Goal-derived categories possess a graded structure. Barsalou's (1983) experiments with goal-derived categories showed that subjects agreed on the graded structure underlying a category – both internal (for category members) and external (for non-category members), although they could be uncertain where to draw the category boundary along the typicality continuum.[93] Goal-based categories, thus, have salient typicality gradients. For example, exemplars of goal-derived categories varied in their similarity to one another, and goodness as examples, as much as do the exemplars of common taxonomic categories. For goal-based categories, typicality as indexed by production frequency in an exemplar generation task varied, with some

[92] According to Alba and Hutchinson (1987: p. 417) common examples of non-taxonomic categories are those defined in terms of specific shopping or usage situations, goal derived categories are constructed to achieve goals, and include frequently used and well-established and novel (named ad-hoc, to emphasize that they are spontaneously created for use in specialized situations for the purpose of achieving novel goals) categories.

[93] This means that there was less agreement on category membership with uncertain categorization for unclear cases. Barsalou (1983: p. 216) states, more precisely, that excluding unclear cases, subjects were in excellent agreement over which items were and were not category members.

members of the category being more dominant than others. Therefore, typicality and production frequency were shown to be correlated for goal-based as well as they have been found to be for common taxonomic categories (Barsalou, 1981; Mervis et al., 1976).

According to his findings, **individuals use the same similarity comparison processes to construct graded structures** for both common taxonomic and goal-derived categories. In fact, he found a high agreement on typicality gradients derived from typicality ratings and rankings for both common and ad-hoc categories. However, **category graded structure appears to be a complex and dynamic phenomenon: a single determinant is not responsible for the graded structure of all categories and graded structure doesn't remain constant across contexts** (Barsalou, 1985: p. 645).

Barsalou (1985) extensively investigated in experimental settings **the determinants of graded category structures**[94] and found out that they **can vary for common taxonomic categories and goal-derived (and ad hoc) categories, and can change with context.**

Family resemblance or an exemplar's similarity to the central tendency of the category, an exemplar's similarity to ideals in the category, frequency of instantiation or encountering of the exemplar, and familiarity have been suggested in Cognitive Psychology literature as possible determinants of a category graded structure.

☆ Family resemblance (see above, par. 2.2.2.2.) should be viewed also (Smith et al., 1974) as an exemplar's similarity to central tendency (i.e. average, median, modal values on dimensions, features etc. of the category) and dissimilarity to central tendency of contrast categories. Comparison to central tendency seems to be a more psychologically plausible way for people to determine family resemblance, because more parsimonious than comparing an exemplar to members and non-members of the category (Barsalou, 1985: p. 630). Similarity to members and non-members and similarity to central tendency are both predictive of family resemblance.

☆ Ideals in a category are characteristics that an exemplar should have if it has to best serve a goal associated with the category. Barsalou (1985: p. 630) suggests, as

[94] In other words, what determines the degree of category typicality of an exemplar or member of a category.

example, that an ideal for "foods to eat on a diet" is "zero calories". This is because, the fewer calories (characteristic) an exemplar has, the better it serves the goal associated with its category "lose weight". The exemplars with decreasing numbers of calories are increasingly good exemplars of the category.

Most categories have more than one ideal, with the most important ideal(s) on a given occasion depending on the goal a person is pursuing. As Barsalou (1985: p. 631) clearly exemplifies, the category "possible restaurants to eat at" may have the ideals of lowest possible cost, highest possible quality, closest possible proximity. If a goal the person is pursuing is having a memorable experience, then high quality may be the most important ideal on that occasion. On the other hand, if the goal is having a quick meal, high proximity might become the most important ideal.

Ideals are not usually – but they may occasionally be – the central tendencies of their categories. They tend instead to be extreme values, which are either true of only a few members or true of none at all. For example, Barsalou (1985: p. 631) observes that zero calories is not the central tendency with respect to calories for things to eat on a diet.

Central tendency depends directly on the exemplars of a category a person has experienced, whereas ideals may be independent of experienced exemplars and can be acquired through the process of planning how to achieve goals, before exemplars are even encountered (Barsalou, 1985: p. 631).

☆ Frequency of instantiation is someone's subjective estimate of how often they have experienced an entity as a member of a particular category.

☆ Familiarity is someone's subjective estimate of how often they have experienced an entity across all contexts.

Thus, frequency of instantiation is a category-dependent measure of frequency of an exemplar encounter/experience, whereas familiarity is category-independent. Increases in frequency of instantiation and familiarity could be both associated with increasing typicality.

Different factors could be hypothesized to determine the graded structure of the different kinds of categories, as well as different factors might jointly determine the graded structure of a particular type of category. As Barsalou (1983: p. 634) exemplifies "someone on a diet might compare selections on a menu to the ideals for things to eat on a diet in order to pick instantiations that will maximize the goal of losing weight"; or "the typicality of a particular fruit may be determined, not only by its similarity to central tendency information, but also by its similarity to relevant ideals, e.g. having to do with taste and nutrition".

His empirical investigation of this issue suggests that **specific kinds of categories (common taxonomical or goal-derived) vary in the combination of factors that determine their graded structure, and** that **multiple determinants can simultaneously determine graded structure in a particular category.**

More precisely, ideals and frequency of instantiation were found to be the determinants more central to the structure of goal-derived categories, whereas similarity to central tendency had not unique predicting power (Barsalou, 1985: p. 636-637).[95] Central tendency accounted for a large amount of unique typicality variance for common taxonomic categories (being the most important determinant of graded structure), but also ideals and frequency of instantiation[96] had unique predicting power, although to a various degree. Barsalou (1985: p. 639) checked if familiarity entered into subjects' judgments of frequency of instantiation. He found that familiarity and frequency of instantiation measures were not the same and familiarity was a much poorer predictor of category typicality than frequency of instantiation.[97]

As an illustration of the different predictors for different types of categories we report the results of Barsalou (1985)'s experiment for two common taxonomical categories and one goal-derived category (Figure 2.4).[98]

[95] This means that it doesn't account for unique variance when the other two predictors were partialed out.

[96] This is consistent with an assumption in memory theory: the more often two things co-occur (exemplar concept and category concept here), the more likely one is to elicit the other in a production task (Barsalou, 1985: p. 637-638).

[97] As Chakravarti (2001: p. 34) notices, frequency of instantiation can be considered a special case of familiarity, since it is related to a particular context.

[98] Alba and Hutchinson (1987: p. 417-418) argue that "A few goal-related attributes structure goal-derived categories (i.e. the attributes being edible and high in calories for the category food not to eat on a diet)".

Figure 2.4 – Predictors of graded structures for common taxonomical and goal-derived categories: an example

Fruit						
Exemplar	OD	EG	CT	FOI	I	FAM
Apple	32	8.7	4.491	7.0	7.8	6.5
Orange	32	8.4	4.565	7.6	8.0	6.8
Strawberries	12	8.1	4.426	7.3	7.8	5.6
Banana	19	7.1	3.435	7.3	6.9	5.3
Pear	14	6.8	4.611	4.0	5.9	4.5
Peach	10	6.2	5.121	5.7	5.8	5.3
Pineapple	3	6.2	3.639	5.2	6.2	5.1
Plum	2	6.2	5.009	4.6	4.7	4.4
Apricot	2	6.1	4.898	4.9	4.9	4.0
Nectarine	2	5.9	4.843	4.4	5.5	3.6
Tangerine	4	5.9	4.556	4.3	4.7	4.0
Grapes	10	5.7	4.370	6.1	7.3	6.0
Cherry	11	5.1	4.824	5.9	6.9	4.7
Watermelon	5	5.1	2.908	5.8	6.7	5.4
Berries	2	4.7	4.389	4.2	5.6	3.9
Lemon	2	4.1	3.611	5.4	3.3	6.1
Blueberries	3	4.0	4.361	3.2	4.7	4.1
Raisins	2	3.3	3.722	5.3	5.0	4.5
Tomato	4	2.0	2.111	4.3	6.2	6.2

Foods Not to Eat on a Diet						
Exemplar	OD	EG	CT	FOI	I	FAM
Chocolate	5	8.2	4.444	7.0	6.5	7.6
Ice cream sundaes	3	8.2	4.659	7.2	8.1	7.1
Candy	16	8.0	4.476	6.7	7.3	8.3
Pie	2	8.0	4.738	7.0	7.7	5.3
Sugar	2	8.0	4.540	7.0	7.0	6.4
Cookies	4	7.8	5.079	6.9	6.8	7.1
Cake	13	7.6	5.135	6.9	7.3	7.8
Pastry	2	7.6	5.468	6.8	7.5	5.7
Ice cream	19	6.9	4.683	6.4	7.4	8.3
French fries	4	6.4	4.294	6.4	7.4	6.6
Pasta	2	6.1	4.849	5.9	5.9	5.5
Potato chips	2	5.9	4.326	6.7	6.6	6.3
Spaghetti	2	5.9	4.222	6.1	5.3	6.7
Pizza	3	5.7	4.318	6.5	5.5	7.1
Butter	2	5.4	3.897	6.4	6.3	6.6
Starches	2	5.4	5.691	6.7	6.8	4.0
Bread	8	4.9	4.913	3.8	5.5	6.7
Hamburgers	3	4.5	3.539	6.4	4.8	6.5
Potatoes	10	3.8	4.397	4.9	6.1	5.9
Salt	3	3.3	2.675	5.8	4.5	6.5
Cheese	2	2.9	3.429	3.9	5.4	7.4
Meat	3	2.2	3.389	5.2	4.4	7.6

The data represent the average scores obtained in experiment 1 for OD = output dominance, EG = exemplar goodness, CT = central tendency, FOI = frequency of instantiation; I = ideals; FAM = familiarity. Within each common taxonomic or goal-derived category, exemplars are ordered by their values for exemplar goodness (typicality)

(Source: Barsalou, 1985, Appendix pp. 650-654)

Therefore the contents of category concepts for common categories tend to be averages of their category instances, whereas the category concepts for ad hoc categories only contain properties of the instances relevant to the goal the category serves, and not the average properties of all their instances. As Barsalou (1983: p. 225) exemplifies, "Since only edible and high in calories are relevant to losing weight, all other properties in «things not to eat on a diet» are not included in the category concept. During typicality judgments, the primary way instances can vary from this concept in similarity is simply with regard to calories. Instances having few calories are not as similar to the category concept as those high in calories and are therefore less typical".

Barsalou (1985: p. 641, experiment 2) also investigated whether **the determinants of a category's graded structure depend on the context in which**

the category is processed. The findings of his experiment indicated the **context-dependence of determinants of a particularly category's graded structure**: in some contexts central tendency causally determined the graded structure of the category, in other contexts ideals did the same, or in some other contexts both central tendency and ideals were simultaneous determinants.

Barsalou (1985: p. 646, 647) concluded that **graded structures do not reflect some invariant structures associated with a category; rather they reflect individuals' dynamic (over time) and flexible (context-dependent) ability to construct categories.** According to Barsalou's (1985: p. 646), individuals have a highly creative ability to construct concepts, by constructing a diverse variety of concepts in working memory (such as a prototype) to represent a category across different situations.

Some information (context-independent) may always be incorporated into a concept, whereas other information (context-dependent) may be incorporated only in relevant contexts. Thus the concepts that represent a category have both stability and flexibility.

Drawing from a large knowledge base in long-term memory, humans are able to construct context-dependent representations in their working memory, which are tailored to the constraints and demands of specific situations (p. 648). **People represent well-established categories in a dynamic and context-dependent manner and construct new categories that serve specific (new) goals.**

The construction and use of goal-derived categories – according to Barsalou (1983: p. 226) – are expression of the creativity of human intelligence, since they are representations which reflect new ways of organizing the environment, that may be necessary for achieving new goals or old ones in a novel way. They require the individuals' ability to cross-classify entities.

Barsalou (1985: p. 632) first introduced the construct of **ad-hoc categories**, defined as those goal-derived categories that are constructed by an individual to achieve a "novel" goal.

Some interesting questions referring the structure and representation of ad-hoc categories raised and investigated by Barsalou are:

☆ Category concepts ⇨ Are the properties composing ad-hoc category concepts well associated, thus making the categories accessible?

☆ Concepts-to-instances associations (relevant in experiments for category production and retrieval tasks) ⇨ Do ad-hoc categories have direct associations from the category concepts to their instances, which make category production and retrieval easier?

☆ Instances-to-concepts associations (relevant in experiments for categorization tasks) ⇨ Do ad-hoc categories have direct associations from their instances to their category concepts, which make categorization of instances easier?

Barsalou (1983: p. 214) in several experiments showed that **the representations in memory of ad-hoc categories** (in terms of category concept,[99] the concept-to-instances associations,[100] the instances-to-concept associations[101]) **are not well established**. This should be expected, since individuals rarely, if ever, have thought of them previously.

In one of its experiments Barsalou (1983: p. 221) found that both concepts and concept-to-instances associations were better established in memory for common categories than for goal-derived categories. Findings showed that the overall exemplar recall, the category access, the exemplars per accessed categories and the intrusions were higher for common categories than for ad-hoc categories. However ad-hoc categories provided organizational schema for presented information (since the ad-hoc categories showed greater exemplar recall than random categories with unrelated items).

A lower consistency in exemplar generation for ad-hoc categories than for common categories was found in another experiment (Barsalou, 1983: p. 218), thus suggesting a different establishment in memory of the concepts-to-instances and a different speed of instance accessibility.

[99] To be intended as the associations between a concept and its properties and between the properties themselves (Barsalou, 1983; 213).
[100] These top-down associations are useful during category production and recall tasks: a category concept act as a cue to activate category instances, (Barsalou, 1983: p. 213).
[101] These bottom-up associations are useful when categorizing single instances of organizing multiple instances of the same category (Barsalou, 1983: p. 213).

Barsalou's interpretation of such results is that the higher experience subjects have with (common taxonomic) categories lead them to establish stronger concept-to-exemplars/instances associations.

A later experiment (Barsalou, 1985) showed that the correlation between production (of exemplars) frequency and typicality was higher for common taxonomic categories than for goal-derived categories, and that subjects generated exemplars at a faster rate for common taxonomic categories than for goal-derived categories. Also these latter results seem consistent with a better established representations in memory for common taxonomic categories, which determine a strong association between the category concept and their exemplars, which, in turn, make easier their generation. They also suggest that the high- and low- typicality instances of common categories differ more than those of ad-hoc categories in the strength of concept-to-instances associations (higher for high-typicality instances in common categories than for high typicality instances in the ad-hoc categories).

A different experiment confirmed that instance-to-concept associations were better established in memory for common than for ad-hoc categories. In fact, a categorization task was easier for common categories than for ad-hoc categories; some ad-hoc categories were easier to discover than others. Categories difficult to label showed a lower consistency in labelling, thus increased difficulties in discovering a category led to increased variability (less agreement) in labelling it. In particular, ad-hoc categories were difficult to identify in a consistent way (with high agreement) without a context. As Barsalou (1983: p. 223) observes "(ad-hoc) category concepts only became obvious and agreed upon in relevant contexts that primed the concepts". His interpretation is that this may be optimal, **given their specialized nature: "ad-hoc categories should come to mind only when primed by current goals"**, as it seems to happen according to the experimental findings. On the other hand, context didn't facilitate categorization, rather it reduced the agreement in categorization for common categories (Barsalou, 1983: p. 222-223). The interpretation of the author is that subjects were more specific in the categorization of common categories when a context was provided because they tried to tailor **common categories** to currents contexts. In other words, as Barsalou states it (1983: p. 223): "categories like fruit, furniture and clothing **may often be**

incorporated into ad hoc categories relevant to current purposes (e.g. fruit for dessert, furniture to be moved, clothing in the laundry)". Barsalou (1992: p. 174) explains that **goal-derived categories are typically secondary and temporary.** He exemplifies that the exemplars of the goal-derived category «food to eat on a diet» have primary categorizations such as celery, tofu, rice cakes; when subjects think of each exemplar of celery initially they think of it initially as celery rather than as a food to eat on a diet. This is a subsequent and temporary cross-classification of celery, which may become relevant because of the current goal.

Integrating the results of many studies, Barsalou (1983: p. 223-224) concludes that "**a given entity can be cross-classified into an indefinitely large number of categories** (i.e. apple into fruit, things to take on a picnic etc.) (...). During the classification of an entity, categories with strong instance-to-category association may be automatically activated (i.e. apple into fruit). (...) In contrast, categories weakly associated to an instance may be activated (i.e. things to take on a picnic to apple) only in contexts that require the use of the category (i.e. going to a picnic)".
The instance alone doesn't activate the ad-hoc category, it's the conjunction instance and a particular context that activate it. "**Classifications highly associated with an instance are available across all contexts. Weakly associated classifications are available in contexts that prime them**"

Barsalou (1983: p. 225) raised the issue of explaining how goals make particular ad hoc categories relevant,[102] but he only suggested that the solution would likely be developed in the context of a theory of problem solving.

He also raised the question of "how new concepts can be constructed to represent ad hoc categories?" and suggests different ways:

- retrieving well established concepts and altering them by adding or deleting properties (when contrary to current goals)
- from property information in memory (i.e. things possessing the property x), requiring the concept to contain a property as well as sets of properties organized as conjunctions, disjunctions or combinations.

[102] "Given a goal, how can we predict which properties should be activated and associated to each other to form the concept for an ad hoc category?"

Barsalou (1991), based on the results of an experiment[103] that showed a consistent pattern in the formation of ad-hoc categories, outlined a general procedure for deriving ad-hoc categories.

He identified the following steps:

1) The selection of a frame, containing attributes that take different values across different instantiations (e.g., the attributes entertainment, vacation locations, vacation time, people to go with, things to take, things to do, expenses for an ad hoc category like vacation)
2) The selection of a particular attribute (e.g., entertainment)
3) The identification of the optimization of that attribute, that is elaborating on the desired values of the attribute (e.g., beaches, casino, night clubs, skiing ecc.)
4) The identification of the constraints bearing on that attribute (e.g., money or time)
5) The combination of optimizations and constraints[104] from all the attributes instantiated (i.e., selecting skiing as the value of the attribute «things to do» constraints other attributes like vacation locations), which helps in creating a more exact description of the category
6) Generating exemplars that fit this description, ordering them on the extent to which they satisfy the goal and storing them in memory for future use."

Barsalou (1992) contends that the core of a frame is determined by (a) a conceptual necessity (e.g., the attributes buyer and seller in the frame for transaction), and (b) the attributes on which all exemplars have values. Other factors that may determine the attributes, constraints and optimizations that are instantiated with a frame are (a) a perceptual salience (b) goal relevance (c) intuitive theories and (d) memory entrenchment." (Chakravarti 2001: p. 40)

"Frames may differ between subjects. (...) Barsalou (1987) points out that **there is a lot of instability both between and within subjects. One important source of variation between subjects could be related to expertise.** Frames of experts are

[103] He asked subjects to plan out various activities (vacations, purchases etc.) and analyzed the extensive open-ended protocols obtained.

[104] Some constraints and optimizations may be enabling in nature while others may be inhibitory in nature (Chakravarti, 2001: p. 40, 41).

likely to be richer than those of novices with many more attributes, attribute-value combinations, and instantiations of the same." (Chakravarti 2001: p. 42)

Once construed, the concept may be reconstructed on subsequent occasions or retrieved, and can be used as a cue to retrieve category instances. **Ad-hoc categories differ from common categories because they haven't well established direct instance-to-concept associations.** Exemplars from ad hoc categories might be retrieved using a generate-test procedure: an item is retrieved from well established (common) category and is then tested for membership in the poorly established (ad hoc) category according to its properties. Instances with the relevant properties become members of the ad hoc category.

Once an ad-hoc category is frequently used/processed, it becomes well-established in memory, and is no longer ad-hoc (Barsalou, 1983: p. 224-225). **Some ad-hoc categories make a transition to goal-derived categories.** For example, «things to sell at a garage sale» may be created as an ad-hoc category for the first garage sale organized by the individual, but will become well-established for subsequent ones. Alba and Hutchinson (1987: p. 431) refer to empirical evidence showing that **repeated use of goal-derived or ad-hoc categories can make them functionally equivalent to common categories, in terms of memory processes.** As they exemplify, after years of dieting, «things not to eat on a diet» would have information processing characteristics that are similar to «automobiles», whereas the structural difference presumably remain unchanged. In sum, goal derived categories include both ad-hoc categories and better established categories that were once ad hoc.[105]

Someone refers to goal-based categories as resulting from a top-down processing in a particular context (e.g., food to eat on a diet) and Barsalou seems to share this interpretation.

He (1992: p. 42) observes that **all the models analyzed within the three views consider the role of perceptual information in categorization**: information initially enters the cognitive system through different sensory modalities (i.e., vision, audition), the cognitive system then forms a structural description from property

[105] This is not a defining characteristic of goal-derived and ad-hoc categories, because common taxonomic categories might sometimes have representations poorly established in memory, for example in early childhood (Horton, 1982).

information, and projects it to memory, trying to find the best matching category. Since information flows from the perceptual modalities (bottom) toward knowledge and procedures in memory (up), **this interpretation of categorization is referred to as bottom-up processing. However, categorization usually involves also a top-down processing**, that is extensive information flowing from memory in the form of expectations (top) to perception (down). Individuals' knowledge provides expectations. Thus, knowledge about the current context produces expectations about categories likely to be present; and expectations influence their categorization performance (i.e., facilitating the categorization of instances from the expected categories, but interfering with the categorization of instances from unexpected categories).

Some **studies** (e.g., Palmer, 1975) **have demonstrated the role of both bottom-up and top-down processing in categorization.** Categorization is not based only on raw similarity argued from information obtained from bottom-up processing but also top-down processing makes the theories of nature and human activity a subject has to influence categorization.

2.3. Recent Research Trends

Medin and Colin (1998: p. 428) have outlined some recent and current trends in research about concepts and categories, arguing that one of the most promising direction relates to the impact of knowledge on conceptual systems. Two interesting developments refer to the effects of expertise on reasoning in a particular domain and of culture.

Psychological **studies on the nature and effects of expertise** have been done in last decades by considering a variety of tasks (i.e., problem solving, decision making). By definition, **experts possess a large body of domain-relevant knowledge, whose quantity is greater than novices' one.** One of the most common methods to assess the amount of knowledge a person possess is recall, and, with respect to chess players, for example, Chase and Simon (1973) in a classic study found out that chess experts were able to recall a greater number of chess positions from a chess board than novices, because of their ability to recognize a greater number of chess pattern made of a greater number of pieces. Similar results about the differences between experts and novices in terms of quantity of knowledge, as revealed by recall, have been obtained in completely different domains (i.e., Bédard, 1989 for internal accounting control or Bordage and Zacks, 1984 in the medical field).

Besides differences in terms of quantity, experts and novices diverge also in its quality, especially with respect to its structure (Bédard and Chi, 1992: p. 135). This is a crucial difference which influences perceptual processes and sub-sequent behavior. **Research in different domains has revealed profound reorganizations of knowledge as a function of amount and type of expertise** (e.g., Chi, 1992; Chi and Bjork, 1991; Medin, Lynch, Coley, Atran, 1997; Tanaka and Taylor, 1991). The particular ways experts' knowledge is organized make, in fact, that knowledge more accessible, functional and efficient, when compared to novices (Bérard and Chi, 1992: 135).

Several studies have highlighted both the different structures of knowledge that characterize experts vs. novices, and the conceptual changes which lead to those structures (Medin and Coley, 1998: p. 428), as well as some effects on the strategies adopted in certain situations to perform specific tasks (usually laboratory tasks such as recall, recognition, problem solving, and decision making). Expert-novice differences refer to the differences in mental representations and cognitive processes associated with domain-specific expertise (Kellogg, 2003: p. 247, 248; Druckman and Bjork, 1991: p. 63). Experts can be defined as "individuals who have learnt a wealth of factual and conceptual knowledge, and have developed the necessary procedural skills to excel in a specific domain" (Kellogg, 2003: p. 247). **The superior or skilled performance shown by experts** (i.e., in problem solving) **can be explained with respect to all these interrelated aspects: the amount of knowledge possessed, the knowledge structures they possess and the strategies or heuristics they use** (Druckman and Bjork, 1991: p. 65; Bédard and Chi, 1992: p. 136). Anderson (1974), for example, showed that more knowledge alone is not sufficient, since it leads to a deterioration of performance. The organization of experts' knowledge has been frequently investigated by analyzing what information experts and novices use to make categorization decisions, with respect to problems (e.g., in physics, mathematics, genetics) as well as real-world objects (e.g., cameras, rice bowls, pictures of dinosaurs for children). Such studies showed that **experts tend to rely on meaning when organizing knowledge in memory, whereas novices based their organization on surface feature of the information available for the categorization task**. For example, subjects facing a problem should first of all classify it, picking out the relevant features which are explicitly stated and inferring additional aspects. In the physics domain, once presented the problem of calculating the amplitude and period of oscillation for a block suspended from a spring attached to the ceiling, experts translate the literal cues into relevant derived features, based on the meaning: block-mass, spring-spring constant, suspended-gravity, thus recognizing a mass-spring oscillation problem, whereas novices tend to stop at the literal information. Other studies showed that **experts have many more concepts than novices, and they have more and stronger links among concepts, with a greater degree of connectedness and cross-referencing (meaningful relationships) which, in turn, can result in a better structure** (Bédard and Chi, 1992: p. 136; Druckman and Bjork, 1991: p. 65). For example, in the medical field, experts' knowledge is characterized by networks of connections among diseases with similar symptoms, whereas novices know the most prototypical features of the diseases, lacking information on shared features of classes of diseases (Bordage and Zacks, 1984). Even though experts and novices may have the same set of concepts available with respect to a certain domain (i.e., dinosaurs, chess), experts have those concepts organized in meaningful ways through patterns of associations (i.e., in family types for dinosaurs or patterns of interrelated pieces for chess)

With respect to factual knowledge, experts have **mental models which are more accurate than novices**. A mental model can be thought of as the way to represent the properties of an object or an event, as well as the structural, functional, and causal relations among the components. The importance of the amount as well as structure of knowledge in driving experts' superior performance and efficient use of such knowledge is well exemplified by expert taxi drivers being able to generate a greater number of secondary routes to reach a target destination when they encounter road blocks on the main routes, thanks to their coherent mental model of the city.

With respect to procedural knowledge, which refers to how a subject perform a task, **experts possess a large quantity of procedural rules** (how to- rules, with actions attached to specific conditions applicable in the specific domain) **as well as a superior sensitivity to one's own capabilities and limitations** (i.e., monitoring one's own comprehension state).

The superior performance of experts is also due to their application of a general strategy to a well organized knowledge domain, rather than to the availability of general strategies (more sophisticated) novices don't have or don't apply competently. Usually, experts and novices tend to apply the same strategy. For example, with respect to problem solving in the medical field (diagnosis task), a generate-and-test strategy is used, where patient symptom data lead to the generation of hypotheses that are then tested for confirmation or disconfirmation, but experts more frequently than novices generate the correct hypothesis. Another common strategy for problem solving is means-ends analysis, where the goal is to reduce the difference between the end state and the current state. Novices tend to use a backward-driven strategy, working from the goal to the problem. Experts may use a riskier forward-driven strategy, working on the problem disregarding the goal, but only when they are familiar with the problem type and possess procedural rules to apply.

A study with respect to chess players clearly demonstrates that it's the use of the rich domain knowledge, when applying general strategies, which underlies experts' superior performance: experts recall of chess pieces was largely superior to novices' one only when these pieces were placed on the chess board according to meaningful game positions, but didn't excel when the pieces were placed randomly on the chess board (Chase and Simon, 1973). In non-familiar situations, the lack of a match between the external stimuli and stored memory representations doesn't allow the triggering of automated procedural rules derived from a rich knowledge base (Druckman and Bjork, 1991: p. 69).

Another tenet of expertise research is that **expertise is domain-specific**, which is coherent with the role of both declarative and procedural knowledge in accounting for it. High proficiency in one domain cannot be transferred to other domains, whereas a transfer from one task to another is possible to the extent that they share the conditional rules constituting procedural knowledge (Bérard and Chi, 1992: p. 138). **One promising direction of inquiry is how to elicit knowledge from experts and how to teach it to novices** (Druckman and Bjork, 1991: p. 70-71). Experts' knowledge is extensive, complex and usually tacit, thus requiring knowledge elicitation techniques (such as analyses of data collected by structured and unstructured interviews as well as think-aloud protocols), in an attempt to capture both declarative and procedural aspects. The non-trivial problem, however, remains how to represent experts' knowledge in a way that can be transmitted to novices, and how to teach it. Among the most common methods generally applied are: direct instruction (e.g., textbooks, teachers' lectures), computer-aided support systems, and cognitive apprenticeship (based on the interaction with a tutor). A critical point is represented by the need of learning with understanding – which involves novices' involvement, motivation and commitment – for the transfer of knowledge to be successful.

Medin and Coley (1998: p. 428) argue expertise impact is an understudied aspect of conceptual functioning and expect that "further investigations of expertise will reveal that some if not many of the findings of cognitive psychology are more accurately seen as novice heuristics than as general characterizations of conceptual functioning". They argue that **the study of expert subjects will** also **"inform theories of conceptual organization by allowing the interplay of mind and world in shaping conceptual structure to be examined"**. For example, the comparison between experts and novices in certain sub-fields allows the subject matter (world) to be held constant, while the knowledge goals and naive theories (mind) may vary, thus assessing the contributions of mind and world.

Some attempts to explore this intriguing subject have already been perform with respect to the effects expertise may have on categorization processes. Two contributions are reviewed here to account for this stream of research: Tanaka and Taylor (1991), investigating the effects of expertise on the vertical dimension of knowledge categories, and the more recent Medin et al. (1997)'s which explores the effect of different types of expertise on the nature and structure of individual categories in a domain.

Tanaka and Taylor (1991) build on the experiments of Rosch et al. (1976) demonstrating the special status (primacy) of basic level categories in object identification and first classification, to investigate the acknowledged but so far disregarded contribution of the perceiver (his mind versus the structure in the world) to the categorization process.[106] By systematically varying the subjects' level of expertise with respect to the objects being categorized, their research aims at assessing whether there is a change in the structure of classification hierarchies or not. The performance of experts and novices was compared in three experiments involving different tasks: feature listing, object naming and category verification. They expected and found empirical support for an increase in new feature listing at the subordinate level in the domain of expertise, thus suggesting that expert knowledge is primarily organized at the subordinate level of abstraction rather than at the basic level. **Expertise changes the distinctiveness of subordinate level categories**. Furthermore, the results confirmed the domain-specific nature or expertise: the object attributes selected by experts as most salient depend on the goals and demands of the task domain (i.e., part features listed at the subordinate level for dog experts vs. behavioral features for bird experts since attending to behavioral cues

[106] Rosch et al. (1976: p. 430) speculated that "different amounts of knowledge about objects can change the classification scheme".

is an important aspect of bird expertise). An experiment with a free naming task was employed to assess the effect of expertise on object identification: whether the level of abstraction used for identification and naming in the domain of expertise changes (e.g., subordinate rather than basic) or not. Novices tended to use basic-level names for identifying objects, thus confirming results from previous research. Experts, on the contrary, frequently used subordinate level names, thus accessing in the naming task their stored information about the features which distinguish exemplars at the less abstract level. A third experiment, based on a category verification task, investigated the effect of expertise on the level of abstraction used for categorization. The "first cut hypothesis" (Rosch et al., 1976) of the primacy of the basic level – based on its distinctiveness, specificity and consequent differentiation – is put under scrutiny by controlling for expertise. Expertise enhanced the speed at which subordinate categories are accessed, so that they are at least as accessible as basic level categories for category verification tasks. They conclude that when the basic level is operational defined by referring to the perceived structure of the world, domain-specific expertise doesn't affect the location of the basic level: the basic level remains the most inclusive at which objects look alike. However, expertise affects the basic level when defined in a psychological way, by referring to the level which is the most psychologically fundamental (i.e., for object recognition and naming): expertise increases the accessibility of the sub-ordinate level because of their differentiation (specificity and distinctiveness).

Another important finding of Tanaka and Taylor (1991: p. 479) is that the characteristics of the expert domain (e.g., the type of activity experts participate in, their goals or the aspects of the objects in that domain) affect the nature of the differences between experts and novices (e.g., which aspects are salient at the subordinate level). As they suggest, "**the nature of expertise may vary as a function of domain in ways that can affect the process of categorization**" (p. 474) is. Such realization underlies the more recent study of Medin et al. (1997), aiming at analysing the effects of different types of expertise on categorization and reasoning. This contribution further enriches the investigation of the interplay between the world (information available in the environment) and the mind (categorizers' needs, goals, theories). By holding constant the domain (trees, with many natural diversities among species), they compared the categorical structures and inductive reasoning of groups of subjects diverging in the type of expertise they had, namely their background, training, characteristics activities they have performed for many years in the selected domain (landscapers, parks maintenance workers, taxonomists). More precisely, they analyzed the convergence of scientific categories with the "folk" categories of the three different types of experts to check the degree of convergence (experiment 1), and assessed the influence of such different categories on inductive reasoning (experiment 2). In the fist experiment Medin et al. examined the groupings of tree species (out of a given sample) of the three types of experts to assess whether the same taxonomies were spontaneously generated or not, and if the nature of any eventual systematic similarities and differences between groups may suggest how different goals and interests may influence categorization. Theoretical contributions available make every prediction expectable, from no effect to radical changes due to goal-influence. A variety of measures of category organization were built and compared to evaluate type of expertise effects. Results indicated moderate consensus among tree experts, hinting systematic variation by sub-groups, along occupational lines. Taxonomists' sorting showed a high correlation with scientific classification, as expected, whereas a lower correlation was found for landscapers and maintenance workers, thus suggesting an effect of goals and interests. Furthermore, some differences were found in the salience and preservation of different levels of the scientific classification (low order – i.e., genus - with closer relations than higher order for all groups, but higher tendency of maintenance workers and especially landscapers in splitting genus level categories), and patterns of folk nomenclature were related to the preservation of the scientific classification (at the genus level). The nature of the systematic differences between classification systems for different kinds of tree experts was further examined, by comparing structural aspects (i.e., number of groups at the first basic level, and of sub-levels and high-levels included in the taxonomy) and qualitative aspects (i.e., justifications, consensual clusters common to all types of experts). The classifications spontaneously produced by the three groups of experts were characterized by different structures, reflecting the influence of the goals of each group: maintenance workers' hierarchical structures were broad and shallow (that is, many initial groupings but modest subsequent collapsing into super-ordinate categories), whereas landscapers' and taxonomists' were deeper (narrower for landscapers, with few initial groups versus many for taxonomists, but more sub- and higher-order groups). Consensual clustering of taxonomists reflected scientific classification. Landscapers' consensus in groupings revealed utilitarian concerns (besides taxonomic). Consensual clustering for maintenance workers was based on morphological properties and influenced by folk terminology, with only one cluster motivated by utilitarian concerns (namely, garbage). Such results are confirmed when analyzing the justifications provided for groupings: different concerns were driving the classifications, and landscapers and maintenance workers classifications were not made by exhaustively sorting tree on a single basis, but rather using different dimensions within a single round of sorting. Some clusters were also found to be common to all expert types, but sometimes agreement in classification hides the impact of human goals and interests besides salient discontinuities given by the world.[107] More precisely, the taxonomists' and maintenance workers' divergences in classifications may be interpreted in terms of different relative weights assigned to a shared set of dimensions (primarily morphological) thus reflecting categories salient in the environment, whereas the landscapers' departures from scientific classification resulted from a utilitarian-driven structure imposed on nature. According to Barsalou's findings, experience has lead landscapers to build well-established goal-derived categories in memory, which represent a salient organizational scheme. In the second experiment, Medin et al. investigated whether the differences in categorization structures salient for different types of experts (especially, non-taxonomic and goal-based for landscapers) carry over to influence other conceptual tasks, namely reasoning

All types of experts privileged genus-level categories for induction, agreeing with science at this level. The same category organization used in sorting was employed in reasoning for taxonomists (coinciding with scientific one) and maintenance workers (relying more on their consensual taxonomy based on morphological properties and folk nomenclature when the so generated inferences conflicted with those based on the scientific taxonomy). Landscapers followed a reasoning strategy

[107] As Medin et al. (1997: p. 53) observe, "similar categories in terms of content may mask differences in the features relevant to those categories in the minds of the categorizers" and justifications for groupings can un-reveal such heterogeneity.

different from their consensual sorting, relying basically on scientific taxonomy for inferences. Categorization at the genus level can be considered to reflect general-purpose discontinuities in nature, useful to support inductive inferences. Goal-derived categories, on the contrary, support special-purpose inferences, that is only with respect to properties related to the goal. Such results suggest experts to have multiple forms of category organization available to them.

With respect to the biological domain, Medin et al. (1997) demonstrated the **existence of universal tendencies in the structure of mind and/or world** (similarities between different expert types), **as well as non-universal contributions of the mind** (divergences between different expert types) **which affect categorization.**

Another recent interesting research stream was anticipated by Tanaka and Taylor (1991: 480), by noticing that differences in **the way objects are categorized could be due, not only to individual idiosyncratic life experiences, but also to the population group a subject belongs to.** With respect to expertise, they argue that the culture may impact on the relative importance of a certain domain and on the typical level of expertise with respect to that domain.

Closer interdisciplinary examinations of conceptual structures in different cultures are also being conducted, to document similarities and differences (e.g., Malt, 1995 for a review with respect to biological categorization).

As Tanaka and Taylor (1991: p. 481) conclude: "while the external environment and the human perceptual system impose certain constraints, human categorization appears to be continually reshaped and altered by learning and experience".

Overall, the current avenues of research seem to suggest further increases in the complexity of the portrait of human categorization (Medin and Coley, 1998: p. 431).

CHAPTER 3

CATEGORIZATION STUDIES IN CONSUMER BEHAVIOR AND MARKETING

3.1. THE REASONS OF THE INTEREST OF CONSUMER BEHAVIOR AND MARKETING IN CATEGORIZATION

Consumer behavior has been defined as "the acquisition, consumption, and disposition of products, services, time and ideas by decision making units" (Jacoby, 1975, 1976) and it has been studied by an increasing number of disciplines, including – of course – marketing, which is particularly interested in the ways to influence consumer behavior. **Consumer decision making has attracted**, not surprisingly, **considerable attention within the Marketing discipline**, with studies focused on the **most important stages of information processing, formation of attitudes, choice**, together with all the factors affecting each process.[108] Information processing includes information search, acquisition, elaboration, use and storage (e.g., Bettman, 1979).

With respect to the information processing stage of consumer decision-making, a certain degree of «cross fertilization» between Marketing and Cognitive Psychology appears conceivable (given the object of study of cognitive psychology), and it **has come up** with expectations.[109] In fact, **among the areas of consumer behavior investigation within the marketing discipline there are categorization and categorical knowledge.** Thus, the constructs and theoretical

[108] These stages are generally agreed upon and they are usually employed to periodically summarize the advances in the domain-specific literature (i.e., special issues of Annual Reviews Psychology).
[109] Wanke and Menon (1998) observe that "consumer research is built extensively on categorization research (...and...) consumer research has also contributed to much of our knowledge on issues in categorization research". Sujan and Tybout (1988) agree that "significant extensions of the current theorizing in psychology are being made by consumer researchers. Many of these insights are a result of consumer researchers' focus on complex «real world» stimuli and their interest in differences in the ability and motivation to process product information among groups of consumers."

models about categorization have been increasingly and profitably applied to extend understanding of how consumers perceive and react to marketing stimuli (Sujan and Tybout, 1988). In particular, **consumer behavior researchers have focused their interest on "product" categorization and "product" category knowledge,** by investigating a variety of related issues (Ratneshwar, 1999). Products, in effect, can be considered some of the environmental stimuli consumers are exposed to. **How do consumers categorize products and which is the knowledge they associate to each product category and how it is used are all issues of interest to both academic and applied researchers or practitioners.** As stated by Saunders et al. (1991), with reference to product categorization: "To the researcher, the question raises basic issues of how consumers perceive categories and judge whether and to what extent an item is like other category members. To the practitioner, such issues are also relevant in a variety of ways", above all for the implication for the marketing strategy and tactics.[110]

Besides focusing on product categorization, investigations have extended to its consequences and antecedents, in an attempt at benefiting of the former and discovering ways to positively influence the latter.

Marketing researchers have devoted, in fact, **their attention to:**

⇒ **The consequences consumers' product categorization might have on constructs of marketing interest, ranging from consideration set formation** (e.g., Troye, 1984; Chakravarti, 2001) **and brand evaluation** (e.g., Peracchio and Tybout, 1988) **to market competition** (e.g., Mollà et al., 1998).

This is related to the study of the uses of product categories by the consumers for functions such as classification and inference making [see later, par. 3.3 and 3.4].

⇒ **The impact of marketing variables,** under at least partial managerial control (e.g., advertising,[111] packaging,[112] brand familiarity,[113] shelf display[114]), **on consumers' product categorization** [see later, par. 3.5].

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[110] As the authors exemplify, the manufacturer of a sporty looking compact car may be interested in knowing whether consumers will tend to compare the car to higher priced vehicles positioned as true sports cars or to lower priced vehicles positioned primarily as compact cars. Many aspects of the manufacturer's marketing strategy will be influenced by the answer, such as market segmentation, advertising (e.g., what attributes to push, what competitors to compare to), and pricing.

[111] E.g., MacInnis and Park (1999).

[112] E.g., Goodstein and Campbell (1999).

[113] E.g., Desai and Rathneshwar (2003).

Of course, such research streams have been stimulated by, and have drawn insights from the theoretical models about categories and categorization in Cognitive Psychology. In fact, consumer behavior and marketing researchers have investigated categorization in particular domain: the marketing stimuli which reach the consumers in the market environment.

In the following paragraphs some exemplifying contributions from such streams of research will be reviewed. An exhaustive analysis of all the works employing a categorization framework within the marketing discipline is beyond the objectives of this dissertation. More emphasis will be placed on those contributions which are more basilar for the development of the conceptual framework for the empirical research (i.e., experience and contextual effects).

[114] E.g., Desrochers (1999).

3.2. Product Categorization and Consumers' Product Category Knowledge

Is categorization fundamental also in the interaction of the individual with the market environment? To what extent and how is consumer decision making influenced by categorization? Which are the categories an individual may construct and use when acting as a consumer? Which are the characteristics of such categories? How are such categories created? Which are the functions such categories may perform? Which are the possible influences that firms' marketing efforts may exert on consumers' categories? Which are the possible consequences of consumers' categories on phenomena of interest for marketing (e.g., product evaluation and choice)? These are some examples of research questions of interest for Consumer Behavior and Marketing studies.

3.2.1. The Category as an Organizing Principle for Consumers' Product Knowledge

A construct which is commonly **considered to play a critical role in consumer decision making is consumer's product knowledge stored in long term memory** (e.g., Coupey and Nakamoto, 1988).

Categories have been proposed as a possible organizing principle for consumers' product knowledge. Categories are meaningful structures and representations of product information that enable consumers to simplify their decision processes.

Consumers' knowledge about products (or brands vs. other variants) **is organized in, at least partially, integrated** (i.e., schema-like) **structures in memory. Such memory structures are composed, at a minimum, of similarly perceived/judged products (referable to as a category) and associated product-based and category-based knowledge** (Cohen and Basu, 1987).

Through categorization, that is grouping together products considered alike in important respects, information processing efficiency and cognitive stability are both enhanced.

Alba and Hutchinson (1987) propose a **multi-dimensional construct for consumer knowledge, which includes familiarity and expertise** (both defined in a broad sense). Familiarity may be considered a synonymous of experience, being defined as the number of product-related experiences a consumer has accumulated (i.e., advertising exposure, information search, interaction with salespersons, choice and decision making, purchasing, product usage in various situation). Expertise is defined as the ability to perform product-related tasks successfully. Increased product familiarity (that is, product-related experiences) usually results in increased consumer expertise. In their well-known model, **consumer expertise includes both the cognitive structures and cognitive processes** required to perform product-related tasks successfully. Cognitive structures are used to represent information internally. More precisely, **cognitive structures in consumer research have been defined** (e.g., Brucks, 1986; Kanwar et al. 1981; Lutz, 1975; Marks and Olson, 1981; Mitchell, 1982) as **"the factual knowledge** (i.e., beliefs) that **consumers have about products and the ways in which that knowledge is organized"**. Although recognizing that in the psychological literature many types of cognitive structures have been analyzed, Alba and Hutchinson (1987: p. 414) notice that «category» cognitive structures are the most intensively investigated and argue that they **are mainly used to** "to **differentiate various products and services in ways that are useful for decision making**" (e.g., Rao and Sabavala, 1981; Cohen, 1982; Srinivastava, Alpert and Shocker, 1984; Nedungadi and Hutchinson, 1985; Sujan, 1985; Brucks, 1986).[115] Cognitive processes operate on cognitive structures (e.g. decision rules for acting on those beliefs) during the performance of any given task.

Consumers use category structures, learned over time and through experience, to organize, differentiate, and ultimately understand the products (i.e., Lee and Ulgado, 1994), at the same way as they use categories to streamline perception of every object in their environment. With respect to a particular category of products, consumers create a category schema or category knowledge or category concept, that is some expectations about the characteristics of the category (i.e. the properties of a product category member and the relationships among these properties), and they may also develop a category affect, that is an affective reaction to the category (e.g.,

[115] Urban, Hulland and Weinberg (1993) observe that "consumers use product categories to structure product knowledge in a meaningful, simplified manner, which helps them make ongoing evaluations".

Mandler and Parker 1976; Fiske and Pavelchak 1986; Fiske and Neuberg 1990).[116] Lee and Ulgado (1994) exemplify the essence of product categorization considering the case of a consumer who, based on her/his experience, possesses in her/his mind the category of «a Sony stereo color TV set». The associated product category knowledge may involve specific expectations about what properties (e.g., stereo sound system, multi-color system, etc.) and what levels of performance along those properties (e.g., good sound quality, good picture quality, etc.) an average member of that category has to offer. An overall affective reaction to the category (e.g., good, bad, etc.) may also be developed, on the basis of the cumulated experience.

Some researchers (e.g., Kanvar et al., 1981; Mitchell and Dacin, 1996; MacInnis et al., 1992) claim that **there are few studies indicating how consumers organize their knowledge about a particular product domain.** One interesting exception can be considered Morel and Schoormans (1998), a study aiming at identifying the product dimensions that consumers use to categorize products and the level of inclusiveness at which the product categorization process takes place. They asked subjects to perform several product grouping tasks, and employed a thinking aloud procedure to elicit the motives underlying their product classifications).

Only few researches in the field of consumer behavior – as Kanvar et al. (1981: p. 122) and Mitchell and Dacin (1996: p. 220) note – **have used the measures developed by psychologists** to assess the content and the organization of knowledge for **the measurement of the content and organization of product category/class knowledge** (e.g., Brucks, 1986; Olson and Muderrisoglu, 1979; Russo and Johnson, 1980).

Some speculations have been proposed about the implications that an extension to products of the findings in the cognitive psychology field about the characteristics of general knowledge categories should have from a marketing perspective (e.g., Johnson and Lehman, 1997; Sujan and Dekleva, 1987).

Some empirical studies, carried out by consumer behavior or marketing researchers, have shown that product categories possess the most important properties of other (natural or artifact) **object categories: graded structures with typicality effects** (e.g., Ward and Loken, 1986), **hierarchical taxonomical**

[116] Category affect will not be analyzed in this dissertation, rather focusing on the category concept or knowledge.

organization with hierarchical effects (e.g., Morel and Schoormans, 1998), **goal-based organization** (e.g., Ratneshwar et al., 2001), **dynamic nature with expertise and contextual effects** (e.g., Ross and Murphy, 1999).

Graded structure of product categories and typicality effects

Johnson and Lehmann (1997) speculated about the graded structure of product categories. They argued that the category structures that individuals construct for the products can vary from sub-ordinate categories that contain highly similar or homogeneous alternatives (e.g., soft drinks) to more basic and super-ordinate categories that contain more dissimilar or heterogeneous alternatives (e.g., beverages). They claimed that at the sub-ordinate category level, the members of the category (alternatives) are differentiated in their ability to meet a relatively specific set of consumer's needs (e.g., calories, flavor) in relatively specific consumption situations. At the super-ordinate category level, the members vary in their ability to meet a more abstract set of basic needs (e.g., nutritional value, life style) across a variety of consumption situations.

According to Lee and Ulgado (1994), in the product domain it is generally believed that the most basic types of categories, which are chronically accessible to consumers in product evaluation situations, include brand name, price, country-of-origin, and name of the store where the product is available, since there is a conspicuous evidence of their effects on product evaluations (e.g., Zeithaml 1988, Rao and Monroe 1989, Bilkey and Nes 1982 for a review of the literature on country-of-origin effects). These correspond to what is called extrinsic cues of a product: they are product-related, but they are not physical or intrinsic attributes of the product (Olson 1977). Lee and Ulgado (1994) argue that these extrinsic cues serve as category labels which are used to organize and understand the remaining product properties.

Understanding the determinants of graded structures is extremely important to marketing purposes (Alba and Hutchinson, 1987: p. 417). For example, manufacturers might try to increase the judged typicality of their own brands within a product category by acting on its determinants. Such an attempt should be critical given the operation of typicality effects and their implications in different marketing settings (i.e., typical category members are the first to be recalled, with a potential influence on their probability of entering in the awareness and consideration set and their probability of being purchased). Different determinants should require different actions: when using product communication to influence typicality, for example, family resemblance should be affected by communication efforts about product attributes, frequency of instantiation might require high exposure to communications about the product or product usage, similarity to an ideal might be influenced through persuasive communication attempts.

A number of researchers (e.g., Nedungadi and Hutchinson 1985, Sujan 1985, Ward and Loken 1986, Solomon 1988) have applied the family resemblance approach – drawn from cognitive psychology (i.e., Rosch and colleagues) – to understand the determinants of product categorization (Saunders et al., 1991).

These research efforts have usually yielded managerially useful data. For example, such studies have tried to quantify the extent to which different attributes contribute to the perception of a given item as a member of a particular category, thus providing insights about the attribute the manufacturer should attempt at influencing first.

One example from this stream of research is Ward and Loken (1986). The family resemblance approach was employed to study prototypicality within the snack foods category. They found, for example, that consumers rated apples as a rather prototypical snack food. Within the family resemblance framework, this was due to the sharing of many attributes with other snack foods (such as potato chips and peanuts): being round, crunchy, crisp, divisible into pieces, easily eaten "finger food", appropriate for many occasions, readily transportable, and liked by many people. They observed that such attributes were not necessarily determinant – in the sense of causing people to view apples as snack foods – but the results suggested feasible ways for apple marketers to design advertising claims aimed at promoting the use of apples as snack foods.

Taxonomic Product Categories and Hierarchical Effects

Categorization research in cognitive psychology suggests that objects are usually grouped at varying levels of specificity in a taxonomy. Evidence has then been provided about the existence of one basic level of inclusiveness that individuals naturally use for categorization and spontaneous naming of objects. The basic level allows parsimony maximization, since a few rich (for the number of attributes describing the category) and distinctive (for the differentiation from the other categories at the same level) categories are created.

Dubé et al. (1992) observe that, drawing from well-established works in cognitive psychology, it has been suggested that consumers form relatively stable and hierarchical representations of product categories in long-term memory. Sujan and Dekleva (1987: p. 372) exemplify what such hierarchical organization could mean for products. They distinguish product class categories (such as cars), less inclusive product type categories (such as sports cars), specific brand level categories (such as Nissan 300ZX cars or Corvette cars).

The hierarchical vertical dimension of product categories has been investigated within the marketing field especially for the fundamental insights it can provide in explicating the market structure (as perceived by consumers) and in suggesting ways to deal with competitive issues.

As Sujan and Tybout (1988) explain, the idea that information about product categories is likely to be organized hierarchically into broad product class categories, below which are nested more specific or basic product type categories, with brand level categories serving as the most specific level of categorization, has been used to explicate market structure issues (e.g., Day, Shocker and Srivastava 1979), and to understand under which contingencies product evaluations can be influenced by marketing interventions exploiting the taxonomical organization of product categories (e.g., Meyers Levy and Tybout, 1987; Sujan and Dekleva, 1987, for the effects on comparative and non-comparative advertising).

Hutchinson, Raman and Mantrala (1994) showed that the «soft drink» category is structured by type (e.g., cola, lemon-lime) and by umbrella brand (e.g., all Coca-Cola brands, all Sprite brands). Brands belonging to the same category are also called related brands, because they are linked to a common retrieval cue such as the same umbrella brand name (Chandler, 1993). Hutchinson, Raman and Mantrala (1994) found out that brand recall is activated in clusters of related brands. They concluded that category structure influences brand recall, since recalling a member of a sub-category activates the other members of the category, which become more likely to be recalled. They also speculate about the effect of noting a brand on the recall of related brands, arguing that it can be different, meaning that it may be hindered. Alba and Chattopadhyay (1985, 1986), in fact, demonstrated «the part-set cuing effect»: priming a member of a sub-category (e.g., Coca-Cola Classic) inhibits the recall of other members of the sub-category (e.g., Coca-Cola Diet) more than the recall of members of other sub-categories (e.g., Sprite), and noting a brand can serve as a brand prime for consumers since increases its accessibility in memory.

Goal-derived Product Categories

Chakravarti (2001: p. 35) raises the issue of whether product categories behave like common taxonomic categories or ad-hoc categories, arguing that research seems to suggest that they have characteristics of both kinds. Intuitively, one can expect product categories to be like ad-hoc categories (i.e., the consumer has some ideals for a product category[117]). Ward and Loken's (1990) results showed that the typicality of the product categories they examined was correlated to both measures of similarity (family resemblance) and as ideals.[118] However, Chakravarti notices that such results may underlie the fact that some product categories are more like common taxonomic categories while other product categories are more like ad-hoc categories.

Some researchers studied thoroughly those two kinds of categories in the product domain.

Ratneshwar et al. (2001), for example, investigated whether and how salient (i.e., highly accessible) consumer goals – both individual and situational – might affect category representations (of food products) and, in particular, the perceived similarity of products, taking also into consideration the impact of the visual resemblance (surface-level) of the stimuli taken in pairs.

Ratneshwar et al. (2001: p. 148) adopted a top-down perspective to categorization, rather than the traditional bottom-up or stimulus-based perspective. The traditional bottom-up perspective argues that similarity-based judgements, which primarily

[117] For example, the category of automobiles may be made up of ideals with respect to fuel efficiency, seating capacity, comfort, etc. for a consumer.

[118] For example, for the category «places to service a car» ideals were significantly correlated with typicality and similarity was not significantly correlated; whereas for the category «fast food restaurants» similarity measures were significantly correlated to typicality while ideals were not. Chakravarti (2001: p. 35) argues that one explanation may be that for the category «places to service a car» subjects may have multiple ideals (e.g., low cost, good service, specialized services), with consequent difficulties to come up with an average service center; whereas, for the «fast food restaurant» category there may be many characteristic similarities between members, and not multiple ideals (i.e., only fast).

influence category representations, are based on the extent of common properties shared by the items versus distinctive properties which are intrinsically salient. Therefore, similarity representations of products are externally grounded, meaning that they are based on the product stimuli themselves, and are rigid. The top-down perspective allows a certain role for consumers goals. In fact, prior research in categorization (Barsalou, 1982, 1983, 1985, 1991) has demonstrated that the goals of the individuals can alter their category representations. However, most investigations have focused on the influence of situational or ad hoc goals (e.g., Barsalou, 1982, 1983, 1985, 1991; Ratneshwar and Shocker, 1991; Roth and Shoben, 1983) and have found an enhancing effect of goals on product perceived similarity when the items were visually quite different (e.g. Ross and Murphy, 1999). The additional contribution of Ratneshwar et al. (2001: p. 148) is the joint analysis of the impact of situational as well as enduring individual differences in goal salience on category representations, together with the influence of visual or surface resemblance between products. The research question underlying their study has been expressed as follows: "can salient consumer goals alter the mental representations of products that are highly similar on the surface?" (Ratneshwar et al. 2001: p. 149). They provide a clear example: an individual for whom the goal of eating healthy foods is very salient (personal goal) and an individual who is going to drive a car (situational goal). "For the more (vs. less) health-oriented individual, the personal goal should perceptually «push together» goal-appropriate products such as a granola bar and fruit yogurt, thereby enhancing their perceived similarity". Similarly, in "a situational context such as driving a car, that makes salient the goal of convenience (...), high (vs. low) situational goal salience should pull apart or perceptually discriminate products like an apple and an orange because only the former is goal appropriate, thus reducing perceived similarity".

The empirical research was performed by considering the category representation of food products – revealed through similarity judgment task of pairs of food items[119]

[119] Two kinds of stimuli were created:
Type P pairs (4 pairs) = both products were appropriate for the personal goal, whereas only one was appropriate for the particular situational goal (e.g., plain granola bar and fruit yogurt)
Type S pairs (4 pairs) = both products were appropriate for the situational goal, whereas only one was appropriate for the personal goal (e.g., plain granola bar and candy bar).

– health as individual goal and convenience (i.e., things people may eat in their cars) or temperature as situational goal. Ratneshwar et al. (2001: p. 154) expected that, when making similarity judgments, participants should focus on the extent to which products are appropriate to the goals salient to them at the point of judgment. Thus, when two products are appropriate to a salient personal or situational goal, participants should perceive them to go together meaningfully and rate their similarity as higher; when only one of the two products can fulfill a salient goal, the contrast between the products on goal appropriateness should cause them to be separated. Consistent with expectations, experimental findings showed that category representations were influenced by salient personal and situational goals, interacting with visual similarity. Both personal and situational goals, when salient for the individual, enhanced the perceived similarity of goal-appropriate product pairs and reduced the perceived similarity of product pairs with only one product ideal for the specific goal. Furthermore, the similarity-enhancing effect of the goal salience was most pronounced when the surface or visual resemblance between pairs of products was low, and the similarity-diminishing effect was more apparent when visual resemblance was high[120] (Ratneshwar et al., 2001: p. 147).

From a marketing perspective, the evidence supporting the hypothesis that salient goals of the consumer (attributable to both person and situation) impact similarity judgments between products in a predictable way provides a link between goal-derived categories and fundamental benefit-segmentation variables (Ratneshwar et al., 2001: p. 148). In this respect, they highlight a literature gap, since research examining consumers' similarity representations of products in terms of consumers' goals or desired benefits is lacking.

A **comprehensive and interesting study of consumers' product knowledge**, covering most of the topics discussed so far, has been conducted by Ross and Murphy (1999). They studied a real-word domain about which people possess a

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Pair type (P or S) was crossed with surface resemblance (high – when products shared many common visual features and had few distinctive ones – or low – when products shared very few visual features and had many distinctive ones).
The eight pairs employed comprised four sets, each consisting of a P and a S pair type; and, for control purposes, one product in each set of pairs was held constant (e.g., plain granola bar) and it was appropriate for both the personal and the situational goal.

[120] For both types of pairs, the hypothesized effects of goal salience were most apparent when they were in opposition (i.e., counteracted) with surface resemblance.

considerable experience and develop extensive knowledge, which is frequently accessed: food.[121] They run seven experiments to investigate how knowledge about food is represented and used (i.e., accessed for inference making) by individuals.

More precisely, they want to ask the following research questions (1999: p. 497-501):

- What categories do people use for thinking about foods? How are such categories represented?

They observe that there are several different ways to classify many foods (e.g., bagel can be considered by an American consumer a bread, a sandwich food, a breakfast food, a Jewish food, a snack food, etc.), and therefore people might create cross-classifications.

In the cognitive psychology literature, for example, Medin et al. (1997) showed that experience using a category may lead to an alternative organization that emphasizes this uses. In their study of categorization among tree experts, in fact, they found landscape workers sorting trees according to their landscaping utility, such as shade trees vs. ornamental trees, providing support to Barsalou's (1983, 1985, 1991) suggestion that individuals may form alternative conceptual organizations in a domain (i.e. cross-categorizations) in response to some goals. Also the literature on social cognition has shown the importance of cross-categorization, for example in personal interactions. Ross and Murphy expected people to employ taxonomic categories, based on the compositional similarities of foods (e.g., fruits, breads), but they wanted to investigate if there are additional categories used for foods (e.g., goal-based categories), how common they are and how consistent they are across people.

- Which functions/roles do knowledge categories people have in the food domain serve (beyond classification[122])? How do people access and use (especially for induction) representations about food?

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[121] Ross and Murphy (1999: p. 495, 500) argue that people know a lot about food (i.e., which food to eat for energy, which food may upset their stomachs, which foods are likely to be served at various holidays and social events, which foods they can afford to buy and how long it will take to prepare them), because of their frequent (i.e., daily) food-related experiences (i.e., eating, planning meals, reading or talking about food, smelling food, and so on) which are integral part of human life, and access such knowledge many times a day. They observe that knowledge of food is learned and used in a large number of ways and contexts, because of the extensive and heterogeneous interaction with food.

[122] Ross and Murphy (1999: p. 499) claim that "we do not learn types of food primarily to classify; the classification is in the service of nutritional, hedonic, and social goals".

They meant to comprehend in which ways individuals' conceptual knowledge affects their understanding of the environment and their actions in the world (i.e., their interaction with food). They investigated if all the categories a food belongs to are accessed when food is experienced or named,[123] if there is a dominant knowledge organization or a combination of different organizations that are commonly used, which categories are used for inferences.[124]

They employed several techniques in their sequential experimental studies:

- category generation, category ratings, and items sorting to assess the representation of the food category;[125]
- a similarity rating task (with and without the category labels) and a speeded priming to examine the access of the food categories discovered
- a test of the use of the discovered categories in inductive reasoning about properties of foods.

Ross and Murphy (1999: p. 536) found that individuals have cross-classifications (that is, multiple categories and ways of categorizing) in the complex food domain: food items belong to a number of different non-hierarchical categories simultaneously. The high-level category of foods was organized simultaneously by taxonomic categories for the kind of food (e.g., vegetables, meats) and script categories for the situations in which foods are eaten (e.g., breakfast foods, snacks).[126] Both types of categories were salient ways of thinking about food (being

[123] In other words, which categories might be brought to mind when encountering different foods or hearing/reading their name.

[124] Medin et al. (1997) argue that some special-purpose organizations are developed by expert subjects and used in inference tasks only to support inferences directly related to these special purpose, for example, with landscapers accessing and using taxonomic categories (based on morphological features) when making biological inferences.

[125] Ross and Murphy's (1999: p. 502) warning is that one fundamental limit of the category generation technique for examining category representation is that the categories discovered may not accurately reflect the categories that are actually used in thinking and making judgments about food, but they may be artifacts of the generation and comparison processes required by the experimental tasks. The category rating task, used in a second experiment, was employed to overcome such shortcoming. Category rating tasks require subjects, who are provided with both an item and a category, to rate how good an instance of the category the item is.

[126] Ross and Murphy (1999: p. 542) specify that they have focused on only one type of organization of foods alternative to taxonomic category (namely, script category), but other organizations may be considered for different uses. As they exemplify, "If one wanted a diet high in protein, one might consider a macro-nutrient organization of foods including proteins, carbohydrates, and fats. Even within our script categories, it is possible that the healthy foods/junk foods categories represent an alternative organization in which foods are characterized by their effects on health (e.g., which might include fattening, stomach-upsetting, etc.).

generated with similar frequency, and also in the sorting task without cues).[127] Subjective representations of foods in memory were dominated by taxonomic categories, but were strongly influenced by script categories as well. The results of the sorting task suggest that taxonomic and script categories are not embedded within a single hierarchy, and exist simultaneously, presumably through different category links (i.e., bagel connected to breads and grain – taxonomic category – as well as breakfast foods – script category).[128] Furthermore, the script categories are represented in memory to a large degree, but they may also be constructed in some circumstances (e.g., post-hoc).[129]

Taxonomic categories are based on food composition, whereas script categories are based on interactions with the food and may be especially useful in generating plans for deciding about what food to eat.

Taxonomic and script categories showed different organizations. Although food items were judged typical of both taxonomic and script categories, a different distribution of membership characterized the two types of categories for the food sample: taxonomic categories had some very good members, a very large number of non-members, and only a few members in between, whereas script categories had relatively few non-members and a larger proportion of poor and fairly good members. Among the proposed explanations for such results, there are: a more well

[127] By dividing participants' responses to the category generation task in kinds of categories, Ross and Murphy (1999: p. 504) found that 49% were super-ordinate taxonomic categories (based on similarity of composition between foods); 42% were script categories (meaning situational and healthiness categories based, respectively, on the situation in which the food was eaten and on the food healthiness), 9% were based on macro-nutrients (based on the similarity of macronutrient profile, useful in cases in which biochemical properties of food need to be carefully regulated, as for diabetes). These latter categories were not considered in the sub-sequent studies because expressing properties. In the category rating task, subjects were asked to rate the goodness of the original food items as an instance of different taxonomic and script categories (those more frequently obtained in the previous category generation task). 43/45 foods were rated as belonging to at least one of the script categories, and 35/45 to at least 3 script categories; 35/45 belonging to just one taxonomic category vs. 9/45 belonging to just one script category. In the category sorting task, subjects in different experimental groups were given different instructions providing or not a basis for the sorting (taxonomic, script, none). The majority of the categorizations in the groups where a basis was provided were consistent with the instruction manipulation, the categorizations in the group without a basis provided were in the middle (closer to the taxonomic condition, but with the use of script categories too).

[128] The two different ways of categorizing were found together in the same category sorts, thus seeming not incompatible or contradictory.

[129] The example they provide is the following: a subject may not have a well-established category of "food eaten at the movie", but such category can easily be constructed post hoc including pop-corn, soda, certain candies, ice-cream. If the subject often eats at the movies, this information may become more and more saliently represented for these items, until it can reach the same importance of taxonomic categories in representing them.

defined criterion for category membership for taxonomic categories, a higher diagnosing power of the features for taxonomic categories, a competition among script categories which reduced the rating for some category members. According to Ross and Murphy (1999: p. 542) the mutual exclusivity of food taxonomic categories compared to the considerable overlap of food script categories may be due to the different ways in which these types of categories are used. When people classify an item without any additional context, it should be preferable to access information useful in a variety of situations, and probably mutually exclusive taxonomic categories dominate.[130] When categories are used to generate exemplars, for example for planning purposes, it might be preferable to have more exemplars in each category and items represented in different categories.

Ross and Murphy's experimental findings suggest that people can access two different conceptual organizations (taxonomic and script) for foods,[131] and use them to classify items and also as a basis for inference. Script categories appeared to be activated by the presentation of food items, although showing less access (amount of activation) than taxonomic categories (but more than novel ad-hoc categories). Taxonomic categories seemed to be preferred as the neutral organization, and to be more accessible (meaning spontaneous activation). Priming the category (through category label provision) in a speeded category verification task had little if any effect on similarity ratings between pairs of items for the taxonomic categories, greatest for the ad-hoc categories, and intermediate for script categories.

In describing the implications of their experimental findings for the mental representation of food categories, Ross and Murphy (1999: p. 540) observe that in such a non-hierarchical network of categories there is non single entry-point and, rather, category access may be determined in part through goals and contexts.[132]

The analysis of the actual use of different types of categories for making inferences and the kinds of inferences they support showed that both taxonomic and

[130] A similar position has been expressed by Rosch (1978).

[131] Two experiments were designed to investigate what knowledge may come to mind when a food is encountered, thus testing the activation of taxonomic and script categories when people are asked (1) to make similarity judgments of pairs of items or (2) to make category judgments for single items.

[132] They exemplify how the contexts of other foods, the time of day, the setting, other cultural indicators, the goal of the activity to be performed can all determine which category (way of conceiving the food) is activated for a given food. For example, seeing coffee and cereals together may activate the category breakfast foods, whereas when coffee and beer are seen together, the category beverage comes to mind.

script categories were used to make a wide range of inferences about food properties. Nevertheless, individuals were sensitive to the different type of inferences that each type of category best allows. The two categorizations were differentially useful for different kinds of inferences about food (on the basis of the kind of property): taxonomic categories were chosen by subjects for biochemical inferences, whereas script categories were chosen for situational inferences.[133] They suggest that taxonomic categories could be structured around intrinsic properties of the food (i.e., origins, textures, tastes, bio-chemical content), whereas the script categories are structured around how foods are related to other activities or events (although these includes some intrinsic properties).

As issues to be addressed by future research, Ross and Murphy (1999: p. 543) suggest to what degree cross-classification exists at lower levels of categorization – since they treated basic level categories (i.e., apple) as items and studied their organization into higher level category (i.e., fruit or snack food; like super-ordinate categories in the object domain) - and whether multiple categories are simultaneously accessed when an item is experienced – since they didn't investigate the simultaneous evoking of taxonomic and script categories for food, rather showing that either can be accessed and used for induction.

All the studies reviewed so far refer mainly to product category representations and use, but also processual aspects (i.e., how categorization of novel instances is done) deserve attention, especially in order to discover whether and how marketing can exert some influences.

In stating a research agenda for the future, Cohen and Basu (1987: p. 470) noted: "**there is not a great deal of research on how product categories develop in consumers' minds** despite the fact that this may well be a more fundamental level at which to look at the organization of product knowledge".

[133] Since, even preferring one type, subjects feel quite confident in making different kinds of inference based on both category types, Ross and Murphy (1999: p. 537) argue that the information associated with the two different conceptual organizations for foods (taxonomic and script) is not strictly segregated, thus meaning that the grouping of foods into taxonomic and script category types are not completely independent.

Desai and Hoyer (1993) discuss how the different categorization views emerged in cognitive psychology could apply in the marketing domain to brands, considering the product category toothpaste as an illustration.

According to the Classical view, there are defining properties – single necessary and jointly sufficient – shared by all the category members. Therefore, all brands of toothpaste should be in paste form, be white in color, have sweet taste, freshen breath. Whenever a brand does not satisfy any of such criteria, it will not be categorized as toothpaste by the consumer.

According to the Probabilistic or prototypical view, categories are represented in terms of collections of characteristic or probable properties, with a prototype defined by a central tendency in such properties, with members varying in the number of properties they possess and in their similarity to the category prototype. Categorization decisions of an item are based on an evaluation along a continuum of goodness of membership, with a property-matching process between the new instance and the category prototype. Therefore, the new item will be evaluated by the consumer on how good or bad member of the category toothpaste it is, with higher chances of being accepted as a member of the base category if compared to the Classical view.

According to the Exemplar view, the product category representation is a collection of individual experienced exemplars, and categorization of a new instance is based on the degree – sufficient – of similarity to one or more of the category's known exemplars. Crest and Colgate might be the two exemplars an American consumer has in the toothpaste product category representation. Categorization of a new item as a toothpaste or not will be based on its comparison with either Colgate or Crest, with a positive answer if it is perceived to be quite similar to either of these brands.

Cohen and Basu (1987) **investigated some (not exhaustive) contextual factors that may impact on the type of categorization** (and information processing) **followed by a subject**, to support the contingent nature of categorization processes.

They considered: the initial category learning context, task involvement, rule complexity, the judgment setting; and they stated some research proposition about the effect of each on categorization strategies.

Regarding the category learning context, they propose that:

- conditions that favour category acquisition through a definitional process (i.e., involving learning the formal relationships between more abstract/non-perceptual aspects of an entity or entities) lead to greater reliance on rule-based and analytic processes in sub-sequent categorizations;
- conditions that favour "in-depth" exposure to exemplars of a category, in a context free from any explicit or implicit consideration of alternative (contrast) categories, lead to greater reliance on exemplar-based and non-analytic processes in sub-sequent categorizations.

To argument such hypotheses, they explain that

- attribute-based rules are more likely to exist and to prove to be valued functionally for categories learned through a definitional process (i.e., financial instruments rather than preferred fast food restaurants), since there is a tendency to think of the category-concept in terms of collections of properties;
- learning accompanied by exposure to exemplars from contrasting categories of products (e.g. Burgundy vs. Bordeaux wines) may focus consumer's attention on characteristics that separate the two groups, whereas usually subjects tend to experience individual instances (i.e. tasting a food) and group them into categories by considering their similarities.

Regarding task involvement/motivation, they observe, on the basis of previous literature findings, that "when category information is acquired from experiences that are incidental rather than goal-directed in nature, sub-sequent classification are more likely to be characterized by exemplar-based (and possibly non-analytic) processing. When information is acquired via a task explicitly involving a categorization decision, subsequent analytic processing is more likely". What is relevant here is if consumer are in a task setting in which they are confronted by a problem to solve or not (with heightened attention to a narrower range of cues relevant to the problem).

They argue that manipulating subjects' assessment of the nature of the problem they have to solve can be important:

- A problem perceived as « object identification and assignment» will promote the construction of a categorization-rule (if it didn't already exist) and prompt its use. They also argue that the aspects of the stimuli pertinent to differentiate instances will probably become more salient, and tendency will by stressed if the task structure requires a choice among alternative categories.

- A problem perceived as not strictly linked to categorization and a non explicit categories contrasting should reduce the tendency to construct and use a categorization-rule.

With respect to the consumer context, Cohen and Basu (1987) argue that task involvement may be strictly related to product involvement (e.g. type, relevance and centrality to the need system), with increases in involvement leading to greater attention to analytical bases for categorization. They suggest that non-analytical categorization processes are more likely for situations implying incidental consumer exposure to products and marketing activities, as well as for repetitive or low importance decisions.

Cohen and Basu (1987: p. 465) state the following research propositions.

Regarding rule complexity and categorization/judgment setting, to discover a categorization rule, the subject should be willing and able to engage in some abstractive processes.

They argue therefore that rules are not easy to acquire and that conditions of exposure to category members may influence the complexity of acquisition (e.g., when the subject focuses on one instance without trying to differentiate it according to its category membership) and the categorization setting may also impact on the application of an acquired rule.

They explain that different aspects of the environment where categorization is made may favour or inhibit the use of an analytical or non-analytical strategy, and provide interesting exemplifications (i.e, time constraints, the opportunity to engage in analysis of individual features, conditions of viewing, presence of distractions). Furthermore, they note: "cues present in the judgment setting (e.g., point-of-purchase displays) can serve to prime either specific aspects/rule or stored exemplars and increase the likelihood of one type of comparison over another".

They also argue that "for the ad hoc and evaluative categories important in product categorization, some types of advertising may be instrumental in focusing attention on features that implicitly differentiate brands, while other types of advertising may simply provide a richer portrayal of a particular brand. Similarly, some distribution and product presentation systems either encourage or mitigate against the development of rules to discriminate among product offerings (e.g., one may have to visit several stores to compare products)". They also consider the accessibility (salience) of alternative categories as a factor attracting the focus on categorization as a problem, thus making more likely a deliberative comparative process and the use of a rule.

Cohen and Basu propose the categorization process to be dependent on the judgement setting:

- when the emphasis is on a focal target object, its distinctive attributes are expected to become important;
- when the salience of the category or category instances (e.g., exemplars, an ideal prototype) is increased; the effects will depend on whether a feature-based rule is readily accessible.

Cohen and Basu (1987: p. 465, 466) state the following articulated research propositions:

- o Increasing the structural complexity of an analytic rule describing category membership leads to greater reliance on exemplar-based representations and non-analytic classification processes
- o Conditions that reduce the availability of cognitive resources in a given context (e.g., time pressure, distractions, etc.) lead to greater reliance on exemplar-based and non-analytic processing
- o Increasing the accessibility of previously experienced exemplars (prototypes) in memory leads to greater reliance on exemplar-based (prototype) processing.
- o Rule analytic processing is encouraged by priming a stored rule or retrieval of features
- o Increasing the salience of multiple categories (i.e., those that are potential "fits to a target item") leads to greater reliance on rule-based analytic processing.

All these prepositions may lead to interesting studies focused on the conditions characterizing category learning, with special regard to the context where it happens.

Categorization seems to play a fundamental role in consumer decision-making, since product knowledge is organized in long term memory in a

hierarchical system of taxonomic categories, at different levels of inclusiveness, each with members characterized by different degrees of typicality. Perceiver's factors and contextual factors (such as, relevant personal or situational goal), however, may alter the consumer's mental representation of product categories based on the raw similarity between marketing stimuli. Individuals may perform cross-classifications (non-hierarchical organized), and different representations can be accessed and activated in different situations. The evidence showing goal-based categories in the product domain suggest that both a bottom-up and a top-down perspective can be appropriate to explain consumer product categorization.

3.2.2. PRODUCT CATEGORY LEARNING THROUGH PRODUCT EXPERIENCE

Research efforts have been devoted to the exploration of some antecedents of categorization (Sujan and Tyboud, 1988). For example, Murray et al. (1988) in an experiment, where mood and processing goal were manipulated, found that individuals in a positive mood showed greater flexibility[134] and creativity in their categorization strategies[135] than did individuals in a neutral mood. This suggested that mood could be an antecedent to categorization, and confirmed the results of Isen and Daubman (1984).[136]

Since categories are learned through experience (e.g., Coupey and Nakamoto, 1988), great emphasis has been placed on consumer experience as an antecedent

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[134] Positive mood subjects adapted their categorization scheme to the processing goal to a greater extent than subjects in a neutral mood.

[135] Positive mood subjects were found to employ creative and non-obvious ways to categorize at both the super-ordinate level (by finding non-obvious-or novel interconnections between items), and at sub-ordinate level (by developing novel distinctions between items).

[136] They found that subjects in a positive mood tended to create and to use categories more inclusively than did subjects in a neutral mood condition. Desai and Hoyer (1993) discuss the implications that such results may have for product line extensions: "consumers with a more positive affect toward the parent brand might get into a positive affect state on seeing or hearing the brand name and might see more extensions similar to the parent brand, leading to the acceptance of a greater number of extensions as compared to consumers with lesser positive affect towards the parent brand."

of product categories and associated knowledge. Also the effects of expertise on categorization have been investigated.[137]

Consumers researchers have been interested in the influence that organized structures of knowledge, stored in consumers' memory, may exert on cognitive activities involved in consumers' processing of information. In this respect, Kanvar et al. (1981: p. 122) argue that **in Cognitive Psychology it is widely recognized that the subject's acquired knowledge about specific domains has very powerful effects on a variety of cognitive processes and outcomes**. Walker et al. (1987: p. 17) agree that "By the late 1970's, consumer researchers had begun to recognize that consumers' stored knowledge in memory strongly influences their cognitive processes (Bettman, 1979; Olson, 1978). Prior knowledge has been shown to affect (...) information acquisition (Chiesi, Spilich and Voss, 1979), information search (Brucks, 1985; Biehal and Chakravarti, 1983; Johnson and Russo, 1984; Punj and Staelin, 1983; Srull, 1983), information processing strategies (Sujan, 1985; Fiske, Kinder and Larter, 1983) and memory organization (Sujan, 1985; Alba and Hasher, 1983; Fiske et al., 1983; Chi, Peltovich and Glaser, 1981)". They also summarize the results of such literature, by stating that **more knowledgeable consumers in a certain domain have a greater amount of knowledge and better-organized structures of knowledge, which translate into more accurate and efficient information processes** (Shower and Cantor, 1985).

The organization of the structures of knowledge stored in semantic memory changes with development of individual experience and expertise in a certain domain [see above 2.3, for general discussion].

A stream of research in Marketing and Consumer Behavior has explored the differences between novice and expert consumers with respect to a certain product in terms of categorical knowledge.

Two studies have emerged as established references for everyone approaching this topic: Alba and Hutchinson (1987) and Mitchell and Dacin (1996).

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[137] Also Murray et al. (1988) in developing their hypotheses, drew a parallel between the effects of positive mood and the effects of expertise on processing. They argued that subjects in positive mood – similarly to experts - may be more adept at using their knowledge structures (flexibility and creativity) and at categorizing at super-ordinate levels if the task requires them to do so.

Alba and Hutchinson (1987), by drawing on established cognitive psychology research about categorization and information processing, speculate about the effect of the experience and expertise a consumer has in a certain domain on the categories related to that domain (structures, representations and processes). They develop some hypotheses, without empirically testing them, and exhort research to confirm or reject what they propose.

One of the main effects of increased expertise[138] **on categorical cognitive structures should be a higher articulation in different hierarchical levels characterized by different generality** (Alba and Hutchinson, 1987: p. 415).

Given the primacy of the basic level as the focus of the initial classification efforts (relatively easy and spontaneous grouping and naming), **expert consumers should be characterized by an increased ability (vs. novices) to categorize products at levels above and below the basic level.** Alba and Hutchinson (1987) report an interesting example involving food. Fruit and vegetables have been found to be basic level categories (Rosch et al., 1976). Similarly, Alba and Hutchinson (1987: p. 415) consider reasonable to assume that meat, poultry, fish, eggs, milk, cereals, etc. are other basic level (or higher) categories. They suggest that the "Basic Four Food Groups" (Brody, 1981) may be categories above the basic level, as they are learned only through public education. Super-ordinate level categories should be more abstract and reflect causal relationships between properties.[139] Sub-ordinate level categories should be based on finer discriminations.[140] Furthermore, the basic level categories of experts (vs. novices) should be more specific.[141] This seems to suggest that the degree of specificity of the various hierarchical levels tends to vary with the level of expertise of the consumer.

The category structures of expert consumers (vs. novices) will be more complicated, but they are also likely to be more accurate.

Typicality effects (graded category structures) should also involve differences between experts and novices, according to Alba and Hutchinson (1987: p. 416),

[138] They usually refer to expertise, having stated that increased experience may result in increased expertise.
[139] These are considered deep category structures, contrasted to surface category structure of novices.
[140] For example, experts may be able to distinguish cars according to the manufacturer, model, year.
[141] For example for an expert it should be spontaneous to label an object (i.e. car) with the name of the brand (i.e. BMW); whereas a novice might spontaneously name the same object with the name of the product class (i.e. car).

translating into a different knowledge of the horizontal dimension of a category. **Novice consumers are expected to know about prototypical brands** (i.e. Budweiser for beer) but not atypical ones (i.e. Lite and LA for beer), **whereas expert consumers are expected to know both prototypical as well as atypical brands.**

Differences in cognitive structures of expert and novice consumers are likely to combine with **differences in cognitive processing.**

Cognitive structures may provide a schema to guide encoding and retrieval. Therefore, the differences in cognitive structures of expert and novice consumers may influence both information acquisition (e.g., a pre-requisite to category formation and updating when categorizing new instances) **and recall** (e.g., involved in category use for different functions). Differences in encoding, from a categorization perspective, may imply different categorization processes followed by expert and novice consumers. For example, when processing a description of a product, an expert consumer is able to recognize the attributes and assign them a rating of importance and typicality with respect to a given category. Experts usually have the ability to restrict processing to relevant and important information. For example, expert consumers may seek information about specific attributes because they are aware of their existence and importance - whereas novice are not – and because they are capable of formulating specific questions about those attributes.142 The expert consumer may therefore process important information more selectively and intensively than other information, and associate the attributes in the description with a brand he is familiar with, whereas the novice must learn the attributes and associate them with the brand. Usually, familiarity is linked to the consumer's ability to adopt a brand-attribute (e.g., brands which possess specific attributes) information organization in memory.

The results of empirical research about information processing have shown experience to be positively related to analytical information processing. Drawing on these findings, **expert and novice consumers are expected to differ in the amount and types of information they selectively consider, and in the way they process such information.**

142 For example, according to Brucks (1985), when searching information for functional attributes, novice consumers are less able to limit the search to those most relevant to the usage situation.

Expert consumers (vs. novices) are expected:

- to better understand the meaning of product information (because they possess more highly developed conceptual structures) and to sustain a lower cognitive effort in achieving a particular level of comprehension;
- to adopt analytic information processing (meaning that experts tend to access all and only the information that is relevant and/or important for a particular product-related task and analyze it in greater extent and depth). Search of additional information is likely to have higher payoffs and lower costs for experts (vs. novices), whereas novices tend to simplify the task by adopting non-analytic processing.

Expert and novice consumers tend therefore to differ in the way they encode information about products, which can then be used also to update existing cognitive structures (i.e., categorization of new items).

The differences in memory representations of experts and novices can have interesting marketing implications. For example, Alba and Hutchinson (1987: p. 435) argue that when a message conveys a list of attributes [all familiar to consumers regardless of their knowledge level] with an inherent structure (i.e., relations between attributes), experts are able to perceive it. When the list lacks an organized structure, experts are able to impose one", whereas novices might perceive unrelated facts, thus yielding comprehension differences between experts and novices (i.e., how different attributes relate to one another). Such **comprehension differences may lead**, in turn, **to differences in information load when processing information** (i.e., trying to organizing the environmental stimuli).

Novices are less able to understand the importance, relevance and implications of attribute information. Sometimes novices try to **simplify** the task, **by using non-analytic processing** (i.e. compensatory rules, thus ignoring important information). Sometimes novices may not comprehend the meaning of the attributes (i.e. for technical specifications provided on electronic devices); whereas sometimes they may comprehend the meaning of the attributes, but don't understand their importance. Even **if they adopt an analytical processing, novices may apply different attribute importance when compared to experts.** Usually they tend to weight highly those attributes that are easily understood (e.g., perceptual) or that have been made salient though promotion (Gardner, 1983; Wright and Rip, 1980).[143]

From a categorization perspective this may suggest that consumers with experience may have an higher ability (vs. novices) to understand the meaning, the importance/relevance and the implications of product attribute information referred to a brand or item, with consequences on their categorization processes (i.e., which properties they can consider in the similarity comparisons, underlying category boundaries and content).

Rodder John (1988) states that "**research [on the differences between novices and experts] suggests that novices tend to use «surface structure» attributes** (attributes that are readily observable) **to categorize, whereas experts use «underlying attributes» (attributes related to the functional meaning of the category) to categorize**". She also observes that "**even if these underlying attributes are known to novices, and therefore are available for making decision, these attributes are not readily accessible**". Therefore, she argues that "**novices can be made to behave more like experts by priming or cuing these underlying attributes**".

Rodder John (1988) tested these hypotheses in an experiment investigating differences in the product categorization process (of familiar brands of beverages and cereals) among children of varying ages.[144] By drawing a parallel between the way inexperienced or novice consumers (young children) vs. experts (old children) are expected to behave, she hypothesized that:

- "even after controlling for product experience, younger children will be more dominated by visual salience (e.g., package, color) in categorizing products than will older children, whereas older children will be more likely to use underlying product characteristics (e.g., taste) in categorizing products than will younger children"

[143] As far as information elaboration is concerned, it may be hypothesize that experts are more likely than novices to elaborate on given information and to do so accurately; and that they have more efficient and easier information processing for achieving the same level of accuracy (Alba and Hutchinson, 1987: p. 428).

[144] Children were presented with three brands from a product category at a time (e.g., Cheerios, Apple Jacks and Apple Squares) and asked to group two of the three brands together and separate from the third and to verbalize their basis for doing so. Subjects sorted several triads and either no basis for categorization was specified (free sort) or a variety of cued bases for categorization was provided.

- "«cued» rather than «free» categorization tasks (e.g., asking children to categorize based on choice preferences rather than to merely group products without specifying a "criterion" for categorization) will eliminate some of the observed age differences"

and founded empirical support in an experimental test.

During the free categorization task, the use of taste (an underlying feature), visual product and package attributes, as a basis for sorting, increased with age, as expected. During the cued categorization task, however, the middle age-group behaved more like the oldest age-group in their use of underlying and visual product attributes, thus suggesting that providing bases for categorization can alleviate some age differences.

Furthermore, experts are expected (Alba and Hutchinson, 1987) to be more analytic. With respect to categorization task, this means, that they will evaluate the similarity between the item and a memory-based representation of the category (i.e., prototype corresponding to the central tendency of instances or particular previously encountered exemplars) by taking into consideration only the information referred to relevant attributes (one or a configuration). On the other hand, novices will tend to consider overall similarity, by ignoring important information about attribute information of which they don't understand the meaning and the importance in terms of implications.

According to Alba and Hutchinson (1987) there is evidence suggesting that **experience increases analytic processing and decreases holistic processing.**

Actually, other research findings suggest that experience alone is not sufficient to improve analytical processing of attribute information; consumer motivation is also necessary.

In fact, Foard and Kemler Nelson (1984) found that direct experience in analytical processing of attribute information led to higher future analytic processing of the same attributes, with improvements in the ability to analyze attribute information that were specific to the attributes involved in previously experienced analytic processing. Simple exposure to attribute information, without experiencing analytic processing, didn't lead to future analytic processing. Other studies showed that **when acquisition of attribute information is from experiences that do not involve**

classification per se (i.e. incidental rather than intentional learning), **subsequent classification is likely to be characterized by holistic processing**[145] (Brooks, 1978; Kemler Nelson, 1984; Reber, 1976). On the other hand, **when information is acquired from experiences that explicitly involve classification** (i.e. intentional learning),[146] **subsequent processing is much more likely to be analytic** (Kemler Nelson, 1984; Lewis and Anderson, 1985; Martin and Caramazza, 1980).

Numerous consumers' **experiences may yield no improvement in analytic processing, if consumers lack the motivation to be analytic. However, experience may influence motivation** (i.e. experts are motivated to use their knowledge for frequent product classifications). Analytic processing is also influenced by contextual factors, such as the availability of cognitive resources (if it is limited – i.e., for time pressure or stimulus complexity - holistic processing tend to prevail).

Hutchinson and Alba (1988) investigated the influence of expertise/training on the way consumers categorize (alternative categorization processes – analytic versus holistic). They explored empirically the relationship between expertise and categorization hypothesized by Alba and Hutchinson (1987) – namely that increased expertise will allow subjects to better discriminate artificial similar products (that is, products similar on perceptual dimensions, such as intentionally imitating competing brands introduced by manufacturers), due to their greater engagement in an analytic (vs. holistic) process. **Analytic categorization processes imply the consumer's ability to ignore irrelevant information and classify products solely on the basis of features that are diagnostic of category membership. The analytical ability develops as a function of the qualitative nature of consumers' product-related experiences (rather than their number only).**

In an experiment, Alba and Hutchinson provided subjects with several types of experience, in a training phase, and observed its effects on subsequent categorization performance (measured by the percentage of proper categorizations). The type of experience was manipulated in terms of number of dimensions on which each training pair differed and of the explicit instruction to learn the rule for

[145] An example of acquisition of attribute information without analytical processing may be exposure to advertising (Alba and Hutchinson, 1987: p. 420).
[146] Non-routine purchasing behavior, with high motivation for the consumer, may require analytical processing (Alba and Hutchinson, 1987: p. 420).

discriminating between the two categories. Three rules were considered: intentional learning (with the same categories for the training and test phase), incidental learning (with different training and test categories) and a preference condition. The criterion attribute (which defined category membership) was varied from very salient to very subtle.

Their findings showed that the level of analytic processing varied with the learning condition experienced (higher for easy learning), the nature of the criterial attribute (higher for salient criterion attribute), but not with intention (same level for subjects in the Incidental and Preference conditions). In a follow-up experiment (omitting all reference to price or brand in the training instructions to the Preference group) subjects in the Intentional condition were significantly more analytic than those in the Preference condition. They also found evidence for an effect of irrelevant information on individuals' beliefs: as the stimulus became more visually similar to the prototype of the incorrect category, subjects using a holistic strategy became more confident of their incorrect responses and subjects learning the criterial attribute and performing perfectly in the test phase became less confident of their responses.

Categorical cognitive structures also influence consumer's recall or retrieval.

Brand names tend to be recalled in categorical clusters, with consumers' category structures playing a major role in influencing the clusters (e.g., Alba and Chattopadhyay, 1985, 1986).

The marketing implications can be very significant. For example, the brands frequently recalled together are likely to be included in the same evoked set and, therefore, compete more directly with each other than brands that are seldom recalled together (Alba and Hutchinson, 1987: p. 431).

Thus, **the differences in experts' and novices' category structures can influence brand recall and consideration/evoked set formation.**

Hutchinson (1983) run an experiment where brand recall protocols were produced by single subjects (pharmacy vs. marketing students) in response to instructions to list the brand names of any products that can be used to treat the symptoms of cold. The analysis of the results suggested at least two hypotheses regarding clustering in brand name recall for experts vs. novices:

- categorical clustering is likely to be more specific for experts vs. novices (i.e. cough-cold products)

- the attributes that are associated with clustered brands are likely to be more causally important and relevant for experts than for novices (i.e. ingredients).

Alba and Hutchinson (1987) go further by discussing and developing hypotheses about the impact of differences in categorical knowledge between expert and novice consumers on their decision and choice behavior.

Alba and Hutchinson (1987: p. 417) summarize the implications of category structure transformation following increased experience on consumer behavior in these terms: "these changes in cognitive structure are most likely to affect consumer behavior by changing the ways in which decisions are framed. (..) In particular, there should be significant differences between novices and experts in the size and composition of the set of alternatives they consider and in the nature of the attributes that are used to evaluate those alternatives".

With respect to consideration set composition, the evoked set of a novice consumer (i.e., backpacker) for «things to buy for a backpacking trip» is expected to be more stimulus-based, that is heavily influenced by external factors (i.e., the inventory and shelf display of products in the stores in which s/he shops), whereas the evoked set of the experienced backpacker is likely to be more memory-based.

In a decision setting, **experts are more likely to rely heavily on memory**, whereas the novices are more likely to rely more on available external stimuli.

According to Alba and Hutchinson (1987), **novices are more likely to be influenced by top-of-mind brand and attribute awareness or by cues available at the point-of-purchase.** Therefore, they advance as a **marketing implication that problem framing techniques** (i.e., in advertising) **may be effectively employed not only to influence the perceived importance of information for novices, but also to selectively remind them of relevant attributes** (i.e., those on which the advertised brand is superior to competitors).

For memory-based decisions, expert and novice consumers are likely to use different processing and decision strategies, owed to their different knowledge: experts can recall a higher quantity of information of better quality (i.e., since experts are able to notice relative differences in the importance, relevance, and consistency of the information they are learning and using).

For example, expert consumers are expected to be able to include more brands in their memory-based evoked sets and to recall and use more attributes during memory-based decision-making, thus becoming more analytic. The higher articulation of product category knowledge yielded by increased experience and expertise includes the relations between and among brands and attributes; thus experts are able to differentiate brands more specifically and on the basis of more meaningful criteria, and to assign to attributes task-relevant importance values.

In decisional contexts where memory is not important (i.e., **when a package or point-of-purchase display reminds consumers of previously advertised information), experts should not benefit of a relative advantage (vs. novices).**

Other situations have been analyzed:

a) consideration set composition given a need to satisfy;

b) consideration set composition, given a category to buy.

a) When the consumers' need is general, experts should be able to consider a more heterogeneous set of alternatives than do novices (because of above the basic level categories), whereas when the need is relatively specific experts should consider a more homogeneous set of alternatives than do novices (because of below-the-basic-level categories). Failing to appreciate the more abstract levels of categorization, novices will probably consider a limited number of alternatives as substitutes, and make sub-optimal choices (Alba and Hutchinson, 1987: p. 416). Expert consumers should be able to make appropriate generalizations from specific product information, whereas novices may make overgeneralizations and under-generalizations. Alba and Hutchinson (1987: p. 416) report another interesting example related to food: novice consumers who wish to eliminate cholesterol from their diet are likely to avoid margarine as well as butter by erroneously over-generalizing the product information of cholesterol content of butter (as margarine is made of vegetable oil that, doesn't contain cholesterol).

b) In a choice setting (i.e., supermarket), when the evaluative process has determined the category (i.e. cheese), but not the type or the brand, type or brand selection will imply finding a category member, and novices are more likely to select the prototypical member of the category (i.e., cheddar for cheese category according to an American consumer), without making further explicit comparisons with other more atypical and unusual exemplars available in the category.

Alba and Hutchinson (1987: p. 439) also warn that experience and expertise may have negative consequences. For example, they may lead to overly strong beliefs about one's true level of knowledge (e.g., Cole et al., 1986; Selnes and Gronhaug, 1986; Park, Mothersbaugh and Feick, 1992). Such exasperated beliefs may have negative effects on information search (i.e. abbreviated) and information interpretation (i.e. information is given careful consideration, but beliefs can bias its encoding and processing).

Mitchell and Dacin (1996) – the second relevant study considered in detail here – reviewed the cognitive psychology and consumer behavior literature about the differences in domain-knowledge between novices and experts, and developed hypotheses/expectations (of similar or divergent results) about the **differences in product-class** (a synonymous of product category) **knowledge between novice and expert consumers**. Actually, they didn't test directly such hypotheses. Rather, they used these hypotheses to assess different measures of expertise, by considering a measure adequate when it supported these hypotheses. [147]

A Product-Class Expert has been defined by Mitchell and Dacin (1996: p. 220) as "someone who has the knowledge necessary (a) to select an appropriate product for a particular usage situation (Brucks, 1985) and (b) to use and maintain products from that product class", which reminds what in Alba and Hutchinson's (1987) definition of expertise is the performance of a product-related task.

Mitchell and Dacin (1996: p. 220) expect, as a basis for the ability of a product-class expert (vs. novice) to select an appropriate product, "the awareness of the alternatives available in the market (i.e., product types, models, brands) and the

[147] Mitchell and Dacin (1996) assessed different measures of consumer expertise by analyzing their ability to predict correct choices in three stimulus-based choice tasks and to support a number of hypotheses (concerning how consumer expertise should affect the content and organization of knowledge for a product class and reasons for choice across different usage situation). They have drawn from the cognitive psychology and consumer behavior literature for both measures and hypotheses.

amount of knowledge about these alternatives to increase with expertise (Bettman and Park, 1980)" in accordance with the findings of Rosch et al. (1976).

The specific hypotheses advanced by Mitchell and Dacin (1996) can be summarized as follows: **hypotheses about knowledge amount, knowledge content, and knowledge organization**.

Hypotheses about knowledge amount of product-class novices and experts:

- Regardless of the number of established product types, models and brands in a product class, the amount of knowledge that consumers associate with various product types is expected to increase with expertise: experts (vs. novices) should be able to associate more brands with each product type, and more models with each brand.
- The knowledge necessary to assess the performance of products (e.g., economy of operation for the product class automobile) on the basis of their physical attributes (e.g., engine size) is expected to increase with expertise: experts (vs. novices) should have more knowledge about performance attributes, different physical components of products, and how physical attributes of products affect performance attributes (i.e., attribute-performance knowledge).

Hypotheses about knowledge content of product-class novices and experts

- Expert consumers (vs. novices) should have more specific-product knowledge (knowledge about specific brands, models, or sub-categories in the product class), product-usage knowledge (usage of products in the product class), and personal knowledge (thoughts, feelings or experiences in the product class). Novices should have a larger (vs. experts) proportion of product-domain knowledge consisting of associated episodic knowledge (about people, events, and objects associated with the product class appearing in advertising, movies, and the news media).[148]
- Expert consumers should have more intra-domain knowledge (ability to compare attributes between products, and products in the product class); novices should have more inter-domain knowledge (ability to compare objects in the product

[148] The reason for this expectation is that expertise generally co-varies with enduring involvement, and thus experts [novices] should have exposure to more [less] information about the product class, think more about the product class, and be more likely to acquire systematically [incidentally from friends, advertising etc.] product-class knowledge.

class with objects in related product classes with which they are more knowledgeable).[149]

Thanks to more complex and detailed knowledge structures related to product categories, experts (vs. novices) should better understand relations (e.g. similarities) between categories and between category members (Joiner and Loken, 1994), should be able to see the relationships between different attributes more clearly (Desai and Hoyer, 1993) and should process similarity judgements more swiftly and accurately (Muthukrishnan and Weitz 1991 in argument strength choices).

Hypotheses about knowledge organization of product-class novices and experts

- Expert consumers should be more likely to specify ordinal relationships between objects (distinguishing between objects by specifying whether an object possesses more or less of an attribute) instead of simply expressing nominal relationships (indicating whether an object contains that attribute or not).

- Expert consumers should organize their knowledge about objects around many attributes, thus facilitating comparisons between objects, whereas novices are expected to organize their knowledge around only a few attributes.

- Expert consumers should perceive more common attributes across items in a product class on which to base their comparisons.

- Expert consumers should evaluate the value and importance of an attribute in distinguishing between objects differently in different usage contexts.[150] More precisely, Mitchell and Dacin hypothesize that "for a given product class, the extent to which a consumer assigns a common evaluation to a specific attribute level across all objects and contexts, and the extent to which these attributes play a central role in distinguishing between objects, will decrease with expertise" (p. 221).

- Expert consumers are expected to base their overall evaluation of products on a careful consideration of their attributes, whereas novices should base their evaluation on fewer attributes (only one or two attributes) or on others' opinions,

[149] The proposed argument is that research on problem solving showed that experts process information in greater depth than do novices (e.g., Chi et al., 1981; Novick, 1988)", consistently with research on consumer behaviour arguing that in choice-settings expert consumers process information about alternative brands in greater depth than do novices (Alba and Hutchinson, 1987), and have greater attribute-performance knowledge.

[150] Such predictions are contrary to Scott et al.'s (1979) findings. Scott et al. (1979) found that the cognitive differentiation was greater for subjects with more domain-knowledge: experts used more attributes, more unique attributes, and more attribute levels to differentiate between objects in a domain.

thus leading to a consistency between the overall evaluation of a product and the evaluation of its attributes which will increase with expertise.

- Expert consumers (vs. novices) are expected to mention a higher number of different attributes as reasons for choice, to draw more inferences about performance-attributes from physical-attribute information, to have more statements about why specific attribute values are good for a specific usage situation, to make more implicit comparisons (comparisons between the brands presented in a choice task and brands in memory), to make less explicit comparisons (comparisons between the brands presented when asked to select an alternative from a brand-by-attribute matrix in a stimulus-based choice task).[151]

Although with an indirect test, Mitchell and Dacin (1996: p. 234) found out, as expected:

- A greater awareness and knowledge about the alternatives available in the market and an organization of this knowledge around product types for expert consumers (vs. novices).
- A higher likelihood to store information about alternatives at the physical-attribute level, that is used to infer performance for experts (vs. novices), with various advantages (i.e., comparisons between the information stored in memory and the alternatives available on the market, the ability to evaluate alternatives most appropriate for different usage situations).
- A lower number of brands and models recalled by novice consumers (vs. experts) and a primacy of episodic knowledge; a prevalence of nominal knowledge about specific models concerning performance, with some consequences (i.e., external comparisons, less flexibility in evaluating the alternative most appropriate for different usage situations).
- Formation of generalized knowledge only after actively interpreting the subjective experiences with products (whereas the mere experiences do not automatically translate into generalized knowledge).

[151] Mitchell and Dacin (1996: p. 222) assume different types of reasons for choice provided with different levels of expertise, especially because of different ways of processing information (i.e., attribute-by-brand) to make a choice and to different content and organization of knowledge; although there is little existent research concerned with the effect of expertise on the generation of reasons for justifying a particular choice.

- The assessment of one's expertise within a domain (that is, subjective knowledge) will not always be appropriate. Furthermore, typical measures of objective and subjective knowledge (e.g., vocabulary tests) may not adequately assess expertise within a domain (since, in their case, the motorcycle-ownership/magazine reading and friends-owning factors explain additional variance over the subjective/objective knowledge factor).

In sum, idiosyncratic experiences with products may lead consumers to become experts, with changes in categorical knowledge and effects showing up on several consequent cognitive and behavioral responses.

3.3. THE USE OF PRODUCT CATEGORIES FOR CLASSIFICATION

Categorization theory is built on the premise that individuals spontaneously tend to divide the world of objects around them into categories, in order to achieve an efficient processing of the stimuli that have been detected and attended to, so that they can be understood (that is, identified and given a meaning). Sujan and Tybout (1988) stress the **high potential of categorization theory in understanding consumer behavior, given the complexity of the choice environment** (i.e., with plenty of brands having both shared and unique properties) **faced by consumers. Categories may be employed for a classification function, to simplify and structure the array of product variants (i.e., product types, brands, models) consumers find in the market environment.**

By classifying new stimuli in the environment (including products variants) as members of previously defined categories stored in memory or by recognizing a previously experienced member of a category, individuals can react to them in a pre-defined way, experimented in the past and consistent with the expectations associated with the category, rather than having to formulate unique responses (Sujan and Tybout, 1988). For example, if a consumer has created the following categories for grouping the brands of cars: sport cars, family cars and sub-compacts cars, he can base his reactions to a new (for the market) or novel (never encountered by him) brand, at least partially, on the category in which it can be classified. The classification is the pre-requisite for inference-making.

One of the main streams of research analyzing consumers' categorization process for classification functions, relevant to the marketing domain, refers to consideration and evoked set formation. Two studies will be discussed here to exemplify the objectives, contents, and results of such contributions: Troye (1984) and Chakravarti (2001), respectively among earlier and more recent efforts.

Categorization provides a useful framework to investigate consumers' simplification of their decision process through a sequential brand selection process.

The evoked set (Howard and Sheth, 1969; Howard, 1977) has been proposed as one possible simplification strategy a buyer can adopt when facing with the multitude and complexity of alternatives of choice (i.e. brands) in the market place. The buyer limits the span of attention to the evoked set, which is a subset of the available alternatives (i.e. brands) of which he is aware, that have a higher probability of being purchased, since they become the candidates for the decision. Other sets have been added later, such as the Processed Set that together with Foggy Set comprises the Awareness Set (Brisoux and Laroche, 1980) or the Inert and Inept Sets that together with the Evoked Set make up the Processed Set (Narayana and Markin, 1975).[152]

For marketers, it is of critical importance to understand the antecedents of the size (how many alternatives) and the content (which alternatives) of the evoked set, as well as its formation process and the stability or not of its composition.

Troye (1984) is among the first researchers to propose a conceptualization of evoked set formation as a categorization process and of the evoked set as the outcome of a categorization process. He claimed that the same principles governing categorization processes in general should be expected to guide the formation of evoked set.

In particular, interesting issues to be empirically addressed are:

- the extent to what the characteristics of the available product alternatives (stimuli) influence evoked set, seen as the output of the categorization process, since models of category formation assume that the characteristics of the set of stimuli out of which the categories are formed, at least partially, determine the categorization process (i.e. family resemblance as a determinant of graded structure for common taxonomic categories);
- the extent to what the subject's motivations and tasks (instructions) affect evoked set seen as the output of the categorization process, given category literature asserting this influence (i.e. current salient goals affect ad-hoc categories creation, on the basis of ideal dimensions), consistently with findings in information processing behavior (Bettman, 1979; Johnson and Russo, 1981).

[152] The Foggy Set comprises alternatives the consumer is aware of, without having specific comprehension and therefore significant meaning because they have not been attribute-processed. The inept set includes alternatives which are totally rejected, whereas the inert set contains the alternatives which are neither accepted nor rejected, because neither positive nor negative attitudes have been developed in their respect.

Troye (1984) assessed, in an experimental setting, the impact of

- the properties of the set of alternatives available for choice (their number and similarity)
- some personal characteristics (motives/instructions for information processing)

on evoked set content (in particular similarity and desirability[153] of the included alternatives) and size.

Instructions asked subjects to assume to be interested in buying the target product category and to choose among the alternatives described. The information provided during experimental procedure was appropriate for the stage of the buying process simulated.

Findings showed that only the number of alternatives available, and not their similarity, influenced – negatively – evoked set content in terms of desirability. Evoked set tended to include alternatives matching the ideal, with few good alternatives erroneously excluded and the worse usually discarded. Increased number of alternatives available lead to lower accuracy of evoked set selection. Pairwise similarity between alternatives resulted as a not sufficient condition for inclusion in evoked set. High similarity between all available alternatives led to a lower individual probability of entering the evoked set. Thus subjects were quite rational in their evoked set formation.

A more recent study which addresses the issue of consideration set composition is Chakravarti (2001), where a finer distinction between memory-based and stimulus-based consideration set is made. According to Chakravarti, memory-based consideration set formation maps on categorization tasks like exemplar generation: subjects are given a category name and asked to generate names of the members of that category. Stimulus-based consideration set formation (out of a given set of brands) could map on categorization judgments: subjects consider a given alternative and make a decision whether or not to include it in a particular category. Furthermore, both memory-based and stimulus-based consideration set formation should map on judgments of typicality. The results of studies showing that more typical instances of a category are recalled faster in a free recall task (e.g., Ward and

[153] The desirability is considered an indicator of the consumer's ability to make a "rational" selection of evoked set alternatives (Troye, 1984: p. 180).

Loken, 1986) have implications for memory-based consideration set formation. Studies (e.g., Mervis and Rosch, 1981) showing that more typical instances of a category are identified or classified more quickly than other instances from a given set of instances, on the other hand, have implications for stimulus-based consideration set formation.[154]

Chakravarti (2001) reconsidered the main principles and findings of the categorization literature in cognitive psychology to speculate about the implications for the consideration-set formation, an issue of marketing relevance.

The role similarity (e.g., as measured by family resemblance) plays in the formation of common taxonomic categories is consistent with the findings that consumers' consideration sets often have brands bunched together in perceptual space (e.g., Lehman and Pan, 1994).

However, a consideration set can also be regarded as a category that is aimed at fulfilling certain consumption goals, that is a goal-based category (i.e., the basic goal of transportation for the consideration set of automobiles). Thus, a product category can be made up of ideals with respect to some attributes and consumers' consideration set for that product will include instances that are close to those ideals. However, to the extent that some product categories may not have very salient ideals, similarity will play a major role.[155] Chakravarti concludes that consideration set composition may vary with the presence or absence of ideals in a product category.

However, consideration sets of product categories characterized by ideals may be composed of similar alternatives or not, depending on the existence of single vs. multiple salient ideals and on the direction of their correlation.

Finally, Chakravarti (2001: p. 56/58) discusses the implication of the different views of the categorization process on consideration set formation, with an example

[154] Chakravarty (2001: p. 30, 31) exemplifies what the implications could be for the category fast-food in the American context. Assuming that McDonald's is regarded to be the most typical member of the category fast-food by an American consumer, previous studies on typicality effects having relevance for consideration set formation suggest that:

- when asked to name instances of the category fast-food (memory-based), subjects are most likely to mention McDonald's earlier and faster than other instances;
- when asked to select the most typical instance of fast-food from a given set of instances (stimulus based), McDonald's is likely to be identified more quickly than other instances like Hardee, Checkers, etc.

[155] Barsalou (1985) found that in the absence of ideals, subjects rely on similarity to central tendency to make judgments of typicality.

referred to cars. Individuals looking for a car may decide that they are searching for SUVs, thus following a similarity-based approach in categorization (and consideration set formation) since SUVs tend to be perceptually similar (i.e., shape and off-road capabilities). The consumer is not able to specify a set of underlying rules that uniquely determine the sub-category of SUVs (as required by the classical view), primarily because other sub-categories (like luxury cars) may share similar values on a lot of underlying attributes (like 4 wheel drive, chassis, good handling, and even off-road capabilities). On the other hand, an automobile engineer can perhaps specify a rule to distinguish between SUVs and luxury cars. Alternatively, individuals looking for a car may decide to consider cars which satisfy the rule «fuel-efficient cars which provide at least x miles to a gallon». The consideration set in this latter situation will probably be more heterogeneous. According to Chakravarti (2001: p. 57) both types of processes for forming a consideration set may coexist and interact. One interesting question he raises is "How do consumers react to alternatives that are perceptually similar but differ on the underlying rule? Or, conversely, to alternatives that are similar with respect to the underlying rule but are perceptually different?"

These and many other questions are still waiting for a response, thus stimulating **continuous extensions** of the research on the use of categories for classification functions referred to products.

3.4. THE USE OF PRODUCT CATEGORIES FOR INFERENCE MAKING

Wanke and Menon (1998) observe that "for consumer research the most important question is, how (categorization) processes affect consumer judgments and decisions". Lee and Ulgado (1994) and Coupey and Nakamoto (1988) agree that the effects of consumers' product category knowledge on product evaluations have been intensively studied in consumer behavior over the past years.

Consumer research has identified many domains of category-based inferences (Wanke, Bless, and Schwarz, 1999), and categorization theory as a conceptual framework is useful in predicting the inferences that consumer make (Sujan and Dekleva, 1987: p. 372).

There is inference any time someone goes beyond the available evidence. **In category-based inferences, the properties of an exemplar are inferred from the category of which it is a member, at different levels**, that is super-ordinate, basic or sub-ordinate. In fact, it has usually been shown that in experimental settings when cues prompt consumers to categorize a target object in a certain way, then the exemplar evaluation is assimilated to its category evaluation (Wanke, Bless, and Schwarz, 1999).

Category-based inferences can therefore facilitate consumers' evaluation. Consumers do not always rely only on the product information given during the situation at hand, when evaluating a product. They can and usually do use their pre-existing knowledge about the product. As Sujan (1985) notices, the use of product categories enables the consumer to rapidly evaluate a product, because of category-based inferences which take place once an item is classified as an example of a known product category. For example, after having categorized an item according to its country of origin or to its brand in case of brand extension, consumers usually infer specific attributes of that item.

Marketing has considered:

1) **category-based inference in the product domain;**
2) **the influence of category-based inferences on product judgment (evaluation) and choice.**

A complete review of such literature is beyond the scope of this dissertation. Only some exemplars from this research field are overviewed here, to give an idea of its contents, so that inferences about its potential applications can be drawn by interested readers.

With respect to the first area of analysis, **for example**, Sujan and Dekleva (1987: p. 372, 373) speculate about the **implications that the hierarchical structure of categories might have on consumers' inferences in product domain.**

Categorization at the basic level, characterized by both richness and distinctiveness (i.e., product type), allows inferences about a product that are most evaluative in character (i.e., a 35 mm camera can be described as takes good pictures, uses a large film format, versatile etc.) and can be distinct when done by contrasting (i.e., a 110 camera can be described as handy to carry, cartridge film). Categorization at a super-ordinate level (i.e., product class) allows fewer inferences to be drawn (i.e., a camera can be described in terms of takes pictures, uses films, etc.). Categorization at a sub-ordinate level (i.e., brand) is likely to increase the number of attributes than can be used to describe the products (i.e., a Canon AE-1 can also be described as Japanese and reliable), but the increase will be small, because most of the inferences can be made based on the membership of the brand to the basic level category of its product type. Although categorization of a product at levels characterized by more specificity (i.e., from super-ordinate to basic to sub-ordinate level) allows inference about a greater number of attributes to be made, the increase is greater in moving from the super-ordinate (i.e., product class) to the basic (i.e., the product type) level than from the basic (i.e., product type) to the sub-ordinate level (i.e., brand).

Sujan and Dekleva (1987: p. 373) also discuss the probable effects of expertise on category-based inferences: when knowledge about a domain increases, individuals tend to use increasingly specific categories (e.g., brand level categories for products) to process information (Mervis and Rosch, 1981). They argue therefore that experts, but not novices, might benefit from brand level categories in the number and quality of inferences they can make.

The implications of hierarchical effects in categorization on inference making were empirically investigated by Sujan and Dekleva (1987). They considered advertising as the specific field of inquiry for marketing implications, and inserted expertise as a potential moderator variable. More precisely, they expected some differences between the effects of comparative and non-comparative advertising on product evaluation when the product is presented in the advertisement within a broad product class or the advertising is aimed at expert consumers and the product is presented at a brand level. Their experiment confirmed that product inferences varied systematically depending on the specificity of the cues available in the ad (category being the most important), and that expertise played a critical role in inference generation (especially at the sub-ordinate or brand level)[156]. The inferences generated (the attributes ascribed to the product even when not explicitly stated) acted as important mediators of both ad perceptions and brand perceptions.

With respect to the second area of research, some studies have extended their focus to include the impact of category-based inferences on product evaluation. An interesting stream of research has investigated how the fit between the instance and the category to which it is claimed to belong affects consumers' judgement. For example, Peracchio and Tybout (1988) examined the **effect of levels of product incongruence**[157] **on product evaluations**. Their findings suggested that products that are moderately incongruent with their claimed category receive more favorable evaluations than either congruent or extremely incongruent products.[158] These results are consistent with Mandler (1982)'s proposal that **categorization processes may have consequences for judgment**, and that the match or congruity between a category activated in memory and a new object determines the extent and direction

[156] Product type and brand level attributes were more likely ascribed to the product when a comparative ad was used, than when a non-comparative product class ad was used, for both experts and novices.

Comparative advertising containing brand cues engendered different responses relative to either product class or product type level non-comparative advertising for experts; but only in relation to product class level non-comparative advertising for novices.

[157] The levels of congruity were operationalized on the basis of Rosch's (Rosch 1975; Rosch and Mervis 1975) notions of hierarchical category structure:

- congruity = conformation of the attributes of a new product to the attributes associated with an activated product category
- moderate incongruity = the attributes of a new product do not completely match those associated with the activated product category, but such incongruity could be resolved by moving to the next lower level in the product hierarchy
- extreme incongruity = the attributes of a new product neither match those associated with an activated product category, nor do they match those associated with categories at the next lower level in the product hierarchy.

[158] This is consistent with the idea that moderate incongruity can somehow be accommodated within the existing cognitive structures related to products.

of the processor's elaboration and subsequent judgments. Another interesting study has been proposed by Lee and Ulgado (1994) and regards **consumers' reaction to conjunction or intersection categories** that is a complex category obtained from two simple categories (ingredients) whose implications are inconsistent with each other.[159] From a marketing perspective, this categorization topic has important implication for product positioning strategies.

Based on existing literature, Lee and Ulgado developed some alternative hypotheses about the ways consumers may deal with the inconsistency created by conjunction categories (labels), when provided also with specific attribute information. They empirically confronted:

1. Category Integration Hypothesis, positing the use of some type of integration rule to combine the affect associated with the ingredient categories (i.e., linear, additive and averaging).
2. Sub-typing Hypothesis, positing the access of a sub-ordinate level of one of the current ingredient categories (i.e., basically Honda automobiles, but manufactured in Mexico or essentially Mexican-made automobiles, but branded Honda).
3. Piecemeal Elaboration Hypothesis, stating that category labels, being contradictory, loose diagnosticity, and are ignored by the consumer in favour of elaboration of the specific product attribute information available.

An experiment investigating the reasoning process followed by consumers to resolve dilemmas engendered by conflicting categories in the product domain, showed results overall compatible with the sub-typing hypothesis. The categories defined by the brand names were dominating over the categories implied by the country-of-manufacture, and were used for sub-typing,[160] whereas the available attribute information didn't affect the evaluation of the conjunction categories.[161]

[159] As Lee and Ulgado (1994) suggest, examples of conjunction categories may be:
- a Polo t-shirt sold at $30, where the ingredient categories are the brand name category (Polo) and the price category ($30)
- a Honda car made in Mexico, where the ingredient categories are the brand name category (Honda) and the country of manufacturing/origin (Mexico)
- a Rolex watch sold through discount stores such as K-Mart or Target, where the ingredient categories are the brand name category (Rolex) and the store category (discount store).

[160] Lee and Ulgado's (1994) warning is that the two ingredient categories were assumed to be at the same level in the product category structure in consumers' memory, whereas they might be at different

Another promising area of application of category-based inference refer to brand extension, seen as a particular type of product judgement. In this case, the categorization constructs may help in interpreting how associations and evaluations of the original brand name can transfer to a brand extension. Also the evolution of these studies shows clearly the influence of new developments in research about categorization in Cognitive Psychology (e.g., consideration of brand extension as flexible and context dependent)

levels (for example, with brand name category at a higher level in the hierarchical structure of categories) so that one becomes dominant.

[161] Lee and Ulgado's (1994) advice that the results are not incompatible with the situation where consumers read the available attribute information, and use it only to make a confirmation check on the brand category membership of the product previously determined as an hypothesis on the base of the brand name.

3.5. CONTEXT EFFECTS IN PRODUCT CATEGORIZATION: THE INFLUENCE OF MARKETING VARIABLES

The idea underlying this stream of research is that some factors – **processor's and environmental characteristics – may influence encoding, retention and retrieval of categorical product knowledge in consumers' memory.** These **studies aim at identifying the conditions under which product category representations in consumer' mind may change, with a special regard to factors under managerial control.**

Coupey and Nakamoto (1988), for example, examined the effects of the task-context in which category learning happens on the processing of product information expressed at an attribute level. Their study investigated the impact of category learning goals assigned to consumers during the experiment – evaluation of similarity vs. preference/choice vs. subsequent recall – on the way they encoded product information in memory and subsequently retrieved it. Some intrinsic characteristics of the categories (the number of exemplars presented to the subject and the skewness of the distribution of properties over the set of presented exemplars) were manipulated too. The findings showed that the learning goal during the experiment and one of the intrinsic characteristics of the category (skewness) separately and jointly influenced the completeness and organization of encoded product information. Subjects in a recall condition tended to use a brand-based organization. Subjects in an evaluative condition focused primarily on attribute information, with little inclination and ability to link the attributes to a particular brand. Subjects in the preference conditions were in between, using attribute information for a preference judgment after comparison and storing the preferred brand, without being able of lately recall its detailed attributes.

In parallel with studies in Cognitive Psychology, **an important stream of research about context effects** on categorization within Marketing discipline **is related to priming.**

Chakravarti, MacInnis, Nakamoto (1990), discussing the distinction proposed by Barsalou (1983) between context-dependent and context-independent properties of a category, argue that context-independent properties should be central to the meaning of the category. In the case of product categories, they speculate that context-independent properties might be those related to a product's ability to deliver its core benefit or to its physical features. They propose as **possible contextual factors externally-provided cues that are designed to prompt elaboration of previously non-salient associations**, and suggest advertising as an object of investigation. They argue that advertising claims might alter the salience of particular associations or shift the mental judgmental setting, thus changing the salience of the associations.

Gutman (1982, 1999: p. 6) found that consumers grouped products into different product categories depending on which product features they emphasized and which ones they ignored, thus showing the interdependence of categories and attributes,.

Joiner and Loken (1994), in their study on category-based inference, noted that a cassette tape player and microcassette recorder would be included in an intermediate category such as «products that run on batteries», rather than in the category «audio products», thus emphasizing different determinant attributes and including a more diverse set of members, depending on what cues were salient to a subject in a given situation.

The research related to goal-derived and ad-hoc categories (e.g., Barsalou 1982, 1983; Ratneshwar and Shocker 1988) **has had an important echo in the consumer behavior and marketing field.**

Coupey and Nakamoto (1988) interpreted Barsalou's research about goal-derived (or purpose-directed) categories as implying the idea that category representations may vary according to the specific use of the categorical knowledge: for example, taxonomic categories (mainly based on perceptual similarity) might be constructed during stimuli perception when the main use is classification; whereas goal-derived categories might be constructed in choice setting (preference definition) when the main use is action.

Wanke, Bless and Schwarz (1999) empirically investigated and demonstrated the emergence of context effects in consumer evaluative judgments of products when consumers are induced (through experimental manipulations) to retrieve ad-hoc categories.

Subjects were exposed to the same four products (lobster, wine, cigarettes, tv-guides), but the manipulation of experimental conditions through instructions induced them to assign the products to different ad-hoc categories (in service of a current – experimental –task): "food" and "product to be sold within a short time period". After the categorization task (aimed at prompting different categories[162]), subjects were asked to evaluate the same target product (wine) along several dimensions (i.e. elegant, unhealthy, a drug, cheap, something for a special occasion). Results showed that within-category assimilation and between-category contrast effects were in action and the target product (wine) was evaluated more or less favourably according to the induced ad-hoc categorization.[163] Thus the impact of contextual stimuli (i.e. product) doesn't depend – only – on the properties of the stimuli per se, but also on the categorisation of those stimuli induced by specific tasks. The interpretation given by Wanke, Bless and Schwarz is that the impact of a contextual stimulus on a target product depends on how both are categorized. The contextual stimuli here do not change (products are the same, with the same features, in all experimental conditions); what changes is how the given contextual task (suggesting ad-hoc goals) instruct participants to categorize the stimuli. As the authors notice, the main implication of these experimental findings is that **"categorization is, at least partially, under a marketer's control"** and therefore **marketers may figure out ways to actively affect consumers' categorization processes** (i.e. by shelving products, pairing them in promotions, devising advertising campaigns). By **developing strategies for eliciting ad-hoc categorizations, marketers may better influence category-derived judgments.**

Desrochers and Jain (1998) investigated the impact of product display on consumers' product categorization, and argued that brand positioning may be communicated through the location of the brand in a particular aisle of a store.

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[162] The exemplars to be included in the "food category" were wine and lobster, whereas the exemplars to be included in the category "things to be sold in a short time period" were lobster and tv-guides.

[163] In particular, wine was evaluated more favourably when it was associated with lobster in the ad-hoc category "food" rather than with cigarettes in the complement of the ad-hoc category "things to be sold within a short time period". According to Wanke et al., this means that comparison effects within the category, with the up-market product lobster as an available/activated standard of comparison, should enhance the positive feature of wine, which are furtherer enhanced by the contrast effect with the complement category's (low profile) members (cigarettes and tv-guide). The same stimuli (lobster) exerted a positive or negative influence on the evaluation of the target object (wine) depending on its categorisation (with wine or with tv-guides). This categorization and, therefore the type of influence it exerts may be externally influenced (by inducing ad-hoc categorisation).

Their thesis is that the spatial proximity of various products on the store shelves spontaneously encourages product categorizations which influence consumers' perceptions of important attributes and, consequently, brand attitudes.

They investigated this issue with an experiment which applied the multi-attribute model and the construct of priming and recency to examine how the in-store location of a product evokes a particular categorization, which in turn influences attribute importance weights and, hence, brand evaluations.

Desrochers's unpublished Ph.D dissertation (Desrochers, 1999) studied thoroughly this thesis.[164] She investigated the role of product categorization – implied in the retailer's grouping of product classes (and brands and items within them) within the store – on consumers' preference formation, in a low-involvement shopping setting (grocery store) and for novice or expert consumers as well. The main thesis, again, is that the retailers' decision regarding how to categorize the items included in assortment ultimately affects consumers' preferences. She intended to demonstrate that the retailer's grouping of various products on the shelves in a store encourages a categorization in consumers' mind that, in turn, affects consumers' attribute importance weights, and, as a consequence influences the basis for product evaluation, with a potential ultimate effect on the retailer's profitability/performance (not investigated). She claimed (1999: p. 5) that previous academic studies of shelf space arrangements and allocations have implicitly assumed that the evaluation of an item remained constant regardless of its categorization and location within a store, and explicitly assumed that an item's location within the store is given. In her research, she questioned the assumption of context independency for product attributes and relative importance, aiming at demonstrating that it depends on the placement of the product within the store (categorization). Desrochers (1999: p. 17, 18) argued that "categorization theory states that collections of objects are spontaneously categorized, which, in turn, evokes an attribute list that forms the basis for comparisons of category members", and, therefore, "grouping product classes within a retail setting simplifies the choice task by encouraging the categorization of items. In turn, this eases the information processing and choice tasks by focusing consumers' attention on a list of relevant,

[164] This empirical research is examined in great detail, because it bears relevance to the conceptual framework to be developed.

category-specific, attributes" which "depends on the type of category". She explains that "the spontaneous identification of a particular category caused by exposure to a collection of products is referred to as priming" and "the primed category influences consumers judgements by identifying a list of relevant attributes". Building on Barsalou (1991) she explained that for categories referred to as common or natural (e.g., birds, furniture and fruit) the list reflects those features shared by the members, whereas in goal-based categories the list refers only to attributes that are most relevant to the achievement of that goal. In a retailing setting, she argues that both types of categories can be created by retailers, such as the common category of dairy foods where the shared feature is need for refrigeration or the intended use-based category of snack foods where the goal is something to eat as a snack, in the grocery sector.

The construct of contextual assimilation effect was drawn from cognitive research to propose the possibility of attribute importance weight changing according to the retailer's categorization. Assimilation effect implies a shift of a judgment toward a reference point. She argued that the judgment concerned the attribute importance and the reference point/standard was the category in which the product was included by the retailer.[165] The first hypothesis is therefore: "For a product that can be in more than one category, the primed category determines the relative importance weights of the attributes used in evaluating the items within this product class" (Desrochers, 1999: p. 21).

The construct of background context effects (Simonson and Tversky, 1992, 1993) was considered to deal with the issue of possible multiple locations for the same product class. Background context effects occur when past choices influence current evaluations and choices, even when independent. Desrochers (1999: p. 21, 22) argued that, in a retail setting, background context effects may arise for previous exposures to a product class in recent shopping trips or during the same shopping trip, and may result in using a previously utilized set of attribute importance weights for evaluating the product class. Category accessibility (that is, the ease at which

[165] Desrochers (1999: p. 19), however, explains that her empirical research differs from previous studies of assimilation effects (Higgins, Rholes, Jones, 1977; Herr, Sherman, Fazio, 1983) because the priming of the category occurs coincidentally with, rather than prior to, the exposure to the ambiguously categorized item.

category information will be available and used in decision-making), however, can limit the impact of background contextual effects. Category accessibility has been shown (e.g., Srull and Wyer, 1979, 1980) to be a positive function of both the recency and frequency of exposure to the categorization. The second advanced hypothesis is: "Following a previous categorization of the same product class, the product's prior categorization influences the attributes and the importance weights used in evaluating it" (Desrochers, 1999: p. 23).

Furthermore, she hypothesized a moderating role of consumer experience/familiarity and expertise with the product class,[166] drawing from results in cognitive research, stating the third hypothesis: "Following a previous categorization of the same product class, novices, rather than experts, are more subject to the priming effect and respond to the new categorization by changing the attribute importance weights used to evaluate it" (Desrochers, 1999: p. 26).

An experiment, using pictures of actual grocery store aisles as stimuli and product classes that can be included in more than one category in the store, was run to test the hypotheses in a multi-product and low involvement shopping situation, with 148 business school students as participating subjects (137 questionnaires useful). She assumed that in a low involvement shopping setting, consumers tend to reduce the set of attributes to those that are most important for making a choice and considered the multi-attribute model as a useful representation of the consumer decision-making process,[167] aimed at maximizing utility from products/brands/items (seen as bundle of attributes) under a budget constraint.

The overall results of the experiment provided support for all the hypotheses: the majority of the consumers used different attribute importance weights depending on the categorization of the product class (priming effect), even in the presence of background effects from the previous exposure (most evident for expert consumers),[168] with higher influence of priming on novices as opposed to experts.[169]

[166] Drawing from Alba and Hutchinson (1987), she considers familiarity and expertise as combined to form product knowledge (since they are not necessarily positively related), defined as learned information that is stored in a person's memory.
[167] Since it reflects the weighting system implicitly operating during the two-stage decision process, regardless of the decision rule employed.
[168] When a second exposure to the same product class occurs, but in a different categorization, some attribute importance weights may be retained (i.e., because of some uses already in mind) from the previous exposure, and used in the evaluation.

Such results have important managerial implications for product placement within a store (i.e., ways to enhance a brand's evaluation). Desrochers discusses, in particular, the implications for manufacturers. Suppliers may benefit of placing their product, which is strong on certain attributes, in a category where such attributes receive a high importance weight by consumers. Another important finding is that it was possible to identify different market segments based on preferences, with each segment attaching different importance weights to the same set of product attributes, thus "in order to effectively direct consumers to focus on a product's strengths, managers must be aware of which attributes are most important to the consumers in their target market" (Desrochers, 1999: p. 68).

In the same stream of research it is possible to include also the recent empirical study of Desai and Rathneswar (2003),[170] investigating the process of brand variants categorization. They analyzed how consumers perceive, categorize and evaluate new product variants (in the snack category) that are positioned on atypical attributes (low fat), by considering the joint effects of:

- supply-side variables: brand familiarity – under the manufacturer's control – and retail shelf display – under the retailer's control but open to influence in brand positioning strategies;
- demand-side variables: consumer goal orientation, that is benefit segments in the market.[171]

They assumed absence of a direct consumption experience with the target products, and limited information processing (rather than detailed consideration of the physical features and ingredients of the products). They expected and (mostly/in

[169] Novice consumers were more subject (vs. experts) to the priming effect, because they tend to change their attribute importance weights when the categorization of the product class changes. This result is consistent with prior categorization research (Markus, Smith and Moreland, 1985; Sanbonmatsu, Kardes and Herr, 1992).

[170] Also for this study many details are provided, given its importance for the stated intended contribution of the dissertation.

[171] The objectives of the investigation were determining (Desai and Ratneshwar, 2003: p. 31):

- "whether product variants positioned on atypical product attributes gain from well-established parent brands";
- "how and to what extent consumer perceptions and buying intentions of product variants are influenced by their placement in goal-based shelf displays vs. taxonomic shelf displays";
- which effects will have benefit segmentation in the market (operationalized as participants' orientation toward the goal attained by the positioning attribute).

general) find empirical support for the product variant positioned on an atypical attributes to have:

- a less favourable perception on the atypical attribute when brand familiarity is high (vs. low), when it is placed in a goal-based (vs. taxonomic) shelf display, by the consumer segment that is more (vs. less) oriented toward the goal attained by the atypical attribute
- a more favourable perception on the typical attributes (i.e., taste) when brand familiarity is high (vs. low), when it is placed in a goal-based (i.e., health foods vs. taxonomic, i.e., regular snack foods) shelf display, by the segment that is more (vs. less) oriented toward the goal attained by the atypical attribute
- a higher buying likelihood when brand familiarity is high[172] (vs. low), when it is placed in a goal-based shelf display (vs. taxonomic); by the consumer segment that is more oriented toward the goal attained by the atypical attribute (i.e. health-oriented vs. less).

Strong evidence was found for an effect of prior brand associations of familiar brands on new product variants. The different perceptions by differently goal-oriented customers were interpreted by considering the likely differences in the category knowledge structures of the two groups that have concomitant implications for contrast processes in product perceptions (Desai and Ratneshwar, 2003: p. 32).

Desai and Ratneshwar (2003: p. 32) discussed the main marketing implications of their findings, with respect to product positioning and targeting decisions. The **findings** about the context effects of shelf display suggest **that an increase of the sales of product variants may be pursued by manufacturers and retail store managers acting on in-store location. In particular, product variants may be placed "in store shelves and sections organized around the consumer benefit on which the variant is positioned and differentiated, rather than – or in addition to – the usual nominal product category shelves"**. However, Desai and Ratneshwar (2003: p. 32) notice that **the well-entrenched nature of category**

[172] The underlying reasoning is that probably the positive affect associated with the parent brand dominates (i.e., halo effect) and the typical product attribute – with a positive evaluation – is the main benefit that consumers look for in the product category, and that the overall functionality of the parent brand does not change drastically in the line extension thus avoiding a brand-schema incongruity situation (Desai and Ratneshwar, 2003: p. 24).

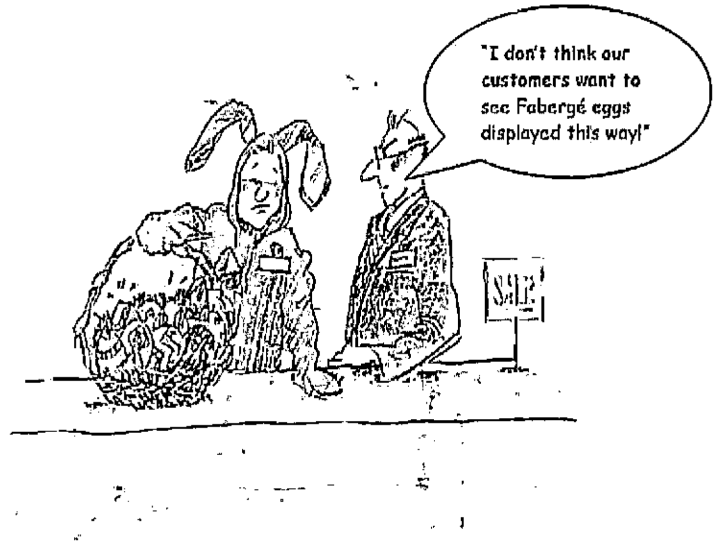
management practices in grocery retailing question the practical feasibility of altering shelf display locations, and that the consumers' willingness to spend extra time and effort for locating individual products in goal-based displays, especially if they have become highly accustomed to taxonomic display, should be verified. Such issue is strictly related to the topic of the potential dynamic co-evolution between retailers' and consumers' categorization, of interest in this dissertation.

Research achievements about categories and categorization in Cognitive Psychology have found various applications in other fields. In Marketing and Consumer Behaviour studies, categorization principles have proven useful in understanding which categories individual consumers create with respect to products available on the market (e.g., taxonomic at different levels of inclusiveness, and goal-based), what knowledge they attach (e.g., with profound differences between novice and experts) and store in memory, and how they use such categories (e.g., to simplify the perception of an array of alternatives through classification, and to speed up evaluation by means of inferences). All such findings help identifying to what extent and how consumers' categorization regarding products may be influenced by managerial action. Promising opportunities of intervention seem to arise from contextual effects affecting categorization.

PART II

CONCEPTUAL FRAMEWORK

"Display the goods. Out of sight, out of mind!"
(old adage, reported by Buskirk and Buskirk, 1979: p. 318)



(Source: Ziccardi and Moin, 1997: p. 236)

Categorization is a fundamental individual ability and a cognitive tendency which influences several aspects of human life, including decision-making processes underlying purchasing and consumption.

Product information processed by a consumer during several kinds of product experiences (both direct such as product usage, and indirect such as advertising or word of mouth about the product) is usually stored in long-term memory in cognitive structures which often are in categorical form. The specific knowledge cumulated and associated to a product category can be retrieved by the individual in sub-sequent consumption and purchasing situations, thus influencing decision-making (i.e., category-based inferences when evaluating the product) and behavior.

Recognizing that consumer information processing about products may take place in-store, retailers figure out ways to second and favour it, thus impacting on customers' acquisition of product knowledge.

When individuals visit a store, they are exposed to and may interact – although to a different extent, according to contingency factors such as time availability and personal motivation – with the assortment carried and visually organized in the physical space, across departments, aisles and shelf-layers. Such exposure and interaction can be interpreted as a product-related experience consumers can exploit to acquire product category knowledge, which can be stored in memory and retrieved in sub-sequent occasions (Chapter 4, par.1).

When deciding assortment presentation retailers are therefore **acting on and managing the nature of the product-related experience store patrons will have while shopping.** They can make the intrinsic informative content of assortment presentation variously explicit through display arrangement and POP materials, thus providing cues to consumers (e.g., variety determinants) which may prompt their product category knowledge development and/or prime retrieval.

A common practice in retail management, whose importance is increased in category management projects, is to create a system of classification – at different levels – of the carried assortment. Defining the boundaries and the contents of the categories in which retailers' assortment can be articulated is an important stage in the implementation of category management. Category definition drives assortment visual organization into the physical environment and display equipments of the store, where customers interact with the products at their disposal. **When presenting assortment the retailer is in fact making a categorization, which is suggested to store patrons. This raises the issue of the influence that retailers' product categorizations may exert on consumers' mental product categories creation and use while shopping** (i.e., for classification and inference functions). **Customer-based approaches to category management urge a category definition starting from the customer perspective.** The main reason is that a cognitive fit between retailers and store patrons is considered beneficial, in terms of customer comfort while shopping (i.e., clear understanding of the visual organization of the offer and dominance of the surrounding environment), perception and appreciation of the proposed variety of choice, and so on. Furthermore, adopting a customer perspective may disclose competitive differentiation opportunities, finding out innovative category configurations (i.e., reflecting complementarity and substitutivity in consumption habits).

Some theoretical contributions (e.g., Busacca and Castaldo, 2000 in the Italian literature) have proposed that looking at consumers' cognitive categorization processes could represent a useful starting point in managing in-store visual organization of the retailer's assortment, but few empirical researches (e.g., Desrochers, 1999) have addressed this issue up to now.

The review of the literature about categories and categorization can provide some suggestions to retailers. For example, a retailer can create taxonomic as well as goal-derived categories, and he can exploit the vertical hierarchical dimension of taxonomic categories. The horizontal dimension of categories can be useful to solve uncertain assignment decisions, by considering the degree of typicality of an item.

But, the literature review outlines also some difficulties for retailers. For example, the empirical effects of category flexibility and instability within and between subjects, well supported in several studies, may have implications of concern for retail marketing practitioners. Analyzing store patrons' categorical knowledge structures about products may not result in a common and unique solution for assortment visual organization in-store.

The customers of a store may – and usually do – differ in their idiosyncratic cumulated product experience and developed expertise, which appear to strongly influence cognitive categorization (Alba and Hutchinson, 1987; Mitchell and Dacin, 1996).

The suggested adoption of a customer-orientation when defining the categories appears, therefore, to be complicated for the retailer by the potential different views customers may have with respect to the same products. Retailers can hardly second the instability and flexibility of store patrons' categorization processes. Reflecting different customers' categorizations in the visual assortment presentation in-store may be feasible only to a certain extent. For example only compatible cross-classifications of the same item may be suggested by making explicit the underlying criteria for category formation through different merchandising and visual merchandising solutions (such as the position in the shelf display, the color of the shelf-layer, POP materials like shelf-talkers or posters hanging over the shelf). Thus, being always in line with the categorization perspective of every customer is rather impracticable in brick and mortar retailing. Lack of cognitive fit, on the other hand, may have negative effects for both retailers and manufacturers (i.e., customers exiting the store to visit another one, lost sales etc.) due to the cognitive discomfort of the customer (i.e., being not able to choose an appropriate alternative or to find what someone is looking for, even when it is available). Such arguments, however, imply a static perspective, that is focused on categorization heterogeneity between customers at a given time, resulting from structural (such as different level and content of product knowledge) as well as contextual (such as salient goals) factors. But categorization flexibility between and within subjects can be considered in a dynamic perspective, too. The reasoning just outlined might disregard some opportunities latent in the dynamic nature of categorization, that is changes in consumers' cognitive structures due to increased experience and expertise (e.g., Alba and Hutchinson, 1987; Medin et al., 1997), as well as to the influence of contextual factors (e.g., Barsalou, 1992; Herr et al. 1983; Higgins and Lurie, 1987; Roth and Shoben, 1983).

Some interesting and – at our best knowledge – still unanswered **research questions, this dissertations aims at empirically investigating are:**

1) **Does retailers' assortment categorization through display arrangement influence customers' product category knowledge?**
2) **Can the retailer play a role in consumer education, by letting consumers categorical cognitive structures change, when acting on assortment presentation?**

1) The first question raised asks whether consumers' product category knowledge can change after an exposure and cognitive interaction (by processing communicated information) with the retailer's assortment, due to its arrangement? In other words, can active exposure (meaning with information processing) to various assortment arrangements differently influence consumers' product category knowledge?

Consumer experience and expertise in the product-domain can be expected to play an important moderating role of the interaction between retailers' in-store assortment categorization and consumers' mental categorizations. As emerged in the literature review (in chapter 2 and 3), experience and expertise – in product-domain as well as in other domains – have been shown to change the knowledge content and organization, as well as processing, which, in turn, guide encoding and retrieval, in a circular dynamic system of knowledge evolution.

When entering a store, different customers may bear different product category knowledge (strictly related to their experience and expertise), with the possibility of different reactions to the same assortment presentation.

Based on the literature, some speculative arguments about the effect of differentiated cognitive categorical structures about products of expert and novice consumers on their reaction to assortment presentation can be advanced, drawing implications for retail practitioners (Chapter 4, par. 3).

2) Retailers might be interested in ways to practically benefit of the potential interaction between suggested categorization in-store and consumers' categorization. Such influence – if empirically supported – could offer a way to overcome retailers' difficulties in adopting a customer perspective when defining categories which arises from flexibility between and within subjects. One alternative to cope with heterogeneous customers' categorizations could be trying to dynamically achieve a cognitive fit with most customers, by letting retailers' and store patrons' categorizations co-evolve. In other words, a more managerially relevant question to be investigated should be whether a retailer can «educate» his customers meaning that he can induce changes in their categorical cognitive structures about products.

Theoretical and empirical research about categorization in distinct fields such as Cognitive Psychology, Consumer Behavior and Marketing can provide some constructs (i.e., contextual effects, priming, taxonomic and goal-derived categories) and findings (i.e., differences in cognitive representations and categorization processes between novice and expert consumers) useful in **developing and testing hypotheses about the possible interaction between the retailer's assortment categorization and the customer's product category knowledge and the opportunities a retailer has to exploit it.**

Putting together the two research questions, a conceptual framework is developed (Chapter 4, par. 3) which describes a dynamic approach to achieve a cognitive fit with most store patrons, by letting their product categorical knowledge to co-evolve with assortment visual organization in-store.

One possibility to induce some customer-learning, which is proposed and empirically investigated in this dissertation, may be:

(a) privileging a visual organization of the assortment which reflects the (expected) more complex, accurate and veridical categorical cognitive structures referred to products of experienced and expert customers;

and

(b) providing information aids (e.g., labels on the shelf, posters, leaflets) to novice consumers, so that they can improve their product category knowledge by processing of the information communicated through display arrangement and POP material.

The issue – proposed and explored in a first empirical study – is whether retailers can exploit the multi-dimensional nature of consumers' knowledge (experience and expertise components) by acting – through purposely managed assortment presentation – **on the quality of the product-related experience consumers may have as store patrons while shopping, in order to influence their expertise in the product domain** (including cognitive structures – here categorical – and cognitive processes), **thus performing an education role for novice consumers.**

Building on findings in Cognitive Psychology research about contextual effects in categorization (affecting structural, representational and processual aspects), **some specific hypotheses about the mechanisms allowing the proposed educational role as well as an experimental design to test its feasibility through tools at retailer's disposal for assortment presentation management** (display arrangement and POP material) **are developed** in the chapters of this part.

The core research proposition can be expressed as follows: retailer's assortment categorization in-store influences the product categorical knowledge and underlying processes of novice consumers.

Assortment presentation by categories suggests a product category structure

- which can be learnt by novice consumers and used for future classification and inference purposes, provided that they give attention to and are motivated to process the available information (e.g., about category names, rules of membership, exemplars) → prompting effect;

- which can be used by experienced and expert consumers to activate the associated knowledge and to update it → priming effect.[173]

Retailers' assortment presentation can be interpreted as a contextual factor which may influence consumers' product categorization processes and outcomes taking place in the shopping environment. In particular, the various tools a retailer can use to carry out the assortment presentation in-store (e.g., display arrangement and POP materials) can be thought of as components which jointly configure a category learning context (as defined by Cohen and Basu, 1987) for store patrons, especially for novices.

Different configurations of the tools imply different prompting/priming efforts[174] of the product category structure and potential contextual effects on consumers' categorization. The strongest educational effect (in terms of changes of category structure and processes) on novices is expected when the retailers is acting coherently on various tools (e.g., both display arrangement and POP materials) and taking into consideration the perspective of more knowledgeable consumers.

An experimental design must be devised, including different treatment conditions each reflecting a different configuration of the tools for assortment presentation and therefore different prompts/primes for the category structure, to test their impact on novice consumers' categorization processes and outcomes (Chapter 5).

[173] The term «prompt» is used with reference to novice consumers since the hypothesized effect is a suggestion of the category structure, which can be learnt; whereas the term «prime» is referred to experienced and expert consumers since a reminding effect of the category structure (already existent in their memory) is expected.

[174] To be intended as different in extent and kind.

CHAPTER 4

RETAILERS' INFLUENCE ON STORE PATRONS' PRODUCT KNOWLEDGE THROUGH ASSORTMENT CATEGORIZATION: EXPLORING THE POTENTIAL

4.1. ASSORTMENT VIEW AS AN EXPERIENCE USEFUL TO BUILD CONSUMERS' PRODUCT CATEGORY KNOWLEDGE

Consumer decision-making, at least partially, takes place when purchasing products within a store. According to a retail industry study (POPAI, 1997) conducted in the American retailing context 74% of all (brand) purchase decisions in mass merchandisers are made in-store, 70% for supermarkets.

Innman and Winer (1998) propose a comprehensive theoretical model of in-store consumer decision making, by drawing from marketing, psychology, and economics literature (Figure 4.1).[175]

The stages included in their model of in-store consumer decision-making are:

a) exposure to product categories and in-store displays as consumers shop the store; with the likelihood of exposure influenced by several contextual factors;

b) motivation to process in-store stimuli, influenced by several factors;

c) recognition of potential need, when consumers have not planned ex-ante to purchase the product category, generated by exposure to product categories and in-store displays, and subject to advance planning to purchase particular categories;

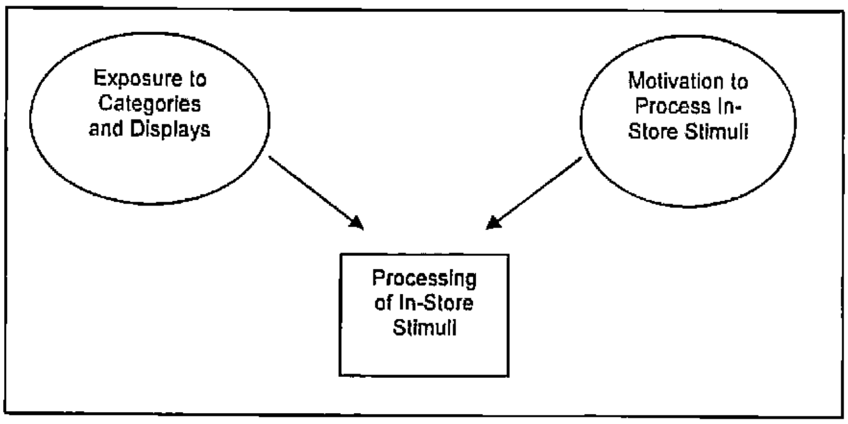
[175] Their focus is on the unplanned purchasing behavior, but their model can provide general insights about in-store behavior. Furthermore, as Innman and Winer (1998: p. 29, 27) specify, they are modeling consumer behavior once the consumer arrives at the store, with prior attitudes and preferences that can influence the in-store process; and consider in-store decision making related to category choice and not to brand choice, without including characteristics of the product category as possible intervening factors.

d) shopping decision, whether purchase was specifically planned, generally planned, a brand switch, or unplanned[176].

It is essentially during the stage of exposure that shoppers – that are able and/or willing to – may engage in product information processing.

Information processing is an important stage of consumer decision making, of interest for both cognitive psychology (e.g., Rosch and Lloyd, 1978) and marketing (e.g., Basu, 1993) academic researchers and practitioners (e.g., Barsalou, 1992). Information can be drawn from both external or internal search (Lusch, 1982: p. 114). External search means seeking information from any source outside the individual (i.e., product package, advertising, acquaintances, etc.). Internal search is the mental recall or review of what the consumer has learned from prior processing of information. Information processed, in fact, is stored first in episodic memory, and, after repeated elaboration, in semantic or long-term memory (Barsalou, 1992; Eysenck, 1984). Kanvar et al. (1981: p. 122) argue that "information acquisition is essentially concerned with the formation of cognitive structures" and Alba and Hutchinson (1987) observe that categories are the most investigated conceptualization of cognitive structures.

Figure 4.1 – A theoretical model of in-store consumer decision-making



(Source: adapted from Innman and Winer, 1998: p. 6)

Information processing during purchasing and consumption decision regards mainly products and services. Consumer declarative knowledge about products can

[176] Four levels of ex-ante planning are considered (Innman and Winer, 1998: p. 9): completely unplanned, category planned, category and brand planned (that is, completely planned), another brand planned than the one actually purchased (that is, switched brand).

be thought of as organized in semantic memory in a categorical form (Eysenck, 1984) and resulting primarily from information processing during purchase and consumption. So, information processing related to products, in part, happens at the point-of-purchase, namely within stores. Consumers create their idiosyncratic product category knowledge, besides experiencing the product directly through consumption or indirectly through manufacturers' communication efforts or word-of-mouth from other consumers, also through shopping experience (i.e., exposure to the assortment presentation). Furthermore, looking for updated and detailed product information and knowing the products available on the market are examples of motivations consumers may have for shopping (e.g., Tauber, 1972; Donovan and Rossiter, 1982; Bloch and Richins, 1983).

Innman and Winer (1998: p. 8) suggest both external (such as time pressure[177]) or internal factors (such as age, involvement,[178] need for cognition,[179] or deal proneness[180]), as influencing motivation to process in-store available information, thus distinguishing incidental versus intentional learning.

When the subject has planned to purchase a certain product, a minimum amount of motivation to process in-store information, and thus likelihood of intentional learning, may be presumed. In-store information processing is also likely when the subjective motivations for shopping are gathering information about the product offer existing on the market or the willingness to learn how to specify and satisfy the consumption preferences.

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[177] According to Park, Iyer, Smith (1989) and Beatty and Smith (1987) findings, consumers under time pressure tend to engage in less search, to deliberate less and fail to make some planned purchases.

[178] For example, Slama and Tashchian (1985) and Beatty and Smith (1987) found a positive association between purchase involvement and consumer search processing. Innman and Winer (1998: p. 7) "expect consumers who engage in greater search – those more cognitively involved in purchasing – are more likely to notice a given in-store stimulus than less involved customers."

[179] According to Haugtvedt et al. (1992) and Maheswaran and Chaiken (1991), consumers with a high need for cognition (Cacioppo and Petty, 1982) are more likely to use message content as a basis for judgment than those with low need for cognition. Innman and Winer (1998: p. 8) expect shoppers with a high need for cognition to be less influenced by mere exposure to a product category or in-store display than shoppers with a low need for cognition. They found out that consumer with high need for cognitions made unplanned purchased with a higher frequency than consumers with low need for cognition.

[180] The processing of in-store stimuli should be motivated by the quest for good deals.

Innman and Winer (1998) argue that "**several factors that drive in-store decision making are under managerial control, particularly those regarding exposure**".

Spitz and Flaschner (1980: p. 56, 57) recognize that the retailer can play an active role in aiding and responding to the steps of consumers' decision-making process taking place in-store. A retailer can encourage problem recognition and definition, and then show ways in which the problem can be solved. For example, a retailer makes the customers taking cognisance of the products available in-store to satisfy their needs, by prominently displaying them and by exploiting other promotional resources (e.g., skilled salespeople, appropriate advertising, and well-thought-out promotional materials also to take away).[181]

Assortment composition (i.e., selection) and presentation (i.e., display and communication in-store, mainly non-personal in self-service retailing) can be interpreted as retailers' tools to satisfy the consumers' information-related motivations for shopping or to aid information search while purchasing, which, in turn, influence information acquisition and processing taking place within the store, germane to declarative knowledge boosting and updating.

Mauri (2000: p. 199, 220) argues that **consumers become acquainted with product variety existing on the marketplace mostly when they visit stores, by observing and analyzing the displayed assortments.** Building on Inman and Winer's model, Mauri (2000: p. 203) details how such learning process – that can be interpreted as a change in customers' knowledge from a categorization perspective (Busacca and Castaldo, 2000: p. 67) - may happen. Several factors influence the probability for the customer of being exposed to a category, including the category display. Following category exposure, only a portion of shoppers will stare at the display, observing the category organization and processing the information available through the display. Such information processing might direct item choice when the purchase for the category has been planned before entering the store, or might trigger the need to buy the category and influence the following choice process. Consumers may learn about a category and become acquainted with their

[181] Lusch (1982: p. 125, 126), describing the types of in-store effects a retailer can engender, also refers to store personnel, atmosphere, point-of-purchase advertising and merchandise inspection.

preferences within the category by analyzing in-store assortments (Mauri, 2000: p. 226), especially when a product is of problematic purchase.

Analyzing retailers' assortment and display may be considered a product-related experience a customer may have as shopper. The customer's exposure to and interaction with the display is an occurrence registered first in episodic memory, and after repeated information processing it can lead the consumers to update their organized knowledge about products in semantic memory (Kellogg, 2003). Customer learning is achieved when there is a change in customers' declarative knowledge (factual and conceptual) about products.

By deciding assortment composition and presentation, the retailer is ultimately acting on the «quality» of a product-related experience (exposure and interaction) consumers may have as store patrons, that can lead also to customers' learning.

4.2. Assortment Presentation by Categories and Consumers' Categorization Processes

In order to satisfy information-related motivations of shopping and to second information search and processing stages of in-store decision-making, it is of fundamental importance for a retailer to have a right variety of product items, but also to manage and communicate it in clear ways, so that consumers may become acquainted of such variety and learn to specify their preferences.

Sand (1995: p. 16) notices that "**product presentation communicates a great deal to the consumer**". Merchandising and its visual declination are the most important instruments a retailer can adopt to carry out/build in-store assortment presentation.

Merchandising is a systematic process of effectively displaying consumer products at the point of purchase, striving to make product purchasing as easy and natural as possible for the customer, and it is frequently based on visual techniques and aids.

Given the ultimate objective of having the right product, at the right place, at the right time, displayed in the right manner, merchandising involves at least three elements: the correct inventory, the optimal positioning, and the proper presentation of a product (Sand, 1995: p. 16).

Regarding product presentation, merchandising aims at making products visible and attractive to consumers, very frequently just at the moment they are deciding what to buy (Sand, 1995: p. 10, 11).

Understanding how best to utilize store layout and shelf-space is fundamental for an effective merchandising (Sand, 1995: p. 48, 49). Once established the store layout (e.g., the location of the departments and of the aisles), the product placement on the shelf-space – that is, display arrangement - must be decided. Display exposes products to customers so that observation, examination, and selection are facilitated (Duncan and Hollander, 1977: p. 160).

Display is a critical vehicle for product information. Bolen (1978: p. 369) defines a retail display as a "**non-personal presentation of merchandise and/or**

information to the target market which takes place within the physical environment of the store".

A good display should provide information (what is the item? where it can be found? what is it used for? what is its price?), among other characteristics such as being secure in storing the products and attractive (e.g., to stimulate impulse buying and contribute to the creation of the store atmosphere) (Bolen, 1978: p. 375), with the ultimate objective of selling products (Buskirk and Buskirk, 1979: p. 318). A display cannot be thought to be passive, it should project the merchandise to attract the customer's attention (Bolen, 1978: p. 369, 372), and sometimes it should be re-arranged to make a merchandise grouping, a department or the entire store more interesting to the customer.

In-store display should reflect what is available in-store, with functions such as department identification and direct promotion of merchandise (interior display), sometimes on or near the point of sale (point-of-purchase display), even physically holding the merchandise (Bolen, 1978: p. 380, 382).

POP display is usually considered in conjunction – and sometimes confusedly and indistinctly – with POP advertising (e.g., Ziccardi, 1997: p. 245; Lusch, 1982: p. 125) to stress the common nature of communication vehicle which can be used for promotional efforts.

For example, Ziccardi (1997: p. 237) includes in POP display: signs (e.g., standing out, wobbling, lighting up or swinging from the regular shelves to attract attention, electronic signs arched over aisles to spotlight new products); cardboard posters (placed beside, beneath, or atop the product); coupons, brochures and pamphlet dispenser; display cases; samples; and interactive kiosks (to dispense coupons, to provide information, to attain consumer information). Lusch (1982: p. 125) defines POP advertising as any communication vehicle, typically in print form, within the store, and provides examples such as signs, banners, special merchandise displays, counter signs, price cards, window signs, posters, elevator cards, flags, and similar devices that inform the consumer about the product or store offerings. He concludes that these promotion vehicles may trigger in the consumer's mind what is needed alerting the consumer with the available products (for unplanned purchases), as well as provide information that can be used by the customer in deciding whether a product fits her/his needs (for planned purchases). Ziccardi (1997: p. 245) then suggests a classification of POP displays and advertising into five basic types:

- merchandisers, which are displays that set a product apart from the regular fixturing or shelving (e.g., end-of-aisle or end-cap displays);
- signage, which shows a store name or logo;
- glorifiers, which highlight the product and put it into a context or environment that enhances it;
- organizers, which help control inventory and make products easy for shoppers to select;
- in-store media, which include ads on shopping carts, in-store sound systems, interactive kiosks, coupon dispensers, and televisions at checkout lanes.

Shelf-displays can be considered complex stimuli the consumer is exposed to, especially in mass-market retailing (e.g., Chandon, 2002: p. 3). Given the myriad of alternatives cluttering up supermarket shelves, only some items gain consumers' attention, and for such reason a growing proportion of the marketing budget of the manufacturers and the retailers is being assigned to point-of-purchase marketing (e.g., Kahn and McAlister, 1997; Chandon, Hutchinson, Young, 2002: p. 1). The effect of POP marketing activities is well supported by empirical evidence. Shelf space, location quality, display organization, POP signs and other forms of POP advertising influence sales (e.g., Curhan, 1974; Desmet and Renaudin, 1998; Drèze, Hoch and Purk, 1994; Wilkinson, Mason, Paksoy, 1982).

Such observed effects can be explained, mainly, because most consumers enter the store without having decided what to buy, they look at and evaluate a fraction of the products available, and are attracted to in-store displays (Inman and Winer, 1998; Kollat and Willet, 1967) (Chandon, Hutchinson, Young, 2002: p. 1, 2).

An important component of retailers' merchandising and visual merchandising effort is to have well arranged and organized products in the selling area of the store (Sand, 1995: p. 59). Buskirk and Buskirk (1979: p. 320) notice that every **store has "a series of assortment displays arranged on shelves in clusters that are meaningful to the customer"**. Desrochers (1999: p. 2) explains that retailers organize several product classes into a category and display them together in one area of the store; therefore, the categorization of products and items determines their locations in the store (including the adjacencies). Her focus is on layout decisions. Desrochers (1999), in fact, considers a category as composed of several product classes, that is something similar to a department.[182] However, she refers also to the organization of items within a product class, which also can give rise to a further categorization,[183] fundamental for display arrangement.

Creating a system of classification (at different levels of inclusiveness, such as a category and a product class in Desrochers 1999's terminology) **for the assortment of merchandise carried, and to use this as a basis for organizing in-store layout and display arrangement on the shelves, is a common practice in retail management.**

Taylor (1970), in describing the historical origins of the in-store merchandise classification (especially the departmental one), refers to the increase in the size of the stores and in the broad variety of products they carried, with implications on both the retailer's and the customers' side.[184]

Desrochers (1999: p. 8) observes that **some trends in the grocery retail environment**, which is becoming increasingly complex, especially for the high numbers of alternatives available for choice as well as for their dynamism,[185] **are emphasizing the retailers' role in creating an environment that eases consumer decision-making.** She argues (1999: p. 10) that **one way to accomplish the task or simplifying the complexity of the grocery retailer environment by making products easier to find is to group product classes into categories and display them together, by labelling store aisles.**

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[182] Desrochers considers as the object to categorize the product classes, rather than the single variants.

[183] She specifies the definitions she has employed in her experiment as follows: "A category, such as laundry supplies, is a collection of product classes such as detergent, bleach and dryer sheets. A product or product class refers to, for example, laundry detergent. The term brand refers to a specific offering within the product class, for example Tide or Cheer. Finally, an item is a variation within a brand referring to, for example a certain size or added ingredient".

[184] "The pattern of subdividing departments into classifications and sub-classifications has become a necessary first step on the road to the more precise definition of customer wants as well as in better merchandising supervision" (Taylor, 1970: p. 11).

[185] To realize the complexity of the retailer environment for the consumer from a decisional perspective it is interesting what Jacoby (1984) observes with reference to the United States in the Eighties: there are approximately 150 nationally distributed breakfast cereal items on the market and the average store carries between 60 and 90 of them; most packages contain pictorial or graphical information in addition to almost 100 separate items of information.

Some studies have shown that consumers try to make an optimal choice subject to reduced cognitive effort in repetitive shopping contexts.

From the retailers' perspective such product groupings are useful for a better shelf-space management, since category-specific analyses can be performed for the assortment and the allocation of space. Very often retailers have to confront complex decisions, because many product classes can be included in more than one category, and multiple locations may have a high logistic cost.

Such practice of classifying the retailer's assortment can be interpreted as a categorization process, according to the definition adopted in the present work. The retailer is grouping some objects (single product variants or brands) that he believes can go together by virtue of some relevant commonalities, and he is treating them in a unique and appropriate manner, such as by displaying them in the same area/department of the store or in the same space on the shelf.

Retailers' assortment presentation may drive consumers' attention to a certain fraction rather than others, and to some product aspects to be considered rather than others, as some existent empirical evidence suggests.

For example, in an actual test-market promotion in a major city in the southwest United States that was structured as a field experiment,[186] Areni et al. (1999) observed that the use of a special POP display (by a producer cooperative of wineries from Texas[187]) led to an unexpected decrease in sales of the featured brand (the brand of the Texan producer cooperative of wineries) and other brands from a specific US region (Texas) and to an increase in sales of the regularly shelved brands from other US regions (i.e. California). Areni et al. (1999: p. 428) advanced the possible explanation (supported by the findings of a follow-up explorative consumer

[186] Brands comprising the cooperative of Texan wineries were displayed in one of two store locations, in three participating stores of different format (large warehouse store specialized in beer, wine and spirits; small package store specialized in beer, wine and spirits; large chain supermarket; to account for different wine purchase patterns).
Three experimental conditions were created (and the manipulation lasted 12 weeks):
- in the «special» treatment, the producer cooperative brands were presented exclusively in the special POP display emphasizing Texas as the location of the wineries
- in the «normal» treatment, the producer cooperative brands were organized by variety on regular shelf space, along with other domestic and imported brands
- in the combined treatment, the producer cooperative brands were simultaneously presented in both locations (special POP display and regular shelf space).

Display location (special vs. normal vs. combined) was the manipulated independent variable; daily sales figures in dollars were observed as the dependent variable, in a Latin-square design to control for the effects of store and time.

[187] The special display consisted of stacked cases of wine with individual bottles placed on top, featuring signage in the form of the state flag, and clearly separated from the regular shelf space devoted to wine.

survey on the decision processes involved in wine purchase) that the special POP display reorganized the wines into «region categories» (in addition to the «variety categories» on regular shelf space), thus positively affecting the easiness for consumers to compare alternatives by region. Sales of wines of the preferred region increased, whereas sales of wines of the disliked regions decreased, relative to when the wines were displayed by variety on regular shelf space, because the attribute (production region) with usual low salience in wine purchase could have been made more salient by the special POP and the consequent product re-organization. The featured brand (in the special POP display) possessed a relative negative value (Texas) on the attribute (usually low salient) made more salient by the in-store product reorganization induced by the special POP display. This increased the penalty consumers associated to the negative value of the attribute with modified salience, thus leading to a decrease in sales. Furthermore, the negative effect of special POP display on brand sales was magnified – rather than offset – by brand strength: strong brands of the featured region suffered the sales decline, whereas weak brands from the featured region were largely unaffected.

Given the observed effects, Areni et al. (1999) investigated in a subsequent laboratory experiment the impact of special POP displays, which reorganized products within the stores by level of a given attribute (i.e., region for wines, rather than variety), on brand purchase likelihood. They hypothesized and found support for an effect of product organization[188] on brand purchase likelihood/brand choice, and a moderating role of the salience of a given product attribute[189] (and its association with a featured brand)[190] and of the normal/baseline brand purchase likelihood. On the contrary, they didn't find support for a mediating role of the importance weight of the focal attribute (i.e., the one used in the product reorganization with special POP display) on the effects of product reorganization on brand choice.[191] They finally proposed the model represented in Figure 4.2.

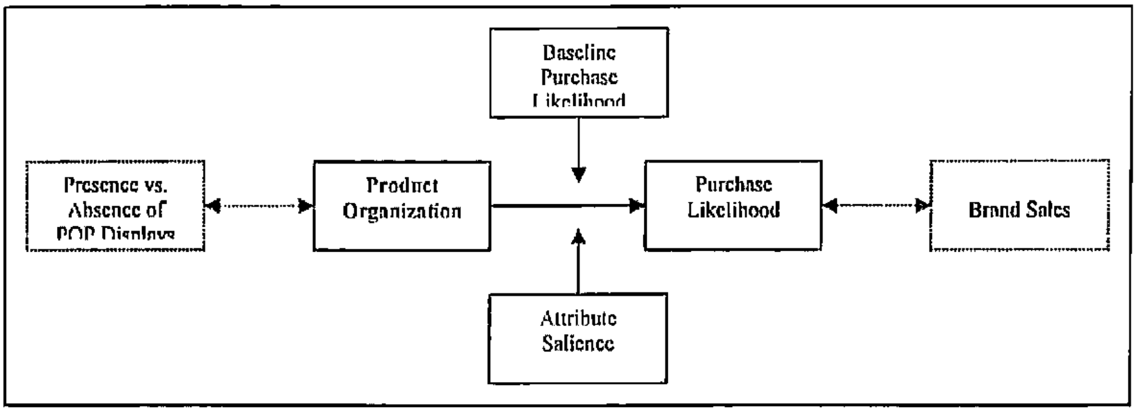
[188] Product organization was manipulated as a between subject factor, by altering the categories (region categories and color categories).

[189] According to the existent literature about wine preferences and purchase decisions and on labelling and display practices in the wine industry, wine color was considered high in salience, and wine production region low.

[190] The laboratory experiment showed the same underlying effect of the market-test, but at an individual, rather than aggregate, level (thanks to the manipulation of product organization).

[191] Actually, the effect found was consistent with expectations, but not statistically significant.

Figure 4.2 – The impact of POP special display on purchase likelihood



(Source: Areni et al., 1999: p. 439)

As Areni et al. (1999: p. 430) summarize, by reorganizing the wine brands into regions, the special POP display drew shoppers' attention to the featured wines and encouraged them to compare alternatives on the basis of region, thus increasing the importance of this otherwise secondary (for wine purchase decisions) aspect.

Assortment presentation through display arrangement and POP material can be interpreted as highlighting and suggesting to the store patrons some product categorizations.

Given the potential effect of in-store categorization on consumers' cognition and behavior, **an interesting question is how retailers create such categories** (at different levels of inclusiveness, with basic, super-ordinate and sub-ordinate categories), that is, which is the nature of the relevant commonalities they consider.

Different suggestions have been provided in the managerial and academic literature. For example, Taylor (1970: p. 15) suggested that merchandise classifications, to be "realistic", should be created by referring to the "customer end-use functions", whereas sub-classifications should be dictated by "variances in merchandise characteristics". He made reference to what he defined as a highly valuable study on the subject at that time – done by the National Retail Merchants Associations (NRMA, 1969) – where a class is defined as "an assortment of units or

Importance weights for a given attribute were higher when the wines were organized according to that attribute versus the other attribute(s): product organization had little or no effect on attribute importance weights for wine color and variety, whereas importance weights assigned to the region were higher when the wines were organized by region.

items of merchandise, which are reasonably substitutable for each other, regardless of who made the item, the material of which it is made, or the part of the store in which it is offered for sale". Sub-classifications, according to Taylor (1970: p. 18, 20), should be done so that each classification possesses the breadth necessary to cover reasonable customer demands for such merchandise and the real challenge is "in isolating the variables, hopefully in order of relative importance, which influence customer demand" for that merchandise (i.e., styling, color, fabric, price for men's apparel). Lowry (1983: p. 346, 347) defined merchandising classification as "a grouping of goods that serve similar customer needs and exhibit closely related sales patterns" and referred the common tendency of retailers to divide merchandise classification into "additional subclasses (or dissections) that are based on their customer-attracting features". Furthermore, he suggested a dynamic classification system, expanding or contracting over time "as a result of changes in customer demand".

All this suggestions seem to imply a customer-orientation in defining assortment organization, which has been made recently more explicit in category management implementation guidelines issued by industry organizations (e.g., ECR), **market research and data provider companies** (e.g., Nielsen, IRI), **and in academic contributions.**

Articulating the assortment in macro-categories, categories, and sub-categories is the first fundamental step – of strategic importance – toward category management implementation (Bertozzi, 2000; ECR, 1995; FMI, 1995). In a customer-based approach to category management category definition must be done taking into consideration the customer's perspective (Bertozzi, 2000: p. 113), that is the consumer's category configuration (Mauri, 2000: p. 214). Castaldo and Bertozzi (2000: p. 9) observe that "**in some of the earliest contributions about category management** (e.g., FMI, 1995) **it is possible to find some principle statements aimed at orienting category definition towards consumers' categorization processes**", **but** they claim that **they were not translated into a "real" customer-based category management, because the considered categorization processes are – as a matter of fact – induced by the offering firms, since the retailers put together the products that consumers are already in the habit of seeing together.**

Castaldo and Bertozzi (2000: p. 9) argue, and provide empirical evidence for the Italian context, that many businesses have adopted a gradual approach to category management and therefore, regarding the category definition stage, they have maintained a traditional product-based definition (pertaining to a production-technologic logic) or a supply-based definition (which is based on the homogeneity of logistic treatment). Even by adopting a production-technology basis, the situation could be very confused as testified by some attempts made within associations such as ECR of a joint effort of manufacturers' and retailers' representatives to come up with an agreed-upon "category tree or dictionary" which can become a common ground within the channel (Pastore, 1997) and in analyzing data provided by market research companies such as AC Nielsen or IRI. Approaches to category definitions which repeat the retailer's usual and consolidated standard in assortment management or which reflect data providers' suggestions have been very common in Italy (e.g. Busacca and Castaldo, 2000: p. 75; Castaldo and Premazzi, 2000: p. 275; Cristini, 1998; Mauri, 1995). Castaldo and Bertozzi (2000: p. 9) claim that, as an answer to requests for a more consumer-oriented definition, some researchers have suggested different criteria for defining a category, such as the use functions of the product (e.g., Lugli, 1997), complementarity and substituitivity relationships between products (e.g., Lugli, 1997; Mazzuccato and Pilotti, 1997), consumption and purchasing processes (e.g., Pellegrini, 1997).

Desrochers (1999: p. 10) argues that often retailers' product (classes) groupings in the store layout and on the shelves are based on intended usage of the products (consistent with consumers' purchase of products to meet some objectives), thus including products complementary in function (i.e., coffee and coffee filters) and sharing some properties (i.e., hot water beverage for coffee, tea and hot chocolate). Other product groupings, however, are based on distribution or storage requirements (i.e., deli, meat and seafood counters and the refrigerator and frozen food cases) or on the same raw material used in their production (i.e., paper).

According to such observations, the more frequent kinds of categories a consumer can find in a store are taxonomic categories and goal-based categories, in the cognitive psychology's terminology.

Mauri (2000: p. 213) notices that **in the marketing literature some efforts have been devoted to develop models and tools** to manage product variety, including how **to build and segment a (product) category in a customer-based logic, with potential implications for the visual arrangement of the category in-store.**

Busacca and Castaldo (2000: p. 66) argue that consumer analysis should provide insights when defining the categories tree, that is, when choosing the dimensions for building and interpreting/reading the assortment. They suggest (2000: p. 70), for example, that the means-end chain (e.g., Gutman, 1982, Olson and Reynolds, 1983) may prove useful for the choice of criteria for building retailers' categories and the levels at which to articulate the assortment. Also Pellegrini (2000) stresses the careful analysis of consumption and purchasing processes, and the specific ways they are carried out (e.g., activities), as the starting point in defining assortment width, depth and its visual organization. Bertozzi (2000) reminds that the hierarchy of criteria followed by consumers when shopping and evaluating products may be reflected by sub-categorizations of the assortment.

Such practical suggestions in the category management literature remind some important findings in cognitive psychology and marketing research about consumers' categorization.

The critical issue in defining the articulation of retailers' product assortment into categories (at a different level of inclusiveness) seems to be the nature of the commonalities consumers recognize when perceptually and cognitively placing some items together, believing them to belong to the same groupings. As debated in the literature, two perspectives seem appropriate to describe the nature of the commonalities: a bottom-up perspective, based on the stimulus properties (e.g., similarities in properties, that is proximity to a central tendency of some relevant attributes for taxonomic categories), **and a top-down perspective, based on the individual/processor** (e.g., proximity to properties considered as ideals for pursuing a certain self-relevant, permanent or situational, goal for goal-based categories).

From a categorization perspective, the criteria retailers should follow when classifying their assortments – also making them explicit through display and POP materials (e.g., organizers) – should take into account and reflect the determinants of product category typicality or goodness as an example, according to consumers' cognition. Typicality is strictly related to the degree of membership of an instance to a certain category, and its determinants are usually different for taxonomic vs. goal-based categories.

Understanding the product properties (e.g, attributes) consumers use when interacting with a product category and compare its members is a key premise to assortment organization.

From a categorization perspective, for example, the empirical findings reported in Mauri (2000: pp. 203-213) showing unfulfilled purchases – although already planned at the brand level – for difficulties in finding the desired variant (of color), may be interpreted as retailers' grouping items on the shelf neglecting some of the dimensions consumers were using as commonalities in creating cognitive product sub-categories (namely, different brands were grouped according to color by consumers, but not by retailers, who organized the hosiery display by brand while mixing colors).

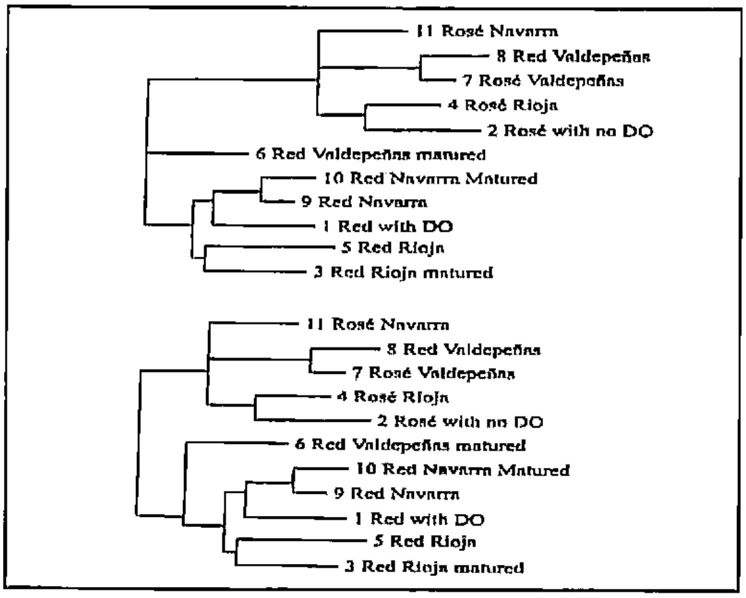
Ratneshwar et al. (2001: p. 148) - adopting a top-down perspective to categorization - considered categories that consumers often construct for achieving salient goals (Barsalou, 1982, 1983, 1985, 1991; Bettman and Sujan, 1987; Loken and Ward, 1990; Medin, Lynch, Coley, 1997; Park and Smith, 1989; Ratneshwar et al., 1996; Ratneshwar and Shocker, 1991; Ross, 1996; Ross and Murphy, 1999) and experimentally operationalized goals at the level of benefits sough by the individual consumer in a particular consumption or use situation (Huffman and Houston, 1993; Park and Smith, 1989; Ratneshwar et al., 1996). Ratneshwar et al. (2001: p. 148) describe goal-derived categories as often not coinciding with nominal product categories for which both consumers and marketers have well-established labels or names, and including disparate products that share few, if any, features on surface. They provide also the example of a healthy-oriented individual who might construct a «breakfast substitutes» category, which can include seemingly diverse foods such as an apple, a granola bar, and fruit yogurt, and that doesn't coincide with the well-established (for both consumers and marketers) nominal product category «breakfast cereals». Such important specific properties of goal-derived categories may have some relevant implications from a marketing perspective, some of which can be sensed from Ratneshwar et al. (2001: p. 155)'s reasoning: "The features that intrinsically characterize different products contribute to a category representation that can be construed as a baseline or central tendency. However, this baseline may provide an inaccurate picture of the category representations instantiated by any particular segment of consumers or consumers in general for any specific use situation. Just as person-situation segmentation variables have proven very useful in understanding heterogeneity in consumer preferences, individual and situational differences in goal salience appear to be quite important in category representations".

Categorization studies in cognitive psychology, consumer behavior and marketing can provide a theoretical foundation and a methodological approach in the development of the retailer's customer-oriented assortment classification by categories, which may serve as a basis for its visual organization/presentation within the store.

Applying the models proposed by different theoretical views (e.g., Probabilistic and Exemplar views) and the methodologies (e.g., experimental tasks of categorization, category verification, exemplar generation; thinking aloud procedure etc.) employed in empirical studies in cognitive psychology to map consumers' categorization processes, referred to products available in-store for choice, may provide insights about the proper visual organization of a category display required by a customer-based category management approach.

Some attempts have already been done. For example, some graphical representations, with a tree structure, have been suggested to visually reflect similarities and dissimilarities between the items, resulting from the consumer's analysis. In the retailing context, Mollà, Mugica and Yague (1998) asked a sample of 100 experienced consumers (heavy purchasers of wine) to evaluate the similarity of pairs of bottles of wine included in the assortment of an hypermarket, and represented the results by applying a method proposed in the psychological field by Sattath and Tversky (1977). In the resulting graph (Figure 4.3), the vertical disposition of the items reflects the criteria that the consumers have implicitly used in grouping – that is a relevant variety-defining factor according to consumers' cognition. The horizontal disposition (length of the horizontal line) reflects the similarity between the items along the dimension which represents the implicit criteria for grouping. In the product category wine, they found that hypermarket shoppers first considered type (red, rosé, white), followed by the presence of an origin denomination. Their ultimate objective, however, was to understand the competitive structure in the wine market, rather than to suggest ways of displaying the products in-store.

Figure 4.3 – Representation of similarities between 11 wine-alternatives, as perceived by a sample of consumers, through a tree-plot



(Source: Mollà, Mugica, Yague, 1998: p. 236)

Building on Busacca and Castaldo's (2000: p. 67) and Mauri's (2000: p. 220, 226) cues,[192] the argument proposed here is that **knowing how a retailer's customers would categorize the assortment they are going to be exposed to in-store allows the retailer to almost replicate it on the shelves, thus pursuing the cognitive fit enabling a shopping experience which is as easy and natural as possible for the customer** (e.g., Nielsen, 1997).

Some difficulties in the implementation of such suggested procedure may arise, due to the empirical findings in Cognitive Psychology about the scarce stability of category concepts/representations between subjects. For example, two

[192] Busacca and Castaldo (2000: p. 67) argue that the studies about individual categorization processes may offer insights to guide the definition of the category-tree, that is, the building and reading keys for the assortment. Mauri (2000: p. 220, 226) suggests that redesigning shelf-display to reflect the criteria consumers follow when looking for and selecting the products should be a solution to manage assortment variety. In particular, this should reduce the gap between offered and perceived variety.

persons having the same category concept don't necessarily have the same set of product properties and relationships between properties in mind (e.g., Medin and Barsalou, 1987), as well as exemplars. Therefore, the same assortment may be categorized differently by different retailer's customers.

A segmentation of the customers according to their cognitive structures about products, followed by a cross-classification of the assortment (according to different but compatible categorization perspectives) when presenting it, could be suggested to overcome such difficulties. Something very similar is already happening in e-retailing. When visiting a virtual store, a customer may choose to sort the available product assortment according to different keys, thus moulding perfectly the product presentation to the search criteria of the customer. The customer can create groupings of items based on what he considers to be the relevant common properties, and then compare the available items with respect to these properties.

Such practice can be implemented only to a certain extent in physical stores, thus making lack of cognitive fit with some segments of customers unavoidable.

The solution proposed, and partially empirically investigated here, is to consider and exploit the low stability of category representations within subjects, meaning dynamism over time and flexibility across situations. A lack of cognitive fit can be temporary, when observed from a dynamic perspective, if the retailer succeeds in making the customer's cognitive structures change in response to in-store assortment presentation.

A re-arrangement of the shelf display may be thought of as unexpected environmental stimuli reaching the customer, giving rise to an experience that impacts on episodic memory first. Repeated exposure to a re-arranged shelf display and consumers' processing of the communicated product information may lastly impact also on their semantic memory.

The main general underlying issue at stake is the interaction between retailers' displays and consumers' cognitive categorical structures and processes about products.[193]

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[193] Kanvar et al. (1981: p. 122), observing that information acquisition allows cognitive structure formation, notice that advertising effect research investigates the interaction between advertising and consumers' cognitive structures. Similarly, the proposed research on display effects aims at understanding the interaction between the communication content of a retailer's display (the information provided) and consumers' cognitive structures about products.

Does retailers' assortment presentation implying categorization influence consumers' categorical product-knowledge?

Recent empirical findings (Areni et al., 1999; Desrochers, 1999; Desai and Ratneshwar, 2003) **suggest that retailers product categorizations matter, that is, they interact with consumers' mental processes, to influence behavior** (e.g., product evaluation, choice, purchase).

Desrochers (1999) and Desai and Ratneshwar (2003) have applied a categorization perspective and the cognitive psychology principles to show how the inclusion on the store-display of the same item into different categories influence the customers' evaluation process (e.g., attribute importance).

Actually, previous research, although not applying a categorization perspective, suggests that product organization in-store influences the importance consumers assign to various attributes when making purchase decisions. Within this stream of research, Areni et al. (1999) investigated and provided empirical evidence that POP displays, which alter the organization of products within the store (Mills, Paul, and Moorman, 1995; Wilson, 1995), may change the salience of attributes when consumers make purchase decisions, and affect brand choice likelihood.[194] As Areni et al. (1999: p. 430) clearly explain, displaying products according to a specific attribute (e.g., by brand, by flavor, by price point) increases the perceptual salience of that attribute (Glass and Holyoak, 1986; Tversky, 1969), especially when otherwise low, thus increasing its importance when consumers evaluate products and make purchase decisions (Hutchinson and Alba, 1991; MacKenzie, 1986), and making easier for consumers to compare alternatives using that attribute (Bettman, 1979; Russo, 1977; Simonson and Winer, 1992; Simonson et al., 1993[195]).

[194] Areni et al., (1999: p. 438) observe that in their research the effect of POP display - through brand reorganization – may have been favoured by the inclusion of multiple brands and by the consideration of a product category in which brands are difficult to evaluate prior to purchase using objective attribute information. Areni et al. (1999: p. 438, 439) highlight that their empirical research may suffer a mono operation bias of the attribute salience construct: wine color and production region differ (besides attribute salience) in that the former is an intrinsic product characteristic whereas the latter is an extrinsic characteristic. They argue that "It could simply be the case that perceptions and decisions criteria related to extrinsic product characteristics are more easily influenced by in-store information than are those corresponding to intrinsic attributes".

[195] By displaying multiple brands and product quality levels of pain relievers, compact disc players, cordless telephone on separate pages of a questionnaire, Simonson et al. found out that the likelihood of participants selecting a private-label brand was higher when each page featured multiple product quality levels of the same brand rather than multiple brands of the same quality level. When the information presentation format made relatively easy to compare brands (multiple brands on the same

The focus in this dissertation will be on the effects of product organization in-store on consumers' product knowledge categories (structure and representation) and on the categorization processes followed. Considering the effects on more hidden and upstream aspects, this research effort will complement previous studies pertaining the impact on product evaluation and choice.

Consumer experience and expertise seem to be important variables potentially moderating the influence of retailers' assortment categorization on consumers' mental product categories and categorization process, since they impact on the content and organization of knowledge.

Desrochers (1999) showed that increased knowledge of the product class moderates the influence of retailers' product categorization on consumers' product evaluation and preference.[196] She found empirical support for the hypothesis that the categorization of a product class by a retailer tends to influence the attribute importance weights used by novices in the product evaluation stage, more than those used by experts. Since she considered product groupings based on their use, she explains (1999: p. 66, 67) such results in these terms: "the categorization evokes a set of uses that can potentially influence the attribute importance weights. Experts were less influenced by the uses implied by the categorization because they, by definition, had more internal product use knowledge. Therefore, they are less apt to be influenced by the uses implied by the categorization of the product. Conversely, novices had less product knowledge and, therefore, exhibited a greater response to changes in categorizations, due to changes in the implied uses".

Desai and Rathneswar (2003), in their analysis of the process of brand variants categorization by retailers and manufacturers (focusing on a new product variant positioned on an atypical attribute for the category - namely low fat for a snack) and of its impact on consumers' evaluation, found that brand familiarity and consumer goal-orientation interacted with retail shelf-display.

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page), the attribute "brand name" received greater weight relative to other product attributes. When the presentation format made relatively difficult to compare brands (multiple quality levels for the same brand on the same page e different brands in different pages), the attribute "brand name" received a lesser weight relative to other product attributes.

[196] She employed a self-reported rating of product class familiarity (on a 7 point scale) together with a self-reported frequency of purchase for familiarity; the number of brands and of uses listed were considered for measuring product class expertise.

Different effects of retailers' categorization on consumers may be expected, depending on their level of experience and expertise, which should affect existent knowledge contents and structures by categories, as well as categorization processes at encoding and retrieval.

A considerable interest, in fact, has been shown in researching the influence organized structures of knowledge stored in memory may have on the cognitive processes involved in consumers' processing of information (Kanvar et al., 1981: p. 122). In other words, this means analyzing how existing cognitive structures affect information processing which, in turn, impacts on such cognitive structures.

Research in Cognitive Psychology has provided evidence that **experts differ from novices in the amount, the content, and the organization of their domain knowledge** (Mitchell and Dacin, 1996: p. 219). Furthermore, **differences in subjects' domain knowledge are connected with differences in various information-processing activities** (i.e., problem solving, reasoning, judgment etc.). To reveal such differences, some experiments have been run involving subjects with different levels of domain-knowledge (determined a priori, according to available criteria), by assigning various tasks, and measuring differences in processing and performance. [197]

Increases in both product experience and product expertise (Alba and Hutchinson, 1987) may be considered drivers of the learning process translating into changes in consumers' organized structures of knowledge related to the product (Busacca and Castaldo, 2000: p. 67).

With increased product experience – that is, more product-related experiences of various kind – usually expertise – that is, ability to perform product related tasks – should increase (Alba and Hutchinson, 1987), especially due to the quality rather than the quantity of experience.

The most apparent differences between expert and novice consumers suggested in the literature (e.g., Alba and Hutchinson, 1987; Mitchell and Dacin, 1996; Ross and Murphy, 1999) are:

- categorical cognitive structures more complex, more accurate, more complete or veridical for experts;

[197] Researchers have usually examined domains with external criteria available to determine a priori the knowledge level of a subject.

- categorization processes more analytical and based not only on similarity in perceptual properties of the stimuli but also on theory-based explanations (more abstract) for experts.

Many hypotheses have been advanced (see summary in Figure 4.4), although they have not been extensively empirically tested in the product domain (an important exception can be considered Ross and Murphy, 1999, referred to food).

Figure 4.4 – The main hypotheses about differences between experts and novices found in the literature

Differences in category structures and representations

- A higher articulation in different hierarchical taxonomic levels characterized by a different degree of specificity (sub-ordinate, basic, super-ordinate) - that is multi-classification - and increased degree of specificity of the basic level for experts vs. novices.
- A higher range of typicality degrees for the members of a category, that is, knowledge of both typical and atypical members for experts vs. novices.
- Higher flexibility with the ability to construct context-dependent categorizations (i.e., goal based categories) even simultaneously – that is cross-categorizations – for experts vs. novices.

Differences in categorization processes

- A higher use of analytical processing for experts vs. novices.
- Lower use of perceptual attributes when categorizing for classification functions for experts vs. novices.
- Lower reliance on irrelevant attribute information when categorizing for classification functions for experts vs. novices.

Such differences bear relevance to retail management. For example, different knowledge structures and consequent information processing between novices and experts may affect their reaction to assortment composition and presentation. Such differences may be related to a different ability to understand the articulation of the assortment structure in terms of within-category variety, or to a different flexibility to cross classify items, and therefore to think of alternative locations in-store where they can be displayed, when these alternative are not placed in the most salient and usual position. Retailers should take into due consideration the difference in knowledge background of their store patrons.

4.3. ENHANCING CONSUMERS' CATEGORY-KNOWLEDGE THROUGH RETAILERS' ASSORTMENT PRESENTATION BY CATEGORIES: A PROPOSAL

Rather than investigating the general issue of the interaction between retailers' and consumers' assortment categorizations by itself, **an experimental study will be devised to answer** a more **specific question "can the retailer, through assortment presentation, act on the quality of the product-related experience customers have in-store, to increase their expertise, by letting the novices' cognitive categorical structures and processes change, to resemble those of experts?".** Such question is strictly related to the practical retailers' exigency of achieving a customer-based category definition, when implementing category management projects.

The general issue of interaction will be therefore explored with the practical aim of assessing the potential of its exploitation by retailers, rather than by manufacturers as in previous empirical studies.[198]

The thesis advanced here is that **a retailer can exploit consumers' product categorical knowledge, and its dynamic nature, to arrange a category display which facilitates shopping, by allowing an easy understanding of assortment inherent structure, so that it can be cognitively managed by the customers.**

Two actions could help the retailer to achieve a beneficial cognitive fit with expert consumers and to favour novice consumers' learning:

- arranging a display which suggests an articulate and complete structure by categories, resembling the – expected – cognitive organization of product knowledge of expert consumers, so that assortment inherent variety can be fully highlighted

and

- providing POP materials that make explicit the underlying logic.

[198] Previous studies on retailers' categorization impact (Areni et al., 1999; Desrochers, 1999; Desai and Ratneshwar, 2003) have emphasized the manufacturers' perspective, investigating how the retailers' merchandising may impact on singular variants' positioning, evaluation and purchase likelihood.

This approach exploits the dynamic nature of consumers' product categorical knowledge. The aim is to reach an immediate cognitive fit with the consumers who are more equipped – due to their experience and expertise, and related cumulated knowledge – to understand and appreciate product variety. At the same time, another aim is dynamically achieving a cognitive fit with the other consumers, by educating novices.

Given the differences in product categorization showed to usually exist between expert and novice consumers, it is suggested here that a cognitive tuning with the experts' perspective, when organizing assortment presentation, should be of benefit for retailers, since:

- expert consumers should immediately understand the depth and breadth of the offer, and find out the preferable item, thus satisfying their expectations, with a simplification of buying process, due to the assortment display reflecting their categorical structures;
- novice consumers might be induced to a learning process, thus changing their cognitive categorical representations, and letting them more knowledge-equipped to interpret the retailer's offer.

The product knowledge categories of experienced and expert consumers are expected to be more complex, complete and veridical than the novices' ones, with a richer structure and representation for the product category. When reflected in assortment presentation, such categories and sub-categories could allow the retailer to propose an articulated visual representation of the variety inherent in the product selection carried in-store. To avoid that novice consumers feel lost when looking at the displayed assortment, since their cognitive structures don't match the experts' in complexity, they should be guided in understanding and learning the logic underlying the categorization, through appropriate POP material. Display alone is not expected to be sufficient for improving the novice consumers' ability to shop within the category, selecting the variant most suitable for their specific needs. Another critical requisite – as Inmar and Winer (1998) suggest – is novices' motivation to accurately process product information mediated by assortment presentation.

Finding empirical support for such thesis may have managerial as well as public policy implications.

The main managerial implication for retailers is that they can act on assortment presentation to achieve a differentiation from competitors, also in presence of similar assortments, trying to emerge as more able to satisfy the information-related motivations for shopping, and the information need of in-store consumer decision making.

Mauri (2000: p. 226) argues that "there is interesting empirical evidence showing that a consumer learns his preferences while purchasing, that is, if the assortment configuration is apt to educate him, his satisfaction increases", and that "the more uncertain are the consumer's preferences, the more he will use assortments to become acquainted with/learn his preferences" (Mauri, 2000: p. 228). Novice consumers are likely to not have well-defined preferences and to rely (more than experts) on the product stimuli displayed to make choices. Experts are likely to have well-established preferences that can be respected in-store, by easily identifying and picking the desired item, thus facilitating purchasing.

The main implication from a public policy perspective is the possibility to involve the retailers as active protagonists of consumer education, at least to a certain extent, without conflicting with their profit orientation.[199]

The **research proposition** which summarizes the advanced thesis can be stated as follows:

a retailer, through in-store assortment presentation (e.g., display criteria and informative supports on the shelf), can perform a consumer educating role, by inducing a change in consumers' categorical representations about products, and a change of the underlying processes – especially for novices.

To explore the educational potential of assortment display – that is its possibility to induce a change in the customers' product knowledge categories and categorization processes – an empirical study will be devised, with the aim of answering two **more specific research questions:**

Can different retailer's assortment categorizations lead to

⇒ different product category representations

[199] For nutrition education some concrete examples may already be found, but with retailers in a passive position, just cooperating by adapting merchandising to other subjects' requests. Some examples are described in: Jeffery et al. (1982), Olson et al. (1982), Achabal et al. (1987), Narhinen et al. (1999), Narhinen et al. (2000).

⇒ different categorization processes for items available on the market following consumers' exposure and cognitive interaction with the assortment, during a simulated shopping experience?

In-store assortment presentation for a certain product category will be manipulated in an experimental setting simulating a shopping experience – i.e., presentation by categories reflecting only the suppliers' perspective or integrating the experienced and expert consumers' perspectives, use of display arrangement and POP material in a coherent or incoherent manner – to check the effects on novice consumers' cognitive categorical representations and processes, discovered by applying techniques well-established in Cognitive Psychology. Two comparisons are of interest to explore the effects:

- pre and post exposure to a certain assortment presentation by categories;
- exposure to a certain assortment presentation solution, rather than another.

Constructs drawn from theoretical and empirical research on categorization can be used to develop some hypotheses about the mechanism (e.g., priming/cueing and other contextual effects) underlying the potential education role of assortment presentation.

The main reasoning building up the proposed conceptual framework is the following (●).

● **Assortment visual categorization in-store might interfere with consumers' product categorization mental processes, with effects extended to the subsequent use of categories:**

- **for a classification function** (i.e., differentiating products and variants);
- **for an inference function** (i.e., likely properties of an instance, given the name of the category to which it belongs).

Smith and Medin, (1981: p. 9) observe that "Where context suggests that an unexamined object belongs to a particular concept, inference may be drawn about that object's properties and such inferences will reduce the effort that need to be put into classification",[200] but argue that "a similar phenomenon can occur even without context".[201]

This observation seems to be particular interesting for retailers: the categorization suggested through assortment visual presentation can be interpreted as a context, which may prompt consumers with a classification of unexamined objects (e.g., for new items launched on the market or items novel to novice consumers), and allow some inferences to be drawn about their characteristics/properties, therefore favouring product category-concept development and establishment in memory.

As Smith and Medin (1981: p. 8) explain, "To have a concept of X is to know something about the properties of entities that belong to the class of X, and such properties can be used to categorize novel objects. Conversely, if you know nothing about a novel object but are told it is an instance of X, you can infer that the object has all or many of X's properties; that is you can run the categorization device in reverse".

- Assortment classification made by a retailer and visually represented in-store through display arrangement and POP materials may **prompt the consumers with criteria for classifying the items into product categories** and sub-categories, that can be learnt while shopping, **and may serve the purpose of consumers' inference, by priming product category structure.**

Focusing the attention on the visual presentation of a single product category, sub-category names, exemplars from the sub-categories, as well as a rule expressing the determinants of typicality for the sub-categories (e.g., properties with a high probability of occurrence for taxonomic categories, or ideal properties for goal-derived categories) may all be cued by the retailer during the customer exposure and interaction in-store with assortment presentation, thus prompting/priming an articulation (suggested and made explicit) of the product category internal structure.

[200] As they exemplify, "if you have a prior reason to believe an object is a hat (it is on a hat rack, for example), you might infer that it has a head-sized opening [property] and then perform only minimal perceptual checks to confirm your inference".

[201] For example, "having determined that an object has some perceptual properties of an hat, you might tentatively assume that the object is an hat and then infer the less perceptual properties" (Smith and Medin, 1981: p. 9).

Having identified a product category to be put on the shelves, the retailer usually articulates it in sub-categories, and defines their composition as well as a name that is frequently provided as a label and other POP material. When defining the sub-category composition, the retailer is choosing exemplars belonging to the product category (higher level of inclusiveness) which can be included in each sub-category (lower level of inclusiveness). Such exemplars are selected by the retailer from the complete manufacturers' offer available in the market, and they can be experienced – through simple vision or exploration – by the consumer when shopping within the store and stopping at the shelf display.

Usually, the category label available at the top of the shelf, on its different levels or at the beginning of the aisle, makes explicit the nature of the communality considered by the retailer when grouping together specific products or variants. The label is often referred to the hierarchical level of a taxonomical categorization (one or more) or the goal of a goal-based categorization. Some common examples may be: beverages for the aisle and soft-drinks vs. alcoholic drinks for the shelves in a taxonomic classification; snack food for the aisle and low-calories snack food for a portion of the shelf, defined by a goal-based category.

Furthermore, a retailer might provide in-store, near the shelf, some additional informative material such as brochures explaining the characteristics of the products, or posters suggesting different comparisons between the available variants. Such POP material can be employed to communicate the logic underlying the categorization, for example making explicit the relationships between the properties of the products included in different sub-categories.

Product information available in-store – including what implicit or explicit in assortment presentation – may be processed and usually organized in memory in categorical form by the consumer. The categorical organization favours later retrieval of related knowledge, when the category name is encountered.

Research in Cognitive Psychology has demonstrated that subjects tend to represent categories through individual (Exemplar View) and/or summary (Probabilistic View) descriptions. Individual descriptions may be exemplars of the category previously experienced by the subject. Summary descriptions are unitary representations (often as prototypes) resulting from abstracting the properties with substantial probability of occurring in category's members, which become therefore salient to the subject for that category. Someone argues that a representation can be mixed, because it includes both exemplars and salient properties abstracted from them.[202]

The category representations can be retrieved from memory for different functions, the most common being classification of novel instances and inference-making.

Assortment presentation may stimulate a category structure, thus favouring the formation of a category representation of products, prompting it when not already existing (prompt), or priming it for potential updating, when already existing in consumers' mind (prime).

This requires, however, consumer intention, that is motivation to process available information by looking at the shelves and at the product-groups displayed, trying to understand their characteristics. Such intention can be presumed, although to a certain extent, for consumers willing to buy within a specific category, without having experience and expertise, and it may be manipulated in an experimental design (e.g., by instructions).

Desrochers (1999: pp. 18/20) refers to priming as "the spontaneous identification of a particular category caused by exposure to a collection of products grouped in a particular store display".[203] Given the focus of her research, she argues that "the primed category influences consumers judgements by identifying a list of relevant attributes", that is, by cueing an appropriate use or set of uses when product grouping is usage-based, and triggering shared features when product grouping is based on distribution requirements or common raw materials. In doing so, the categorization draws importance to, or away from, certain product attributes. Different cues associated to alternative categorizations may result in a change in the relative importance of the attributes, and in apparent changes in consumers' preferences.

[202] Alba and Hutchinson (1987: p. 441) observe that many authors have proposed hybrid models for intentional learning, in which prototypes are learned and used in conjunction with exemplar information. Barsalou (1992: p. 31) exemplifies that individuals can remember specific exemplars of bachelors they have met, and use these memories to classify similar people by analogy at later times; but they also know prototypical properties of bachelors that may be useful in reasoning about them, following the categorization.

[203] As she explains, a peculiarity of this priming of the category is that it occurs coincidently with, rather than prior to, the exposure to the to-be categorized items.

Desrochers (1999) however, didn't consider the possibility to provide a category label in-store. As she explains (p. 27), her research **tested whether priming occurs solely by the presence of the visible products, since "grocery store shelves do not have category names in clear view when looking at the shelves, nor are the categorizations disclosed in this experiment"**. However the situation is often different, especially in the present retailing setting where different category management projects have been implemented. Labelling categories displayed on the shelf, and providing additional informative POP materials are becoming more common, also in the Italian grocery retailing.[204] Category labelling was considered, somehow, by Areni et al. (1999) in their investigation of the effects of special POP displays on brand purchase likelihood within a product category, through increased salience of product category attributes. In their field experiment, the special POP display re-organized wines by region, and a signage in the form of a state flag was available. In the following laboratory experiment, the factor «product organization» was manipulated, by altering the category names provided (e.g., by employing the headers Texas vs. California Wineries for the region-based categories, and Red vs. White vs. Rosé Wines for the color-based categories).

Assortment-category labelling can be interpreted as priming of a category name, which may influence consumers' inference-making.

Referring to the sequence of stages in categorization proposed in the literature (related to the different functions categories may play) can be useful to speculate about the potential effects of category labelling in the shopping environment.

The provision of a category name by the retailer may facilitate category identification, useful for classification purposes (i.e., of the exemplars available in the assortment carried by the store). Category identification, in turn, allows category activation, that is retrieval from consumer's long-term memory of the knowledge associated to that category name. This can happen, however, only when the consumer has already stored in memory that category – with the same or an unambiguously synonymous name – and recognizes it. In other words, if the consumer possesses that category in his memory, when reading the category name he

[204] E.g., vertical separators for different clusters of product variants/lines on the shelves – that are organizers - for a category management project about yogurt and beer, with the respective leader manufacturers acting as advisors.

can assign a particular meaning to it, by retrieving the associated knowledge, such as expectations about the properties of the members of that categories, proper ways of interacting with them, etc..

In this situation, the category name provided by the retailer act as a recall cue (Alba and Hutchinson, 1987: p. 435) for information organized by category in consumers' memory. It is category activation which allows category-based inference making.

Providing both category exemplars and names on the retailer's shelves might also engender a part-set cuing effect, linked to the particular assortment selection process and presentation arrangement the retailer has followed. In other words, showing a set of brands as belonging to some sub-categories may inhibit shoppers' recall of other variants of the same sub-categories (Alba and Chattopadhyay, 1985).[205]

Therefore, it seems reasonable to speculate that the idiosyncratic knowledge consumers have accumulated over time, expression of their product experience and expertise, may influence the impact of category labels provided by the retailers on their categorization process.

When activating their idiosyncratic category knowledge, the experienced and expert consumers may process the incoming external information (i.e., exemplars, rules) to update their existing cognitive structures. For example, they can compare the composition of the category displayed on the shelves with the composition of their mental category; they can assess similarity between the members of the displayed category and those they have in mind; they can compare the category membership probabilistic rule they have developed with the one suggested by the retailer, and so on.

Some discrepancies may arise and should be taken into serious consideration.

For example, Cherian and Jones (1991) developed a model for brand categorization, where they proposed some antecedents and consequents for categorization. Ability, motivation and opportunity are regarded as antecedents. They consider as short term outputs of using categorization as a preferred cognitive strategy either fitting an instance into an existing category or fitting an existing category to an instance. Of

[205] Alba and Chattopadyay (1985, 1986) found out that provision of some items within a set as cues – for example, only some members of a product category – may inhibit retrieval of other items within the same set engendering what is known as a part-set cueing effect.

more interest here is their discussion of what might happen when an instance to be processed is congruous or incongruous to the consumers' existing product categorical structure. When it is congruous, it fits immediately. When an instance is incongruous, it can be made fit by means of assimilation (if there is mild discrepancy, by considering it another instance of the category), accommodation (if there is moderate discrepancy, by creating a sub-category), alteration (e.g., going to another node in the hierarchy); or a new category can be created (when discrepant instances accrue). In this sense, consumers' existent category structures may be updated when some discrepancies with what suggested in-store emerge.

Learning may occur – for example, with a memorization of novel instances as members of the existing category (e.g., atypical members), with an increased articulation of the internal structure of the category, with the inclusion of new properties or the elimination of others for which the consumer has changed her/his mind about their importance as critical properties, due to their frequency of occurrence.

Given category activation, the next phase is category application. For example, the consumer may use the retrieved category knowledge to choose the item to buy for satisfying a certain need, thus applying category knowledge in a problem-solving setting.

The consumer who doesn't possess the category cued by assortment presentation, when reading the category name, won't retrieve and associate any meaning. The contention here is that, if the consumer is adequately motivated, he can process the incoming external information to build his cognitive structures, for example, by creating new categories.

Novice consumers are expected to be more apt to be influenced by the contextual prompt of a product category structure, since they may be not able to use their own cognitive structures to understand the stimuli received in-store (e.g., Alba and Hutchinson, 1987: p. 435). Expert consumers usually use their cognitive structures to understand the stimuli, by recognizing their implicit organization, or by imposing their own. If the retailer's categorization reflects the experts' one, expert consumers simply recognize some cues which activate their categorical knowledge about products.

In the existing literature, such speculations find some empirical evidence.

Desrochers (1999) considered consumer's existent knowledge about the product class as a potential moderating variable for category priming effects, and found support for this hypothesis, suggesting its impact on the extent to which experts vs. novices rely on information stored in memory, vs. provided in the shopping environment, as a suitable explanation. She argued (1999: p. 26) that "a lack of personal experience with the product may lead the consumer to rely on the information with which he/she is confronted (Bettman, 1979). (...) "The placement of products within a store provides an enormous amount of the information with which consumers are confronted. For example, the brands available in a product class and the variations between the items in the product class are pieces of a consumer's product knowledge. In addition, since these displays are most often formed based on uses of the product, this also becomes part of the consumer's product knowledge," whereas "experts may already be aware of many uses, due to prior experiences with the product. Upon seeing a new categorization, some of these uses may become more salient, although fewer new uses may be evoked".

The type of assortment categorization proposed by the retailer might interact with the consumer's experience and expertise with products, in determining the effects on store patrons' cognition and behavior. With respect to cognition, a different impact of assortment presentation by categories, on category structures and on categorization processes of experts vs. novices, can be hypothesized.

Retailers' decisions about in-store assortment presentation can be interpreted as what Cohen and Basu (1987) define «category learning context», a contextual factor affecting the type of categorization and related information processing followed by individuals.

The shelf-display, together with additional POP material aimed at informing the customer, may be considered as components configuring a category learning context for the shopper who is visiting the store and stopping in front of the shelf, given that she is willing to process the intrinsic and extrinsic information it provides.

Furthermore, the category learning context may coincide with the judgment setting (that is, the environment in which a categorization decision is made), another contextual factor considered by Cohen and Basu (1987), since the store patrons' categorization might serve the function of consideration set formation for choosing a variant within a product category to purchase.

Cohen and Basu (1987: p. 466) observe that "**cues present in the judgment setting (e.g., point-of-purchase displays) can serve to prime either specific aspects/rule or stored exemplars and increase the likelihood of one type of comparison over another**" when categorizing, and that "**some distribution and product presentation systems either encourage or mitigate against the development of rules to discriminate among product offerings**". **Thus,** they **speculate that point-of-purchase displays can ultimately impact on consumers' categorization process, through priming, that is cueing a rule for defining category membership or some exemplars from the category.**

When referring to novice consumers visiting a store and exposed to product assortment presentation, our proposition is that they can use the category rules and/or exemplars cued by display and POP material as prompt, rather than primes, and learn the suggested product category structure.

Another contextual factor, considered also by Cohen and Basu (1987), plays an important enabling role: the motivation to process the cued information. An intentional learning, based on such motivation, is expected to be more effective than an incidental learning, based on mere and casual exposure to the assortment presentation.

The contention here is that, **through assortment presentation, retailers may manage the characteristics of a category learning context and judgment setting at consumers' disposal as store patrons, so that a product category structure may be prompted/primed to a different extent and in different ways.**

The display arrangement – when made by categories and sub-categories – may prompt/prime some exemplars (selected by the retailer among those manufactured) **of the categories and sub-categories, together with their names when a proper label is provided on the shelf.**

POP material can be useful to prompt/prime the rule underlying the membership in categories and sub-categories.

Display arrangement and POP materials may therefore change the cues available in a category learning context. Category and sub-category names, exemplars, and rules are all components which contribute to the definition of the product category structure.

Nedungadi et al. (2001) observe that many marketing strategies (i.e., positioning) implicitly assume that consumers possess and use some knowledge of the product category structures. They review some research findings in consumer behavior showing that, even when consumers are familiar with the product category, they may not possess (either at all, or not rich enough) and/or use their knowledge of the product category structures.

For example, the results of Alba and Chattopadhyay (1985) showed that consumers may ignore entire sub-categories of brands in a product class, whereas the results of Nedungadi (1990) showed that consumers may use some sub-categories only when they are somehow primed or reminded, otherwise failing to be recalled. Drawing on Alba and Hutchinson (1987), they argue that the lack of a category structure and/or its not sufficient richness for use are even more likely for consumers with little expertise. Even when consumers possess a well-articulated product category structure, this might be not entirely used during choice, for example because the consumer retrieval context is limited to a set of salient sub-categories he usually recalls when facing a choice setting (e.g., for repeated and frequent purchases).

The main interest of Nedungadi et al. (2001) is on memory-based choice[206] and on methods to activate a category structure that, by making the structure salient, should facilitate brand recall, consideration and choice. They empirically investigated whether priming a category structure would improve consumers' ability to retrieve brands, thus leading to a within-category choice consistent with evaluation, and found support for such effects.

As Nedungadi et al. (2001: p. 192) reminded, the main function of product category structures is to distinguish brands (or variants) in ways useful for sub-

[206] Lynch, Marmorstein and Weigold (1988: p. 10) distinguish three types of choice tasks-setting:

- memory-based = when relevant attitudes and/or attribute information about all brands must be recalled
- stimulus-based = all alternatives are either physically present or are described externally (usually on a common set of dimensions as in a Consumer Report format)
- mixed = some of the alternatives are physically present while others must be remembered.

They suggest that consumer decision-making may proceed quite differently in each of these situations with respect to: what alternatives are considered, what informational inputs about each considered alternative are used in making the choice, how these inputs are combined.

sequent decision making, and, when a category structure is available during retrieval, it enhances information accessibility, by acting as a retrieval plan which provides retrieval cues. More precisely, they expected availability of a category structure at retrieval to increase the number of sub-categories from which brands are recalled – with a stronger facilitatory effect for less salient or minor sub-categories – and to increase the total number of brands recalled from the product category.

Priming a category structure (increasing its salience), however, presupposes the existence of such structure in consumers' memory. Nedungadi et al. (2001), in fact, considered in their experiment product categories target-subjects were familiar with, and had developed a highly consistent category structure.[207]

The main interest here is on assessing whether different methods (e.g., names, exemplars, rules) a retailer could use, for making a product category structure explicit and salient to shoppers through assortment presentation, may differently influence sub-sequent novice consumers' brand recall, organization and consideration, in a choice setting such as a shopping environment. Since novice consumers are considered as the focus, the category structure should be not present at all or be only partially developed, and therefore be learned (catching the prompt), rather than activated through priming. The product category structure learned by novices during «active» exposure to assortment presentation might be available for sub-sequent categorization tasks, for example, aimed at defining the consideration set for item purchase. The adjective «active» stresses that motivation to and involvement in processing available information is an important enabling/moderating factor to be controlled.

Although the objective of the proposed investigation is not the same as Nedungadi et al. (2001), some hypotheses they develop may be adapted to our research setting, besides considering the different types of category structure prompting/priming (exemplars and/or rules and/or labels) a retailer can activate. Also their methodology can be partially imitated.

[207] The sub-categories considered when priming the product category structure were identified via pre-test as being used by at least 20% of the target-subjects in the sample.

Research proposition 1 – Provision of category structure by the retailer through assortment presentation leads to an increase in the number of total brands (known and) recalled from the product category by novice consumers.

The effect is expected for the brands prompted for the considered sub-categories.

Research proposition 2 – Provision of (an articulated) category structure by the retailer through assortment presentation leads to an increase in the number of product sub-categories (known and) accessed by novice consumers, although to a different extent, depending on the kind of prompt/priming effort implied by actions on different tools for assortment presentation

The maximum effect in terms of number of sub-group merely recalled is expected when a retailer is not coherently prompting sub-groups exemplars and sub-groups rules, together with their labels. In such case, the consumer can draws sub-groups names based on a different logic. A superior performance, in terms of sub-groups accessed to provide exemplars included, is expected when the retailer is consistently prompting both some exemplars and a rule for category membership, and especially for the specific sub-categories prompted.

Prompting only the rule for membership and the sub-category names may increase the number of sub-categories known, but hardly their members. Maybe consumers can remember and put in the prompted sub-categories some already known (experienced) exemplars, with low salience. A systematic effect on the number of sub-categories as revealed by brand recall, however, is not expected. On the other hand, prompting might affect later categorization of new instances, if POP material is available as support.

Prompting the exemplars of the sub-categories is expected to have an effect on the number of sub-categories known and on their members, especially when sub-categories are presented as contrasting (e.g. with names). When detailed product information about the exemplars is available (e.g., package in real settings), exemplars can be used in later categorizations of new instances.

From a methodological perspective, the expected effects on novice consumers' category structures and representations may be detected in an experimental setting, through a brand recall and categorization (grouping and labelling) tasks – similar to

Nedungadi et al. (2001), performed by the subjects pre- and post- exposure to opportunely manipulated assortment

Assortment presentation will be manipulated to reflect an in-store category learning context of different nature – according to the prompting/priming of the category structure effort the retailer deploys, by acting on different tools: display arrangement and/or POP material.

Display arrangement will be either present or not, to assess the impact of display exposure as a learning opportunity. Display arrangement prompts/primes the sub-categories labels and some exemplars. Furthermore, when present, different display arrangements will be considered – namely sub-categories defined from a mere supplier's perspective vs. an experienced and expert consumer-based perspective – to assess the proposed potential of exploiting the dynamic nature of consumers' categorical knowledge.

A leaflet to be given in-store may be used to prompt the rule for sub-category membership as well as category names. The category structure made explicit in the leaflet will be based on experienced and expert consumers. When combined with the display arrangement manipulation, this will create situations where the exemplars and rules are either consistent or not. A control group, not exposed either to display arrangement or POP material, will be introduced, required to perform a filling task rather than exposure. The same filling task, however, will be performed by every subject.

To manipulate and induce consumers' motivation to process available information – another contextual factor at stake – some guiding instructions will be given to subjects.

To further investigate the educating potential of novices for choice, an additional task, with respect to Nedungadi et al. (2001) will be required to subjects: an exemplar generation task, with a goal/need for the product category prompted, (e.g., consideration set formation for a purchase on a third-person behalf, when the goal/need is specified).

In an experimental setting, instructions during a categorization task (with learning supports), requiring the subject to choose an item or a set of items to be considered for a purchase for a third person (e.g., relative) who has a certain need/goal (e.g., is going to practice sport) may induce task involvement/motivation to process the information provided, rather than mere exposure to the learning stimuli. As Cohen and Basu (1987: p. 465) observe, "much of consumer behavior seems to involve incidental exposure to products and marketing activities" with likely non-analytic categorization processing.

Increasing prompting intensity of the product category structure is expected to improve the subjects' performance on this task.

Another contention here is that **through assortment presentation, retailers may manage the characteristics of a category learning context and judgment setting at consumers' disposal as store patrons, so that specific categorization processes may be induced.**

In their contingent model, Cohen and Basu (1987: p. 462, 464) state that individuals have the flexibility to adopt diverse categorization modes or more than one sequentially: property-level as well as entity-level representations of category members. Furthermore, individuals can perform the comparison process, at the basis of the categorization decision, property-by-property (analytical) and/or considering correlated and configural properties (non-analytical), in response to/as a function of contextual factors. They argue that the categorization process followed by consumers may be shaped by their specific learning histories, which include marketing and advertising influences, and by the contextual influences of choice and consumption environments. They assume that a certain amount of feature-based information about a stimulus is automatically read, after exposure to it, and that both an analytic or a non-analytic processing of this information are possible, with contextual factors influencing the flexibility to adopt one vs. the other or both sequentially. They focus on category learning context, task involvement/motivation, and judgment setting.

With respect to the category learning context, Cohen and Basu (1987) argue that

- when conditions favour category acquisition through a definitional process (i.e., involving learning the relationships between abstract/non-perceptual aspects of an entity or entities), a greater reliance of the subject on rule-based and analytic processing in sub-sequent categorizations is likely, since the subject tends to think the category as a collection of related properties;

- when conditions favour in-depth exposure to exemplars of a category, without an explicit or implicit consideration of alternative/contrast categories, a greater reliance of the subject on exemplar-based and non-analytic processing in sub-sequent categorizations is likely; whereas, when exposure is to exemplars from contrasting categories, a sub-sequent analytical processing is likely, since the subject may focus on characteristics that separate the different categories, rather than on individual instances.

Providing a leaflet which makes explicit the rule for (sub)category membership can be interpreted as creating a category learning context which favours category learning through a definitional process, thus making reliance on rule-based and analytic processing by novices likely in sub-sequent categorizations.

A display arrangement with labelled sub-categories including some exemplars can be interpreted as creating a category learning context which favours exposure to exemplars from contrasting categories, thus making reliance on rule-based and analytic processing by novices in sub-sequent categorizations likely.

A display arrangement by sub-categories, but without labels, can be interpreted as creating a category learning context which favours exposure to exemplars but from contrasting categories, thus making reliance on exemplar-based and non-analytic processing by novices in sub-sequent categorizations likely.

Display arrangement and POP material, when combined, may either enhance or inhibit in a coherent or divergent manner reliance on rule-based and analytic categorization.

Cohen and Basu (1987: p. 465) suggest that another important contextual factor influencing categorization processes is task involvement or motivation, that is related to the nature and importance of the problem for which categorization of stimuli is necessary. They argue that when the problem is perceived as object identification and assignment, the focus is likely to be on differentiating aspects, thus favouring the construction and use of a categorization rule, and this tendency should be emphasized when the problem involves a choice among alternative categories.

The joint effect of category learning context and task involvement is also demonstrated by other research findings. Individuals motivated to experience an analytical processing of attribute information (intentional learning context), in fact, have showed an improvement in their ability to later engage in analytic processing of similar information (e.g., Foard and Kemler Nelson, 1984, Lewis and Anderson, 1985; Martin and Caramazza, 1980).

Besides observing the tendency of novice consumers to rely on «surface structure» attributes, rather than on «underlying attributes» when categorizing, Rodder John (1988) argues that even when novices know the underlying attributes, they are not readily accessible, and therefore suggest that "novices can be made to behave more like experts by priming or cuing these underlying attributes". She also empirically demonstrated such possibility, considering children of different ages as consumers with comparable levels of experience but different expertise.

Direct experience in analytical processing of attribute information has been shown to lead to likely future analytical processing of the same attributes, due to improved ability, whereas simple exposure to attribute information, without experiencing analytical processing of it, didn't engender the same effects. Acquisition of attribute information from experiences not involving classification per se (i.e. incidental learning), has been shown to likely lead to subsequent classification characterized by holistic processing208 (Brooks, 1978; Kemler Nelson, 1984; Reber, 1976); whereas acquisition of attribute information from experiences explicitly involving classification (i.e. intentional learning),209 where consumers are motivated to analytic processing, have been shown to likely lead to subsequent analytic processing (Kemler Nelson, 1984; Lewis and Anderson, 1985; Martin and Caramazza, 1980). Alba and Hutchinson (1987: p. 441) refer to research findings suggesting that exemplar-based classifications are dominant when initial learning is incidental, abstract rules for classification are developed only when learning is intentional, but complexity of the concept to be learnt leads to exemplar-based classification even when learning is intentional. For this reason, some researchers have modelled intentional learning as involving both prototype and exemplars.

[208] An example of acquisition of attribute information without analytical processing may be exposure to advertising (Alba and Hutchinson, 1987: p. 420).

[209] Non-routineczed purchasing behavior with high motivation for the consumer may require analytical processing (Alba and Hutchinson, 1987: p. 420).

Analytic processing is also influenced by other situational factors, such as the availability of cognitive resources that when limited (i.e., for time pressure or stimulus complexity) favors holistic processing.

Another contextual factor considered by Cohen and Basu (1987) is the judgment setting (that is, the environment in which the categorization is made). In our experimental design, the category learning context and the judgment setting coincide, since we are considering the shopping environment where consumers have to make a purchase choice, to explore its learning potential for novices.

Research proposition 3 – Through assortment presentation, retailers provide a product category structure which leads novice consumers to follow categorization processes which vary according to the cues for the category structure made available.[210]

To summarize the objectives and rationale of the research design, to be developed in detail in chapter 5, **the focus here is on novice consumers of a certain product category**, who are expected:

- to have less articulated (even not existent) structures (e.g., low number of sub-categories and brands) and representations (e.g., relationships between properties) for the product category;
- to follow preferably non-analytic categorization processes, relying more on superficial and irrelevant aspects of the product category.

The research design should allow an empirical investigation of the thesis that, by prompting a product category structure and providing adequate cues, when presenting assortment, retailers can induce:

- learning of a more articulated category structure, also influencing its subsequent uses (i.e., classification and inference making);
- more analytic categorization processes of novel instances

by novice consumers.

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[210] For example, product display arrangement and POP informational material (leaflet), when done by categories and exploiting the knowledge of experienced and expert consumers, favour analytical categorization processing of product information by novice consumers (that is, rule-based categorization).

By activating various merchandising tools, retailers can obtain assortment presentations which imply different cues for consumers categorization processes while shopping, and different effects on their organized knowledge about products.

The comparison, in an experimental setting, of different assortment presentation solutions should hopefully show that, by exploiting expert consumers' product category knowledge when defining display arrangements (that is, identifying an articulated structure for that category, and providing appropriate cues (i.e., category labels, rules, exemplars), retailers can improve their customers' product category knowledge which can then be employed in purchase decision-making.

For example, novices consumers, who don't have that categorical structures in their memories, are enabled to easily recognize them. They can then try to learn the category structures or to use them when deciding in-store which item to buy from that product category. Categorization processes of novice consumers may be induced to be more analytical and based on more relevant aspects. Expert consumers should find reflected in the assortment their categorical knowledge.

Product display arrangement and POP informational material (leaflet), when done by categories and exploiting the knowledge of experienced and expert consumers, favour analytical categorization processing of product information by novice consumers (that is, rule-based categorization).

An articulated and expert-knowledge-based display arrangement, prompting composition by providing exemplars, together with POP material prompting a category definition rule, as well as involvement, are expected to engender higher novices' learning, that is improvement in their categorical knowledge about products.

Next part will present in detail a research design to be employed for a firts investigation of the tenability of the outlined conceptual framework.

PART III

EMPIRICAL RESEARCH

CHAPTER 5

RESEARCH DESIGN

5.1. AN EXPERIMENTAL STUDY OF THE INFORMATIVE AND EDUCATIONAL POTENTIAL OF RETAILERS' ASSORTMENT PRESENTATION BY CATEGORIES: OVERVIEW

The area of empirical investigation can be delimited by stating the main objective of the study, the research questions to be answered and the research propositions summarizing expected results based on reviewed theoretical contributions, previous empirical evidence and speculations.

Objective

Exploring the informative and educational potential of retailers' assortment presentation by categories.

Research Questions

Does assortment presentation by categories influence the content and organization of novice consumers' categorical knowledge about products, and the underlying processes?

Research propositions

- **Assortment presentation by categories** – obtained through display arrangement and/or POP material such as leaflets – defines a category learning context which **impacts on the structural and representational aspects of novice consumers' categorical knowledge about the product** (differently according to the nature of the assortment presentation) through prompting, provided a sufficient attention to and motivation to process available information.
- **Assortment presentation by categories** – obtained through display arrangement and/or POP material such as leaflets – defines a category learning context which **impacts on the type of categorization a novice consumer will follow** when

processing product information in-store (differently according to the nature of the assortment presentation), provided he has sufficient motivation.

The study aims at investigating the effects of different consumer product category learning conditions in-store, prior and/or contextual to purchase, and created by the retailer through assortment presentation, on

a) novice consumers' product category knowledge structure, as revealed by a free exemplar and group generation task (brand recall, group recall, brand grouping and labelling);
b) novice consumers' categorization processing of new instances when attribute information is provided, and there is motivation to process such information, as revealed by a category judgment and category verification tasks.

Motivation to process information available at the point-of-purchase can be expected to play an important role (moderator). It could be manipulated too in the experimental design, by providing task instructions aimed at creating consumers' involvement with the informative simulated shopping environment. For example, the consumers' cognitive interaction with assortment presentation can be induced through the assignment of a specific objective which requires processing the communicated information, such as consideration set formation given a certain need to satisfy.

The **empirical research** is conceived as **articulated in three separate and sequential experiments.**

■ **Experiment 1** aims at investigating the effects of alternative assortment presentation by categories on novice consumers' product category knowledge structures when motivation to process environmental information isn't manipulated and therefore guarantee. Such experimental design simulates a situation where store patrons are exposed to in-store informative stimuli to which they give at least a minimum but heterogeneous amount of attention, without necessarily elaborating product information to update existing product category structures. This can be considered an experiment devised to explore whether product category learning may take place incidentally in retail settings. This experiment will be carried out, by involving a convenient sample of subjects in a pilot study, to analyze observed effects in this dissertation. In such a way the entire experimental procedure will be tested to identify potential improvements for future replications with larger and random samples of subjects.

The manipulation of consumers' motivation to process available information – in addition to the characteristics of in-store category learning context managed by a retailer – will be regarded as a further development of the empirical study.

■ **Experiment 2** is quite similar to experiment 1, except for task instructions that assign a specific objective to subjects which may drive their attention and motivate them to actively process available product information (namely, suggested product categorization) when exposed to assortment presentation.

The comparison between two experiments, which differ in the manipulation of consumer motivation to process available product-information only (1 vs. 2), will allow an investigation of the potential for intentional (experiments 2) rather than mere incidental (experiment 1) category learning in a retail setting.

■ **Experiment 3** focuses on the effects of assortment presentation by categories on novices' categorization processes. It is similar to experiment 2, given the manipulation to drive motivation to process available information through purchase and consumption-related instructions. It differs of experiment 1 and 2 since detailed product information (e.g., cards) is provided with respect to novel instances that must be categorized by participant subjects.

All these experiments are conducted in simulated conditions rather than in real retail settings.

This chapter describes in detail the method, and the following chapter presents, for discussion, the results of a first part of the whole empirical study (experiment 1). This chapter will also sketch the method for analysing, through a separate experiment (experiment 2), the potential for intentional category learning in a retail setting through «active» exposure to assortment presentation by categories. Finally, the method for analysing the potential for learning different (i.e., analytic vs. non-analytic) categorization processes by novice consumers due to exposure to assortment presentation will be presented (experiment 3). Both these last experiments will be performed as further developments of this dissertation.

5.2. METHOD

Design

Three ***experiments*** with the same design but requiring different tasks (to measure different dependent variables) and involving different samples of subjects can be performed to study the effects of being exposed to assortment presentation by categories on consumers' product-category structures and representations (experiment 1 and 2), as well as on the type of categorization process followed (experiment 3).

A between-subjects factorial experimental design can be conceived, with:

- two qualitative independent variables – POP and Display – representing variations in type (namely, in the characteristics of a learning situation typical for a store patron and managed by the retailer)
- a dependent variable – product category structure (for experiment 1 and 2) and categorization process (for experiment 3) – measured by several indicators.

The treatment conditions of the experiments are classified with respect to the levels represented on 2 independent variables, one (POP) with 2 levels and one (Display) with 3 levels. The two experiments are characterized, therefore, as 2 (Exposure to POP material) x 3 (Exposure to Display arrangement) factorial designs, involving different subjects in six treatment groups. A baseline treatment condition (control group) is present.

Subjects

Master (graduate) students attending classes at a University in the North of Italy (Bocconi University – Milan) are involved as ***participant subjects***, since all qualifying as adult consumers. Therefore, a convenient, rather than random sampling from the population of interest, is performed, thus allowing only a non-statistical generalization of the results.

The screening variables employed to select participant subjects are: experience and expertise in the product category. Several indicators of familiarity are considered to assess experience, whereas expertise is evaluated through a test with questions about the characteristics and uses of the product category. Only consumers who can be qualified as novice for the target product-category (based on the selected screening measures) will be involved.

The design and procedure of experiment 1 is tested with 54 subjects; with a sample size of 9 (= n. of subjects in each treatment condition), which will allow a low power level. This can be considered a pilot study, useful to detect potential shortcomings in the procedure, and to gain a first rough idea of the effects of assortment presentation by categories as incidental category learning context. The low sample size, in fact, does not guarantee a high power, also because it may sometimes entail violations of assumptions underlying statistical analyses, thus affecting the ability to detect true treatment effects. The low sample size is due to the complexity of the procedure, which requires about 45 minutes or one hour to be completed, as well as to the lack of any reward for participation.

A repetition of the experiment must be done with a larger sample size to assure a more satisfying power of the experiment and more conclusive hypotheses testing efforts.

Stimuli

The product category selected for the pilot study (to test and improve the method) is dietary/nutritional supplements, hypothesized as a basic level category and considering the brands as the instances to be categorized.

The product category «dietary supplements» can be interesting to explore the informative and educational potential of assortment presentation for different reasons:

- it is a product category of rather problematic purchase, given its relationship with health and therefore the personal physical risk involved;
- manufacturers' offer is characterized by a sufficiently high heterogeneity,[211] translating into potentially complex retailers' assortments, also in terms of variety for the consumer;[212]

[211] Manufacturers' offer is characterized by plenty of umbrella-brands, specific brands, active ingredients, purposes, kinds or forms (e.g., tablets, caplets, etc.), serving sizes and package format, prices, and so on.
[212] Retailers can choose different combinations of items, selected among those available through their suppliers, to be displayed on the shelves or sold with the pharmacist's advice.

- consumers (especially some segments) show growing interest in well-ness and health, thus increasing the market potential of this category, and self-care is becoming a common tendency in the medical and pharmaceutical areas, with consumers invited and willing to become more educated and able to select by themselves the products, without relying on physicians and pharmacists for recurrent and simple needs;[213]
- it is sold in different retail formats: pharmacies, where it has been traditionally present, specialized stores (i.e., vitamins), but also supermarkets and hypermarkets with the self-service technique, which is becoming very common also in pharmacies, given their increasing marketing orientation (e.g., merchandising which exploits waiting-time for service spent in-store).

Since POP and Display are the independent variables manipulated to resemble different assortment presentations by categories, a leaflet representing a guide to purchasing and a display arrangement for the product category «dietary supplements» need to be prepared as experimental stimuli [see next paragraph].

Procedure

A random assignment of subjects and of testing sessions to treatment conditions is followed, but it is restricted to have the same number of subjects assigned to each treatment condition (balanced design). This should allow a control/reduction of treatment variability (environmental variables effect) and subject variability (e.g., Keppel, 1997; Field, 2000). Subjects are asked to come to the experiment one at a time, and which of the different treatments each subject will receive is decided randomly at the time of her/his arrival for the experiment. Furthermore, subjects are tested individually.

In experiment 1, subjects are told that they would perform a number of tasks that were designed by a marketing consulting company as part of a consultancy project for an existent retailer (not specified), selling both grocery and non-grocery merchandise and with a strong private label policy. The objectives of the study subjects are involved in, as consumers and store patrons, are stated in the cover of the experiment as follows:

[213] Dietary supplements in Italy is a product category with a low penetration, but very interesting increasing rates, thus suggesting that two segments of users and non-users can be easily identified.

- assessing some retailer's communication tools (e.g., brochures, displays, websites), already existing or purposely prepared by the marketing consultancy company, and understanding how to improve these tools to be of more value for the store patrons;
- gathering insights to direct further developments of the private label policy.

Subjects are told they will perform the tasks, sometimes repeatedly, with respect to some exemplifying product categories chosen by the marketing consultancy company. In fact, for all subjects, «breakfast cereals» is used as a practice category, requiring the subjects to perform all the tasks with this product category, before repeating them with the target product category of «dietary supplements».

To justify the lack of reward for the participation to the experiment, subjects were told that the marketing consulting company was created and managed by undergraduate students as assignment in an entrepreneurship and management training-program (really existing in Italy), without reporting the name of the program. This program requires different teams of undergraduate students to create a fictitious business, meaning that they have to organize and manage it as in the real market, competing with other businesses, but employing fictitious financial resources in what results in a sort of business-game. The undergraduate students are strictly required to simulate the real market when performing the activities they have chosen as core business (i.e., consultancy, insurance, etc.) and a specific project that has been assigned to each team by a committee made of some teachers and businessmen. To increase the subjects' motivation to collaborate with their participation to the experiment, their are told that the final evaluation of the undergraduate students will be based on the way they will perform such an assignment (in terms of results as well as entire process) as a real company. Therefore, the Master students will be involved in the business game as consumers and store patrons interviewed by the fictitious marketing consulting company. But, in the cover they are strongly recommended to behave forgetting the fictitious nature of the company.

As far as the experimental procedure is concerned, after introductory remarks[214], an exemplar generation task for the practice product category «breakfast cereals»

[214] Introductory remarks explain subjects that there are not correct and wrong answers and that the results of the study will be analyzed in aggregate form, without any reference to the identity of the participant subjects. They are also required to answer what they really think.

first, and for the target-product category «dietary supplements» then, is performed. Subjects are given 2 minutes for brand listing, 2 minutes for sub-categories (groups) listing, and 3 minutes for associations between brands and sub-groups, as described later.

The assortment presentation manipulation (POP and display arrangement) is then administered, as described in the next section, followed by a filling or buffer task. Subjects in the control condition perform only the buffer task – intended to discharge working memory and to distract the subject from the real objective of the investigation. The buffer task consists in listing all the sorting criteria the subject is able to think of, for the practice product category, playing the role of a web-designer/marketing manager projecting the ways of the assortment presentation to be implemented in an e-commerce website. An existent web-site, but for a different product category – sport shoes – is shown as an example, to be sure everyone understands the task, disregarding the specific experience with e-commerce.

After the buffer task, to be performed in maximum 2 minutes, the subjects are asked to focus their attention again on the target product category, and to repeat the brand and group recall, and the associative (brands and groups) task in 3 minutes.

To dissimulate the repetition of the same task, in line with the cover for the experiment, subjects are told: "Marketing consultancy companies firmly believe matrixes are useful managerial tools, and they are always looking for new uses. Could you try to fill in the following matrix, thinking again at the product category «dietary supplements», by listing all the brands you can remember in this moment (by row), and the name of the groups you can create with them (by column), putting an X sign in the corresponding cell whenever you think a brand belongs to a group?". They are instructed that they do not necessarily have to be in line with the initial task (e.g., they can use different words). After completing this task in the available time, they are asked, again to dissimulate the real objective:

- "Do you think the scheme provided by the matrix has been of any help to you, compared to the absence of scheme in the first task you have performed? Why?"

and to express their agreement on a 7 point scale (1 = I completely disagree; 7 = I completely agree) with some sentences.[215]

In experiment 2 and 3, the same cover is used. An initial free exemplar generation task is performed by all subjects (exactly as in experiment 1), to assess their initial exemplar and sub-categories. The POP and display manipulations are then administered with a procedure similar to experiment 1, but with the addition represented by product cards [as explained later].

A buffer task will be subsequently performed, followed by the repetition of the exemplar and group generation task in experiment 2 and by a category judgment task and a category verification task in experiment 3 (as in Basu, 1993).

At the end of each experiment, subjects are asked what they think was the aim of the study they have been involved in, in order to discharge those who guesses it. Again, this question is dissimulated to be in line with the cover of the experiment.

Some *classification variables* (measured at the time of the experiment) included in the research design are: gender, age, education level, job position, life style (e.g., interests, preferred free-time activities – with a special inquiry about following a diet and performing a sport since they might influence the consumption behavior and the expertise in the product category selected for the study), health profile (considered a variable that might influence the motivation to process product information for the selected category and therefore the quality of accumulated product experience and the potential expertise developed), shopping habits, consumption habits [see Questionnaires in Appendix[216]].

Manipulations of the Independent Variables

Given the objective to test the impact on store patrons' (novice consumers) categorization processes (experiment 3) and outcomes (experiment 1 and 2[217]) of different category learning contexts a retailer can create when defining assortment presentation, different *treatment conditions* are devised.

[215] The sentences are:
- To fill in the provided scheme has required a higher effort for the performance of the task
- To fill in the provided scheme has speeded up the performance of the task
- The mere listing of brands and sub-groups without matrix makes task performance easier because more natural.

[216] It is the original Italian version. A translation in English can be provided on request.

[217] Adding consumers' intention to learn .

The two manipulated factors in all the experiments are amongst the most important tools a retailer can act on, when presenting assortment in-store: POP material and display arrangement.

Factor A = reading of a leaflet representing a paper-guide to purchasing within the product category «dietary supplements». Such leaflet explains the relationship sub-category ⇔(functional) attributes ⇔ benefits.

From a categorization perspective, the guide can be interpreted as a prompt of the product category articulation in sub-categories, by providing only the names and the underlying reasons (commonality or bases for similarity), thus suggesting a rule for sub-category membership.

Factor B = vision of a shelf display arrangement for the product category «dietary supplements». The shelf display can be considered as making explicit the articulation of the product category in sub-categories, each including different variants - here brands - representing their exemplars. The items are displayed near each other, according to a certain sequence, and, as commonly found, with labels naming the sub-categories. The display and the articulation of the category it represents can be built according to different views (manufacturer's vs. consumer's, in addition to retailer's), besides respecting the criteria established by shelf management literature (e.g., sub-groups in vertical layers and different brands on the same layer).

From a categorization perspective, the display arrangement can be interpreted as a prompt of the product category articulation in sub-categories, by providing both the name and the composition (some exemplars).

POP material (leaflet) is manipulated at 2 levels:

- no brochure ⇒ no prompts of the sub-categories names and rules for membership;
- brochure making explicit some sub-categories based on (experienced and expert) consumers' perspective ⇒ prompting articulation by customer-based sub-categories, through labels and rules for membership.

Display is manipulated at 3 levels:

- no display ⇒ no prompts;

- display arranged by taking into consideration only the retailers' and manufacturers' perspective, disregarding the consumers' perspective ⇒ prompting articulation by sub-categories not experienced customer-based, through exemplars and names (labels);
- display arranged by taking into consideration also the (experienced and expert) consumers' perspective ⇒ prompting articulation by customer-based sub-categories, through exemplars and with labels.

All the factors are manipulated as between-subjects, and the combination of the levels «no display» and «no brochure» is considered a baseline condition.

The resulting treatment conditions are summarized in Figure 5.1.

Figure 5.1 – The treatment conditions for experiment 1

			Factor A	
			Reading of a paper guide to the «dietary supplements» category, which explains the relationship attributes-benefits for each sub-category	
			Level a1	*Level a2*
Factor B			No	Yes
Vision of a shelf-display arrangement, which reflects a particular view of the structure of the product category (namely, which considers or not the experienced and expert consumers' view)	*Level b1*	No shelf-display	*Treatment condition/Group 1* = Control or base-line condition	*Treatment condition/Group 2*
	Level b2	Shelf-display organized according to a supply-based view	*Treatment condition/Group 3*	*Treatment condition/Group 4*
	Level b3	Shelf-display organized according to a supply and consumer-based view	*Treatment condition/Group 5*	*Treatment condition/Group 6*

When translated into the actual retailing setting, factor A reflects a learning opportunity for the consumer which can be offered by the retailer (i.e., brochure available in-store), but also by the manufacturer (i.e., brochure inserted into newspapers and magazines or distributed in-store by asking the cooperation of the retailer) or other subjects (i.e., physicians, fitness personal trainers, health associations, consumer associations and so on). Although the retailer doesn't necessarily have a direct control on this learning opportunity, such an informative support can influence the consumer's knowledge of a product category before or during in-store visit and purchase and interfere with other retailer's assortment presentation tools.

The paper guide to dietary supplements can be thought as making explicit a part of the content of the category concept the more expert consumers should have (Alba and Hutchinson, 1987; Mitchell and Dacin, 1996), namely the relationships between the properties of the members of the sub-categories, such as physical or functional attributes and performance attributes that may be translated into the attribute-benefit link in the means-end chain (Gutman, 1982; Olson and Reynolds, 1983). It expresses the commonalities underlying the different sub-categories, by providing a (probabilistic) rule for sub-category membership.

The paper guide here is considered to reflect a customer-based product categorization perspective, to investigate the effects of a coherent (e.g., group 6) vs. incoherent (e.g., group 4) in-store suggested product categorization, resulting, for example, from a cooperative vs. non-cooperative category management effort by manufacturers (e.g., applying a customer-perspective) and retailers (e.g., applying either a customer-perspective or not).

Factor B reflects a learning opportunity for the consumer under the direct control of the retailer. The shelf display may directly influence consumers' product category knowledge and their purchase behavior while shopping in-store, or indirectly (for example, through memory) when planning to buy.

The display can be thought as making explicit another part of the content of the category concept the more expert consumers should have, namely the category-to-instances associations that is some exemplars of the category (e.g., brands).

The stimuli for factor B were prepared using brand variants really existent on the market

All the experiments aren't conducted on the field, but in "laboratory" conditions to assure maximum control of the independent variables. The manipulations are administered by showing some reproduction of the brochure with the purchasing guide and of the display arrangement. The study has to be performed without involving any dietary supplement manufacturer or pharmacist.[218] For this reasons,

[218] This study doesn't benefit of any grant.

some pictures of dietary supplement available on the web have been employed to build the stimuli, without using specific graphics software retailers and merchandisers may have. This is considered acceptable for the pilot study, whereas for the larger study more realistic stimuli will be employed, including a professionally prepared brochure and a real shelf display or pictures of shelf display in existing pharmacies.

Another characteristic of the stimuli is that the display arrangement is rather simplified, in terms of number of items and facings for each item displayed on each layer, when compared to real retailing settings. Again, the needs of control and of feasibility of the study without involving other subjects from the industry of interest have been privileged to realism.[219]

In experiment 1, some tasks are assigned to assure a minimum exposure to assortment presentation – that is attention to and incidental[220] processing of its information content – for the free exemplar generation task, as well as to increase the credibility of the cover for the experiment aimed at distracting participants from the real objective of the study.

Subjects in the «POP provided» condition are asked to observe and to read carefully the leaflet and to subsequently answer some questions (without looking at the brochure):

- Do you think that the leaflet graphic (colors, format) is adequate?
- Who do you think has prepared this leaflet?
- Where do you expect to find this leaflet?
- Have you found any mistake?
- Do you think it is clear?
- Imagine you have to purchase a dietary supplement, do you think this leaflet could be of any help? How?

[219] The need of control, for example, requires having the same number of exemplars displayed in each product sub-category in both customer-based and supply-based arrangements, whereas the feasibility in complete autonomy implies that only the items for which a picture can be easily found on the web are likely to be included as sub-category exemplars.

[220] Incidental with respect to category learning. Participating subjects are invited to look at and read carefully the brochure and to observe the display arrangement (for some minutes, not specified), by anticipating that they will be asked some questions about the brochure and the shelf, without having the possibility to see them again while answering.

Subjects in the «display arrangement provided (customer and not-customer based)» conditions are asked to carefully observe the display arrangement, in order to subsequently answer some questions (without looking at the brochure):

- Do you have any suggestions to give to the pharmacists who has prepared this shelf?
- Do you find anything strange?

In experiment 2 and 3 some product cards showing product attribute and benefit information are distributed to subjects, in the treatment groups implying a manipulation, alone for the control group or in addition to POP and/or display. These product cards should be used by subjects to specify their consideration set for a specific purchase and consumption need in experiment 2. With such instructions subjects in the treatment conditions are expected to show motivation to process stimuli information. In experiment 3 product cards are needed to perform the categorization task.

Tasks and Dependent Variables

Experiment 1)

Building on Nedungadi et al. (2001) and Barsalou (1983, exp. 3) an exemplar production task has been initially chosen to analyze the impact on novices' product categorical knowledge content and organization. After a preliminary test of the procedure for experiment 1, however, some adjustments have been made to the exemplar production task, which are expected to be appropriate, given the involvement of novice consumers as participating subjects. The exemplar production task employed by Nedungadi et al. (2001) to explore the subject's product category structure asks interviewees to list all the brands they know in the product category, and to group them in sub-categories, also providing a name and the reasons for categorizing. Nedungadi et al.'s experiment is done with expert consumers, who usually have well developed category structures with many instances-to-concept associations. For an expert consumer it should be easy to list brands in a given product category and then group them. Novice consumers, on the contrary, are expected to have less developed category structures. This means that they may know only some brands and be uncertain about others (for example, if they have been exposed to brand advertising). They may have some rough idea of groups existing within a product category, although with a different degree of confidence. For such reasons, sub-group generation has been added to exemplar generation, before asking to perform the associative task between exemplars and sub-groups, also allowing some brands or sub-group to remain unlinked. For each recalled brand and sub-group, the subjects are also required to specify their degree of confidence regarding the relationship with the target product-category (sure, quite sure, uncertain about the association brand-category, subgroup-category, brands and sub-groups).

Brands, sub-groups and associations, as revealed by recall, are considered to reflect participants' product category structures and representations.

Experiment 2)

In experiment 2, some adjustments are made on the design of experiment 1, with the objective of inducing a motivation to process information communicated through assortment presentation, by means of specific task instructions.

Participating subjects are first required to perform an exemplar and sub-group generation task, followed by an associative task of brands and sub-groups, exactly as in experiment 1. After this, the subjects read a common scenario followed by a conclusion specific for each treatment condition which contains, whether due, the manipulation of POP and Display arrangement. Exactly the same stimuli as in experiment 1 are administered. The instructions then ask participants to specify their consideration set for a certain purchasing need, related to the product category of dietary supplement, which was specified in the common scenario.[221] In this case the consideration set can be considered memory-based, since there aren't products «in sight» when the question is asked. The next stage requires subjects to read a common scenario and to examine some product cards, in order to specify, again, their consideration set for the same given specific need, but out of the items provided. In this case, the consideration set can be considered stimulus-based, since it can be drawn on the exemplars of the product category shown to the subjects. The product cards will be purposely created and will concern some brands included in the display used as stimulus and some other brands not included in the display used as stimulus. In both cases two alternatives will be from the sub-category corresponding to the given specific need and two from other sub-categories.

Figure 5.2. describes the scenario to be employed in the first consideration set generation task (without product cards), whereas figure 5.3 refers to the procedure to be followed in the second consideration set generation task (with product cards available).

The comparison of the performance of task without and with product cards, with or without active exposure to assortment presentation by categories, may allow an

[221] The specific need refers to a goal-derived category inserted in the stimuli. It is the sub-category whose brands had the lower notoriety according to the sample of experienced consumers involved in the preliminary study of the product category structure.

appreciation of use of informative aid provided. A buffer task separates the two consideration tasks.

Experiment 3)

Another objective of the study is to investigate the impact of assortment presentation on novices' product categorization processes and related information treatment.

The procedure proposed by Cohen and Basu (1987) and applied by Basu (1993) seems useful to analyze how the in-store category learning context managed by the retailer may influence the type of categorization process consumers follow.

Cohen and Basu (1987), arguing the contingency of categorization processes, propose two methodologies – based on the category-judgement vs. category-verification paradigms – to explore some conditions which favour engagement in one type of categorization process rather than another (rule-based vs. exemplar-based). Basu (1993) applies such methodologies in a combined way within a single experimental design, as suggested by Cohen and Basu (1987: p. 469), to discriminate between analytic and non-analytic categorization processes. Different categorization processes can be identified on the basis of the specific information-processing steps, occurring when an object is assigned membership to a category, that are germane to a comparison process between the to-be-categorized item and categorical knowledge, where both the memory representation serving as reference and the mechanics of the comparison process are relevant.

Figure 5.2 – Scenario for the memory-based consideration set generation task

Common scenario description	
One of your neighbours, who is also a good friend, knowing that you were going to buy some medecines for you in a pharmacy has asked you a favour. He is in a urgent need to buy some dietary supplements, but he has no time now. More precisely, he is facing a really effortful working period at his job-place and feels very stressed and tired.	
Specific scenario description and instructions	
Group 1	Do you have any idea of brands you could buy for your friend? [...listing...]
Group 2	Just today, in a newspaper, you have found an article about dietary supplements, showing a guide to purchase. To be more informed, you read it in the 5 minutes you were waiting for the bus. [...take a careful reading of the leaflet in the next 5 minutes....] Do you have any idea of brands you could buy for your friend? [...listing...]
Group 3	When you enter the pharmacy at lunch time, it's very crowded. While waiting for your turn, you stare at the display with some dietary supplements and you spend your 5 minutes waiting time examining it. [...take a careful look of the display....] Do you have any idea of brands you could buy for your friend? [...listing...]
Group 4	Today, in a newspaper, you have found an article about dietary supplements, showing a guide to purchase. Just to be more informed, you read it in the 5 minutes you were waiting for the bus. [...take a careful reading of the leaflet in the next 5 minutes....] When you enter the pharmacy at lunch time, it's very crowded. While waiting for your turn, you stare at the display with some dietary supplements and you spend your 5 minutes waiting time examining it. [...take a careful look of the display....] Do you have any idea of brands you could buy for your friend? [...listing...]
Group 5	When you enter the pharmacy at lunch time, it's very crowded. While waiting for your turn, you stare at the display with some dietary supplements and you spend your 5 minutes waiting time examining it. [...take a careful look of the display....] Do you have any idea of brands you could buy for your friend? [...listing...]
Group 6	Today, in a newspaper, you have found an article about dietary supplements, showing a guide to purchase. Just to be more informed, you read it in the 5 minutes you were waiting for the bus. [...take a careful reading of the leaflet in the next 5 minutes....] When you enter the pharmacy at lunch time, it's very crowded. While waiting for your turn, you stare at the display with some dietary supplements and you spend your 5 minutes waiting time examining it. [...take a careful look of the display....] Do you have any idea of brands you could buy for your friend? [...listing...]

Figure 5.3 – Scenario for the stimulus-based consideration set generation task

Common scenario description
At last, you decide to give up, exiting the crowded pharmacy to have your lunch before going back to work. You will buy the medicines you need and the products for your friend, in the evening. There is another pharmacy along your way to come back home. Once in the pharmacy near home you find out that this is the "month of wellness", as a coloured poster reminds you. The shelf displaying dietary supplements is placed in a central position and there is a message inviting customers to help themselves, looking at the products and reading their descriptions by freely taking the packages. Since you aren't in a hurry and the pharmacist is busy with other customers, you start reading carefully the packages on the shelf, trying to find out something for your friend and, maybe, for you. [Some product cards are provided to the subjects, describing the item according to a common scheme; 5 minutes are given to perform the task] Do you have any idea of brands you could buy for your friend? [...listing...]

By combining Alba and Hutchinson (1985) and Cohen and Basu (1987) arguments,[222] Basu considers the classical and probabilistic views in the psychological literature as corresponding to an analytic categorization process. This implies the search for necessary and sufficient properties which determine category membership, in the classical model. In the probabilistic model it involves a comparison between the properties of the to-be-categorized item and the prototype, in order to assess the degree of overlap. Also some exemplar models may involve an analytical categorization process. It's the case of those implying a categorization process consisting of an aspect-by-aspect matching process between the to-be-categorized item and a category exemplar retrieved from memory, in order to assess their similarity. Some other exemplar models imply a non-analytical categorization process: those requiring a more holistic process, based on global or overall comparisons between the to-be-categorized item and a category exemplar retrieved from memory, without a decomposition into component properties. Cohen and Basu

[222] As Cohen and Basu (1987: p. 438) explain, in Alba and Hutchinson (1985) the terms analytical and non-analytical with respect to the categorization process are used differently. Alba and Hutchinson (1985) refer to the analytic process as one based on the identification of criterial aspects of a category definition (e.g., rule-defining), and to the non-analytic process as one implying similarity to one or more category members whether or not the aspects relied on are category-defining; both, however, imply feature-based comparison. Cohen and Basu (1987) consider analytic process as one implying a feature-by-feature/aspect-by-aspect/attribute-by-attribute comparison (piecemeal), whereas non-analytic refers to an overall similarity comparison (holistic). This is the meaning Basu (1993) privileges too.

(1987: p. 458, 459) observe that some instantiations/models of the probabilistic view (especially in social cognition) may also imply a non-analytic categorization processing. This happens when the reference for the comparison is the prototype (to be intended as an hypothetical entity, resulting from the combination of the features of a typical category member) to be employed directly in an overall-matching, rather feature-matching, comparison. As Basu (1993: p. 99) explains for consumer judgments settings, according to the analytic view of the categorization process, "consumers (i.e., viewers of advertisements, product displays, etc.) are seen as focusing attention on a to-be-categorized brand to identify its relevant attributes, followed by piecemeal comparisons with feature-defined category information in memory to eventually build up to a judgment of fit".

A methodology to discriminate different categorization processes is useful, since many researchers have recognized – by developing mixed models – the possibility of subjects engaging in different categorization processes in response to process-relevant contingencies, including individual enduring characteristics (e.g., nature of experience in learning about a product category) and characteristics of the context of the categorization decision (Basu, 1993: p. 100). In this empirical research the suggested methodology is applied to analyze the effects of the characteristics of the context of the categorization decision (namely the shopping environment as defined by retailers' assortment presentation), when controlling a relevant individual characteristic (by considering experience and expertise with the product category).[223] Cohen and Basu (1987: p. 466, 469) argue that, if the researcher's objective is to understand when consumers are likely to adopt one categorization process rather than another, it might be useful to develop a better understanding (i.e., general taxonomy) of potential purchase situations and other judgment settings (e.g., product evaluation situations) as well as conditions of knowledge acquisition, in terms of the contingent factors apt to influence the categorization strategy. This is what is done when defining different treatment conditions in this experimental design. The thesis

[223] Basu (1993: p. 100) observes that "Someday consumer researchers, as well as marketing practitioners, might be able to describe specific product/brand categorization environments in terms of such process-contingent dimensions, thereby predicting which of the strategies would be potentially dominant", and he argues that such an exploration of the contingencies could be done only after the development of methodologies to infer the nature of the categorization mechanisms. The aim here is to explore some process-contingent dimensions linked to the shopping environment.

proposed and to be empirically investigated here is that a retailer, by purposely managing assortment presentation, may induce different categorization processes by consumers. Through actions in presenting its assortment, the retailer may lead novice consumers to rely, more than normally expected, on rule-based and analytic categorization, thus filling in the gap with expert consumers. A methodology apt to discriminate between rule and exemplar-based categorization processes can be employed to test the thesis and the hypotheses that can be developed.

The methodology based on the category-judgement paradigm considers the outcome of categorization judgments made by consumers for unfamiliar instances (products, brands), whereas the methodology based on the category-verification paradigm considers the effect of a category assignment decision on the relative quality of retrieval associated with different forms of category information (e.g., stored feature-based rules, exemplars etc.).

The category-judgment paradigm is built on the premise that exemplar-based and rule-based processes should be differently sensitive to manipulations of overall similarity between a test item and some category learning items (Cohen and Basu, 1987: p. 466). During a categorization task, exemplar-processing adopters should be more sensitive to variations in overall similarity (entire profile rather than a critical value on a single attribute), whereas rule-processing adopters should be more sensitive to different matches of a test item to a specific rule, even if overall similarity to the learning items is equivalent. The methodology involves choosing some test items such that they reflect different patterns of rule and/or exemplar similarity with respect to some learning instances, and examining the categorization performance for these test items to infer whether the expected processing differences emerge.

The verification-accuracy paradigm, after category learning, asks subjects to verify the category fitting of a test instance in a learned category, when the form of categorical knowledge acquired is varied, manipulating the learning conditions. It builds on the premise that exemplar-based and rule-based categorization processes should be differentiated accordingly to the strength of memory traced implied by each. In rule-based categorization no exemplar retrieval is assumed in sub-sequent categorization tasks. Exemplar-processing adopters are expected to show higher accuracy (and lower reaction times) vs. rule-processing adopters when:

- a to be-verified aspect of a category exemplar is inconsistent with its category designation, but it had indeed been associated with the exemplar;
- a to be verified aspect is consistent with its category designation, but it had not been associated with the exemplar.

The two methodologies are suggested by Cohen and Basu (1987: p. 469) as complementary. Reliance on mere categorization results, as required by the categorization-judgment paradigm, is not considered sufficient to identify convincingly the specific categorization process, because the same result is obtainable through different processes. On the other hand, the systematic variance in verification accuracy may be small and influenced by non-equivalence in prior knowledge of exemplars. The two methodologies in conjunction are proposed and empirically demonstrated to provide evidence about the nature of the categorization process adopted, also because their indexes can be accommodated in the same set of experimental procedures.

Basu (1993) followed this suggestion and run an experiment consisting of three stages:

- a learning stage – learning of new categories;
- a categorization stage – categorization of stimuli in terms of the acquired categories
- a response stage – measurement of quantitative and qualitative aspects of retrieval of exemplar information acquired during the learning stage.

In the experimental design proposed here, the exposure to different assortment presentation solutions, in a retailing setting, resembles the learning stage, where the action on specific tools configures what Cohen and Basu (1987) define as the context for category learning.

The stimuli in our treatment conditions are expected to create various category learning contexts favouring the adoption of different categorization processes, due to the different nature of the information provided about the category through the actions on the tools for assortment – exemplars and/or rule.[224]

To resemble the procedure followed by Basu (1993: p. 103), in the treatment condition with display, for two competing sub-categories (e.g., wellbeing and to face periods of effort) product cards describing the items displayed (exemplars) on a common set of properties will be provided. This should allow the creation of a discrimination learning context, where subjects may focus their attention on understanding the basis for differentiation (that is, a category-defining rule based on available information), rather than learning of the individual exemplars.[225] The paper-guide to subjects in conditions involving display exposure may be given only after a while.[226]

It is to be assessed whether the experiment can be done using exactly the same stimuli as in experiment 1 or by creating new stimuli with fictitious, rather than real, brands. Basu (1993)'s procedure requires building fictitious variants in each sub-category so that they are all identical on the discriminant properties and most similar (i.e., with one exception out of four exemplars) on non-discriminant properties.

[224] The approach followed in this empirical research will resemble, more closely, the general application of the category-judgment paradigm in perceptual categorization and concept acquisition studies, where subjects are exposed to instances from one or more categories (usually sub-categories of a more general category and potentially competing in terms of assignments of new instances), learning variables are manipulated, and besides mere instances of the categories, some form of prototype or rule information is communicated simultaneously (as here), prior to, or after exposure to the exemplars (Basu, 1993: p. 101).

[225] This experiment satisfy other Basu (1993)'s warnings:

- the product category selected for the study should be rich in individual instances and in attribute-based descriptions, so that both exemplar- and rule-based representations in memory and retrieval for comparison are feasible;
- the exemplar and rule manipulations in the experiment are cleaner when subjects have few of these of their own; and this should be likely when involving novices;
- category defining rules for the rule-condition should be constructed to reflect exemplar and feature-defined distinctions individuals (here only experts and experienced) are intuitively able to do.

[226] Cohen and Basu (1987: p. 469), to avoid experimental demand leading subjects in the rule-condition to deserve unwanted attention to rule-relevant aspects, suggest to post-pone rule information when exemplar learning is completed, so that initial acquisition of category information is equivalent. On the other hand, since the interest here is assessing the possibilities to induce novice consumers categorization processes to resemble experts' ones, the learning context should induce rule-learning, directly or by inference. In other words, experimental demand here is a desired effect from a managerial perspective.

When using real brands it could be difficult to found variants which respect such structural constraints.[227]

A categorization stage, here with a judgment setting coinciding with the learning context, can be then used to tests the effects, together with some measurements made during the final response stage.

The test instances – to be categorized – should be classified differently by adopting the learned category rule vs. overall exemplar similarity, so that the underlying categorization process followed by the subject can be inferred. The product card of the test-instances need to be created too, after deciding whether they should be existent or fictitious. A pre-test should be performed to check whether the test-instances that will be prepared for the experiment respect the required configurations.[228]

During the categorization stage, subjects will be shown a number (eg. two) of «new» instances, in random order, and will be asked to decide whether they belong to a certain sub-category (among those included in the display and in the paper-guide) or not, and to self-rate the confidence in the categorization judgment on a 7 point-scale (1 = not confident at all; 7 = very confident). The reaction time will be measured too. Following Basu's (1993: p. 118)[229] suggestion, a thinking aloud technique will be also applied during the categorization stage, by asking subjects to explain the reasons why they are making a specific categorization judgment, thus

[227] Basu (1993: p. 104), in this respect, notices: "real brands in the marketplace in all probability do not subscribe to the structural constraints characterizing artificially constructed stimuli in terms of the necessary relationships between features and instances for purposes of predicting judgment outcomes". He suggests that the complementary use of the methodology drawn from the category-verification paradigm may be useful to overcome such shortcomings.

[228] Following Basu (1993), the pre-test will ask:

- a sample of subjects to judge, using a scale range, the instances to be employed during the learning and the test stages according to their membership in specific categories, after having made explicit the rule (relevant properties) for category membership;
- another sample of subjects to assess the overall similarity between the instances to be employed during the learning and the test stages, in a pairwise fashion on a 3 point scale (highly similar, somewhat similar, not at all similar);
- a third sample of subjects to respond to a set of verification items, considering arbitrarily a cutoff of 70% correct responses to select one inconsistent-associated and one consistent-unassociated aspect for each learning exemplar.

[229] Basu (1993: p. 118) argue that: "It may be worthwhile in future investigations to design alternative instructions that deflect attention from the response-latency dimension and encourage subjects to verbalize their mental processes as decisions are being made. As such, concurrent reports produced by thinking-aloud instructions may allow more accurate descriptions (...)".

obtaining a verbalization of their mental processes. A free-format elicitation will be adopted to minimize interference.

To analyze the experimental data, following Basu's (1993) treatment of subjects' self-report, the output of the thinking aloud procedure will be coded by two judges, blind to the experimental conditions into five types:

- described use of learned-category defining rule
- described use of self-generated rule
- described use of feature-based comparison between test and learning exemplar(s)
- described overall similarity comparisons to specific exemplar(s)
- no response.

Types 1,2,3 will be considered to reflect analytic categorization and grouped for comparison with category type 4 believed to reflect non-analytic categorization.

For the category-verification stage, as in Basu (1993), two salient aspects from each of the learning exemplars will be selected as to-be-verified features, and two verification questions will be prepared for each aspect, one inconsistent-associated and the other consistent-unassociated.

To sum up, the depended variables out of experiment 2 will be:

- category judgments for the test-instances, self-rated confidence in the category judgement, time for the category judgement;
- category verification answers for the consistent-unassociated and inconsistent-associated aspects;
- self-reports codified by independent judges.

Data analysis will resemble the one employed by Basu (1993).

The temporal deployment of the experiments for the different treatment groups is summarized in figure 5.4 (experiment 1), 5.5 (experiment 2) and 5.6 (experiment 3).

Figure 5.4 - The temporal deployment of experiment 1 for the different treatment groups

Group	*Training test* (brand recall, grouping, and labelling task) *for the practice-product category*	*Initial test* (brand recall, grouping, and labelling task, through free listing) *for the target-product category*	*Active Exposure to POP material*	*Active Exposure To Display Arrangement*	*Buffer task* (sorting criteria for a web site)	*Final test* (brand recall, grouping, and labelling, dissimulated with the matrix) *for the target product category*
Group 1	X	X	No	No	X	X
Group 2	X	X	Yes	No	X	X
Group 3	X	X	No	Yes-not consumer based	X	X
Group 4	X	X	Yes	Yes-not consumer based	X	X
Group 5	X	X	No	Yes-consumer based	X	X
Group 6	X	X	Yes	Yes consumer based	X	X

Figure 5.5 – The temporal deployment of experiment 2 for the different treatment groups

Group	*Initial test* (brand recall, grouping, and labelling task, through free listing) *for the target-product category*	*Active Exposure to POP material, without product-cards* (memory based consideration set)	*Active Exposure To Display Arrangement, without product-cards* (memory based consideration set)	*Active Exposure to POP material, with product-cards* (stimulus based consideration set)	*Active Exposure To Display Arrangement, with product-cards* (stimulus based consideration set)	*Buffer task*	*Final test* (brand recall, grouping, and labelling, dissimulated with the matrix) *for the target product category*
Group 1	X	No	No	No	No	X	X
Group 2	X	Yes	No	Yes	No	X	X
Group 3	X	No	Yes-not consumer based	No	Yes-not consumer based	X	X
Group 4	X	Yes	Yes-not consumer based	Yes	Yes-not consumer based	X	X
Group 5	X	No	Yes-consumer based	No	Yes-consumer based	X	X
Group 6	X	Yes	Yes consumer based	Yes	Yes consumer based	X	X

Figure 5.6 – The temporal deployment of experiment 3 for the different treatment groups

Group	*Initial task (brand recall, grouping, labelling)*	*Learning stage*		*Categorization stage (with attribute information provided on a product card)*	*Response stage*
		Active Exposure to POP material	*Active Exposure To Display Arrangement + product cards with attribute information*		
Group 1	X	No	No	X	X
Group 2	X	Yes	No	X	X
Group 3	X	No	Yes-not consumer based	X	X
Group 4	X	Yes	Yes-not consumer based	X	X
Group 5	X	No	Yes-consumer based	X	X
Group 6	X	Yes	Yes consumer based	X	X

All the instruments created to collect data for experiment 1 are provided in Appendix, together with a more detailed description of their preparation.

Appendix A describes preliminary stimuli preparation.

Appendix B (brochure/leaflet), C (supply-based display arrangement), and D (consumer-based display arrangement) contains the original version – in Italian – of the stimuli created and administered.

Appendix E explains the cover of the experiment described to participants.

Appendix F contains the questionnaires employed to collect all data about the personal profile of the participating subject, including the measures of experience ("Scheda profilo consumatore") and expertise (Questionario "Alimentazione e integrazione alimentare") with the product category , as well as socio-demographic information asked at the end of the experiment ("Scheda profilo socio-demografico"). Finally, Appendix G contains the slides employed for the procedure of experiment 1.

5.3. EXPECTATIONS AND HYPOTHESES

For all experiments, following Barsalou (1983, exp. 3), the overall recall is first calculated, here as the total number of product category exemplars (brands) and sub-groups recalled by subjects. Recall can be therefore decomposed into the sub-category access and the exemplar retrieval. Given the procedure followed, recalled brands and sub-groups can be distinguished from associated ones: brands associated to at least one sub-group, and sub-groups with at least one exemplar. Associations can then be computed, also distinguishing one-to-one links.

Experiment 1 investigates the effects of different prompts of a product category structure, through assortment presentation tools, on novice consumers product category structures and representations, as revealed by generation tasks. Prompts differ in intensity and nature: number of manipulated tools (POP and display) and coherence (SB and/or CB).

Increasing the prompting intensity for the product category structures and varying the nature of the proposed cues (e.g., by acting on more tools) is expected to affect subjective performance in the generation task.

Figure 5.7. describes for each treatment group, in the upper part of the corresponding cell, the intensity and nature of the retailer's prompting effort involved in the respective manipulation (sub-group name and/or rule and/or exemplars, as well as type of sub-groups names and rules). In the lower part of each cell, there is a brief description of the changes in performance – in task 5 (after eventual manipulation) compared to task 1 – expected for the corresponding treatment group, with respect to the components of the cognitive product-category structures: sub-groups, brands, associations sub-groups and brands.

Figure 5.8 and 5.9 illustrate (through highlights in different colors) the main differences in retailers' prompting effort between each pair of treatment groups, and they can be useful to predict effects on the various indexes of the dependent variable «cognitive product category structures».

Figure 5.7 – Differences in category-structure prompting effort between treatment groups and expected performance in experimental tasks

<table>
<tr><td></td><td></td><td colspan="2">POP</td></tr>
<tr><td></td><td></td><td>No POP</td><td>Yes POP</td></tr>
<tr><td rowspan="3">DISPLAY</td><td>No display</td><td>*No prompt*

Negligible variations in
- n. of sg,
- n. of brands,
- n. of associations
(due to later recall or forgetting)</td><td>*Prompt*
- *sg name CB*
- *sg rule CB (comps-tg)*
- *no exemplars*
- *no associations*

Increase in
n. of sg (recalled, not necessarily associated, especially those in brochure);
delta nature of sg (comps-tg);
negligible variations in n. of brands and associations (due to later recall or forgetting, or reaction to cues in POP)</td></tr>
<tr><td>SB Display</td><td>*Prompt*
- *sg name SB*
- *no sg rule*
- *exemplars SB*
- *associations SB*

Increase in
- n. of sg (in SB display),
- n. of brands (especially in SB display),
- n. of associations (especially in SB display);
small changes in nature of sg (comps)</td><td>*Prompt*
- *sg name SB & CB*
- *sg rule CB (comps-tg)*
- *exemplars SB*
- *associations SB*

Increase in
- n. of sg (recalled in brochure-CB, and associated especially in SB display),
- n. of brands,
- n. of associations not 1-to-one (cross-classific, especially in SB display);
delta in nature of sg (comps and tgt)</td></tr>
<tr><td>CB Display</td><td>*Prompt*
- *sg name CB*
- *no sg rule*
- *exemplars CB*
- *associations CB*

Increase in
- n. of sg (in CB display/ ~~brochure~~),
- n. of brands (especially in CB display),
- n. of associations (especially in CB display);
small changes in nature of sg (tgt)</td><td>*Prompt*
- *sg name CB (repeated)*
- *sg rule CB (comps-tg)*
- *exemplars CB*
- *associations CB*

Increase in
- n. of sg (in brochure-CB display),
- n. of brands (especially in CB display),
- n. of associations (especially in CB display);
small delta in nature of sg (tgt)</td></tr>
</table>

Figure 5.8 – Expected effects of POP, with different Display solutions

		POP	
		No POP	Yes POP
DISPLAY	No display	*TG1* No prompt	TG2 *Prompt* - *sg name CB* - *sg rule CB (comps-tg)* - *no exemplars* - *no associations*
		TG2 vs. TG1 (POP when no display) Increase in n. of sg (recalled but not necessarily associated); delta nature sg (comps,tgt); negligible increase in n. of brands and associations (reaction to cues)	
	SB Display	TG3 *Prompt* - *sg name SB* - *no sg rule* - *exemplars SB* - *associations SB*	TG4 *Prompt* - *sg name SB & CB* - *sg rule CB (comps-tg)* - *exemplars SB* - *associations SB*
		TG4 vs. TG3 (POP when SB display) Increase in n. of sg (recalled, both SB and CB, and associated especially SB), increase in n. of associations (cross-classifications), higher heterogeneity in nature of sg (comps and tgt)	
	CB Display	TG5 Prompt - *sg name CB* - *no sg rule* - *exemplars CB* - *associations CB*	TG6 *Prompt* - *sg name CB (repeated)* - *sg rule CB (comps-tg)* - *exemplars CB* - *associations CB*
		TG6 vs. TG5 (POP when CB display) Increase n. of sure sg (especially CB) and associations; negligible increase in n. of sg	

Figure 5.9 – Expected effects of Display, with different solutions for POP

	POP	
DISPLAY	No POP	Yes POP
No display	*TG1* No prompt	TG2 *Prompt* - *sg name CB* - *sg rule CB (comps-tg)* - *no exemplars* - *no associations*
SB Display	TG3 *Prompt* - *sg name* SB - *no sg rule* - *exemplars* SB - *associations* SB	TG4 *Prompt* - *sg name SB* ... - *sg rule CB (comps-tg)* - *exemplars SB* - *associations SB*
CB Display	TG5 *Prompt* - *sg name* CB - *no sg rule* - *exemplars* CB - *associations* CB	TG6 *Prompt* - *sg name CB (repeated)* - *sg rule CB (comps-tg)* - *exemplars* CB - *associations* CB

TG5 vs. TG1: Increase in n. of sg, brands, associations (especially in CB display); delta nature sg (comps, tgt)

TG3 vs. TG1: Increase in n. of sg, brands, associations (especially in SB display); delta nature sg (comps)

TG5 vs. TG3: Differences in nature of sg (more cross class for TG3) and n. of associations (in SB vs. CB display)

TG4 vs. TG2: Increase in n. of sg (CB besides SB), brands and associations (especially in SB display, with cross-classific)

TG6 vs. TG2: Increase in n. of brands and associations (especially in CB display)

TG6 vs. TG4: Differences in nature of sg (cross class for TG4) and in n. of associations (in SB vs. CB display)

Overall, main significant effects of POP are expected on the sub-group component of the cognitive product-category structures revealed through recall (in qualitative and quantitative aspects), since retailers prompt sub-group names and rules;[230] main significant effects of Display are expected on the brand component of the cognitive product-category structures and on associations (especially those reflecting the stimuli), since prompt efforts regards exemplars of made explicit sub-groups.

[230] Although novices may memorize some additional sub-groups prompted by POP, they may not be able to recall or even know brands which can be associated to these novel sub-groups for which they may have understood underlying rule. They can try to cross-classify the brands they know, according to novel sub-groups, thus affecting the number of groups and non-exclusive associations, but such effect is not expected to be so strong.

Interaction effects are expected to show up, too; with effects of POP being not the same for different solutions regarding display.

Similar but stronger (more evident) effects – due to active exposure favoured by motivation to process stimuli – are expected in experiment 2.

Experiment 3 investigates the effects of different prompts of a product category structure, through assortment presentation tools, on novice consumers product categorization processes, as revealed by a combined category-judgment and category-verification task.

The methodology based on the category-judgment paradigm considers the outcome of the category assignment. Analytic categorization processes in the category-judgment paradigm lead to a classification of the novel item based on match/mismatch of featural properties, whereas non-analytic categorization processes lead to a classification based on overall similarity with specific exemplar(s) experienced in the past. In Basu's (1993) experiment, the rule group was expected to be faster in categorization reaction time and more confident in their judgments (vs. exemplar group) because of the structurally simple rule suggested.

The methodology based on the category-verification paradigm considers the qualitative and quantitative aspects of retrieval of exemplar information acquired in the learning phase and measured after the category assignment.

Non analytic categorization processes in the category-verification paradigm lead to superior assessment of specific aspects of the exemplars experienced in the past and retrieved from memory.

In Basu's (1993) experiment the exemplar group was expected to be superior (vs. the rule group) in verifying the inconsistent-associated and consistent-unassociated aspects.

The self-report at the end of the experiment were expected to be strongly dominated by the specific learned rule for the rule group who was expected to report a narrower range of strategies dominated by analytic ones, whereas the exemplar group was expected to report a broader range of strategies both analytic and non-analytic.

Since Cohen and Basu (1987) focus on memory-based consumer decisions, they propose that:

- increasing the accessibility of previous experienced exemplars (prototypes) in memory leads to greater reliance on exemplar-based (prototype) processing
- priming a stored rule of retrieval of features encourages rule-analytic processing.

In the proposed experiment the focus is on the learning opportunities for novices in stimulus-based or mixed decision settings (shopping environment). Therefore, it is proposed that:

- Providing the opportunity to experience sub-category exemplars, which can be stored in memory and later accessed, allows sub-sequent exemplar-based processing, especially when contrasting sub-categories are not emphasized in the learning context, given that the subject is motivated to process the exemplar information.
- Providing a rule for sub-category membership, which can be stored in memory and later accessed, allows sub-sequent rule-based processing, given that the subject is motivated to process the rule information.

Therefore:

- Display arrangement by consumer-knowledge or supply-based sub-categories, with a label provided, allows consumers' exposure to exemplars of alternative categories, thus increasing the likelihood of sub-sequent classification of instances by rule (analytic categorization).
- Display arrangement by supply-based or consumer-based sub-categories, without a label provided allows consumers' exposure to exemplars (without emphasizing alternative sub-categories), thus increasing the likelihood of sub-sequent classification of instances by exemplars (non analytic categorization) – not investigated.
- POP materials expressing the sub-category name and properties (at different level of abstractions) allows consumers' definitional learning of sub-categories, thus increasing the likelihood of sub-sequent classification of instances by rule (analytic categorization).

Consumers in treatment condition 1 (no display, no guide) are expected to follow a memory-based (rather than stimulus-based) categorization process, based on the exemplars they have stored in memory and maybe on superficial overall similarity.

Consumers in treatment condition 2 (guide, but no display) vs. consumers in treatment condition 1 (no display, no guide) are expected to experience a category learning context which favours category acquisition through a definitional process (involving learning the causal relationships between the category members' properties), thus increasing the likelihood of sub-sequent rule-based categorization and analytical processing of the product information referred to those attributes/properties.

Consumers in treatment condition 3 and 5 (display, no guide) vs. consumers in treatment condition 1 (no display, no guide) are expected to experience a category learning context which favours an exposure to exemplars belonging to alternative or contrast categories, thus increasing the likelihood of sub-sequent analytic or rule-based categorization (both retrieved from memory and prompted by the display).

Consumers in treatment condition 4 and 6 are expected to try to follow a combination of rule-based and exemplar-based categorization, thus affecting reaction time. They are expected to rely heavily on rule-based categorization, and to be able to specify the properties of the exemplars they have experienced, given the category learning context which favours acquisition through a definitional process combined with exposition to exemplars from contrasting categories.

In summary, display arrangement and POP material are expected to increase the ability of novice consumers to follow an analytic categorization process rule-based, allowing them to store information about exemplars in an exemplar (e.g., brand) by properties organization, provided that they are motivated to process such information.

A first appreciations of the effects suggested by hypotheses specified for experiment 1 can be proposed in next chapter, by analysing the results of the pilot study.

CHAPTER 6

EXPERIMENTAL DATA ANALYSIS AND RESULTS

This chapter summarizes the results of an experiment aiming at analysing the potential for a mere incidental category learning by novice consumers, with respect to a certain product category – showed by changes in their product category structures, revealed through recall - when exposed to assortment presentation by categories in a retail setting.

It can be considered a pilot study to assess the feasibility of the devised experimental procedure, and to highlight potential improvements for future replication. This test is critical also because further developments of the whole research project (described in Chapter 5) entail quite similar experimental procedures.

Although the characteristics of the sample (convenient) do not allow conclusive tests of research hypotheses, a first appreciation of experimental effects can be gained.

The procedure for experiment 1 requires subjects to perform several tasks for a practice product category, besides the target product category. Although several interesting data related to individual structures of product-category knowledge were collected also with respect to the training product-category of breakfast cereals, such data will be completely disregarded in this chapter, in order to focus on the target product category of dietary supplements.

The characteristics of the sample of subjects involved is first described, followed by the detailed presentation of main results, and by a final general discussion of the experimental findings, as well as an evaluation of the research limitations to outline future directions.

6.1. Description of the Sample

54 subjects participated individually to the experiment, 9 for each treatment condition, following a random assignment. Due to feasibility constraints (e.g., time and costs), a convenient sampling procedure and a relatively low sample-size were employed, thus preventing any possibility of statistical generalization. For the same reasons, the power of the experiment should not result very high.

None of the participants guessed the real purpose of the experimental manipulation, as confirmed by the content of their written answers (as well as oral answers, which were audio-taped) to the questions asked during the final check-stage of the procedure.

Before and after completing the experimental procedure, **some variables useful to describe the subjects' profile were collected**, by means of answers to structured questionnaires [see Appendix F].

Some descriptive variables referred to the subjects' socio-demographic profile, whereas other referred to their profile as consumers of the two product categories considered in the experimental procedure – the target product category of dietary supplements and the trial product category of breakfast cereals. Some additional questions were aimed at assessing the subjects' attitude and behavior with respect to private labels and the retailers' communications actions, in line with the cover of the experiment, and will be disregarded in this chapter except for some interesting ones which can bear relevance to interpreting experimental results.

Socio-demographic profile

Participant subjects are all **Master Students**, with a **different university-background**: 24 subjects (44,4%) have an economic background (mostly business administration), whereas 30 subjects (55,6%) have a background in other social sciences (e.g., communication, foreign literature and languages, political science, philosophy, sociology and psychology).

The average age is around 25 years (standard deviation 1,6), ranging from a minimum of 22 to a maximum of 29. The average age for the different treatment conditions is shown in table 6.1. Treatment groups 1, 2 and 3 have a relatively lower mean age than treatment groups 4, 5, 6, and treatment group 5 has the highest within group variability, as signalled by the higher standard deviation. Such differences, however, don't reach statistical significance.

Table 6.1 – Mean Age for the different treatment groups

TREATMENT GROUP	Mean Age	N.	Std Deviation	Minimum	Maximum
1	26,0000	9	1,32288	24,00	28,00
2	25,7778	9	1,64148	23,00	29,00
3	25,2222	9	1,71594	23,00	28,00
4	24,8889	9	1,36423	24,00	28,00
5	25,1111	9	2,02759	22,00	28,00
6	25,4444	9	1,58990	23,00	28,00
Total	*25,4074*	*54*	*1,59620*	*22,00*	*29,00*

As shown in table 6.2, most participants are female, who account for 67% of the interviewees versus 33% of males. There are some gender differences between the treatment groups, with a higher relative incidence of female in treatment group 3, and a lower presence in treatment group 5, but such differences do not reach statistical significance.

None of the participant subjects is married. Participants who live alone are 19 (35%), whereas 14 still live with their native family (26%), and 21 (39%) with others such as friends and relatives. Most of participants live – at least temporarily – in Milano, with the exception of 5 students living in Lombardia who reach every day Milano to attend Master classes.

The majority of interviewed Master students, however, are from the north of Italy (42, that is 78%), 5 (around 9%) are from the centre and 7 (13%) from south and islands.

Personal interests and preferred activities during free-time (multiple response) highlight a neat dominance of sport cited by 76% of participants, followed by reading (43%) and other cultural entertaining activities such as cinema, theatre, museums (43%), travelling (31,5%) and social life (22%). As shown in table 6.3, sport is really popular in treatment group 4, but again observed differences are not statistically significant.

6 participants (11% on the total) admitted to have some **health problems related to dietary habits** (3 allergies to food components, 1 problems with liver, and 2 dietary deficiencies of iron and of vitamins due to non consumption of meat, fruit and vegetables). 23 participants (43%) declared to have some **health problems due to their life style**: 15 of them mentioned stress and 4 mentioned tiredness often due to sleeping problems, and the remaining referred to physic problems such as blood circulation due to sedentary life, or head-aches, digestive and intestinal problems which are mostly connected to stressful life styles.

Table 6.2 – Composition by gender for the different treatment groups

			GENDER		
			FEMALE	MALE	Total
TREATMENT GROUP	1	Count	6	3	9
		% within TREAT GROUP	66,7%	33,3%	100,0%
		% within GENDER	16,7%	16,7%	16,7%
		% of Total	11,1%	5,6%	16,7%
	2	Count	6	3	9
		% within TREAT GROUP	66,7%	33,3%	100,0%
		% within GENDER	16,7%	16,7%	16,7%
		% of Total	11,1%	5,6%	16,7%
	3	Count	8	1	9
		% within TREAT GROUP	88,9%	11,1%	100,0%
		% within GENDER	22,2%	5,6%	16,7%
		% of Total	14,8%	1,9%	16,7%
	4	Count	6	3	9
		% within TREAT GROUP	66,7%	33,3%	100,0%
		% within GENDER	16,7%	16,7%	16,7%
		% of Total	11,1%	5,6%	16,7%
	5	Count	6	3	9
		% within TREAT GROUP	66,7%	33,3%	100,0%
		% within GENDER	16,7%	16,7%	16,7%
		% of Total	11,1%	5,6%	16,7%
	6	Count	4	5	9
		% within TREAT GROUP	44,4%	55,6%	100,0%
		% within GENDER	11,1%	27,8%	16,7%
		% of Total	7,4%	9,3%	16,7%
Total		Count	36	18	54
		% within TREAT GROUP	66,7%	33,3%	100,0%
		% within GENDER	100,0%	100,0%	100,0%
		% of Total	66,7%	33,3%	100,0%

Table 6.3 – Preference for sport as area of interest for free-time in the different treatment groups

			SPORT		
			NO	YES	Total
TREATMENT GROUP	1	Count	4	5	9
		% within TREAT GROUP	44,4%	55,6%	100,0%
		% within SPORT	30,8%	12,2%	16,7%
		% of Total	7,4%	9,3%	16,7%
	2	Count	3	6	9
		% within TREAT GROUP	33,3%	66,7%	100,0%
		% within SPORT	23,1%	14,6%	16,7%
		% of Total	5,6%	11,1%	16,7%
	3	Count	1	8	9
		% within TREAT GROUP	11,1%	88,9%	100,0%
		% within SPORT	7,7%	19,5%	16,7%
		% of Total	1,9%	14,8%	16,7%
	4	Count		9	9
		% within TREAT GROUP		100,0%	100,0%
		% within SPORT		22,0%	16,7%
		% of Total		16,7%	16,7%
	5	Count	3	6	9
		% within TREAT GROUP	33,3%	66,7%	100,0%
		% within SPORT	23,1%	14,6%	16,7%
		% of Total	5,6%	11,1%	16,7%
	6	Count	2	7	9
		% within TREAT GROUP	22,2%	77,8%	100,0%
		% within SPORT	15,4%	17,1%	16,7%
		% of Total	3,7%	13,0%	16,7%
Total		Count	13	41	54
		% within TREAT GROUP	24,1%	75,9%	100,0%
		% within SPORT	100,0%	100,0%	100,0%
		% of Total	24,1%	75,9%	100,0%

Such data, overall, confirm that the interviewees can be potentially interested in the target product-category of dietary supplements: their life styles intangle situations of increased need for nutrients which can't be easily faced with a well-balanced diet.

Profile as consumers and store patrons

Other data of interest can be drawn by questions about subjects' attitudes and behaviors with respect to the two considered product categories (especially private labels for dietary supplements) and concerning retailers' communication efforts.

Out of the 36 interviewees who purchased and consumed at least once a dietary supplement (including those for sport activities), 34 subjects (94%) never bought private labels, whereas 2 persons did.

Disregarding the specific experience with dietary supplements, 21 subjects out of 54 (39%) declared they would buy a private label, whereas 32 (59%) wouldn't, and one (2%) answered it would depend on the retailer's ability to guarantee a high quality product due to its particular nature. Subjects who wouldn't buy a private label for dietary supplements were asked to provide the reasons. 6 (18,75% of non-potential private label buyers) answered they do not feel the need to consume dietary supplements and/or would never buy dietary supplements because they do not believe in their effectiveness. 24 subjects (44,44%) referred to the specific nature of dietary supplements which requires high level and specialist competences to be manufactured (having to do with health), by saying that they will lack trust in private labels, especially those sold in stores other than pharmacies, and will prefer to buy a well-known brand in pharmacy, also benefiting of the pharmacists' advice. 2 interviewees didn't provide motivations. Most cited points of purchase, distinct by type of dietary supplements, confirm such tendency (e.g., supermarket and bar or gym for sport supplements, pharmacy or specialized stores for others).

Such data suggests **most interviewed subjects perceive a certain degree of risk when thinking of buying the target product category, because of its relationships with personal health and the specific manufacturing process which must guarantee high standards of quality. Other interviewees are suspicious towards the target product category, questioning its real effectiveness and also real need**, thinking a well balanced diet should be sufficient. **Such perceptions and attitudes have to be considered in light of the relative novice status of the interviewee-subjects** with respect to the entire product category of dietary supplements [see next sub-paragraph].

Other collected data can be used to infer the subjects' need or tendency, in general while shopping, to deserve attention to and elaborate on product-information made available trough different media.

Subjects were asked to assess the frequency of performing some activities describing an active use of the communication tools employed by retailers. Individual responses should be provided with respect to a 7-point scale, ranging from the two anchoring points of 1 = never and 7 = always. Among the various communications tools, some of interest are reported here.

As shown in table 6.4, when shopping subjects tend to read very often price label (mean 5,59), followed by individual product-label (mean 4,33). Interviewees report to be less in the habit of comparing different product-labels in-store (mean 3,67), examining other in-store informative aids (mean 3,44), reading promotional leaflets (mean 3,35), although with higher variability (as revealed by standard deviation). Subjects seem to rely not so frequently on personal information aid by sales assistants (mean 3,35).

Treatment group 2 declare a lower tendency (when compared to the general mean) to read price label. Treatment group 3 emerges as the more oriented toward individual product label reading, whereas treatment group 4 engages relatively more frequently in product-label comparison in-store, and reading of retailers' promotional leaflets is relatively more common in treatment groups 1 and 6. Treatment group 6, followed by 1 and 3, show a relatively higher frequency of consideration for in-store additional informative aids. Sales assistants' help is relatively less used by treatment groups 1 and 2. However, all such differences are not statistically significant.

Taken as a whole, and **with respect to shopping activity in general** (that is, without specifying particular product-categories or purchasing situations), participants subjects' attention seems to be attracted by price information and other data available on specific product packages. **It seems that interviewees are not in the habit of approaching a "common" shopping environment as active extensive (meaning by exploiting all available sources) information-seekers. Rather they seems to focus on specific pieces of information, more related to single items taken in isolation within a product category** (e.g., label on package and price).

Experience and Expertise with dietary supplements

All participant subjects have a minimum idea of what the product category "dietary supplements" is, as revealed by a qualitative analysis of the definition provided (open) at the beginning of the interview, together with their free listing of the factors which can affect a person's nutritional need.[231]

[231] Both the personal definitions and the lists of factors affecting individual nutritional need are not inserted in this dissertation. They are available on request.

The analysis of collected data about idiosyncratic experience and expertise in the target product category provides a justification for their participation to the experiment, since **all of them can be qualified as novice consumers with respect to the "entire" product category**.

Table 6.5 shows that 18 out of 54 participants (33,3%) never bought or used dietary supplements,[232] whereas 36 (66,7%) did it, with various frequencies and with respect to different product sub-categories and brands.

Table 6.4 – Self-assessed frequency of use of some pieces of information, made available through various retailers' communication tools (7-points scale: 1=never, 7=always)

TREAT GROUP		produc label reading (in-store)	product label comparison (in-store)	reading of retailers' promotional leaflets	observation of in-store information posters and similar	sales-assistants' help	reading of price-label
1	Mean	4,44	3,89	3,89	3,67	2,89	6,11
	N	9	9	9	9	9	9
	Std. Deviation	1,810	2,028	1,900	1,871	1,764	1,167
	Minimum	2	1	1	1	1	4
	Maximum	7	7	6	6	5	7
2	Mean	4,11	3,33	3,00	3,33	2,67	4,78
	N	9	9	9	9	9	9
	Std. Deviation	1,065	1,936	1,871	1,732	,866	1,856
	Minimum	1	1	1	1	1	2
	Maximum	7	7	6	6	4	7
3	Mean	5,00	4,22	3,11	3,67	4,22	6,11
	N	9	9	9	9	9	9
	Std. Deviation	1,658	2,279	2,028	2,062	1,481	1,054
	Minimum	3	1	1	1	2	4
	Maximum	7	7	6	7	6	7
4	Mean	4,11	4,56	3,00	3,00	3,22	5,33
	N	9	9	9	9	9	9
	Std. Deviation	1,764	2,186	1,936	1,671	1,302	1,871
	Minimum	2	1	1	1	2	3
	Maximum	7	7	7	6	5	7
5	Mean	4,56	3,11	3,44	3,22	3,33	5,56
	N	9	9	9	9	9	9
	Std. Deviation	2,068	2,261	1,944	1,922	1,323	2,007
	Minimum	1	1	1	1	1	1
	Maximum	7	7	7	6	5	7
6	Mean	3,78	2,89	3,67	3,78	3,78	5,67
	N	9	9	9	9	9	9
	Std. Deviation	1,986	2,028	2,000	1,856	1,767	1,581
	Minimum	1	1	1	1	1	2
	Maximum	7	7	7	7	6	7
Total	Mean	4,33	3,67	3,35	3,44	3,35	5,59
	N	54	54	54	54	54	54
	Std. Deviation	1,833	2,110	1,885	1,819	1,481	1,620
	Minimum	1	1	1	1	1	1
	Maximum	7	7	7	7	6	7

[232] Although there is a relatively higher incidence of non buyers in treatment groups 1 and 5, such differences didn't reach statistical significance.

Table 6.5 – **Dietary supplements' purchase and consumption** (at least once in one's own life) **for the treatment groups**

			TREATMENT GROUP						
			1	2	3	4	5	6	Total
PURCHASE/ CONSUMPTION	Yes	Count	4	7	7	6	5	7	36
		% within purch/cons	11,1%	19,4%	19,4%	16,7%	13,9%	19,4%	100,0%
		% within treat group	44,4%	77,8%	77,8%	66,7%	55,6%	77,8%	66,7%
		% of Total	7,4%	13,0%	13,0%	11,1%	9,3%	13,0%	66,7%
	No	Count	5	2	2	3	4	2	18
		% within purch/cons	27,8%	11,1%	11,1%	16,7%	22,2%	11,1%	100,0%
		% within treat group	55,6%	22,2%	22,2%	33,3%	44,4%	22,2%	33,3%
		% of Total	9,3%	3,7%	3,7%	5,6%	7,4%	3,7%	33,3%
Total		Count	9	9	9	9	9	9	54
		% within purch/cons	16,7%	16,7%	16,7%	16,7%	16,7%	16,7%	100,0%
		% within treat group	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	16,7%	16,7%	16,7%	16,7%	16,7%	16,7%	100,0%

Some interviewees have a certain experience with dietary supplements, but it is confined only to certain sub-categories, usually saline supplements employed in sport practice or products to loose weight.

Most interviewees answering they often or regularly use dietary supplements, in fact, referred to those which are sport-related and usually not bought in pharmacy, but rather in supermarkets, bars and gyms (Gatorade and Isostad are the most cited brands). Such products can be considered dietary supplements in a broad sense, but are not included in experimental stimuli. As a matter of fact, when asked to assess their familiarity with the product category frequent or heavy users of sport-related drinks provided a low evaluation, and furthermore they showed a low literacy with respect to product expertise measures.

Consumption and buying activities with respect to other sub-categories of dietary supplements is not so common. Most interviewers answering to have bought at least one dietary supplement have tried a brand once in their life or use one or few brands in certain periods of their life.

As shown in table 6.6, 5 subjects out of 54 have said to consume dietary supplements often or regularly. Among subjects answering to buy dietary supplements often, one has cited brands which are combined dietary supplements for wellness to assume every day, and the subject said to use it twice a week, two have mentioned brands for sport, and two have cited brands of products to loose weight. The interviewee assessing to have a regular consumption has cited a brand which is a combined dietary supplement for wellness, but has specified to use it not continuously (only some months).

Participants subjects' mean self-assessed familiarity with the product category is 2,07 (table 6.7). There are some differences between treatment groups, with groups 1 and 5 having a slightly lower familiarity, but they are not statistically significant.[233] By looking at table 6.8, it appears that self-assessed familiarity with the whole product-category is not always related to frequency of buying and consumption, usually referred to specific brands and sub-categories. For example, those saying to buy often or regularly assessed their familiarity lower than other less frequent consumers.

Table 6.6 – Frequency of purchase and consumption of dietary supplements for the treatment groups

			FREQUENCY OF CONSUMPTION OF DIETARY SUPPLEMENTS					
			never	seldom	from time to time	often	regularly	Total
TREATMENT GROUP	1	Count	5	2	2			9
		% within Treatment group	55,6%	22,2%	22,2%			100,0%
		% within Frequency	27,8%	10,5%	16,7%			16,7%
		% of Total	9,3%	3,7%	3,7%			16,7%
	2	Count	2	3	2	2		9
		% within Treatment group	22,2%	33,3%	22,2%	22,2%		100,0%
		% within Frequency	11,1%	15,8%	16,7%	50,0%		16,7%
		% of Total	3,7%	5,6%	3,7%	3,7%		16,7%
	3	Count	2	6	1			9
		% within Treatment group	22,2%	66,7%	11,1%			100,0%
		% within Frequency	11,1%	31,6%	8,3%			16,7%
		% of Total	3,7%	11,1%	1,9%			16,7%
	4	Count	3	4		1	1	9
		% within Treatment group	33,3%	44,4%		11,1%	11,1%	100,0%
		% within Frequency	16,7%	21,1%		25,0%	100,0%	16,7%
		% of Total	5,6%	7,4%		1,9%	1,9%	16,7%
	5	Count	4	2	3			9
		% within Treatment group	44,4%	22,2%	33,3%			100,0%
		% within Frequency	22,2%	10,5%	25,0%			16,7%
		% of Total	7,4%	3,7%	5,6%			16,7%
	6	Count	2	2	4	1		9
		% within Treatment group	22,2%	22,2%	44,4%	11,1%		100,0%
		% within Frequency	11,1%	10,5%	33,3%	25,0%		16,7%
		% of Total	3,7%	3,7%	7,4%	1,9%		16,7%
Total		Count	18	19	12	4	1	54
		% within Treatment group	33,3%	35,2%	22,2%	7,4%	1,9%	100,0%
		% within Frequency	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	33,3%	35,2%	22,2%	7,4%	1,9%	100,0%

In table 6.9 it is apparent that **saline supplements for sport are the most popularly purchased sub-category for the sample of subjects considered**, in line with their preferences for free time activities. **Also combined supplements useful for wellness are common, followed by products to control and loose weight**, which are mostly purchased by women.

[233] 2 subjects self-assessed their familiarity as 5, but all other subjective (eg. brands and frequency of purchase) and objective (e.g., vocabulary test) measures of experience and expertise didn't support such evaluation, and therefore subjects were retained as novices.

Open ended questions about frequency of purchase and consumption also reveal the seasonality of use of such products. Gatorade (12 subjects) is the leading purchased brand for sport supplements, whereas Multicentrum (6 subjects) and Supradyn (5 subjects) are leaders in combined for wellness.

Almost every participant has been exposed to advertising activity in the target product-category, as revealed by their reported memories, summarized in table 6.10. They recall, on average, 2 brand-advertisements, with a lower mean in groups 1 and 2.[234] Again, Gatorade, Multicentrum and Supradyn are leading brands in advertisement recall, followed by Polase for poli-minerals sub-category and by Kalo for products to loose weight.

Table 6.7 – Self-assessed familiarity with the product category «dietary-supplements

TREATM GROUP		SELF-ASSESSED FAMILIARITY
1	Mean	1,89
	N	9
	Std. Deviation	1,537
	Minimum	1
	Maximum	5
2	Mean	2,22
	N	9
	Std. Deviation	1,481
	Minimum	1
	Maximum	5
3	Mean	2,22
	N	9
	Std. Deviation	1,202
	Minimum	1
	Maximum	5
4	Mean	2,11
	N	9
	Std. Deviation	1,269
	Minimum	1
	Maximum	4
5	Mean	1,89
	N	9
	Std. Deviation	1,364
	Minimum	1
	Maximum	4
6	Mean	2,11
	N	9
	Std. Deviation	1,054
	Minimum	1
	Maximum	4
Total	Mean	2,07
	N	54
	Std. Deviation	1,272
	Minimum	1
	Maximum	5

[234] Differences between groups are not statistical significant.

Table 6.8 – Self-assessed familiarity with the product category for different frequency of purchase/consumption, separately for the treatment groups

SELF-ASSESSED FAMILIARITY

Familiarità la dichta

TREATM GROUI	FREQUENCY	Mean	N	Std. Deviation	Minimum	Maximum
1	never	1,20	5	,447	1	2
	seldom	1,00	2	,000	1	1
	sometimes	4,50	2	,707	4	5
	often					
	regularly					
	Total	1,89	9	1,537	1	5
2	never	1,00	2	,000	1	1
	seldom	1,33	3	,577	1	2
	sometimes	3,50	2	,707	3	4
	often	3,50	2	2,121	2	5
	regularly					
	Total	2,22	9	1,481	1	5
3	never	1,00	2	,000	1	1
	seldom	2,17	6	,408	2	3
	sometimes	5,00	1	.	5	5
	often					
	regularly					
	Total	2,22	9	1,202	1	5
4	never	1,00	3	,000	1	1
	seldom	2,50	4	1,291	1	4
	sometimes					
	often	4,00	1	.	4	4
	regularly	2,00	1	.	2	2
	Total	2,11	9	1,269	1	4
5	never	1,00	4	,000	1	1
	seldom	1,00	2	,000	1	1
	sometimes	3,67	3	,577	3	4
	often					
	regularly					
	Total	1,89	9	1,364	1	4
6	never	1,00	2	,000	1	1
	seldom	2,50	2	,707	2	3
	sometimes	2,75	4	,957	2	4
	often	1,00	1	.	1	1
	regularly					
	Total	2,11	9	1,054	1	4
Total	never	1,06	18	,236	1	2
	seldom	1,89	19	,875	1	4
	sometimes	3,58	12	,996	2	5
	often	3,00	4	1,826	1	5
	regularly	2,00	1	.	2	2
	Total	2,07	54	1,272	1	5

Table 6.9 – Dietary supplements' purchase and consumption, by main sub-category (multiple response allowed), for the treatment groups

	SALINE FOR SPORT						COMBINED FOR WELLNESS						ULTI-MINERALS FOR IMMEDIATE EFFOR RECOVERY						MINO-ACIDS FOR EFFORTFUL PERIODS					
	no			yes			no			yes			no			yes			no			yes		
	Count	Row %	Col %	Count	Row %	Col %	Count	Row %	Col %	Count	Row %	Col %	Count	Row %	Col %	Count	Row %	Col %	Count	Row %	Col %	Count	Row %	Col %
TREAT GROUI 1	5	55,6%	2,2%	4	44,4%	0,8%	8	88,9%	8,6%	1	11,1%	9,1%	8	88,9%	6,3%	1	11,1%	0,0%	9	00,0%	7,0%			
2	7	77,8%	7,1%	2	22,2%	5,4%	7	77,8%	6,3%	2	22,2%	8,2%	8	88,9%	6,3%	1	11,1%	0,0%	9	00,0%	7,0%			
3	7	77,8%	7,1%	2	22,2%	5,4%	7	77,8%	6,3%	2	22,2%	8,2%	9	00,0%	8,4%				9	00,0%	7,0%			
4	6	66,7%	4,6%	3	33,3%	3,1%	7	77,8%	6,3%	2	22,2%	8,2%	9	00,0%	8,4%				9	00,0%	7,0%			
5	9	00,0%	2,0%				8	88,9%	8,6%	1	11,1%	9,1%	8	88,9%	6,3%	1	11,1%	0,0%	8	88,9%	5,1%	1	11,1%	00,0%
6	7	77,8%	7,1%	2	22,2%	5,4%	6	66,7%	4,0%	3	33,3%	7,3%	7	77,8%	4,3%	2	22,2%	0,0%	9	00,0%	7,0%			

	FOR MEMORY						TO CONTROL AND LOOSE WEIGHT						VITAMIN C					
	no			yes			no			yes			no			yes		
	Count	Row %	Col %	Count	Row %	Col %	Count	Row %	Col %	Count	Row %	Col %	Count	Row %	Col %	Count	Row %	Col %
TREATME GROUP 1	9	100,0%	17,6%				9	100,0%	18,4%				9	100,0%	17,6%			
2	9	100,0%	17,6%				8	88,9%	16,3%	1	11,1%	20,0%	9	100,0%	17,6%			
3	7	77,8%	13,7%	2	22,2%	66,7%	8	88,9%	16,3%	1	11,1%	20,0%	8	88,9%	15,7%	1	11,1%	33,3%
4	9	100,0%	17,6%				8	88,9%	16,3%	1	11,1%	20,0%	8	88,9%	15,7%	1	11,1%	33,3%
5	9	100,0%	17,6%				8	88,9%	16,3%	1	11,1%	20,0%	8	88,9%	15,7%	1	11,1%	33,3%
6	8	88,9%	15,7%	1	11,1%	33,3%	8	88,9%	16,3%	1	11,1%	20,0%	9	100,0%	17,6%			

Table 6.10 – Recall of brand-advertisements in the product category «dietary-supplements»

a)

			TREATMENT						
			1	2	3	4	5	6	Total
Recall brand-within dietary product	no	Coun	2	1	3	1			7
		% within recalled advertis	28,6%	14,3%	42,9%	14,3%			100,0
		% within treatment	22,2%	11,1%	33,3%	11,1%			13,0%
		% of	3,7%	1,9%	5,6%	1,9%			13,0%
	yes	Coun	7	8	6	8	9	9	47
		% within recalled advertis	14,9%	17,0%	12,8%	17,0%	19,1%	19,1%	100,0
		% within treatment	77,8%	88,9%	66,7%	88,9%	100,0	100,0	87,0%
		% of	13,0%	14,8%	11,1%	14,8%	16,7%	16,7%	87,0%
Total		Coun	9	9	9	9	9	9	54
		% within recalled advertis	16,7%	16,7%	16,7%	16,7%	16,7%	16,7%	100,0
		% within treatment	100,0	100,0	100,0	100,0	100,0	100,0	100,0
		% of	16,7%	16,7%	16,7%	16,7%	16,7%	16,7%	100,0

b)

TREATM GROI		N. BRANDS WITH ADVERTISM RECALL
1	Mean	1,11
	N	9
	Std. Deviatic	,782
2	Mean	1,56
	N	9
	Std. Deviatic	1,130
3	Mean	2,00
	N	9
	Std. Deviatic	1,936
4	Mean	2,11
	N	9
	Std. Deviatic	1,900
5	Mean	2,67
	N	9
	Std. Deviatic	1,803
6	Mean	2,44
	N	9
	Std. Deviatic	1,333
Total	Mean	1,98
	N	54
	Std. Deviatic	1,560

c)

	TREATMENT GROUP					
	1	2	3	4	5	6
adv Multicentrum (yes)	4	4	4	4	4	5
adv Gatorade	2	3	2	2	4	4
adv Isostad		1		1	1	
adv Powerade		1		1		
adv Polase		1	2	1	1	2
adv Polase sport		1			1	
adv Multiup						1
adv Supradyn	7	9	5	8	8	7
adv Mgkvis			1			
adv vitasohn					1	
adv Selenium ACE	1					
adv Kalo			2	3	5	2
adv Pesoforma	1			2		
adv Slim fast		1				
adv Enervit		1				
adv Kilokal				1		1
adv acutil fosforo					1	1
adv cebion			1	1	1	1
other adv		1			2	1

Table 6.11 – Increase in recall of brands with known advertisement in task 5 versus 1

INCREASE RECALL OF BRANDS WITH KNOW ADVERTISEMENT

Incremento ricordo marche con pubbl

TREATMENT GROUP	Mean	N	Std. Deviation
1	,0000	7	,00000
2	,0000	7	,57735
3	1,4286	7	1,51186
4	1,1429	7	1,46385
5	,7778	9	,83333
6	1,1111	9	1,05409
Total	,7609	46	1,11922

The subjects' familiarity with the product category as a whole or with specific sub-groups, in general, affects their performance in generation task prior and post manipulation. Results appear to confirm frequency of instantiation as a determinant of the typicality and salience of exemplars within a product category.

Subjects usually recalled in task 1 or, after eventual manipulation, in task 5, the brands to which they were exposed to, through advertisements.

It has to be said that subjects were asked which advertisements they recalled at the end of the experiment. Therefore, it is not clear whether their advertisement recall influenced brand recall in experimental generation task, or whether the stimuli manipulation influenced their advertisement recall. Some data (summarized in table 6.11) seems to suggest the second interpretation, given an increased citation of brands with recalled advertisements. Furthermore, the differences between groups reach statistical significance ($p = 0{,}047$). Also a qualitative analysis of individual patterns of response seems to support such interpretation.

The same pattern is found for purchased brands (at least once in life). Subjects recalled, at least partially, the brands they have declared to have bought, without differences between task 1 and 5, as shown by table 6.12 and 6.13. This seems to suggest that at least those brands purchased more than once in life are salient in consumers' category structures, especially when advertisement is recalled too. Although there are some differences among groups, these are not statistically significant. Slightly differences regard brands purchased and recall, therefore minimizing potential heterogeneous inflation for treatment effects on recall, due to previous experience with the brands included in experimental stimuli. An evaluation of the delta in number of brands recalled in task 5 versus task 1, however, must cope with this potential differentiated experience with specific brands (really existent) used in manipulations, providing a more accurate appreciation of the informative potential of assortment presentation.

Participants subjects do not possess significant expertise, as revealed by the set of measures employed (preliminary tested).

A vocabulary test – requiring subjects to specify the nature of main or inactive ingredients for some components' names with respect to the product category of dietary supplements – registered many unanswered items or mistakes.[235]

As shown in table 6.14, 50% of involved subjects admitted of not knowing the difference between main and inactive ingredients, which are always specified in dietary supplements informative labels. A better performance, not statistically significant, is observed in group 3.

Among those arguing to know the difference between the terms, correct answers were on average 5 components out of 12, with 3 main ingredients and 2 inactive substances (table 6.15). It has to be said that some guessing was possible, given all interviewees are Master students and most component names may allow inferences. For this reason, "I don't know" answers can be considered the most reliable measure of the performance of the vocabulary test. Subjects explicitly admitted of not knowing, on average, the meaning of 50% of the provided components, with a certain variability between subjects.

The performance in other definitional tasks was not satisfying either. Most subjects do not know at all or are not sure about the definition of "probiotic" or "functional food", both considered in Italian Health Ministry's recommendations concerning consumer protection with respect to dietary supplements.

[235] Vocabulary tests are very commonly employed as methods of assessing expertise, as suggested by Brucks (1985).

Table 6.12 – Recall of purchased brands in task 1 (before manipulation)

			CITATION OF PURCHASED BRANDS IN TASK 1				
			nd	no	in part	yes	Total
TREATMENT GROUP	1,00	Count	5			4	9
		% within treatm group	55,6%			44,4%	100,0%
		% within Citation	23,8%			20,0%	16,7%
		% of Total	9,3%			7,4%	16,7%
	2,00	Count	4		1	4	9
		% within treatm group	44,4%		11,1%	44,4%	100,0%
		% within Citation	19,0%		16,7%	20,0%	16,7%
		% of Total	7,4%		1,9%	7,4%	16,7%
	3,00	Count	3	1	2	3	9
		% within treatm group	33,3%	11,1%	22,2%	33,3%	100,0%
		% within Citation	14,3%	14,3%	33,3%	15,0%	16,7%
		% of Total	5,6%	1,9%	3,7%	5,6%	16,7%
	4,00	Count	3	2	2	2	9
		% within treatm group	33,3%	22,2%	22,2%	22,2%	100,0%
		% within Citation	14,3%	28,6%	33,3%	10,0%	16,7%
		% of Total	5,6%	3,7%	3,7%	3,7%	16,7%
	5,00	Count	4	3		2	9
		% within treatm group	44,4%	33,3%		22,2%	100,0%
		% within Citation	19,0%	42,9%		10,0%	16,7%
		% of Total	7,4%	5,6%		3,7%	16,7%
	6,00	Count	2	1	1	5	9
		% within treatm group	22,2%	11,1%	11,1%	55,6%	100,0%
		% within Citation	9,5%	14,3%	16,7%	25,0%	16,7%
		% of Total	3,7%	1,9%	1,9%	9,3%	16,7%
Total		Count	21	7	6	20	54
		% within treatm group	38,9%	13,0%	11,1%	37,0%	100,0%
		% within Citation	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	38,9%	13,0%	11,1%	37,0%	100,0%

Table 6.13 – Recall of purchased brands in task 5 (after manipulation)

			CITATION OF PURCHASED BRANDS IN TASK 5				
			nd	no	in part	yes	Total
Treatment group	1	Count	5			4	9
		% within Treatm group	55,6%			44,4%	100,0%
		% within Citation	23,8%			20,0%	16,7%
		% of Total	9,3%			7,4%	16,7%
	2	Count	4		1	4	9
		% within Treatm group	44,4%		11,1%	44,4%	100,0%
		% within Citation	19,0%		16,7%	20,0%	16,7%
		% of Total	7,4%		1,9%	7,4%	16,7%
	3	Count	3	1	2	3	9
		% within Treatm group	33,3%	11,1%	22,2%	33,3%	100,0%
		% within Citation	14,3%	14,3%	33,3%	15,0%	16,7%
		% of Total	5,6%	1,9%	3,7%	5,6%	16,7%
	4	Count	3	2	2	2	9
		% within Treatm group	33,3%	22,2%	22,2%	22,2%	100,0%
		% within Citation	14,3%	28,6%	33,3%	10,0%	16,7%
		% of Total	5,6%	3,7%	3,7%	3,7%	16,7%
	5	Count	4	3		2	9
		% within Treatm group	44,4%	33,3%		22,2%	100,0%
		% within Citation	19,0%	42,9%		10,0%	16,7%
		% of Total	7,4%	5,6%		3,7%	16,7%
	6	Count	2	1	1	5	9
		% within Treatm group	22,2%	11,1%	11,1%	55,6%	100,0%
		% within Citation	9,5%	14,3%	16,7%	25,0%	16,7%
		% of Total	3,7%	1,9%	1,9%	9,3%	16,7%
Total		Count	21	7	6	20	54
		% within Treatm group	38,9%	13,0%	11,1%	37,0%	100,0%
		% within Citation	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	38,9%	13,0%	11,1%	37,0%	100,0%

Table 6.14 – Vocabulary test performance: knowing the difference between main ingredients and inactive ingredients

			KNOW DIFFERENCE		
			no	yes	Total
TREATMENT GROUP	1	Count	6	3	9
		% within Treatm G	66,7%	33,3%	100,0%
		% within Know diff	22,2%	11,1%	16,7%
		% of Total	11,1%	5,6%	16,7%
	2	Count	5	4	9
		% within Treatm G	55,6%	44,4%	100,0%
		% within Know diff	18,5%	14,8%	16,7%
		% of Total	9,3%	7,4%	16,7%
	3	Count	3	6	9
		% within Treatm G	33,3%	66,7%	100,0%
		% within Know diff	11,1%	22,2%	16,7%
		% of Total	5,6%	11,1%	16,7%
	4	Count	5	4	9
		% within Treatm G	55,6%	44,4%	100,0%
		% within Know diff	18,5%	14,8%	16,7%
		% of Total	9,3%	7,4%	16,7%
	5	Count	4	5	9
		% within Treatm G	44,4%	55,6%	100,0%
		% within Know diff	14,8%	18,5%	16,7%
		% of Total	7,4%	9,3%	16,7%
	6	Count	4	5	9
		% within Treatm G	44,4%	55,6%	100,0%
		% within Know diff	14,8%	18,5%	16,7%
		% of Total	7,4%	9,3%	16,7%
Total		Count	27	27	54
		% within Treatm G	50,0%	50,0%	100,0%
		% within Know diff	100,0%	100,0%	100,0%
		% of Total	50,0%	50,0%	100,0%

Table 6.15 – Vocabulary test performance: identifying main ingredients and inactive ingredients of dietary supplements

TREATMENT GROUP		N.CORRECT MAIN COMPON	N. CORRECT INACTIVE COMPON	N. CORRECT ANSWERS	% CORRECT ANSWERS	N. NOT KNOWN	% NOT KNOWN
1	Mean	2,0000	1,5000	3,5000	29,1667	5,5000	45,8333
	N	2	2	2	2	2	2
	Std. Deviation	1,41421	,70711	,70711	5,89256	3,53553	29,46278
	Minimum						
	Maximum						
2	Mean	3,3333	1,6667	5,0000	41,6667	6,7500	56,2500
	N	3	3	3	3	4	4
	Std. Deviation	2,30940	1,52753	3,60555	30,04626	4,78714	39,89280
	Minimum						
	Maximum						
3	Mean	3,0000	1,8333	4,8333	40,2778	5,3333	44,4444
	N	6	6	6	6	6	6
	Std. Deviation	1,67332	1,72240	2,03680	24,39072	3,93277	32,77307
	Minimum						
	Maximum						
4	Mean	2,0000	1,2500	3,2500	27,0833	7,7500	64,5833
	N	4	4	4	4	4	4
	Std. Deviation	2,82843	1,50000	3,94757	32,89644	5,05800	42,14997
	Minimum						
	Maximum						
5	Mean	2,8000	1,4000	4,2000	35,0000	6,6000	55,0000
	N	5	5	5	5	5	5
	Std. Deviation	2,68328	1,34164	3,96232	33,01935	4,97996	41,49967
	Minimum						
	Maximum						
6	Mean	4,0000	2,5000	6,5000	54,1667	4,1667	34,7222
	N	6	6	6	6	6	6
	Std. Deviation	2,82843	1,04881	3,27109	27,25905	3,86868	32,23898
	Minimum						
	Maximum						
Total	Mean	3,0000	1,7692	4,7692	39,7436	5,8889	49,0741
	N	26	26	26	26	27	27
	Std. Deviation	2.29783	1,33589	3,25340	27,11167	4,15408	34,61738
	Minimum						
	Maximum						

Table 6.16 – Vocabulary test performance:
knowing specific definitions

		PROBIOTIC NAME				
		orrect answe	wrong answer 1	don't know	wrong answer 2	Total
TREATMEI GROUP	1 Count			9		9
	% within Treatr			100,0%		100,0%
	% within name			19,6%		16,7%
	% of Total			16,7%		16,7%
	2 Count			9		9
	% within Treatr			100,0%		100,0%
	% within name			19,6%		16,7%
	% of Total			16,7%		16,7%
	3 Count		2	6	1	9
	% within Treatr		22,2%	66,7%	11,1%	100,0%
	% within name		66,7%	13,0%	100,0%	16,7%
	% of Total		3,7%	11,1%	1,9%	16,7%
	4 Count	2		7		9
	% within Treatr	22,2%		77,8%		100,0%
	% within name	50,0%		15,2%		16,7%
	% of Total	3,7%		13,0%		16,7%
	5 Count			8		9
	% within Treatr			100,0%		100,0%
	% within name			19,6%		16,7%
	% of Total			16,7%		16,7%
	5 Count	2	1	6		9
	% within Treatr	22,2%	11,1%	66,7%		100,0%
	% within name	50,0%	33,3%	13,0%		16,7%
	% of Total	3,7%	1,9%	11,1%		16,7%
Total	Count	4	3	46	1	54
	% within Treatr	7,4%	5,6%	85,2%	1,8%	100,0%
	% within name	100,0%	100,0%	100,0%	100,0%	100,0%
	% of Total	7,4%	5,6%	85,2%	1,9%	100,0%

		KNOWLEDGE FUNCT FOOD			
		no	not sure	yes	Total
TREATMEN GROUP	1 Count	3	6		9
	% within Treatr	33,3%	66,7%		100,0%
	% within knowl	10,3%	28,6%		16,7%
	% of Total	5,6%	11,1%		16,7%
	2 Count	6	2	1	9
	% within Treatr	66,7%	22,2%	11,1%	100,0%
	% within knowl	20,7%	9,5%	25,0%	16,7%
	% of Total	11,1%	3,7%	1,8%	16,7%
	3 Count	5	4		9
	% within Treatr	55,6%	44,4%		100,0%
	% within knowl	17,2%	19,0%		16,7%
	% of Total	9,3%	7,4%		16,7%
	4 Count	4	5		9
	% within Treatr	44,4%	55,6%		100,0%
	% within knowl	13,8%	23,8%		16,7%
	% of Total	7,4%	9,3%		16,7%
	5 Count	6	2	1	9
	% within Treatr	66,7%	22,2%	11,1%	100,0%
	% within knowl	20,7%	9,5%	25,0%	16,7%
	% of Total	11,1%	3,7%	1,8%	16,7%
	6 Count	5	2	2	9
	% within Treatr	55,6%	22,2%	22,2%	100,0%
	% within knowl	17,2%	9,5%	50,0%	16,7%
	% of Total	9,3%	3,7%	3,7%	16,7%
Total	Count	29	21	4	54
	% within Treatr	53,7%	38,9%	7,4%	100,0%
	% within knowl	100,0%	100,0%	100,0%	100,0%
	% of Total	53,7%	38,9%	7,4%	100,0%

As a more interesting assessment of their non-expert status, participants didn't perform well in the task of associating nutritional components to specific functions of human organism. This task has to do with attributes-benefits links in the target product category, and it is a pre-requisite to self-selection of dietary supplements.[236]

Interviewees stated, on average, of not knowing the nutritional components useful for about 50% of the human body functions (table 6.17), with a relatively better performance for group 6 and worst for group 1 (not significant).

When answering, subjects demonstrated a differentiated awareness, depending on the specific function. Performance was low for anti-aging and sexual functions, and it was better for nervous, immunizing, and support functions, as shown in table 6.18. It has to be noticed that when correctly answering, subjects were providing only one substance, usually well-know to have the specified consequence-properties: vitamin B for nervous function, vitamins for immunizing function and calcium for support function.

[236] Brucks (1985) considers such aspect as very common, too, in consumers' knowledge measurement.

Table 6.17 – Test of awareness for component-consequences relationships

TREATM GROUP		N of FUNCTIONS WITHOUT ANSWER	% of NON RESPONSE for FUNCTIONS
1	Mean	3,22	64,44
	N	9	9
	Std. Deviation	,972	19,437
2	Mean	2,33	46,67
	N	9	9
	Std. Deviation	1,225	24,495
3	Mean	2,00	40,00
	N	9	9
	Std. Deviation	,707	14,142
4	Mean	2,78	55,56
	N	9	9
	Std. Deviation	1,394	27,889
5	Mean	2,22	44,44
	N	9	9
	Std. Deviation	1,787	35,746
6	Mean	1,89	37,78
	N	9	9
	Std. Deviation	1,537	30,732
Total	Mean	2,41	48,15
	N	54	54
	Std. Deviation	1,339	26,782

Data concerning subjects playing a role in influencing individual purchases of dietary supplements provide additional evidence in support of interviewees' low ability and self-confidence when choosing an appropriate product: usually sport supplements are bought following a personal decision or the trainers' suggestions, whereas for other sub-categories the medical advice is necessary.

Given the complex and interrelated nature of product-category experience and expertise, each subject's answers to the screening-questionnaire were assessed on a case-by-case basis by two independent judges (besides the author), to assess whether the novice status could be recognized referring to the whole product-category of dietary supplements. That is, both subjective and objective measures were combined to obtain an overall evaluation of the novice status. 9 subjects were not admitted to the experiment due to their experience and expertise profile, unanimously judged as not low by the judges.

Table 6.18 – Test of awareness for component-consequences relationships: details

			ANTIAGING FUNCTION				
			missing	wrong answer	don't know	yes	Total
TREATMENT GROUP	1	Count		4	4	1	9
		% within Treatm G		44,4%	44,4%	11,1%	100,0%
		% within Antiage F		16,0%	23,5%	16,7%	16,7%
		% of Total		7,4%	7,4%	1,9%	16,7%
	2	Count		7	2		9
		% within Treatm G		77,8%	22,2%		100,0%
		% within Antiage F		28,0%	11,8%		16,7%
		% of Total		13,0%	3,7%		16,7%
	3	Count		4	3	2	9
		% within Treatm G		44,4%	33,3%	22,2%	100,0%
		% within Antiage F		16,0%	17,6%	33,3%	16,7%
		% of Total		7,4%	5,6%	3,7%	16,7%
	4	Count	3	3	2	1	9
		% within Treatm G	33,3%	33,3%	22,2%	11,1%	100,0%
		% within Antiage F	50,0%	12,0%	11,8%	16,7%	16,7%
		% of Total	5,6%	5,6%	3,7%	1,9%	16,7%
	5	Count	2	3	3	1	9
		% within Treatm G	22,2%	33,3%	33,3%	11,1%	100,0%
		% within Antiage F	33,3%	12,0%	17,6%	16,7%	16,7%
		% of Total	3,7%	5,6%	5,6%	1,9%	16,7%
	6	Count	1	4	3	1	9
		% within Treatm G	11,1%	44,4%	33,3%	11,1%	100,0%
		% within Antiage F	16,7%	16,0%	17,6%	16,7%	16,7%
		% of Total	1,9%	7,4%	5,6%	1,9%	16,7%
Total		Count	6	25	17	6	54
		% within Treatm G	11,1%	46,3%	31,5%	11,1%	100,0%
		% within Antiage F	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	11,1%	46,3%	31,5%	11,1%	100,0%

			NERVOUS FUNCTION				
			missing	wrong answer	don't know	correct answer	Total
TREATMENT GROUP	1	Count	4	1	3	1	9
		% within Treat G	44,4%	11,1%	33,3%	11,1%	100,0%
		% within Nerv F	28,6%	12,5%	15,8%	7,7%	16,7%
		% of Total	7,4%	1,9%	5,6%	1,9%	16,7%
	2	Count	3	1	1	4	9
		% within Treat G	33,3%	11,1%	11,1%	44,4%	100,0%
		% within Nerv F	21,4%	12,5%	5,3%	30,8%	16,7%
		% of Total	5,6%	1,9%	1,9%	7,4%	16,7%
	3	Count		2	4	3	9
		% within Treat G		22,2%	44,4%	33,3%	100,0%
		% within Nerv F		25,0%	21,1%	23,1%	16,7%
		% of Total		3,7%	7,4%	5,6%	16,7%
	4	Count	2	1	5	1	9
		% within Treat G	22,2%	11,1%	55,6%	11,1%	100,0%
		% within Nerv F	14,3%	12,5%	26,3%	7,7%	16,7%
		% of Total	3,7%	1,9%	9,3%	1,9%	16,7%
	5	Count	1	1	4	3	9
		% within Treat G	11,1%	11,1%	44,4%	33,3%	100,0%
		% within Nerv F	7,1%	12,5%	21,1%	23,1%	16,7%
		% of Total	1,9%	1,9%	7,4%	5,6%	16,7%
	6	Count	4	2	2	1	9
		% within Treat G	44,4%	22,2%	22,2%	11,1%	100,0%
		% within Nerv F	28,6%	25,0%	10,5%	7,7%	16,7%
		% of Total	7,4%	3,7%	3,7%	1,9%	16,7%
Total		Count	14	8	19	13	54
		% within Treat G	25,9%	14,8%	35,2%	24,1%	100,0%
		% within Nerv F	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	25,9%	14,8%	35,2%	24,1%	100,0%

			IMMUNIT FUNCTION				
			missing	wrong answer	don't know	correct answer	Total
TREATMENT GROUP	1	Count	2	2	1	4	9
		% within Treat G	22,2%	22,2%	11,1%	44,4%	100,0%
		% within Immun F	40,0%	22,2%	10,0%	13,3%	16,7%
		% of Total	3,7%	3,7%	1,9%	7,4%	16,7%
	2	Count	1	2	2	4	9
		% within Treat G	11,1%	22,2%	22,2%	44,4%	100,0%
		% within Immun F	20,0%	22,2%	20,0%	13,3%	16,7%
		% of Total	1,9%	3,7%	3,7%	7,4%	16,7%
	3	Count		2	3	4	9
		% within Treat G		22,2%	33,3%	44,4%	100,0%
		% within Immun F		22,2%	30,0%	13,3%	16,7%
		% of Total		3,7%	5,6%	7,4%	16,7%
	4	Count	2	1	1	5	9
		% within Treat G	22,2%	11,1%	11,1%	55,6%	100,0%
		% within Immun F	40,0%	11,1%	10,0%	16,7%	16,7%
		% of Total	3,7%	1,9%	1,9%	9,3%	16,7%
	5	Count			2	7	9
		% within Treat G			22,2%	77,8%	100,0%
		% within Immun F			20,0%	23,3%	16,7%
		% of Total			3,7%	13,0%	16,7%
	6	Count		2	1	6	9
		% within Treat G		22,2%	11,1%	66,7%	100,0%
		% within Immun F		22,2%	10,0%	20,0%	16,7%
		% of Total		3,7%	1,9%	11,1%	16,7%
Total		Count	5	9	10	30	54
		% within Treat G	9,3%	16,7%	18,5%	55,6%	100,0%
		% within Immun F	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	9,3%	16,7%	18,5%	55,6%	100,0%

			SUPPORT FUNCTION				
				no	non so	sì	Total
TREATMENT GROUP	1	Count	3	1	3	2	9
		% within Treat G	33,3%	11,1%	33,3%	22,2%	100,0%
		% within Supp F	60,0%	14,3%	42,9%	5,7%	16,7%
		% of Total	5,6%	1,9%	5,6%	3,7%	16,7%
	2	Count			1	8	9
		% within Treat G			11,1%	88,9%	100,0%
		% within Supp F			14,3%	22,9%	16,7%
		% of Total			1,9%	14,8%	16,7%
	3	Count		2		7	9
		% within Treat G		22,2%		77,8%	100,0%
		% within Supp F		28,6%		20,0%	16,7%
		% of Total		3,7%		13,0%	16,7%
	4	Count	2	1		6	9
		% within Treat G	22,2%	11,1%		66,7%	100,0%
		% within Supp F	40,0%	14,3%		17,1%	16,7%
		% of Total	3,7%	1,9%		11,1%	16,7%
	5	Count		1	2	6	9
		% within Treat G		11,1%	22,2%	66,7%	100,0%
		% within Supp F		14,3%	28,6%	17,1%	16,7%
		% of Total		1,9%	3,7%	11,1%	16,7%
	6	Count		2	1	6	9
		% within Treat G		22,2%	11,1%	66,7%	100,0%
		% within Supp F		28,6%	14,3%	17,1%	16,7%
		% of Total		3,7%	1,9%	11,1%	16,7%
Total		Count	5	7	7	35	54
		% within Treat G	9,3%	13,0%	13,0%	64,8%	100,0%
		% within Supp F	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	9,3%	13,0%	13,0%	64,8%	100,0%

			SEXUAL FUNCTION				
			missing	wrong answer	don't know	yes	Total
TREATMENT GROUP	1	Count	4	1	4		9
		% within Treat G	44,4%	11,1%	44,4%		100,0%
		% within Sex F	33,3%	16,7%	11,4%		16,7%
		% of Total	7,4%	1,9%	7,4%		16,7%
	2	Count	4		5		9
		% within Treat G	44,4%		55,6%		100,0%
		% within Sex F	33,3%		14,3%		16,7%
		% of Total	7,4%		9,3%		16,7%
	3	Count			9		9
		% within Treat G			100,0%		100,0%
		% within Sex F			25,7%		16,7%
		% of Total			16,7%		16,7%
	4	Count	3	1	5		9
		% within Treat G	33,3%	11,1%	55,6%		100,0%
		% within Sex F	25,0%	16,7%	14,3%		16,7%
		% of Total	5,6%	1,9%	9,3%		16,7%
	5	Count		3	6		9
		% within Treat G		33,3%	66,7%		100,0%
		% within Sex F		50,0%	17,1%		16,7%
		% of Total		5,6%	11,1%		16,7%
	6	Count	1	1	6	1	9
		% within Treat G	11,1%	11,1%	66,7%	11,1%	100,0%
		% within Sex F	8,3%	16,7%	17,1%	100,0%	16,7%
		% of Total	1,9%	1,9%	11,1%	1,9%	16,7%
Total		Count	12	6	35	1	54
		% within Treat G	22,2%	11,1%	64,8%	1,9%	100,0%
		% within Sex F	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	22,2%	11,1%	64,8%	1,9%	100,0%

6.2. DEFINITION OF VARIABLES

Given the experimental design described earlier (chapter 5, experiment 1), the two independent manipulated variables are «Pop availability», which is a qualitative dichotomous variable (two levels are no and yes), and «Display availability» which is another qualitative variable which may assume three levels (no, supply-based, consumer-based).

The outcome variable of interest is consumers' product knowledge category structure, which can be analyzed in terms of its components (in isolation as well as related).

Consumers' product category knowledge structure has been measured as outcome in the experiment, with respect to:

- brands;[237]
- sub-groups (or sub-categories);
- associations between brands and sub-groups;
- motivations underlying such associations.

Furthermore, the personal degree of confidence when recalling a brand, a sub-group or an association referred to the product category of dietary supplements has been requested, through self-assessment on a three point scale (sure, almost sure, not sure).

The complexity of the task performed by participant subjects during the experimental procedure allows an assessment of consumers' product category knowledge structures in quantitative terms (e.g., how many brands, sub-groups, associations) and in qualitative aspects (e.g., which sub-groups, with which strength of association/confidence).

By considering the quantitative and qualitative aspects of participants' product category structure after eventual manipulations (POP and/or Display) a first appreciation of whether the experimental manipulation has engendered an effect on

[237] Actually, during the experimental procedure, both terms brands and variants were used when illustrating the task. Most consumers reported brands, whereas some of them reported some components as variants, whereas others reported specific flavour alternatives as variants. Although offering interesting insights on novices' personal knowledge about a product category, the focus in this chapter will be on data referred to brands.

the dependent variable of interest can be obtained. The dependent variable can be considered to be, in this case, product category structure after the eventual manipulation (in task 5), measured through several indexes.

A comparison of the participants' category structures measures as emerging in task 5, between different treatment groups (by means of an ANOVA) will highlight any significant difference.

The experimental procedure, actually, entails the repetition of exactly the same task before any eventual manipulations (task 1) and after the manipulations (task 5). **This will allow a comparison of the subjective performance on the dependent variable within the experiment, thus offering a more accurate assessment of the eventual learning (in a dynamic sense) occurring throughout the experimental stages.** The dependent variable can be considered here to be product category learning, operationalized as changes in the individual product category knowledge structure during the experiment, measured through several indexes. **A comparison of the changes in individual product category structures between different treatment groups (by means of an ANOVA) will signal any significant difference.**

Unfortunately the "delta" variables are computed ones and this, from a statistical perspective, will reduce the degrees of freedom when conducting ANOVA.

Due to the low sample size in this pilot test of the experimental procedure, for delta variables it will be not so easy to respect all the assumptions underlying ANOVA, thus compromising the possibility to detect any effect. Nevertheless, such indexes of the dependent variables are computed and the ANOVA performed to gain a first grasp.

Table 6.19 summarizes all the indexes for the dependent variables «product category knowledge structure» and «changes in product category knowledge structures» which can be construed, based on the experimental procedure followed for the pilot study investigating incidental learning opportunities related to assortment presentation by categories.

In the first column of the table the indexes which can be obtained in both task 1 and 5 with respect to brands, sub-groups and associations are listed. All these indexes can be considered various measures of the «product category knowledge structure». Each of them has peculiarities, thus producing information of different kind. Some indexes try to solve some potential faults of others (preceding rows in the table list), which are mentioned in the last column. The second column specifies when a delta variable can be calculated by comparing performance in task 1 and 5. Indexes in the second column can therefore be considered as indexes to measure «changes in product category knowledge structures». The third column specifies potential problems encountered when calculating the index, some of which can be overcome and some others not.

Different groups of indexes can serve distinct purposes, when qualifying the effects exposure to assortment presentation may have at a cognitive level.

To obtain an assessment of "improving" learning – to be intended as knowledge changes in both quantitative and qualitative terms, such as adding elements to cognitive structures in an appropriate way – total number of proper brands, proper sub-groups and correct associations seem to be more appropriate.

Sub-group composition by nature and stimuli familiarity are more apt at assessing the influence of experimental stimuli which shows up as qualitative changes in cognitive structures. All other indexes can be useful to further refine understanding of what's happening to individual product category knowledge structures during the experiment (i.e., remind effect vs. "cognitive appropriation" of the categorization suggested by provided stimuli).

Table 6.19 – Indexes to assess quantitative and qualitative aspects of «product category knowledge structures» and «changes in product category knowledge structures»

BRANDS

TASK 1 AND TASK 5	COMPARISON TASK 1 AND 5	POTENTIAL PROBLEMS	MEANING
Brand-recall (*)		Recalled vs. associated: some brands can be only recalled without being associated to any sub-group	
Total number of recalled brands (disregarding degree of confidence and correctness)	Delta (%) total number of recalled brands	Components rather than brands; umbrella brands	The comparison can show a "remind" as well as a "learning" effect. Furthermore, the confidence can vary, and not all the recalled brands are necessarily correct.
"Qualified" brand-recall (*)			
N and % of «sure» brands recalled	Delta (n. and %) sure brands recalled	Lack of specification of degree of confidence	It can be considered a measure of change in participants' "subjective" knowledge of the product category, in terms of brands, during the experiment.
N. and % of «proper» brands recalled	Delta (n. and %) of proper brands recalled	Subjective evaluation of proper (independent judges)	It can be considered a measure of change in participants' "objective" knowledge of the product category, in terms of brands, during the experiment.
Stimulus Dominance for Brands (*) (**)			
% of incidence of number of recalled brands which are included in display-stimuli on total number of recalled brands	Delta stimulus dominance for brands		The comparison can show how the dominance of the recalled brand-set by stimuli-brands evolves over the experiment.
Stimulus Familiarity for Brands (*) (**)			
% of the brands included in display-stimuli which are recalled by the subject	Delta stimulus familiarity for brands		The comparison can show how the subject's familiarity with the displayed brands evolves over the experiment.

(*) = The same indexes can be calculated with respect to the brands which are associated to a sub-group besides being recalled [associated brands]

(**) = The same indexes can be calculated with respect to only Sure and Proper brands, too.

SUB-GROUPS

TASK 1 AND TASK 5	COMPARISON TASK 1 AND 5	POTENTIAL PROBLEMS	MEANING
Sub-group-recall (*)		Recalled vs. associated: some sub-groups can be only recalled without being associated to any brand	
Total number of recalled sub-groups (disregarding degree of confidence and correctness)	Delta (%) total number of recalled sub-groups	Sub-groups which are not at the same level, not mutually exclusive sub-groups	The comparison can show a "recall" as well as a "learning" effect. Furthermore, the confidence can vary and not all the recalled brands are necessarily correct.
"Qualified" sub-group recall (*)			
N. and % of «sure» sub-groups recalled	Delta (n. and %) of sure sub-groups recalled	Lack of specification of degree of confidence	It can be considered a measure of change in participants' "subjective" knowledge of the product category, in terms of sub-groups, during the experiment
N. and % of «proper» sub-groups recalled	Delta (n. and %) of proper sub-groups recalled	Subjectivity, multiple levels in sub-groups	It can be considered a measure of change in participants' "objective" knowledge of the product category, in terms of sub-groups, during the experiment.
Stimulus Dominance for Sub-groups_brochure (*) (**)			
% of incidence of the number of recalled sub-groups which are included in brochure-stimulus on the total number of recalled sub-groups	Delta stimulus dominance for sub-groups in brochure	Subjectivity in assessing similarity between recalled sub-groups and brochure sub-groups; name and motivations to be compared to name and rules (components, benefits)	The comparison can show how the dominance of the recalled sub-group set by sub-groups in the brochure evolves over the experiment.
Stimulus Familiarity for Sub-groups_brochure (*) (**)			
% of the sub-groups included in brochure-stimulus which are recalled by the subject	Delta stimulus familiarity for sub-groups in brochure		The comparison can show how the subject's familiarity with the sub-groups in the brochure evolves over the experiment.

Stimulus Dominance for Sub-groups_supply-based display (*) (**)			
% of incidence of the number of recalled sub-groups which are included in supply-based display-stimulus on the total number of recalled sub-groups	Delta stimulus dominance for sub-groups in SB display	Subjectivity in assessing similarity between recalled sub-groups and supply-based display's sub-groups; name, exemplars and motivations to be compared to name and exemplars	The comparison can show how the dominance of the recalled sub-group set by sub-groups in the supply-based display evolves over the experiment.
Stimulus Familiarity for Sub-groups_supply-based display (*) (**)			
% of the sub-groups included in supply-based display-stimulus which are recalled by the subject	Delta familiarity dominance for sub-groups in SB display	Subjectivity in assessing similarity between recalled sub-groups and supply-based display's sub-groups; name, exemplars and motivations to be compared to name and exemplars	The comparison can show how the subject's familiarity with the sub-groups in the supply-based display evolves over the experiment.
Stimulus Dominance for Sub-groups_consumer-based display (*) (**)			
% of incidence of number of recalled sub-groups included in consumer-based display-stimulus on total number of recalled sub-groups	Delta dominance for sub-groups in CB display	Subjectivity in assessing similarity between recalled sub-groups and supply-based display's sub-groups; name, exemplars and motivations to be compared to name and exemplars	The comparison can show how the dominance of the recalled sub-group set by sub-groups in the consumer-based display evolves over the experiment.

Stimulus Familiarity for Sub-groups_consumer-based display (*) (**)			
% of the sub-groups included in consumer-based display-stimulus which are recalled by the subject	Delta familiarity for sub-groups in CB display	Subjectivity in assessing similarity between recalled sub-groups and supply-based display's sub-groups; name, exemplars and motivations to be compared to name and exemplars	The comparison can show how the subject's familiarity with the sub-groups in the consumer-based display evolves over the experiment.
Sub-groups nature (*) (**)			
% of incidence of sub-groups of different nature on the total number of sub-groups recalled by the subject ↳ physical appearance (bottom-up) ↳ composition (bottom-up) ↳ usage/goal (top-down)	Delta sub-group nature	Subjectivity in assessing the nature of the sub-groups (based on name, exemplars, motivations) Multiple levels in recalled sub-groups	It shows whether the recalled sub-group set changes or not in terms of kind of sub-groups.

(*) = The same indexes can be calculated with respect to the sub-groups which are associated to a brand besides being recalled [associated sub-groups]

(**) = The same indexes can be calculated with respect to only Sure and Proper sub-groups, too.

ASSOCIATIONS

TASK 1 AND TASK 5	COMPARISON TASK 1 AND 5	POTENTIAL PROBLEMS	MEANING
Association recall (**)			
Total number of associations made by the subject	Delta (%) in total number of associations	Difficulty in finding a standard to compute a relative index. Not every combination recalled brand and recalled sub-group can be a potential associations. Multiple associations (e.g., umbrella brands, brand in different physical appearance etc.)	Rough index of the increase in product-category structural density. The subject may make multiple associations, with different degrees of confidence, not necessarily correct.
"Qualified" associations			
% of incidence of the number of «sure» associations made by the subject on the total number of associations made	Delta % incidence sure associations	Lack of specification of degree of confidence; degree of confidence for association vs. combination of degree of confidence for corresponding brands and sub-groups	It can be considered a rough measure of change in participants' "subjective" knowledge of the product category during the experiment.
% of incidence of the number of «proper» associations made by the subject on the total number of associations made	Delta % incidence proper associations	Subjectivity in evaluating proper associations; multiple levels for sub-groups, and multiple associations true for the same brand	It can be considered a rough measure of change in participants' "objective" knowledge of the product category during the experiment.
Total number of associations one-to-one made by the subject	Delta (%) in total number of associations		Trying to refine previous indexes to avoid multiple associations problems.
Stimulus dominance for associations_Supply-based display (**)			
% of incidence of the associations included in supply-based display-stimulus on the total number of associations made by the subject	Delta dominance for associations in SB display		It is affected by multiple vs. one-to-one associations.

Stimulus familiarity for associations_Supply-based display (**)			
% of the associations included in supply-based display-stimulus which are made by the subject	Delta familiarity for associations in SB display		It shows how the portion of the stimulus shelf-display evolves during the experiment. It is not affected by multiple associations.
Stimulus dominance for associations_Consumer-based display (**)			
% of incidence of the associations included in consumer-based display-stimulus on the total number of associations made by the subject	Delta dominance for associations in CB display		It is affected by multiple vs. one-to-one associations.
Stimulus familiarity for associations_Consumer-based display (**)			
% of the associations included in consumer-based display-stimulus which are made by the subject	Delta familiarity for associations in CB display	It shows how the portion of the stimulus shelf-display evolves during the experiment. It is not affected by multiple associations.	

(**) The same indexes can be calculated with respect to only Sure and Proper (one-to-one) associations, too.

6.3. DATA ANALYSIS AND RESULTS

The preliminary steps required to perform experimental data analysis have been data entry, followed by data coding and computation of variables (e.g., % of incidence and delta). Data analysis consists of:

- data exploration (e.g., summary tables with descriptive statistics and normality tests),
- between subjects factorial ANOVA, with a preliminary check of assumptions underlying this analysis (e.g., homogeneity of variances),

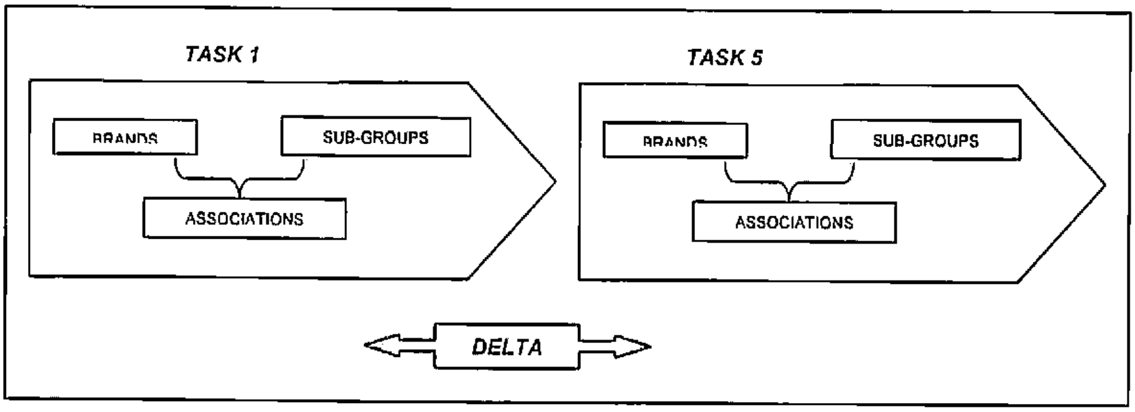
and it is conducted with the help of statistic software.

The experiment run as a pilot study (referred to as experiment 1 in chapter 5) is a **completely randomized factorial design** (Keppel, 1991: p. 19), in which each subject is assigned randomly to only one of the treatment conditions. As factorial design, the arrangement of the treatment conditions allows getting information about the influence of each of the independent variables considered separately (main effects), as well as about how the independent variables (POP and display) combine (interaction effects) to influence the outcome-performance of interest (novice consumers' product category structure and representation in mind, as revealed by recall).

6.3.1. OVERVIEW

A between-subject factorial ANOVA has been performed, using SPSS software v.10, with all the indexes described in table 6.19. The results of the analysis are presented here following the schema suggested in figure 6.1, that is, organized with respect to the different components of consumers' product-category knowledge considered as dependent variables: brands, sub-groups, associations. Furthermore, besides considering effects on the subjects' performance in task 5 (after eventual manipulation), delta of performance between task 1 and 5 will be examined.

Figure 6.1 – A scheme for summarizing results of experimental data analysis



Before starting ANOVA, a **preliminary data exploration** has been run to **check whether underlying assumptions hold**, especially normality and homogeneity of error variances.

The additional assumption of independence of scores (both within and between groups) can be considered achieved through randomly assigning subjects to conditions and testing them individually (Keppel, 1991: p. 97).

To check for **normality**, two tests are available in SPSS software: the Kolmogorov-Smirnov and Shapiro-Wilk tests. When such tests are non significant (p> 0,05) they indicate that the distribution of the sample is not significantly different from a normal distribution, whereas when the test is significant (p< 0,05) it signals a deviation from normality (Field, 2000: 31).

To test **homogeneity of error variances,** SPSS sets as default, in ANOVA procedure, Levene's test. Such test is used to assess the tenability of the assumption of equal variances, since it looks at whether there are any significant differences between group variances. A non-significant result (sig. >0,05) of the Levene's test indicates that the assumption of homogeneity of variances is respected (Field, 2000: 317).

The results of the exploratory analysis on all measures of the dependent variables, to check their respect of normality are summarized in table Appendix H. As it is easily apparent, most distributions present a deviation from normality and this should be related to the low sample size. In addition, some variables show heterogeneity of variances.

Such conditions may affect subsequent analysis. The F test is not particularly affected by normality assumption violation when the distributions of scores are symmetrical and sample size are equal but are greater than n=12 (Keppel, 1991: p. 97). This is not the case here. Therefore, it should be advisable to shift significance level from the typical α=0,05 to a more stringent criterion such as 0,025 or even 0,001 to provide a reasonable correction to any distortion that might occur under these circumstances.

Normality is important for inference purposes, but this isn't of great concern since our convenient sample precludes generalizations to the population. ANOVA is robust, so estimates can be considered consistent, although not efficient.

Some steps must be taken to try to overcome the violation of the assumption of homogeneity of variances. Heterogeneity of variance leads to an increase in type I error (that is, rejecting H_0 of homogeneity of group means when H_0 is true). Also this situation may be faced by adopting a more stringent significance level (Keppel, 1991: p. 106), such as α=0,025 (especially when the ratio of the largest to the smallest variance is greater than 3:1).

When running the analysis, Type IV Sum of Squares was specified as method to calculate sums of squares in ANOVA model, following Field's (2000: p. 312) suggestion, to cope with eventual missing values.

The main output of ANOVA is the **overall F test**, which is considered a omnibus test because of its composite nature (Keppel, 1991: p. 111). **A non-significant overall F test leads to the conclusion that the particular sample means observed show differences that are reasonably accounted for by experimental error. A significant overall F test leads to the conclusion that differences among groups are present, somewhere, without specifying which particular differences among the group means are the real ones. Further analytical comparisons can be done, following a significant F test on the entire experiment.**

Analytical comparisons (or planned contrasts) are meaningful comparisons between two or more treatment conditions, which are components of a larger experimental design. **Analytical comparisons are more appropriate to extract information critical to the status of the research questions underlying the experiment.** Analytical comparisons can be conducted directly on a set of data to test specific hypotheses, without reference to the significance or not of the omnibus F test.

Actually, SPSS software allows certain analytical comparisons to be done between levels of a single factor. For example, the simple contrast option refers to a comparison between each category/level of an independent variable and a category/level which is considered as reference (Field, 2000: p. 272). Usually this option is suggested to compare different treatment levels with a control level (e.g. display SB and CB vs. no display as control level for Display Arrangement factor).

To obtain comparisons between specific cells of between-subjects factorial designs other software must be more appropriate, giving complete flexibility to the researcher.

Such kind of planned comparisons could be interesting in this study to test more specific hypotheses, including some stated in chapter 5. For example, by looking at table 6.20, a comparison between group 6 and 4 (differing in the kind of display provided, having both POP available), can be useful to test the hypothesis of different effects for congruent vs. not-congruent actions on distinct assortment presentation tools.

Such investigations, although very interesting for the research purposes stated, are dismissed here, for practical problems. They will be done with respect to future replications of the experiment, with a larger sample size which may meet all assumptions underlying ANOVA, and with data analyzed with more specialized software.

Table 6.20 – Example of planned contrast theory-driven

Group	G1	G2	G3	G4	G5	G6
POP	No	Yes	No	Yes	No	Yes
Display	No	No	Yes-SB	Yes-SB	Yes-CB	Yes-CB

SPSS software includes post-hoc comparison options. **Post-hoc or multiple comparisons** try to extract the maximum amount of information from any given study, by searching for significant comparisons dictated by the outcome of the experiment, rather than by initial research hypotheses (Keppel, 1991: p. 171). Given the high number of potential single-degree of freedom comparisons, post-hoc comparisons procedures must cope with family-wise error inflation. Most post-hoc tests perform relatively well under deviations from normality (especially when small), but have some problems when there are unequal group sizes or heterogeneous variances (Field, 2000: p. 275). Following Field's (2000: p. 275) discussion of different peculiarities of the post-hoc tests available in SPSS software, Gabriel's test seems the most appropriate when homogeneity of variance is respected, since it is powerful and it can cope with slightly unequal group sizes. However, Games-Howell's test, which is also accurate when sample sizes are unequal, will be performed too, and it will be considered when there is any doubt that the population variances are equal, although it has the shortcoming of being very liberal when sample sizes are small. Post-hoc comparisons will be reported only when both tests signal their significance, although at different values.

As Keppel (1991: p. 183) clearly states, when conducting a planned comparison, the researcher is asking "is this difference significant", with specific questions to be confirmed or disconfirmed driving the choice of the difference to be tested; whereas when conducting a post-hoc comparison, the researcher is asking "which differences are significant?" and this is a sort of exploratory data analysis which can lead to insights for future experiments. The risk in both analyses is family-wise error, and a more stringent standard is suggested to guard again this risk.

Following paragraphs report the results of the overall F test on the entire experiment, and a discussion of significant (at different levels) interaction and main effects. The results of significant post-hoc comparisons are provided too. Finally, some planned contrasts will be illustrated.

Given low sample size of this pilot study, results must be interpreted with a certain caution and have to be considered exploratory, rather than confirmatory.

Further replications of the experiment with larger sample sizes (to control for errors and assure adequate power) are needed to shed more light on the potential informative and educational potential of retailers' assortment presentation by categories.

The pilot study considered here can offer some initial hints.

6.3.2. OVERALL F-TESTS: INTERACTION AND MAIN EFFECTS

Factorial design are rich with information, since they allow the study of whether a certain variable (e.g., display), analyzed together with another one (e.g., POP), will show the same effects as if it would when analyzed alone (in a single-factor design).

The **main effects** of an independent variable refer to its average effect on the dependent variable of interest, when the other independent variable manipulated in the experiment is ignored or disregarded (Keppel, 1991: p. 191). For example, in this experimental design main effects of POP represents its influence on the dependent variable (subjective category structure), disregarding the presence and specific nature of display. Main effects of Display refer to its influence on the dependent variable, ignoring the presence or absence of POP.

When thinking of a factorial design as made of a set of component single-factor experiments, it is possible to consider simple effects of each independent variable as the effects of the first variable when the other is held constant (at a certain level). There are **interaction effects** when the effects of component experiments (with respect to one independent variable) are not the same for all levels of the other independent variable.

Translated to the experiment run, for example, significant interaction effects mean that the effects of POP on the dependent variable are not the same for all levels of Display, and the effects of Display on the dependent variable are not the same for all levels of POP.

Main effects are of interest only when interaction effects are absent, because it is possible to focus on the two sets of marginal means rather than on specific cell means. When there is interaction, the effects of each independent variable in the experimental design must be interpreted by considering the levels of the other independent variable.

Table 6.21 summarizes significant and non significant main and interaction effects for all the indexes construed for the dependent variables (cognitive structures emerging through recall in task 5 and their changes in task 5 versus 1), aggregated with respect to brands, sub-groups and associations. For significant effects, when the assumption of homogeneity of variance holds, the exact significance level is reported in (...). "Nd" is indicated to precede significant effects when the assumption of homogeneity of variance is not met. The significance value is specified, to permit an evaluation of its acceptance with respect to more stringent standards (e.g., 2.5% or 1%). As Keppel (1991) and Field (2000) suggest, in fact, in such situations caution may be exerted and a more stringent standard should be, at least, considered to avoid inflations in type I error. When an effect is not significant, "n.s." is indicated if homogeneity of variance holds and "n.d." when it doesn't. Exact values for Levene's test and the F-ratio for all the indexes showing significant effects are provided in Appendix I. For computed Delta variables, only significance values are indicated in table 6.21, whereas detailed analyses are not reported in Appendix I.[238] Table 6.21 specifies also where post-hoc or multiple comparison tests signalled significant differences, and the direction of the effects. Some planned contrasts have been done, by exploiting the procedure available in SPSS software. For display, which is a three level variable, a simple contrast between each treatment level (SB and CB display) and the control level (no display) has been done. These will be reported in table 6.22. Unfortunately procedures available in SPSS for between-subjects factorial ANOVA (Univariate-General Linear Model) do not allow a free choice of contrasts between specific cells of the experimental design. Such contrasts would be useful to assess the relative information-potential of coherent vs. not coherent categorizations suggested through display and POP. Another software (e.g., SAS) should be used in the future to test more sophisticated hypotheses.

Some dependent variables didn't respect the assumption of equality of error variances, underlying ANOVA. In such situation, following Field (2000:317)'s suggestion, a common step which can be taken to equalize the variances is data transformation, frequently taking the square root of all values of the dependent variables. For example, number of sure recalled brands in task 5 didn't respect the assumption, and a transformation of the variable (square root) removed the problem. Some other measures violated the assumption of homogeneity of error variances, and their transformation (squared root) didn't solve this problem: % of proper recalled

[238] They are available on request.

and associated, % of sure and proper sub-groups recalled in task 5, number of sub-groups recalled in brochure. In such cases, significant effects – where found – must be regarded with caution.

Any significant effects was found (therefore outputs are not inserted) for several variables. Some characteristics may have contributed to this outcome. Some score distributions, for example, violate the assumption of homogeneity of error variances: number of recalled sub-groups in CB display; number of sub-groups reflecting targets and umbrella-brands; number of not-associated sub-groups. Other variables are computed: % of sure recalled brands; % of associated sure brands; delta % of sure sub-groups; delta dominance sub-groups recalled in brochure; delta % incidence of sub-groups reflecting different criteria; delta % of incidence of correct associations. Some of these variables, besides being computed, fail to respect the assumption of homogeneity of error variances: % of proper recalled brands or associated; dominance for recalled brands (sign. of homogeneity of error variance test at 10%, p= 0,080); % of not-associated brands (sign. of homogeneity of error variance test at 10%, p= 0,086); dominance for associated brands; % of proper sub-groups recalled; dominance for recalled sub-groups in CB display; % of sub-groups reflecting targets and umbrella-brands; % of sure sub-groups associated; delta % number of sure brands as well of proper ones, both recalled and associated; delta number of sub-groups recalled; delta familiarity and delta dominance for sub-groups recalled in brochure. Finally, some variables do not present particular potential technical problems, such as for number of associations.

Table 6.21 – Interaction and main effects

DEPENDENT VARIABLES ⇩	POP MAIN EFFECT	INTERACTION EFFECT	DISPLAY MAIN EFFECT
S = significant at the level specified in (...) NS = not significant ND = not well defined for problems (e.g., heterogeneity of variances); significant effects, however, are specified For POP: level 0= no; level 1 = yes For display: level 0 = no display, level 1 = SB display; level 2 = CB display			
BRANDS			
N. Recalled Brands_task 5	n.s. sig. Contrast test level 1 vs. 0	s. (p= 0,025) POP NO: NO<CB<SB POP YES: SB<NO<CB	s. (p=0,043) sig. Post-hoc comparison level 1 vs. 0 at 5%
N. Sure Brands Recalled_task 5	n.d. [Levene's test]	n.d. [Levene's test]	n.d.-s. (p= 0,029) [Levene's test] sig. Post-hoc comparison level 2 vs. 0 at 5% NO<SB<CB
—SQR N. Sure Brands Recalled_task 5	n.s.	s. (p=0,041) POP NO: NO<CB<SB POP YES: SB<NO<CB	n.s. sig. Post-hoc comparison level 2 vs. 0 at 5%
% Sure Brands Recalled_task 5 (computed variable)	n.d. [Levene's test]	n.d. [Levene's test]	n.d. [Levene's test]
N. Proper Brands Recalled_task 5	n.s.	s. (p=0,038) POP NO: NO<CB<SB POP YES: SB<NO<CB	n.s.
% Proper Brands Recalled_task 5 (computed variable)	n.d. [Levene's test]	n.d. [Levene's test]	n.d. [Levene's test]
N. Recalled Brands in display_task 5	n.s.	n.s.	s. (p= 0,009) Sign. Post-hoc comparison level 1 vs. 0 at 2% and 2 vs. 0 at 5% NO < CB < SB
Dominance Recalled Brands in display_task 5 (computed variable)	n.d. [Levene's test]	n.d. [Levene's test]	n.d. [Levene's test]

Familiarity Recalled Brands in display_task 5 (computed variable)	n.s.	n.s.	S. (p= 0,009) Sign. Post-hoc comparison level 1 vs. 0 at 2% and 2 vs. 0 at 5% NO < CB < SB
N. Associated Brands_task 5	n.s.	S. (p= 0,043) POP NO: NO<CB<SB POP YES: NO=SB<CB	S. (p= 0,036) Sign. post-hoc comparison level 1 vs. 0 at 5%
% Not-Associated Brands_task 5 (computed variable)	n.s.	n.s.	n.s.
N. Sure Associated Brands_task 5	n.s.	n.s.	S. (p= 0,046) NO < SB< CB
% Sure Associated Brands_task 5 (computed variable)	n.s.	n.s.	n.s.
N. Proper Brands Associated _task 5	n.s.	S. (p= 0,036) POP NO: NO<CB<SB POP YES: SB<NO<CB	S. at 10% (p= 0,051)
% Proper Brands Associated_task 5 (computed variable)	n.s.	n.s.	n.s.
N. Brands Associated in Display_task 5	n.s.	n.s.	S. (p= 0,007) Sign. Post-hoc comparison level 1 vs. 0 at 2% and 2 vs. 0 at 5% NO < CB< SB
Dominance Associated Brands in Display_task 5 (computed variable)	n.s.	n.s.	n.s.
Familiarity Associated Brands_task 5 (computed variable)	n.s.	n.s.	S. (p= 0,007) Sign. Post-hoc comparison level 1 vs. 0 at 2% and 2 vs. 0 at 5% NO < CB< SB

DEPENDENT VARIABLES ⇩	POP MAIN EFFECT	INTERACTION EFFECT	DISPLAY MAIN EFFECT
SUB-GROUPS			
N. Recalled SG_task 5	n.d. [Levene's test]	n.d.-s. (p= 0,038) [Levene's test] POP NO: NO<CB<SB POP YES: CB<SB<NO	n.d. [Levene's test]
N. Sure SG Recalled _task 5	s. (p= 0,022) NO < YES	n.s.	n.s.
% Sure SG Recalled _task 5 (computed variable)	n.d. [Levene's test]	n.d. [Levene's test]	n.d. [Levene's test]
N. Proper SG Recalled _task 5	n.s.	s. (p=0,013) NO POP: NO<CB<SB YES POP: SB<CB<NO	n.s.
% Proper SG Recalled_task 5 (computed variable)	n.d. [Levene's test]	n.d. [Levene's test]	n.d. [Levene's test]
N. Recalled SG in brochure_task 5	n.d. [Levene's test]	n.d. [Levene's test]	n.d. [Levene's test]
Dominance Recalled SG in brochure_task 5 (computed variable)	n.d. [Levene's test]	n.d. [Levene's test]	n.d.-s. (p= 0,030) [Levene's test] Sig. Post-hoc comparison level 2 vs. 0 at 2,5% NO < SB < CB
Familiarity Recalled SG in brochure_task 5 (computed variable)	n.d. [Levene's test]	n.d. [Levene's test]	n.d.-s. at 10% (p=0,058) [Levene's test] Sign. Post-hoc comparison level 2 vs. 0 NO < SB < CB
N. Recalled SG in SB display_task 5	n.d. [Levene's test]	n.d. [Levene's test]	n.d.-s. (p=0,002) [Levene's test] Sign. Post-hoc comparison level 1 vs. 0 at 2,5% NO < CB < SB
Dominance Recalled SG in SB display_task 5 (computed variable)	n.d. [Levene's test]	n.d. [Levene's test]	n.d.-s. (p=0,002) [Levene's test] Sign. Post-hoc comparison level 1 vs.

			0 at 2,5% NO < CB < SB
Familiarity Recalled SG in SB display_task 5 (computed variable)	n.d. [Levene's test]	n.d. [Levene's test]	n.d.-s. (p=0,002) [Levene's test] Sign. Post-hoc comparison level 1 vs. 0 at 2,5% NO < CB < SB
N. Recalled SG in CB display_task 5	n.d. [Levene's test]	n.d. [Levene's test]	n.d. [Levene's test]
Dominance Recalled SG in CB display_task 5 (computed variable)	n.d. [Levene's test]	n.d. [Levene's test]	n.d. [Levene's test]
Familiarity Recalled SG in CB display_task 5 (computed variable)	n.d.-s. at 10% (p= 0,058) [Levene's test] NO < YES	n.d. [Levene's test]	n.d. [Levene's test]
N. SG reflecting Composition_task 5	n.d.-s. at 10% (p= 0,061) [Levene's test] NO > YES	n.d. [Levene's test]	n.d. [Levene's test]
% sg composition_task 5 (computed variable)	n.d.-s. (p= 0,036) (Levene's test, model sig.) NO > YES	n.d. [Levene's test]	n.d. [Levene's test]
N. sg reflecting Target_task 5	n.d. [Levene's test]	n.d. [Levene's test]	n.d. [Levene's test]
% sg target_task 5 (computed variable)	n.s.	n.s.	n.s.
N. SG reflecting Brand_task 5	n.d. [Levene's test]	n.d. [Levene's test]	n.d. [Levene's test]
% sg brand_task 5 (computed variable)	n.d. [Levene's test]	n.d. [Levene's test]	n.d. [Levene's test]
N. SG reflecting FORM_task 5	n.d.-s. (p= 0,037) [Levene's test] NO < YES	n.d. [Levene's test]	n.d. [Levene's test]
% sg form_task 5 (computed variable)	n.d.- s. (p= 0,014) [Levene's test]	n.d.- s. (p= 0,015) [Levene's test] POP NO: NO<CB<SB POP YES: CB<SB<NO	n.d. [Levene's test]
N. SG Associated_task 5	s. at 10% (p= 0,067) NO < YES	n.s.	n.s.

N. Non-associated SG_task 5 (computed variable)	n.d. [Levene's test]	n.d. [Levene's test]	n.d. [Levene's test]
% Non-associated SG_task 5 (computed variable)	n.d. [Levene's test]	n.d. [Levene's test]	n.d. [Levene's test]
N. Sure SG Associated_task 5	s. (p= 0,042) NO < YES	n.s.	n.s.
% Sure SG Associated_task 5 (computed variable)	n.d. [Levene's test]	n.d. [Levene's test]	n.d. [Levene's test]
N. Proper SG Associated_task 5	n.s.	s. (p= 0,040) POP NO: NO<CB<SB POP YES: SB<CB<NO	n.s.
% Proper SG Associated_task 5 (computed variable)	n.d. [Levene's test]	n.d.-s. at 10% (p=0,067) [Levene's test] POP NO: NO<CB=SB POP YES: SB<CB=NO	n.d. [Levene's test]
N. Associated SG in Brochure_task 5	n.s.	n.s.	s. (p= 0,049) Sig. Post-hoc comparison level 2 vs. 0 at 5% NO<SB<CB
Dominance Associated SG in brochure_task 5 (computed variable)	n.d. [Levene's test]	n.d. [Levene's test]	n.d.-s. (p= 0,034) [Levene's test] Sig. Post-hoc comparison level 2 vs. 0 at 5% NO < SB < CB
Familiarity Associated SG in brochure_task 5	n.s.	n.s.	s. (p= 0,049) Sig. Post-hoc comparison level 2 vs. 0 at 5% NO < SB < CB
N. Associated SG in SB display_task 5	n.d. [Levene's test]	n.d. [Levene's test]	n.d.-s. (p= 0,004) [Levene's test] Sig. Post-hoc comparison level 1 vs. 0 at 2,5% NO < CB < SB
Dominance Associated SG in SB display_task 5 (computed variable)	n.d. [Levene's test]	n.d. [Levene's test]	n.d.-s. (p= 0,035) [Levene's test]

			Sig. Post-hoc comparison level 1 vs. 0 at 5% NO < CB < SB
Familiarity Associated SG in SB display_task 5	n.d. [Levene's test]	n.d. [Levene's test]	n.d.-s. (p= 0,004) [Levene's test] Sig. Post-hoc comparison level 1 vs. 0 at 2,5% NO < CB < SB
N. Associated SG in CB display_task 5	n.d. [Levene's test]	n.d. [Levene's test]	n.d.-s. (p= 0,055) [Levene's test] Sig. Post-hoc comparison level 2 vs. 0 at 5% NO < SB < CB
Dominance Associated SG in CB display_task 5 (computed variable)	n.s.	n.s.	s. (p= 0,017) Sig. Post-hoc comparison level 2 vs. 0 at 2,5% NO < SB < CB
Familiarity Associated SG in CB display_task 5	n.d. [Levene's test]	n.d. [Levene's test]	n.d.-s. at 10% (p= 0,055) [Levene's test] Sig. Post-hoc comparison level 2 vs. 0 at 5% NO < SB < CB
ASSOCIATIONS			
N. Associations_task 5	n.s.	n.s.	n.s.
N. one-to-one associations_task 5	n.s.	s. (p= 0,011) POP NO: NO<CB<SB POP YES: SB<NO<CB	n.s.
N. Correct Associations_task 5	n.s.	s. (p= 0,009) POP NO: NO<SB<CB POP YES: SB<CB<NO	n.s.
% Correct Associations_task 5 (computed variable)	n.d. [Levene's test]	n.d.-s. (p= 0,022) [Levene's test] POP NO: NO<SB<CB POP YES: SB<CB<NO	n.d. [Levene's test]
N. Associations in SB display_task 5	n.d.-s. at 10% [Levene's test]	n.d.-s. at 10% [Levene's test] POP NO: NO<CB<SB	n.d.-s. (p= 0,01) [Levene's test]

		POP YES: NO<CB<SB	sign. Post-hoc comp. 1 vs. 0 at 1%
Dominance Associations in SB display_task 5 (computed variable)	n.d. [Levene's test]	n.d. [Levene's test]	n.d.-s. (p= 0,005) [Levene's test] sign. Post-hoc comp. 1 vs. 0 at 1% NO < CB < SB
Familiarity Associations in SB display_task 5 (computed variable)	n.d.-s. at 10% [Levene's test] NO > YES	n.d. [Levene's test]	n.d.-s. (p= 0,001) [Levene's test] sign. Post-hoc comp. 1 vs. 0 at 1% NO < CB < SB
N. Associations in CB display_task 5	n.d. [Levene's test]	n.d. [Levene's test]	n.d.-s. (p= 0,017) [Levene's test] sign. Post-hoc comp. 2 vs. 0 at 5% NO < SB < CB
Dominance Associations in CB display_task 5 (computed variable)	n.d. [Levene's test]	n.d. [Levene's test]	n.d.-s. (p= 0,02) [Levene's test] sign. Post-hoc comp. 2 vs. 0 at 1% NO < SB < CB
Familiarity Associations in CB display_task 5 (computed variable)	n.d. [Levene's test]	n.d. [Levene's test]	n.d.-s. (p= 0,017) [Levene's test] sign. Post-hoc comp. 2 vs. 0 at 5% NO < SB < CB
N. Sure Associations in SB display_task 5	n.d. [Levene's test]	n.d. [Levene's test]	n.d.-s. (p= 0,015) [Levene's test] sign. Post-hoc comp. 1 vs. 0 at 5% NO < CB < SB
Dominance Sure Associations in SB display_task 5 (computed variable)	n.d. [Levene's test]	n.d. [Levene's test]	n.d.-s. (p= 0,022) [Levene's test] sign. Post-hoc comp. 1 vs. 0 at 5% NO < CB < SB
Familiarity Sure Associations in SB display_task 5 (computed variable)	n.d. [Levene's test]	n.d. [Levene's test]	n.d.-s. (p= 0,008) [Levene's test] sign. Post-hoc comp. 1 vs. 0 at 5% NO < CB < SB

N. Sure Associations in CB display_task 5	n.d. [Levene's test]	n.d. [Levene's test]	n.d. s. (p= 0,031) (Levene's test, model sign.) sign. Post-hoc comp. 2 vs. 0 at 5% NO < SB< CB
Dominance Sure Associations in CB display_task 5 (computed variable)	n.d. [Levene's test]	n.d. [Levene's test]	n.d.-s. (p= 0,008) [Levene's test] sign. Post-hoc comp. 2 vs. 0 at 5% NO < SB< CB
Familiarity Sure Associations in CB display_task 5 (computed variable)	n.d. [Levene's test]	n.d. [Levene's test]	n.d. s. (p= 0,026) (Levene's test, model sign.) sign. Post-hoc comp. 2 vs. 0 at 5% NO < SB< CB

DEPENDENT VARIABLES ()	POP MAIN EFFECT	INTERACTION EFFECT	DISPLAY MAIN EFFECT
DELTA (all computed variables)			
BRANDS			
delta n. recalled brands	n.s.	s. (p= 0,000) POP NO: NO<CB<SB POP YES: NO<SB<CB	s. (p= 0,029) Sig. Post-hoc comparisons level 2 vs. 0 and 1 vs. 0 at 10%
delta % n marche sure recalled brands on total n	n.d. [Levene's test]	n.d. [Levene's test]	n.d. [Levene's test]
delta % proper brands recalled	n.d. [Levene's test]	n.d. [Levene's test]	n.d. [Levene's test]
delta dominance recalled brands in display	n.s.	n.s.	s. (p= 0,001) Sig. Post-hoc comparisons level 2 vs. 0 and 1 vs. 0 at 1% NO < SB< CB
delta familiarity recalled brands in display	n.d. [Levene's test]	n.d. [Levene's test]	n.d.-s. (p= 0,000) [Levene's test] Sig. Post-hoc comparisons level 2 vs. 0 and 1 vs. 0 at 1% NO < CB < SB
delta n. associated brands	n.s.	n.s.	s. (p= 0,043) Sig. Post-hoc comparison level 1 vs. 0 at 5% NO < CB < SB
delta % n. non associated brands on total n.	n.d. [Levene's test]	n.d. [Levene's test]	n.d. [Levene's test]
delta % n. sure brands on total n.	n.s.	n.s.	n.s.
delta % proper brands associated on total n.	n.s.	n.s.	n.s.

delta dominance associated brands in display	n.s.	n.s.	s. (p= 0,019) Sig. Post-hoc comparison level 2 vs. 0 at 3% NO < SB < CB
delta familiarity associated brands in display	n.d. [Levene's test]	n.d. [Levene's test]	n.d.-s. (p= 0,000) [Levene's test] Sig. Post-hoc comparisons level 2 vs. 0 and 1 vs. 0 at 1% NO < SB < CB
SUB-GROUPS			
delta n. recalled sg	n.d. [Levene's test]	n.d. [Levene's test]	n.d. [Levene's test]
delta % sure sg recalled	n.s.	n.s.	n.s.
delta % proper sg recalled	n.d. [Levene's test]	n.d. [Levene's test]	n.d.-s. at 10% (p=0,052) [Levene's test] NO < CB < SB
delta dominance sg recalled in brochure	n.s.	n.s.	n.s.
delta familiarity sg recalled in brochure	n.d. [Levene's test]	n.d. [Levene's test]	n.d. [Levene's test]
delta dominance sg recalled in SB display	n.d. [Levene's test]	n.d. [Levene's test]	n.d. [Levene's test]
delta familiarity sg recalled in SB display	n.d. [Levene's test]	n.d.-s. (p= 0,034) [Levene's test] POP NO: NO<SB<CB POP YES: SB<NO<CB	n.d.-s. (p= 0,030) [Levene's test] Sign. Post-hoc comparisons level 1 vs. 0 at 5% NO < CB < SB
delta dominance sg recalled in CB display	n.d.-s. (p= 0,007) [Levene's test] NO < YES	n.d. [Levene's test]	n.d. [Levene's test]
delta familiarity sg recalled in CB display	n.d.-s. (p= 0,011) [Levene's test] NO < YES	n.d. [Levene's test]	n.d. [Levene's test]

delta % incid sg reflecting composition	n.s.	n.s.	n.s.
delta % incid sg reflecting target	n.s.	n.s.	n.s.
delta % incid sg reflecting form	n.d. [Levene's test]	n.d. [Levene's test]	n.d. [Levene's test]
delta n. associated sg	n.s.	n.s.	n.s.
delta % incid non-associated sg	n.s.	n.s.	n.s.
delta % sure sg associated	n.s.	n.s.	n.s.
delta % proper sg associated	n.s.	n.s.	n.s.
delta dominance associated sg in brochure	n.s.	n.s.	n.s.
delta familiarity associated sg in brochure	n.d. [Levene's test]	n.d. [Levene's test]	n.d. [Levene's test]
delta dominance associated sg in display SB	n.s.	n.s.	n.s.
delta familiarity associated sg in display SB	n.d. [Levene's test]	n.d. [Levene's test]	n.d.-s. (p= 0,024) [Levene's test] NO < CB < SB
delta dominance associated sg in display CB	n.d.-s. (p= 0,023) [Levene's test] NO<YES	n.d. [Levene's test]	n.d.-s. (p= 0,011) [Levene's test] Sign. Post-hoc comparisons level 2 vs. 0 at 1% NO < SB < CB
delta familiarity associated sg in display CB	n.d.-s. (p= 0,028) [Levene's test] NO < YES	n.d. [Levene's test]	n.d.-s. (p=0,025) [Levene's test] Sign. Post-hoc comparisons level 2 vs. 0 at 2,5%
ASSOCIATIONS			
delta n associations (correct or not)	n.s.	n.s.	n.s.
delta one-to-one associations	n.s.	s. (p= 0,015) POP NO: NO<CB<SB POP YES: NO<SB<CB	s. (p= 0,030) Sign. Post-hoc comparisons level 2

			vs. 0 at 5%
delta n associations sure brand & unsure sg	n.d. [Levene's test]	n.d. [Levene's test]	n.d. [Levene's test]
delta % incid correct associations on total	n.s.	n.s.	n.s.
delta n associations in SB display	n.d. [Levene's test]	n.d. [Levene's test]	n.d.-s. (p= 0,003) [Levene's test] Sign. Post-hoc comparisons level 1 vs. 0 at 2,5% NO < CB < SB
delta n associations in CB display	n.d. [Levene's test]	n.d. [Levene's test]	n.d.-s. (p= 0,019) [Levene's test] Sign. Post-hoc comparisons level 2 vs. 0 at 5% NO < SB < CB

A non-significant F-test means that the differences observed in the experiment were too small to allow the conclusion that treatment means are different. It isn't correct to conclude that treatment differences are absent or lacking, but only that the experiment may have been not sufficiently sensitive to detect them if they did exist (Keppel, 1991: 89).

Post-hoc power analyses are commonly used in order to attempt to interpret an F test that is not significant. By estimating an index of relative treatment magnitude, it is possible to discuss whether the non-significant F test means that differences between groups are trivial or not existing, or rather that differences may be present but the power of the experiment was insufficient to detect them, for example due to a relatively small sample size (Keppel, 1991: p. 87). Such analyses are not performed here, since power is for rather sure low, due to small sample size.

6.3.3. PLANNED AND POST-HOC COMPARISONS

Planned contrasts are useful to test specific hypotheses. Expected effects in previous chapter (figure 5.8 and 5.9) refers to comparisons between single cells of the experimental design. Amongst SPSS software procedures for planned contrasts, there is the simple one which allows a comparison between a certain level of an independent variable considered as reference (usually the control level) and all other levels of the same variable.

This procedure will permit a rough investigation of the effects hypothesized in previous chapters. A simple contrast for POP, compares the performance of all treatment groups involving exposure to POP to those without it. In other words, with respect to figure 5.8, it is a comparison between two blocks of cells, collapsed for each column: groups 1, 3, 5 vs. 2, 4, 6, disregarding the specific level of the other independent variable. Simple contrasts for Display – a three levels variable – compares the performance of all the treatment groups involving SB display (3, 4) to those not involving display (1, 2), and the performance of treatment groups exposed to CB display (5, 6) to those not exposed to display (1, 2), always disregarding the specific level of the POP variable. In this case, with respect to figure 5.8, the comparison refers to pairs of blocks of cells collapsed in each row.

Table 6.22 summarizes the significant simple planned comparisons. Such contrasts performed on different measures of the dependent variables (cognitive structures revealed in task 5 and changes between task 5 and 1) may favour the evaluation of different types of effects. Variables are listed in table in a sequence which reflects their contribution to the investigation of the effects of the exposure to display arrangement, to differentiated display arrangements (supply-based vs. consumer-based), and to POP on examined components of the cognitive structures.

The brand component of cognitive structures is affected by exposure to Display (as suggested by significance of most planned simple contrasts for both treatment levels of display), but also by the nature of its arrangement (as suggested by asymmetries in significance of simple planned contrasts for different treatment levels of display). The same is true for the associative relationships making up cognitive structures made explicit through recall. In all situations, being exposed to display (rather than not) improves the performance signalled by the dependent variable score.

The sub-group component of cognitive structures is affected by POP but also display, as far as quantitative aspects (e.g., different number) and qualitative aspects (e.g., composition) are concerned. POP alone doesn't affect the brand component.

Furthermore, a planned contrast between SB and CB conditions has been performed, by selecting the option "repeated contrasts" in ANOVA procedure. The results are shown in the corresponding column, with direction always indicated and significance reported.[239]

Post-hoc comparisons (shown in table 6.21) are in line with planned contrasts.

[239] Other indexes showing significant planned contrasts between SB and CB conditions, not reported in table are: number of associations in SB display and respective familiarity (but not dominance), number of sub-groups associated in CB display; dominance of sure associations in CB display; delta % proper recalled sub-groups, % of incidence of correct associations on total

Table 6.22 – Significant planned contrasts

VARIABLES	POP No-Yes	DISPLAY No-SB	DISPLAY No-CB	DISPLAY SB-CB	EFFECTS
Number of recalled brands in task 5	/	(p= 0,013) NO<SB	/	/	Effects of exposure to display (vs. not) on the brand component of cognitive structures
Number of brands associated in task 5	/	(p= 0,013) NO<SB	at 10% (p= 0,073) NO<CB	/	
Number of proper brands recalled in task 5	/	(p= 0,029) NO<SB	at 10% (p= 0,060) NO<CB	/	
Number of proper brands associated in task 5	/	(p= 0,027) NO<SB	(p= 0,045) NO<CB	(p = 0,044) SB > CB	
Number of recalled brands inserted also in display in task 5	/	(p= 0,004) NO<SB	(p= 0,015) NO<CB	/	
Number of sure brands associated in task 5	/	(p= 0,033) NO<SB	(p= 0, 030) NO<CB	/	
Number of brands associated in display stimuli in task 5		(p= 0,003) NO<SB	(p= 0,015) NO<CB	/	
Familiarity of recalled brands in display stimuli in task 5	/	(p= 0,004) NO<SB	(p= 0,015) NO<CB	/	
Familiarity of brands associated in display stimuli in task 5	/	(p= 0,003) NO<SB	(p= 0,015) NO<CB	/	
Number of sure brands associated in display stimuli in task 5	/	(p= 0,004) NO<SB	(p= 0,010) NO<CB	/	
Delta number of recalled brands	/	(p= 0,000) NO<SB	(p= 0,005) NO<CB	/	
Delta number of associated brands in task 5	/	(p= 0,016) NO<SB	/	/	
Delta dominance recalled brands in display	/	(p= 0,004) NO<SB	(p= 0,000) NO<CB	/	
Delta dominance associated brands in display	/	(p= 0,023) NO<SB	(p= 0,010) NO<CB	/	
Delta familiarity of recalled brands in display	/	(p= 0,000), but problems with homogeneity of variance NO<SB	(p= 0,000), but problems with homogeneity of variance NO<CB	/	
Delta familiarity associated brands in display	/	(p= 0,000) but problems with homogeneity of variance NO<SB	(p= 0,001) but problems with homogeneity of variance NO<CB	/	
Number of recalled sub-groups in brochure in task 5	/	/	(p= 0,019) NO<CB	/	

Dominance recalled sub-groups in brochure in task 5	/	/	(p= 0,010), but problems with homogeneity of variances NO<CB	/	Effects of exposure to <u>different</u> display arrangements on the sub-group, brand and associative relationships components of cognitive structures
Familiarity of recalled sub-groups in brochure in task 5	/	/	(p= 0,019), but problems with homogeneity of variances NO<CB	/	
Number of associated sub-groups in brochure in task 5	/	/	(p= 0,016) NO<CB	/	
Dominance associated sub-groups in brochure in task 5	/	/	(p= 0,012), but problems with homogeneity of variances NO<CB	(p = 0,070) CB>SB	
Familiarity of associated sub-groups in brochure in task 5	/	/	(p= 0,016) NO<CB	/	
Number of recalled sub-groups in SB display in task 5	/	(p= 0,01), but problems with homogeneity of variances NO<SB	/	(p = 0,007) SB>CB	
Familiarity of recalled sub-groups in SB display in task 5	/	(p= 0,01), but problems with homogeneity of variances NO<SB	/	(p = 0,007) SB>CB	
Number of associated sub-groups in SB display in task 5	/	(p= 0,02), but problems with homogeneity of variances NO<SB	/	(p = 0,014) SB>CB	
Dominance of associated sub-groups in SB display in task 5	/	(p= 0,010), but problems for homogeneity of variances NO<SB	/	/	
Familiarity associated sub-groups in SB display in task 5	/	(p= 0,02), but problems with homogeneity of variances NO<SB	/	(p = 0,014) SB>CB	
Delta familiarity of associated sub-groups in SB display	/	(p= 0, 011) but problems with homogeneity of variance NO<SB	/	(p = 0,031) SB>CB	
Number of associated sub-groups in CB display in task 5	/	/	(p= 0,017) but problems for homogeneity of variances NO<CB	(p = 0, 059) CB>SB	
Dominance of associated sub-groups in CB display in task 5	/	/	(p= 0,005) NO<CB	/	

Familiarity of associated sub-groups in CB display in task 5	/	/	(p= 0,017), but problems with homogeneity of variance NO<CB	/	
Delta familiarity sg recalled in SB display	/	(p= 0,012), but problems with homogeneity of variance NO<SB	/	(p= 0,047) SB > CB	
Delta dominance recalled sub-groups in CB display	(p= 0,07) but problems with homogeneity of variance NO<YES	/	(p= 0,033) but problems with homogeneity of variance NO<CB	/	
Delta familiarity sg recalled in CB display	(p= 0, 011) but problems with homogeneity of variance NO<YES	/	/	/	
Delta dominance of associated sub-groups in CB display	(p= 0,023) but problems with homogeneity of variance NO<YES	/	(p= 0,003) but problems with homogeneity of variance NO<CB	/	
Delta familiarity of associated sub-groups in CB display	(p= 0,028) but problems with homogeneity of variance NO<YES	/	(p= 0,007) but problems with homogeneity of variance NO<CB	/	
Delta associations one-to-one	/	(p= 0,030) NO<SB	(p= 0,016) NO<CB	/	
Delta associations in SB display	(p= 0,001), but problems with homogeneity of variance NO<YES	/	/	(p = 0,022) SB>CB	
Delta associations in CB display	/	/	(p= 0,006), but problems with homogeneity of variance NO<CB	(p = 0,047) CB>SB	
(square root of) number of sub-groups recalled in task 5	(p= 0,027) NO<YES	(p= 0,012) NO<SB	at 10% (p= 0,1) NO<CB	/	Effects of exposure to POP and display on the sub-group component of cognitive structures
N. of sure sub-groups recalled in task 5	(p= 0,022) NO<YES	(p= 0,033) NO<SB	/	/	
Number of associated sub-groups in task 5	at 10% (p= 0,067) NO<YES	/	/	/	
Number of Sure associated sub-groups in task 5	(p= 0,042) NO<YES	/	/	/	

N. of sub-groups reflecting composition in task 5	at 10% (p= 0,061), but problems with homogeneity of variances NO<YES	at 10% (p= 0,063), but problems with homogeneity of variances NO<SB	/	/	
% of sub-groups reflecting composition in task 5	(p= 0,036), but problems with homogeneity of variances NO<YES	/	/	/	
N. of sub-groups reflecting target in task 5	/	/	at 10% (p= 0,056), but problems with homogeneity of variances NO<CB	/	
N. of sub-groups reflecting form in task 5	(p= 0,037) but problems with homogeneity of variances NO<YES	/	/	/	
% of sub-groups reflecting form in task 5	(p= 0,015) but problems with homogeneity of variances NO<YES	/	/	/	

6.4. DISCUSSION

The first aspect to be considered, given the nature of factorial designed, is the **combined influence** of the two manipulated variables on the dependent variables, **by interpreting significant interaction effects.**

The two distinct tools for assortment presentation exert a combined influence on the brand component of the subjective product category structures, and, to a less extent, on the sub-group component as well as on the associative relationships.

Regarding interaction effects on the brand-component of subjective product category structures as revealed by recall in task 5, the combined influence affects both "tout court" and "qualified" brands which are recalled and associated.

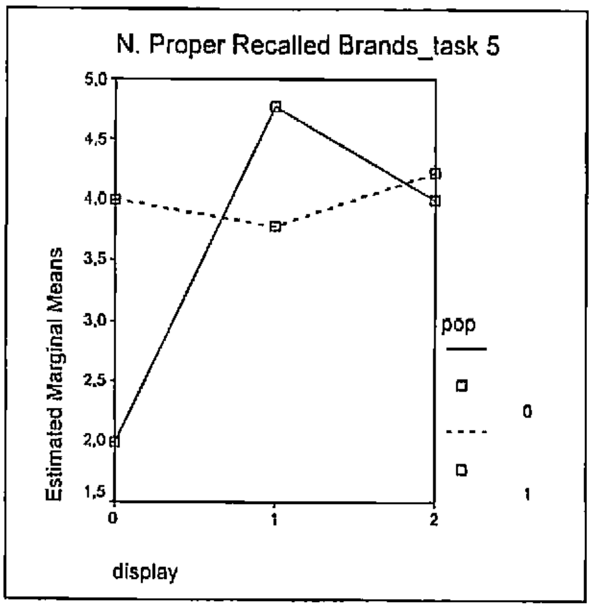
It has been found a significant interaction effect on the total number of recalled brands (sig. at 2,5%) and associated brands (at 5%), on the squared root (transformation to equalize variances) of total number of sure recalled brands (at 5%), on total number of proper brands recalled and associated (both at 5%).
The analysis of the plot of the estimated marginal means (reported here only for some variables as example)[240] reveals that all these interactions are not ordinal:[241] when POP isn't available, performance score on such variables are higher in SB condition than CB and no display; whereas when POP is available, CB condition shows a better performance than no display and SB conditions (as suggested by results reported in table 6.21). As figure 6.2 shows with respect to total number of proper brands cited and associated to at least one sub-group, subjects not exposed to display (0 on x axis) perform better when POP is available (dotted line marked as level 1 in legend): prompting sub-group names and rules helps recalling brands in the product category to be associated to these sub-groups. When subjects are exposed to SB display (1 on x axis), the availability of a brochure prompting other sub-groups

[240] To simplify exposition, only one plot for every group of variables showing similar disordinal interaction is provided, since the direction of effects is the same. All plots not inserted here can be provided, on request, to interested readers. As well, all tables showing cell means, not inserted in the dissertation, are available for readers willing to know the magnitude of differences. It has to be reminded, however, that low sample size suggests to take estimates with a certain caution.
[241] Keppel (1991: p. 235) defines a disordinal interaction as characterized by the rank order of factor A changing at the different levels of factor B, in a two factorial design.

names and rules leads to a comparatively worse performance. Looking at a brochure which suggests a categorization other than the one seen on the shelf – likely to be encountered by novice consumers in episodic interactions with the product category – may constrain the subject to double checking the fitting of the brand with both the SB and the CB categorization rules thus reducing the number of brands provided or lead the subject to guess (not always properly) brands belonging to CB sub-groups for which any exemplar is available as reference. Subjects looking at a CB display (2 on x axis) show a slightly improvement in performance when POP is available: reading the rule underlying sub-groups, besides names and exemplars prompted by display, may help recalling few additional proper brands.

The disordinal interaction effects limit the interpretation of any significant main effect found on the same measures of the dependent variable, since no general conclusion can be reached regarding such an effect (it will depend on the level of the other variable).

Figure 6.2 - Significant interaction effects on the brand-component of subjects' cognitive structures: an example

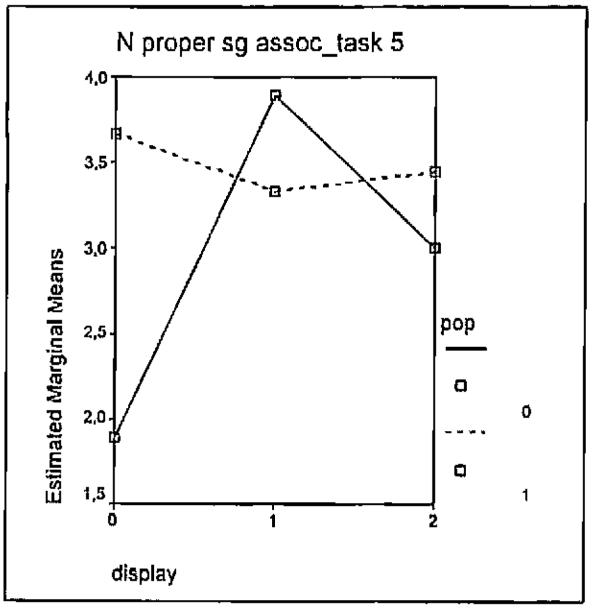


Concerning interaction effects on the sub-group component of subjective product category structures as revealed by recall in task 5, the influence extends to objectively qualified recall, with a significant effect for the number of recalled sub-groups (at 5%, to be taken with caution for heterogeneity of variances), and for those that can be considered "proper", both recalled (at 1%) and associated (at 5%). Furthermore, interaction effects affect the nature of recalled sub-groups, with respect to the % of incidence of those reflecting form. Looking at plots, all such interactions are disordinal, again leading to not clearly interpretable main effects where significant. Total number of sub-groups recalled for subjects not exposed to display is higher when POP is provided, and the same pattern holds (but with a smaller difference) for CB condition; whereas subjects looking at SB display perform slightly worse when confronted also to POP. % of sub-groups based on form shows a similar disordinal interaction. These effects are not exactly in line with expectations, particularly because subjects in SB display and POP condition seem not drawing sub-groups names (to be recalled but not necessarily associated) from both stimuli they are exposed to.

Regarding the number of proper sub-groups recalled and associated (as shown in figure 6.3), POP available (vs. non available) results in higher performance for no display (0 on x axis) and CB display (2 on x axis) conditions, and decreases it for SB display (1 on x axis) condition. With POP (vs. without) proper associated sub-groups are in higher number for no display and CB display conditions, whereas for SB conditions the number is higher without POP. Again, divergent sub-group prompting through distinct assortment presentation tools lead to a relatively lower performance regarding the sub-group component of category structures referred to products.

When interaction effects on associative relationships making up subjective product category structures are considered, the influence regards the number of one-to-one associations (sig. at 2%) and the number (at 1%) as well as % of incidence (with caution for variances, but at 2,5%) of correct associations. Again, it's a disordinal interaction. For number of one-to-one associations, with POP, there is a higher number for CB followed by no display and SB display conditions, whereas without POP it is higher for SB display (to be interpreted with caution due to heterogeneity of variance), followed by CB and no display. For % of correct associations, when there isn't POP, CB display performance is better than SB and no display; whereas with POP the performance is better for no display, followed by CB and SB display.

Figure 6.3 - Significant interaction effects on the sub-group component of subjects' cognitive structures: an example

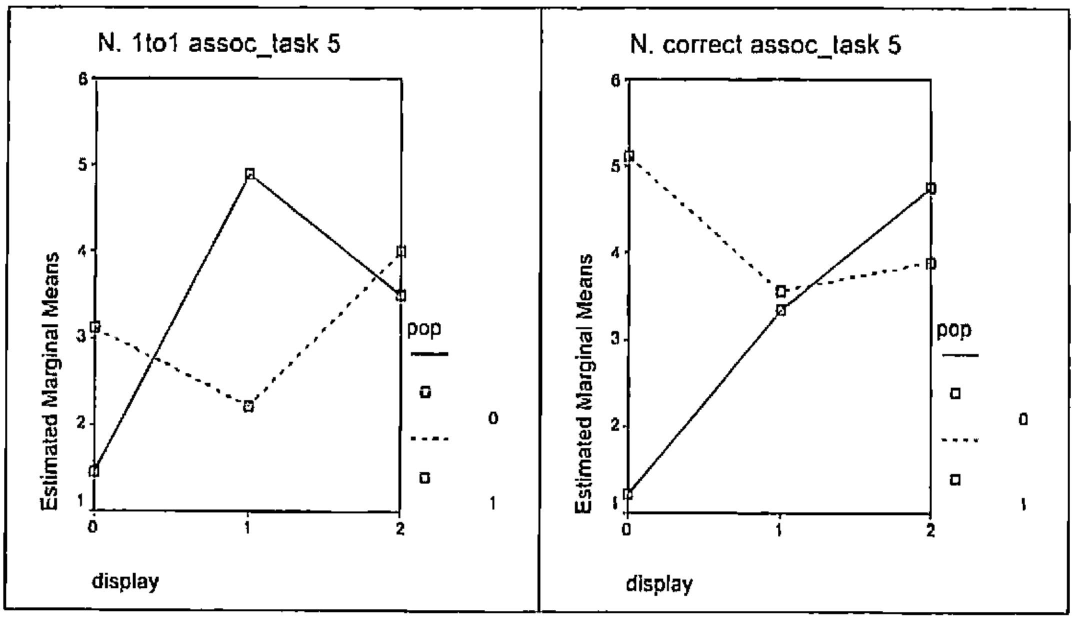


As depicted in figure 6.4, some interesting findings are:

- a reduction in number of one-to-one associations for SB display condition when POP is provided (vs. not), which suggests that cross-classification to cope with different prompted categorizations is not practiced by involved subjects;
- a performance getting worse for subjects in CB condition when also POP is available (vs. not).

Both findings are not exactly in line with expectations. A proposed interpretation is that when POP is provided, but motivation to elaborate information is not constrained and time available for reading the brochure (with detailed information) is limited, subjects tends to get confused and loose confidence in their not well structured recalls about the product category. More time available for intentional elaboration of product information (in line with intentional learning contexts), as well as repeated exposure to POP may lead to expected effects in terms of updating of existent cognitive structures for novice consumers.

Figure 6.4 – Significant interaction effects on the associative relationships component of subjects' cognitive structures: an example



When no interaction is significant, thus allowing a easier interpretation of its influence, the main effect of Display has been observed on the brand component, on the sub-group component, and on the resulting associations making up product categories in interviewees' mindset.

As far as the effect of display on the brand component of the cognitive structures emerging in task 5 is concerned, the influence affects the subjective degree of confidence for recalled and associated exemplars, and the extent to which there is a cognitive "appropriation" of the exemplars in .the display-stimuli.

Display influences the number of sure brands recalled (at 3% with caution for Levene's test results) and associated (sig. at 5%). Post-hoc comparisons reveal significant differences between CB and no display conditions for recall, in the expected direction.

Display influences the number of brands recalled which are in the stimulus-display as well as the respective computed familiarity with brands in display (both sig. at 1%). Such display effect is confirmed by post-hoc comparisons: all are significant (at 5% or less), as anticipated also by planned simple contrasts. Performance in SB condition is better than CB and no display, although the difference between the treatment levels is not statistically significant, as revealed by planned contrasts.

This holds also for number of brands associated which are in the stimulus-display and respective familiarity (sig. at 1%), and all post-hoc comparisons are significant (at 5% or less), again anticipated by planned comparisons, with the same direction of effects. Dominance of the brands (recalled or associated) in display is not subjected to a significant main effect of display.

The significant main effect on total number of recalled and associated brands is not interesting, by itself, given disordinal significant interaction.

All such results seems to suggest the idea that brands seen in stimulus-display sum up with those already known and recalled, which are retained, as shown by significance of familiarity but not of dominance. Such findings might underlie an updating of existing product category structures, by adding new exemplars incidentally learnt from display stimuli. With all caution required, involved subjects appear to react to exemplar-prompt provided through display. Furthermore, SB categorization of brands appears as easier to be retained than CB categorization (although the planned comparison between CB and SB is not significant).

As far as the sub-group component of the category structure is concerned, display affects:

- dominance of recalled sub-groups which are included in brochure (at 3% with caution required), but not the number of recalled sub-groups in brochure (n.s.) and their familiarity (sig. at 6% but with caution needed). Post-hoc comparisons show a significant difference between CB display (with sub-groups coherent with brochure) and no display conditions (at 2,5%), in the expected direction.
- number of sub-group associated which are inserted in the brochure (at 5%), as well as respective computed dominance (at 4% with caution for heterogeneity of variances) and familiarity (at 5%). Post-hoc comparisons show a significant difference between CB display and no display conditions (at 5% or less), as it can be expected. Furthermore, the planned contrast (with repeated option) between the two treatment levels shows for dominance that CB average score is significantly higher than SB at 10% (p= 0,07).

- number of recalled and associated sub-groups in SB display (both with caution required, but at 1%) as well as respective computed dominance and familiarity (with caution, but at 1% except for dominance of associated that is 5%). Post-hoc comparisons show a significant difference between SB and no display conditions (at 2,5% except for dominance associated that is 5%). Furthermore, a planned contrast shows that SB score is significantly higher than CB ($p = 0{,}007$ for number and familiarity of recalled sub-groups; $p = 0{,}013$ for dominance of recalled; $p = 0{,}014$ for number and familiarity of associated).
- number of sub-groups associated which are present in CB display (but at 6%, with caution required for variances) as well as respective computed familiarity (at 5%). There is a post-hoc comparison highlighting a significant difference between CB display and no display (at 5% or less), as expectable. The effects is more apparent for dominance of sub-groups associated which are present in CB display (at 2%), with post-hoc comparison suggesting differences between CB and no display conditions (at 2,5%). No significant effects are found on recalled ones. Planned contrasts between SB and CB conditions highlight that CB is significantly higher than SB score for dominance ($p = 0{,}059$).

Subjects in CB display benefits from coherent sub-groups in POP and display and can associate some exemplars to such sub-groups by exploiting the display arrangement.

Associations are affected by display, too. More precisely, all indexes reflecting the "appropriation" of the stimulus-display signal its influence. A significant main effect of display is found, in fact, with respect to:

- number of associations in SB display, and respective computed dominance and familiarity (to be evaluated with caution because of heterogeneity of variances, but all at 1%). Post-hoc comparisons show a significant difference between SB and no display conditions (with caution, but at 1%), in the expected direction. Planned contrasts signal that SB score is significantly higher tan CB ($p = 0{,}020$) for number and familiarity of SB associations, whereas the difference regarding dominance is not significant.
- number of associations in CB display, and respective dominance and familiarity (to be evaluated with caution because of heterogeneity of variances, but all at

2%). Post-hoc comparisons show a significant difference between CB and no display conditions (with caution, but at 1% for dominance and 5% for the others), as it could be expected. Planned contrasts between CB and SB suggest the first is higher ($p = 0, 944$ for number and familiarity; $p = 0,007$ for dominance).

The same effects hold also when considering "sure" associations in SB display (with caution, but at 1%), as well as respective dominance (at 2,5%, with caution) and familiarity (caution required, but at 1%), or "sure" associations in CB display (at 5%, with caution), dominance (cautiously, but at 1%) and familiarity (at 5%, with caution). Post-hoc comparisons show significant differences between SB and no display conditions (with caution, but at 1% for familiarity or 5% for others) when associations in SB display are considered, and between CB and no display conditions (at 1% for dominance and 5% for others, with caution) for associations in CB display, all in the predictable direction. The same pattern of post-hoc comparisons found for associations in SB or CB display holds also for sure associations (with sig. at 5%, and caution required).

All together, such findings seem to suggest a tendency to replicate, in post-manipulation recalled product-category structures, some associations seen in experimental stimuli. Recalled structures, however, are not completely changed. Rather, they are updated to conform also to what suggested by experimental stimuli. Again, marginal means show that SB categorization is more likely to be retained than CB, given the observed differences in performance (although not significant in terms of planned contrasts).

Display doesn't exert main effects on number of proper brands recalled, dominance of brands recalled and associated which are inserted in display, number of sub-groups (also sure and proper) recalled and associated, number of sub-groups recalled included in brochure (but it does for associated), nature of sub-groups, total number of associations including those one-to-one and correct (for which interaction effects are significant). Such pattern of findings seem to suggest that individual assignments with respect to brands already stored in memory resists, and rather structures are enriched with new components seen in stimuli. This holds especially for subjects exposed to SB display (without display).

It remains to be assessed the influence of POP when no significant interaction is present. Main effects of POP regard degree of confidence in sub-group naming and nature. Indexes interested by POP effects, in fact, are number of sure sub-groups recalled (sig. at 2,5%) and associated (sig. at 5%), and % of sub-groups reflecting composition and form (sig. at 5%, to be evaluated with caution because of heterogeneity of variance).

In line with expectations, non significant effects of POP are found for the brand-component of subjective category structures.[242] This is coherent with the nature of POP, prompting only sub-category names and rules, without providing exemplars. Furthermore, POP doesn't affect significantly associations, in line with hypotheses.

It could be interesting to see which effects hold also for delta variables, which are computed ones, based on comparison of the performance in task 1 and 5, assessed through the same index.

Significant interaction effects are found for: delta in number of recalled brand, delta in familiarity of recalled sub-groups inserted in SB display (at 5%, to be evaluated with caution) and delta in number of one-to-one associations (at 2,5%). For all these variables, when POP isn't provided, performance is better in SB condition than in CB and no display; with POP, CB performance is better than SB and no display.

A significant main effect of display affects delta in number of associated brands (at 5%), delta for dominance of recalled (at 1%) and associated brands (at 2,5%) which are inserted in display, delta in familiarity of recalled and associated brands inserted in display (to be evaluated with caution for heterogeneity of variances, but both at less than 1%).

Post-hoc comparisons reveal a significant difference between both treatment and control levels (at 1%) for delta dominance and delta familiarity of recalled brands in display; and for delta familiarity for associated brands (with caution required, but at 1%). A significant difference appears also between SB and no display conditions for delta in number of associated brands (at 5%) and for delta dominance associated brands in display (at 3%).

[242] As seen, interaction effects interest number of recalled sub-groups (cross-classifications), as well as proper sub-groups recalled and associated, and % of incidence of form-based sub-groups.

Display shows a main effect also on: delta familiarity for associated sub-groups in SB display (at 2,5%, with caution) and delta dominance for associated sub-groups in CB display (at less than 2,5%, with caution, and significant main effect of POP), as well as respective delta familiarity (at 2,5% and caution required). Post-hoc comparisons show a significant difference between CB and no display conditions for both delta dominance and delta familiarity with associated sub-groups included in CB display (at 1% and 2,5% respectively, and caution needed).

Display affects the number of associations in SB (with caution, but at 1%) and CB display (with caution, but at 2%), too, with a post-hoc comparison showing a significant difference between SB and no display conditions for the first index (at 2,5%) and between CB and no display conditions for the last index (at 5%).

Delta variables provide additional evidence that exposure to display leads participants to integrate what they have seen during the experiment in their recalled category structure for the target-product.

In order to have first tentative assessments of the hypotheses stated in previous chapter, although significant tests are not performed, a mere comparison of scores between treatment groups can be done and leads to the results reported here.

By considering delta variables, it is possible to assess whether expectations expressed (see above, figure 5.7) with respect to different performance on the dependent variables between different treatment groups are reflected by experimental findings. Figure 6.5 replicates figure 5.7, by adding a symbol in bold to show which effect was observed in the measured delta variable.

By considering specific indexes for brand, sub-group and association components, figure 6.6 and 6.7 replicate respectively figure 5.8 and 5.9, by showing what's happened according to experimental results.

Figure 6.5 – Observed effects with respect to delta variables

		POP	
		No POP	Yes POP
DISPLAY	No display	GT1 *No prompt* Negligible variations in - n. of sg (ok, ⇩) - n. of brands (ok, ⇩) - n. of associations (ok, small ⇧)	GT2 *Prompt* - *sg name CB* - *sg rule CB (comps-tg)* - *no exemplars* - *no associations* Increase in n. of sg - recalled, not necessarily associated (ok, ⇧) - especially those in brochure (ok, ⇧) delta nature of sg (comps-tg); ok, small ⇩comps) negligible variations in n. of brands and associations <u>(not negligible⇧)</u>
	SB Display	GT3 *Prompt* *-sg name SB* *-no sg rule* *-exemplars SB* *-associations SB* Increase in - n. of sg, especially in SB display (ok, ⇧ familiarity) - n. of brands, especially in SB display (ok, ⇧ familiarity) - n. of associations (ok, ⇧), especially in SB display (ok, ⇧ familiarity) small changes in nature of sg, especially comps (ok, small ⇧ comps whereas others ⇩; small ⇧ tgt)	GT4 *Prompt* - *sg name SB & CB* - *sg rule CB (comps-tg)* - *exemplars SB* - *associations SB* Increase in - n. of sg, especially recalled in brochure-CB, and associated in SB display (ok, small ⇧) - n. of brands (ok, ⇧) - n. of associations not 1-to-one, for cross-classific <u>(no, lowest ⇧)</u> especially in SB display (ok, ⇧) delta in nature of sg, (comps and tgt (ok, ⇩ comps; ⇧ % tgt)
	CB Display	GT5 *Prompt* - *sg name CB* - *no sg rule* - *exemplars CB* - *associations CB* Increase in - n. of sg, especially in CB display/~~-brochure~~ (ok, ⇧) - n. of brands, especially in CB display (ok, ⇧ familiarity) - n. of associations (ok, ⇧ but lower than TG3), especially in CB display (ok, ⇧ but also SB) small changes in nature of sg, tgt (ok, ⇧ lower than TG6)	GT6 *Prompt* - *sg name CB (repeated)* - *sg rule CB (comps-tg)* - *exemplars CB* - *associations CB* Increase in - n. of sg, in brochure-CB display (ok, small ⇧) - n. of brands, especially in CB display - n. of associations (ok, ⇧), especially in CB display (ok, ⇧ familiarity) small delta in nature of sg, tgt (ok, ⇩ comps; ⇧ % tgt lower than TG4)

Figure 6.6. – Observed effects of POP, with different Display solutions

<table>
<tr><td></td><td></td><td colspan="2">POP</td></tr>
<tr><td></td><td></td><td>No POP</td><td>Yes POP</td></tr>
<tr><td rowspan="6">DISPLAY</td><td rowspan="2">No display</td><td>TG1
No prompt</td><td>TG2
Prompt
- sg name CB
- sg rule CB (comps-tg)
- no exemplars
- no associations</td></tr>
<tr><td colspan="2">TG2 vs. TG1 (POP when no display)
Increase in n. of sg (recalled but not necessarily associated)
ok, ⇧ recalled and <u>associated</u>

delta nature sg (comps, tgt)
ok, ⇩ comps, ⇧ tgt

negligible increase in n. of brands and associations
no, ⇧</td></tr>
<tr><td rowspan="2">SB Display</td><td>TG3
Prompt
- sg name SB
- no sg rule
- exemplars SB
- associations SB</td><td>TG4
Prompt
- sg name SB & CB
- Sg rule CB (comps-tg)
- exemplars SB
- associations SB</td></tr>
<tr><td colspan="2">TG4 vs. TG3 (POP when SB display)
Increase in n. of sg, recalled, both SB and CB, and associated (especially SB)
<u>no</u>

increase in n. of associations (cross-classifications)
<u>no</u>

higher heterogeneity in nature of sg (comps and tgt)
⇧ tgt but ⇩ comps</td></tr>
<tr><td rowspan="2">CB Display</td><td>TG5
Prompt
- sg name CB
- no sg rule
- exemplars CB
- associations CB</td><td>TG6
Prompt
- sg name CB (repeated)
- sg rule CB (comps-tg)
- exemplars CB
- associations CB</td></tr>
<tr><td colspan="2">TG6 vs. TG5 (POP when CB display)
Increase n. of sure sg (especially CB) and associations
ok, small ⇧
negligible increase in n. of sg
ok</td></tr>
</table>

Figure 6.7 – Observed effects of Display, with different solutions for POP

DISPLAY	POP: No POP	POP: Yes POP
No display	*TG1* No prompt	TG2 *Prompt* - *sg name CB* - *sg rule CB (comps-tg)* - *no exemplars* - *no associations*
SB Display	TG3 *Prompt* - *sg name* SB - *no sg rule* - *exemplars* SB - *associations* SB	TG4 *Prompt* - *sg name SB* [illegible] - *sg rule CB (comps-tg)* - *exemplars* SB - *associations* SB
CB Display	TG5 *Prompt* - *sg name* CB - *no sg rule* - *exemplars* CB - *associations* CB	TG6 *Prompt* - *sg name CB (repeated)* - *sg rule CB (comps-tg)* - *exemplars* CB - *associations* CB

TG5 vs. TG1 ⇧
Increase in
- n. of sg, brands ok ⇧
- n. of associations, especially in CB display ok ⇧

delta nature sg (comps, tgt) ok, in % comps ⇩, tg ⇧

TG3 vs. TG1 ⇧
Increase in
- n. of sg ok ⇧
- n. of brands ok ⇧
- n. of associations, especially in SB display ok ⇧
delta nature sg (comps) ok, ⇧

TG5 vs TG3 ⇧

Differences in nature of sg (more cross class for TG3) ok, ⇧ % tg, ⇩ comps

differences in n. of associations (in SB vs. CB display) ok, CB higher for TG5 and SB higher for TG3

[illegible]
Increase in
- n. of sg (CB besides SB)
<u>No, ⇩</u>
- n. of brands ok ⇧
- n. of and associations (especially in SB display, with cross-classific)
<u>No, ⇩</u>

TG6 vs. TG2 ⇧
Increase in n. of brands and associations (especially in CB display) ok, ⇧

TG6 vs. TG4 ⇩

Differences in nature of sg ok, small ⇧ % tg, ⇩ comps

cross class for TG4
<u>No</u>

and in n. of associations (in SB vs. CB display) ok, CB higher for TG6 and SB higher for TG4

Although such findings must be considered with even more caution, the main deviation from expectations refers the the combined effect of POP and Display, with subjects not performing cross-classifications and not drawing on both stimuli to memorize sub-groups. POP alone seems to stimulate more (unconstrained) brand and associations recall, than combined with display.

To sum up, **interaction effects between the two investigated tools of assortment presentation, exploiting categorization as organizing logic, affect the entire architecture of subjective cognitive structures, revealed throught solicited recall. Differences emerge with respect to brands, sub-groups, and associations** (especially, one-to-one and correct).

After some minutes of exposure to a picture of a display and/or to a fac-simile of a brochure, subjects modify the articulation of their categorical associations. Also exposure to POP is not neutral (particularly with respect to sub-groups).

An interesting effect, somehow unexpected, shows up with respect to POP. **Interaction effects seem to suggest that, when POP is available, the performance of subjects exposed also to display tends to get worst. This can be due to the specific type of learning potential investigated in experiment 1: incidental learning.**

POP prompts a categorization for the target product in a way less "immediate" to grasp than display. To understand the categorization suggested by POP, subjects must read the brochure carefully, considering all the columns' contents, and also by comparing various rows to find out the differences (the rule). In the procedure of experiment 1 subjects were asked to read the brochure, in order to answer future questions. This can drive participants' attention, but surely is far from the motivation subjects willing to buy an item in a product category for which they qualify as novice (especially when health-related) would have. In addition, time constraint (few minutes) does not favour careful and complete reading. All this can engender a certain confusion: in finding out higher variation in the product category than expected (based on what they recall), subjects may get lost. This can be even more evident for subjects exposed to coherent pop and display: being exposed twice to a categorization, that may be different from one's own, can lead to an attempt to review it, but making mistakes (e.g., wrong brands or associations, whereas sub-groups consolidate). Subjects exposed to a not coherent display, might believe cross-classifications are possible and add new ones – trying to replicate what seen or to follow the rule read – by increasing brands and/or sub-groups, also proposing associations, although not always correct. But, experimental findings suggest this was not the case, with subjects in SB-POP condition showing lower number of recalled components, including associations. They appear to be in troubles dealing with not coherent logics.

The categorization suggested by display arrangement (especially given the relative simplicity of employed stimuli, in terms of number of alternatives per sub-category) seems to be more easy to memorize, without requiring high elaboration. Subjects therefore can "paste" additional components within their cognitive categories' architecture, adding pre-categorized brands (e.g. associations they are able to recall after vision of the stimuli) to existent ones, without necessarily re-arranging components already stored in memory (e.g., following brand advertisement exposure or brand purchase and consumption).

The effects of homogeneous versus heterogeneous categorizations, suggested through different assortment presentation tools, on consumers' cognitive structures emerge as an interesting topic, calling for further investigation. Replicated exposure to POP stimuli or a simulated intentional learning context during the experimental procedure may help understanding whether and when combined actions may result in improved novices' cognitive structures, rather than in confusion.

Another area to be explored more in detail is the process of "cognitive acquisition" of the categorization suggested through display:

- to what extent are morphologic changes in cognitive structures, after exposure, simply additive?
- to what extent do they lead to re-arrangements and attempts to build cross-classifications?

also analysing the motivations underlying categorization tasks, by means of thinking aloud procedures.

Although to be considered with a certain caution, due to low sample size, experimental findings seem to provide empirical evidence that product assortment categorization matters, meaning that it can interfere with cognitive category structures of novices consumers. Encouraging results about interaction effects between display and POP, as well as significant planned contrasts and post-hoc comparisons suggest to pursue research efforts aiming at "qualifying" such influence in terms of consequences related to different actions on available assortment-presentation tools.

Is a combined action more effective than an isolated one? Under what conditions (e.g., types of categorization suggested, repeated exposure)? are examples of research questions that can motivate future exploratory studies.

6.5. Limitations and Further Developments

Experimental findings, although interesting and promising also in terms of managerial implications, cannot be considered apt to be generalized, and conclusive.

Further replications of the study are required to enable a significant contribution to theoretical and empirical research concerning contextual effects on consumers' product categorization, and particularly to the nascent stream of literature considering retailing settings, including assortment presentation, as potential sources for such effects.

Future replications can undoubtedly benefit of some procedural improvements for experiment 1, drawn from the pilot study conducted also purposely to allow such fine-tuning.

To assure higher inference power, a random and larger sample from the population of interest (adult consumers) has to be involved. In view of size increase, a simplification of the entire experimental procedure, especially to reduce time required for completion, is advisable, too. The only conceivable way to reduce the length of the procedure, without compromising its information richness, is eliminating the trial product category for the performance of task 1. Some other shorter tasks, involving a product category different than target-one, can be added to maintain cover credibility. Furthermore, some forms of reward for subjects' participation are desirable.

Some changes of the experimental stimuli can be necessary, too, in order to increase their verisimilitude: a real brochure and a large-format picture of a display arrangement (rather than a computer-based simulation) or, better, real displays arranged with existent products have to be created to be submitted to participants' observation. This is an improvement suggested if real products (brands and items) will be retained. Alternatively, another possible change is considering not-existent brands, in order to avoid the influence of prior participants' differential exposure to instances from different product sub-categories. In such an alternative scenario, some hypothetical product cards, or better, packages must be created, and a computer-based simulation of display arrangement (obtained with professional graphics software) has to be submitted, together with a real brochure, to participants in treatment groups.

The sub-categories employed in the study can be reviewed, too. A suggested change is removing or replacing the sub-category related to weight control, since it contains exactly the same alternatives in both categorizations, and furthermore it has very similar labels, thus reducing its discrimination potential of the type of stimuli (brochure and/or display) which may have affected its recall.[243]

A stricter control over participants' behavior by the interviewer, meaning immediate check of the right way of answering (e.g., always specifying the degree of self-confidence) and solicit to perform the task completely, can be useful to reduce missing cases or mistakes (e.g., answers referred to the trial product-category where required with respect to the target product-category).

As far as data analysis is concerned, involving a judge-committee – with every member blind to research hypotheses (thus excluding the researcher) – when coding answers, can reduce potential critics for subjectivity.

A different statistical software should be adopted, too. Such software may allow higher researchers' flexibility when specifying the types of analysis to be performed (e.g., planned contrasts), especially if it has been conceived on purpose for experimental data.

Further refinements of data analysis can be proposed, to exploit the experimental design's richness in information. For example, sub-categories inserted in stimuli always differ in terms of labels (except for weight control), to reflect underlying logic, and often differ in component items. A detailed analysis, with larger sample size, taking into consideration separately the effects on different product sub-categories, can be useful to investigate the effects of different naming and labelling.

Having refined and replicated experiment 1, or also in parallel, experiment 2 and 3 should be conducted, to assess the effects of assortment presentation by categories on individual cognitive category structures and representations, as far as categorization processes of new instances, when motivation to process available

[243] For example, the significant interaction found with respect to delta in familiarity of recalled sub-groups in SB display or the significant POP main effect at 10% with respect to familiarity of associations in SB display can have ben influenced by such situation.

product-information – in a way resembling purchase-oriented novice consumers – is controlled.

Experiment 2 could prove useful to shade light on the role of attention and motivation to process available information, which seems suggested by findings of experiment 1. A certain variance in dependent variable scores for participants to the pilot study, in fact, could be due to a different attention deserved to experimental stimuli. Furthermore, findings about interaction effects on sub-groups recall, somehow unexpected (given lower performance of treatment groups with both display and POP), seem to suggest that not only motivation but also the possibility (e.g., time available) to process available product category information (e.g., rules underlying grouping) is critical. Experiment 3 results will be sensitive to motivation and possibility to process stimuli informative content, too.

Results showing a relatively lower performance for subjects in treatment groups with a suggested categorization reflecting more experienced and expert consumers' rules, when compared to those exposed to a supply-based categorization, point to the specific nature of category learning, which requires time and it's effortful. Goal-based categories often become a classification simultaneous to a primary categorization, reflecting similarity in stimuli characteristics. Novices' categorization are likely to be bottom-up, driven by item-similarity. For the product category considered in the experiment, similarity in composition and shape/form can be regarded as common bases for primary categorization. The ability to cross-classify items, also according to top-down processes driven by theory-based criteria, follows extensive experience and characterizes experts. It's not a single experience (especially if incidental) with in-store stimuli suggesting an alternative categorization – less familiar to novices consumers who are more accustomed to supply-based categorization – that can lead to its immediate learning. Rather, it's a repeated exposure to suggested categorizations, not familiar to the subject, which can lead to learning, with radical changes of existent cognitive structures.

Some observations on this subject, supporting the proposed interpretation, are provided by Dalli and Romani (2003: p. 112) who argue that consumers' knowledge regarding products develops dynamically and requires costs and time to be adapted. They explain (2003: p. 226) that an individual must encounter with a certain frequency situations where consolidate cognitive structures show up as inadequate, in order to become acquainted of the necessity to change them. Dalli and Romani (2003: p. 227-228) describe three distinct processes which can lead to a modification of consolidated knowledge:

- accumulation, when new pieces of information are integrated coherently into existing structures;
- modification, when existent knowledge structures are partially modified to account for new information;
- restructuring, when complexity and articulation of the cognitive structures increase and new associative networks are required, to lead to easy activation and retrieval.

Accumulation and modification processes rather than restructuring seem to take place following experimental exposure to in-store stimuli, as it could be expected given the nature of the incidental learning context simulated. Accumulation and modification occur especially for individuals exposed to supply-based categorization, whereas customer-based categorization has the potential to lead to restructuring, but the learning context characteristics in experiment 1 (e.g., frequency and duration of exposure to in-store stimuli) cannot be sufficient to guarantee it. Longitudinal studies must complement this research project, to investigate the effects of exposure to the same stimuli suggesting a non familiar product categorization (like customer-based display and POP for novice consumers in Experiment 1) on novices' cognitive structures. Such developments should advisably be conducted in real retail settings, rather than simulated, both off-line in operating stores as well as on-line – where it is easier to manipulate assortment presentation stimuli and to track interaction between suggested categorizations and individual cognitive structures in a dynamic perspective.

Convergent results emerging from the various components of the outlined research project should provide a sound contribution to extending existent research, and to drive retailers' efforts in category management implementation, as far as assortment presentation is concerned.

CONCLUSIONS

Categorization is an ubiquitous cognitive activity, strictly related to the interaction of human mind and external world, as well as to consequent behavior.

Categorization has been therefore thoroughly investigated in Cognitive Psychology, as well as in other disciplines, including Marketing.

Categorization is fundamental for information processing in humans, which involves as main phases: acquisition, storage, retrieval, manipulation or transformation and use of information to perform intelligent activities. Furthermore, categorization plays a critical role in perception, thinking, language, and action.

During categorization processes, people assign some objects (in a broad sense, ranging from things to abstract entities, from linguistic symbols to persons) to categories, by recognizing them as belonging together in virtue of some relevant commonalities (mainly reflecting similarity or theoretical justifications), and then treat those objects in some unified and appropriate ways, by producing a specific response. Responses can be conceived at the cognitive level (e.g., perception, memory) as well as at the behavioral level (e.g., actions taken to interact with the object). Categorization, for example, simplifies perception and is regarded as an organizing principle for human knowledge, acquired through extensive experience and interaction with the environment, and stored in long-term semantic memory. Categorization leads to a classification of non-identical stimuli so that they can be treated as equivalent (to a certain extent and for certain purposes) and therefore dealt with, by individual limited cognitive abilities. Classification then may serve the purpose of inference and prediction, thus guiding also behavior.

A category, in fact, can be regarded not only as a group of objects sharing relevant commonalities, but also as the related knowledge an individual has acquired and stored in memory for future use (category-concept). Having identified the reference category (e.g., classification function), the knowledge associated to that category can be activated and retrieved so that it can be applied to be of some value (e.g., inference function) in current context (e.g., decision making).

All such characteristics help explaining the interest of Marketing discipline, amongst several others (e.g., sociology, biology, linguistic etc.), in categorization.

Objects to be categorized can well be products consumers are exposed to, when interacting with the market environment. Adequate responses at the cognitive level may be perceptions related to such products, as well as memories attached to them, stored as product-category knowledge. In particular, consumers' experiences are strictly related to consumers' expertise to build up a multidimensional construct of consumers' knowledge. Categorical cognitive structures are components of consumers' expertise with respect to a certain product category, and can be affected by information processing mostly occurring during individual idiosyncratic experiences.

Classifying (also novel) items as members of a certain product category helps organizing and differentiating the array of product stimuli of which the consumer is aware, and can lead to following inferences (e.g., properties such items should have) which, in turn, can guide consumers' behavior (e.g., purchase).

As a matter of fact, information processing, where categorization is fundamental, is amongst the most important stages in consumer decision-making, underlying final choices in the market.

Marketing researchers, in particular, aim at understanding how consumer information processing takes place, also in order to exploit the possibilities of favourably influencing it.

Categorization doesn't escape such an attempt, with research efforts devoted to:

- examining the consequences of consumers' product categorization on phenomena of interest for marketers, such as brand evaluation and purchase intention;
- investigating if and how marketing variables, under managerial control (e.g., brand attributes or typicality, brand familiarity built through advertising efforts or positioning in-store), affect product-categories consumers create in their minds, as well as the underlying processes, besides following cognitive and behavioral outcomes.

The ubiquitous nature of categorization makes not so completely surprising its application also in the retailing context. In particular, retailers exploit categorization to facilitate some managerial activities. For example, retailers use categories – at different levels of inclusiveness – to classify carried merchandise. Such categories, becoming part of the informative system, are then useful references to guide management processes and to articulate related organizational responsibilities, both internal (e.g., inventory management, accounting and control) and external (e.g., buyers in charge of orders to suppliers, department sales specialists). Different commonalities may be privileged by retailers when creating such managerially significant categories. Similarity in manufacturing process or in logistic treatment have been preferred for long as bases to create merchandise classification systems in retailing, with implications on internal and external processes.

Nineties have been characterized by the proposal of an innovative managerial approach: category management, thought as a viable solution for retailers and manufactures, facing a tough market scenario, in fast-moving goods supply-chains. Such an approach even emphasizes the managerial significance of categorization for retailers, since product categories are required to become strategic business units. For retailers this implies setting goals based on the competitive environment and consumer behavior requirements, adapting marketing mix tools (e.g., pricing, merchandising, promotions, assortment width and depth etc.), measuring performance effects, and so on, all at "the category-level", in a reiterated manner. Furthermore, all these activities may be executed with varying degrees of involvement and influence from the retailer's suppliers and external consultants (i.e. data providers), with implications for the retailer's network relations. The ultimate objective of category management approach is improving the performance of all the partners along the supply-chain, through enhanced delivered value to the customers.

For category management purposes, a category is conceived as a distinct manageable group of products that consumers perceive to be related and/or substitutable in meeting a consumer need (ECR Report, FMI 1995).

Category definition represents a critical step in category management projects, bearing implications at the strategic (e.g., differentiation from competitors), organizational (e.g., areas of responsibility) and operational (e.g., store layout and display) levels. When considering the relationship between retailers and consumers, category definition has a communication valence, since it drives the visual organization of product assortment within the store, where prospective shoppers may be looking for some items, processing information stimuli more or less explicit (including the suggested product categorization).

Proponents of a customer-based category management approach urge retailers to consider and integrate their customers' perspective when defining categories for managerial relevant purposes. Some contributions in academic and practitioner literature suggest mapping on consumers' categorization processes to reach a cognitive fit, claimed to be beneficial in terms of dominance of the shopping environment, and ability to select appropriate alternatives for purchase and consumption.

Such literature, however, does not explain in detail how to map on store patrons' categorization processes, when visually organizing assortment presentation in store.

Knowing the foundations of human categorization processes, in general and regarding products, should be a pre-requisite to follow such suggestions.

The fist contribution this dissertation has intended to provide is a comprehensive review of the international literature on categories and categorization, from Cognitive Psychology and Marketing disciplines, in order to offer a theoretical background to retailers' efforts towards obtaining an assortment presentation by categories in line with their customers' perspective [part I].

The literature review, especially from Cognitive Psychology, offers some useful insights, for example, by suggesting the articulation of product-category structures along a vertical as well as an horizontal dimension, or the heterogeneous nature of the commonalities to be considered, involving not only similarity in external stimuli, but also theoretical reasons residing in perceivers' minds (e.g., being ideal to pursue a specific situational or personal goal).

Furthermore, such literature can offer a methodological support, since it provides established techniques to examine what category structures and representations subjects have developed in their mind-set, and which process of categorization they follow. For example, procedures can involve exemplar generation, category rating, category judgment tasks and so on; thinking aloud and protocol analysis can be employed to increase information richness of in depth interviews, and matrixes can be construed and subjected to statistical analyses to assess the degree of consensus vs. heterogeneity between subjects or groups of persons, and so on. The application of similar techniques can become a component of retailers' efforts of demand analysis, which should precede and systematically accompany the category-definition step in category management implementation.

On the other hand, the literature review highlights some potential complexities for retailers. Empirical findings have demonstrated differences, both between and within subjects, in consumers' category structures, representations and processual aspects, which may undermine the retailers' ability to be always "in line" with every store patron looking at assortment presentation in-store.

An interesting research question arising from reviewed literature, and bearing relevance to retailers' practical need of guidelines for assortment presentation, is whether assortment categorization in-store matters for store patrons, meaning that it can affect their cognition and behavior.

As a matter of fact, categorization research from a marketing perspective has sparely been applied to retail settings and problems. Only recently, some empirical studies have addressed the issue of the influence retailers' choices regarding the product-positioning in-store, through display, may have on consumers' evaluations, by drawing constructs from the categorization framework. **Empirical findings – showing contextual effects on consumers' product evaluation, depending on the specific category where the product is inserted when displayed in-store – seem to suggest that retailers' categorization matters. The effect on consumers' product-category representations is claimed by researchers as the reason behind observed effects** (e.g., through priming that increases the salience of certain components of the structures stored in memory), **without testing it explicitly.**

The second intended contribution of this dissertation is building on such findings, and enriching this nascent stream of research, by investigating whether retailers' categorization may affect consumers' structures and representations regarding products.

A complex research project, articulated in sequential experimental studies, has been outlined [part III] **to investigate the potential for category incidental as well as intentional learning, arising from consumers' exposure to assortment presentation**, and leading to changes in existent product category structures (as revealed by recalled representations) and categorization processes. **The focus is placed only on novice consumers**, given differences empirically demonstrated to exist in categorization processes and outcomes, arising from differences in cumulated knowledge about a certain domain, including products.

The thrust of this research is mainly of an applied nature, being devoted to exploring the potential of co-evolution between retailers' and store patrons' categorizations about products variants in assortment, during consumers' experiences while looking at shelves and additional POP material available in-store, and processing their informative content. The potential of co-evolution can be of relevance for retailers looking for establishing a cognitive fit with their customers, which is suggested as beneficial in category management literature, overcoming the complexities due to individual heterogeneity, and filling in the gap regarding practical suggestions to achieve such objective.

A pilot study, aimed at testing the procedure developed for the first of the series of experimental studies, has been conducted, involving 54 Italian Master students, all qualifying as not experienced and not experts with respect to the selected product category of dietary supplements.

A 2 (Exposure to POP material: no, yes) x 3 (Exposure to Display arrangement: no, supply-based, consumer-based) between-subjects factorial experimental design is proposed to assess the effects of manipulated variables, reflecting the most important tools of assortment presentation a retailer can manage, on several indexes measuring the dependent variable "product-category structure" revealed through recall, as well as "changes in product-category structure throughout the experiment". The experimental procedure is articulated in several tasks, including a buffer task, a check task (to find out guessing), and questionnaires to collect personal profile data. Real alternatives (brands) in the product category of interest are inserted in experimental stimuli, all simulating assortment presentation tools by means of pictures.

Although not conclusive, empirical findings obtained through the pilot experimental study on incidental learning due to assortment presentation by categories can be useful to enrich the emergent stream of research on contextual effects on categorizations concerning also retail-settings as source of such

effects. The experimental results obtained are in line to what argued by Desrochers (1999) and found by Desai and Ratneshwar (2003) with respect to the influence assortment display may have on categorization and on consequent outcomes including product evaluation and purchase intention.

These first findings, with all caution needed given low sample size, if corroborated in future replication on larger scale and in further steps of the research, may reveal opportunities for a dynamic process of cognitive-fit achievement between retailers and store patrons, according to the conceptual framework proposed in this dissertation [part II] **for empirical test of feasibility.**

According to empirical results, assortment presentation appears to be "not neutral". An exposure, with a minimum of cognitive interaction (e.g., reading) and for a short time, to assortment presentation tools – suggesting a product categorization according to a certain logic – is accompanied by some changes in subjects' cognitive representations regarding the category of dietary supplements, as revealed through recall. All cognitive category components are affected: recalled brands, cited sub-groups and reported associative relations between them, with a certain reactivity to those inserted in the stimuli subjects have been exposed to, during experimental procedure.

Number of recalled brands tends to increase, with a repetition of those suggested through display. Cited sub-groups tend to increase in number and to change in nature, again with a repetition of those cued through POP and, above all, display. Also associations between brand⇔sub-group change in number and in correctness and reflect those included in experimental stimuli.

Consistent with expectations, provision of a category structure by the retailer, through assortment presentation, leads to an increase in the number of total brands known and recalled for target-product category by novice consumers, with higher effects for prompted brands (as signalled by familiarity indexes, showing a significant effect of display). It is especially display which exerts a significant effect on the brand component of cognitive structures (often in interaction with POP).

Also consistent with expectations, provision of an articulated category structure by the retailer leads to an increase in the number of product sub-categories known and accessed by novice consumers. However, it seems that structure provided through display (more than through POP) mostly affects sub-group component. For example, familiarity of sub-groups in the brochure as well as respective dominance show a significant effect of display (since brochure contains exactly the same sub-group labels as CB display), but not of POP.

Not in line with expectations, the availability of different categorizations, suggested through distinct tools, do not lead subjects to increase the number of sub-groups cited. Consistently with expectation, the availability of POP material coherent with display helped consolidating individual structures, as shown by the significant POP effect with respect to the number of sure sub-group associated. Coherence of tools also affected the correctness of associations (as suggested by a negative delta in the % of incidence of correct ones on total for treatment groups involving no POP, no display, and SB display)

Such findings extend previous research ascribing observed changes in revealed cognitive structures of experienced consumers (e.g., Nedungadi et al., 2001) and effects on product evaluation of both novice and expert consumers (e.g., Desrochers, 1999; Desai and Ratneshwar, 2003) to priming affecting retrieved category representations, thus enriching the role of store display as a contextual factor in categorization.

Besides having a "remind effect", thus increasing the salience of certain components of consumers' category representations about products (e.g., sub-groups and underlying similarities) retrieved for evaluation purposes (e.g., inference and decision making), **assortment presentation by categories seem to be a potential category learning context.** Exposure to assortment presentation can lead to changes in individual category structures. Such results are in line with contributions arguing that consumers learn about the variety in a product category also by visiting stores and looking at their assortments.

It is not argued here that changes in category structures are all due to reactions to prompts in terms of incidental learning. Also a remind effect was in place with assortment presentation tools containing cues which activated – existent although not well-established – category structures. This interpretation can be based on results showing an increase in recall of the brands with known advertisements after exposure to experimental stimuli. Further studies, involving not existing brands, may help isolating true learning from mere reminding effects.

Nevertheless, an incidental learning effect showed up, too. Novice consumers involved in the experimental study seem to rely on assortment presentation through display arrangement (more than through POP) to update their cognitive structures, by adding new components (e.g., brands and sub-groups). Consumers – exposed to a simulations of a display – trust those stimuli and use them to update their memories, as revealed by sub-sequent product-category made-explicit structures. Nobody questioned the verisimilitude of sub-groups or brands displayed, although they could be fake. Consumers memorized (although not necessarily consciously) the brands they have seen, sometimes associated to a certain sub-group, and were able to later recall them. This is supported by a qualitative analysis of the responses, showing consumers recalling brand names very close (but not perfectly fitting) or very similar (not computed) to those in experimental stimuli.

Each assortment presentation tool has a informative/educational potential, by its own. The activation of one of the tools (disregarding the other) is accompanied by a significant improving change in subjective performance, in terms of both size (e.g., number of brands and sub-groups) and accuracy (e.g., objective signalled by proper brands and sub-groups, and subjective shown by sure citations) of the revealed category structures.

The different object of prompting (sub-category name, rule, exemplar) allowed by distinct assortment presentation tools has shown effects in line with expectations. POP alone doesn't impact on the brand component of the category structures and on associations, whereas it impacts on the nature of the sub-groups, on the degree of confidence for associated sub-groups, as well as on the delta of the familiarity and dominance for sub-groups in CB display (coinciding with POP labels). Display alone exerts an influence on all the components, involving prompting and priming of sub-groups, brands, and also associations.

Interesting findings refer to the effects of the nature/intensity of prompting: use of both POP and display, in a coherent vs. not-coherent manner (with respect to the suggested categorization). Significant interaction effects suggest that where subjects have not the opportunity to look at a display, POP helps

increasing the size of the category structure (number of brands, sub-groups and often associations) and frequently its accuracy (proper and sure). On the contrary, when reading POP is followed by exposure to a display arrangement, the performance tends to deteriorate when they aren't coherent (SB display condition) and to improve to some extent when they are coherent (CB display).

When looking at the magnitude of the performance in different treatment groups, it appears that in this experimental design, POP has not a considerable "additional value" in terms of opportunities to learn when display is available. Rather, it appears to create an information overload and create a certain confusion in interviewed (especially when not coherent). Outside the store environment, that is reading the POP when not exposed to a display, such information aid can express the greatest learning potential for consumers.

It has to be reminded, to interpret such findings, that all these effects refer to an experimental procedure where exposure to POP is conceived as "spot" and for a short-time, preceding eventual interaction with a display arrangement.

Such results seem to be justifiable given the procedure for experiment 1, which investigates incidental learning. A "one-shot" and short exposure to POP allows low opportunities for processing a rich information content, furthermore proposing a categorization of products to which novice consumers are expected to be not familiar with (being based on attribute-benefits relationships underlying the attainment of certain goals related to specific consumption needs).

Results referred to sub-groups recall seem to suggest that subjects exposed to POP and SB display tend not spontaneously to become acquainted of cross-classification possibilities, and rather they tend to reduce the number of citations, especially with respect to correct ones. The ability to cross-classify items in a product category according to alternative sub-category cannot be obtained through a one-shot experience. Repeated exposure to an alternative categorization scheme, together with motivation and possibility (e.g., time available) to elaborate on its underlying logic and to understand relevant rules are required.

The suggested categorization should lead to a re-structuring of the approximate category structures novice consumers have developed following previous interactions with the product category, rather than to a mere integration of new information stimuli (as in the case of the categorization suggested by SB display).

With respect to empirical research, new directions of study can be followed to shed more light on the observed effects. Experiment 2 and 3 may help clear the role of motivation to process available product information (in categorical form) on cognitive representations and categorization processes. It has to be reminded that participant subjects seems not particularly prone to be extensive information-seekers and processors in the store-environment. Longitudinal studies with repeated exposure to POP, before but also concurrently to interaction with a display arrangement, can contribute **to identify the conditions leading to a synergic rather than to a confusing impact of complementary tools of assortment presentation.** A qualitative analysis of the answers subjects have provided to the cover-questions following exposure to POP seems to confirm the interpretation of the utility of POP, since participants admitted to think the brochure could be useful when in the need to purchase a dietary supplement.

The discussed findings bear managerial implications, too. Retailers should be careful when providing additional informative-material in-store, especially when it suggests alternative categorizations for the same items. It might be that, at least at the beginning, this material creates an information overload, especially for novice consumers who can feel confused. In self-service stores it should be advisable to prepare take away information aids, which can be carefully examined by consumer before purchasing (e.g., at home), sure to have a "memo" (e.g., poster or brochure) in-store when looking at displays. Another solution is open when sale assistants are at customers' disposal. A possibility which can be investigated in future studies is that POP material can be employed by sales assistants (or pharmacists for the considered product category) as a didactic tool in their personal interaction with the customer. POP can be regarded as a "codified and made explicit knowledge" expert consumers and buyers usually have. Sales assistants can help novice consumers to process new and alternative categorizations, thus enabling them to be autonomous in selecting appropriate alternatives from the carried assortment. Resources necessary to prepare POP and time spent to explain it can be considered as a specific investment a retailer can do in its relationship with the customers – especially novices – to enhance their knowledge so that they can become competent and able to self-purchase in that product category, when necessary, or interact with the pharmacists to find out a response to specific needs. **An area of potential investigation in this respect can also be the role perceived retailers' knowledge-enhancing efforts may have on store patrons' purchase behavior and on their relationship with the retailer (e.g., satisfaction, trust, loyalty).**

Some other experimental results to be discussed regard the type of categorization that can be suggested to customers. The pilot study has considered, in particular, a supply-based categorization, which can be considered more traditional and similar to the one most consumers are familiar with, and a consumer-based or goal-based categorization, which can be thought of as a secondary categorization, usually adopted by very experienced and expert consumers.

Although not significant differences requires a certain caution, performance observed for SB display treatment groups with respect to the size of the category structures is often better than CB display treatment groups, especially without POP.

The comparison of dominance index scores between treatment groups suggests that an integration of new product-category information provided by experimental stimuli into existing cognitive structures prevails on restructuring. For example, brands and sub-groups suggested by experimental stimuli tend to be recalled (as shown by familiarity index), in addition to already stored exemplars and sub-categories, thus without dominating the structure revealed through post-manipulation recall. Furthermore, this is more apparent for SB display condition.

Learning, as it could be obviously expected, is not an immediate and easy process.

In particular, incidental learning is more difficult to show up with respect to a new and more articulated categorization, such as the one resulting from more experienced and experts' consumers perspectives matching, employed to build stimuli. **Such initial results can be extremely interesting for retailers willing to innovate traditional surface similarity-based assortment classifications, and for sure require additional studies to be more clearly investigated.**

Conclusive remarks cannot finish without expressing the wish that this dissertation will be categorized as an interesting initial explorative study, that can be built on and improved, to develop more sophisticated analyses aimed at investigating the potential of exploiting assortment categorization in-store to enhance consumers' knowledge about products and their consequent ability to choose more suitable alternatives in the market.

APPENDIXES

APPENDIX A - STIMULI PREPARATION FOR EXPERIMENT 1.

The stimuli to be used in the experiment are:

- a paper guide to the product category «dietary supplements», for factor A;
- a shelf display arrangement for the product category «dietary supplements», for factor B.

The stimuli for the experiment have been prepared to be as realistic as possible, that is, by taking into consideration the process a manufacturer, a retailer or another subject in the product category supply chain is likely to follow when devising a mere informative effort (i.e., only a shopping guide for the product category) or when a retailer is planning and implementing a category management project (i.e., rethinking of the category assortment composition and presentation).

A preliminary study of the product category structure according to the manufacturers', the retailers', and the experienced and expert consumers' view has been conducted (on January and February 2003) to provide inputs for the stimuli preparation. A desk analysis has been preferred, when possible, to a field analysis to cope with time and resource constraints.

To reconstruct the product category structure according to the manufacturers' view, a documental analysis has been performed by taking into consideration different sources suggesting taxonomies/classifications for the «dietary supplements» proposed by associations of manufacturers (e.g., the European Federation Of Associations of Health Product Manufactures, available on the web site www.ehpm.com). Similarly, a documental analysis of the classifications proposed by associations or organizations of pharmacists (i.e., www.professionefarmacia.it, www.farmasalute.it) has provided the view of main retailers for dietary supplements in Italy.

Finally, the product category structure according to the physicians' view has been reconstructed on the basis of available classifications proposed by their professional associations (e.g., www.italmed.it).

The documental analysis showed great heterogeneity between different sources, with classifications based on product components (i.e., combined, mono- and multi- minerals; mono- and multi- vitamins, amino acids, amino acids in association, derived from amino acids) and their origin (i.e., preparations of medical herbs, natural vitamins, gandular extracts), sometimes on targets (i.e., for adults vs. children) or according to their function or provided benefits (i.e., anti-oxidants, tonics; appetite stimulating; immuno-stimulating; other stimulators) or product usage destination.

The classification suggested by physicians and pharmacists is assumed to reflect the product categorization of «expert» consumers, as defined by Michell and Dacin, 1996. Pharmacists and physicians are expected, due to their specific educational background, to be able to select – among the alternatives available on the market – the product suitable for certain specific needs, thanks to their understanding of the relationships between product attributes and benefits arising from their consumption, as well as the appropriate way of consuming the product.

To understand the product category structure according to the «experienced» consumers' view, some in-depth interviews have been conducted on February 2003. A convenient sample of 35 subjects was selected among members of the administrative staff, teachers and participants attending executive courses in a Graduate Business School in the North of Italy (Milano), according to self-assessed familiarity with the product category, measured on a 7-point scale identical to the one applied by Nedungadi et al. (2001). Deep-interviews were conducted individually. Subjects were shown a sample of variants from the product category and asked to perform a categorization task, that is grouping the instances, providing the category name and the underlying reasons. The items to be considered in the categorization task were selected – among the population described in the detailed lists of manufactured dietary supplements made available by the Italian Ministry of Health, by specialized data providers and by websites (i.e., www.pharmology.com) in the industry – according to the following market-oriented criteria:

a. market share > 2% or market share < 2% but > 70% within the specific way of use (e.g. tablet vs. caplet) or market share < 2% but with the reference belonging to a product line (i.e., Complementa, Biokromaton, Integra)

b. number of pieces sold per year > 40000.

62 items were finally selected and are shown in alphabetical order in table AppA.1.

Table AppA.1 – The brands considered in the preliminary study to reconstruct the expert consumers' category structure

Acutil Fosforo	Gegorvit	Naturamix jr
Acutil Multivitaminico	Integra Sport	Naturamix ad
Benegum	Integra start	Naturamix sr
Betotal	Integra prima scuola	Neovis
Bioscalin Retard	Integra selenio	Neovis Plus
Biokromaton Antioxidant	Integra multivitaminico e minerali	Neovis Stress
Biokromaton Salinum	Integra ferro	Polase
Biokromaton C	Integra B+C	Polase Sport
Biokromaton Mineral Vit	Integra magnesio e potassio	Pollingel
Biotrefon	Isostad	Sargenor
Caltrate	Isostad Energy Action	Selenium ACE
Caltrate Junior	LievitoShon	Sillix C
Carovit Forte	Magnosol	Supradyn
Cebion	Meritene	Vitalmix Complex
C Tard	MGK Vis	Vitalmix Fos
Enervit	Multicentrum	Vitalmix Jr
Enervit Sport	Multicentrum Jr	Vitashon jr
Fon Wan Memory	Multicentrum Select	Vitashon Total
Fon Wan Eleuthero	Multiup	Zigull
Fon Wan Ginko Biloba		Zincolral
Fon Wan Ginsenergy		
Fon Wan Energy		
Friliver		

By looking at the list, it is immediately possible to understand some characteristics of the manufacturers' offer of items within the product category. Different variants for the same (umbrella) brand are available, where the variant is defined by the target to which the item is appealing (i.e., Caltrate and Caltrate Junior; Multicentrum, Multicentrum Jr, Multicentrum Select; Naturalmix Jr, Naturalmix Ad, Naturalmix Sr), the destination use (i.e., Enervit and Enervit Sport; Polase and Polase Sport; Integra Sport and Integra Prima Scuola), the main component/supplement (i.e., Integra Ferro, Integra B+C; Integra Magnesio and Potassio; Fon Wan Eleuthero, Fon Wan Ginko Biloba). Such a branding practice suggests that manufacturers in the pharmaceutical industry are taking into serious consideration the need to clearly communicate to consumers the differences between the variants they propose, especially because their products can be sold also through mass distribution (i.e., hypermarkets and supermarkets) with a self-service technique which requires the package of the product to be self-selling. For our investigation purposes, this practice can cause some problems during the performance of the recalling task necessary to collect data for the experiment, since the consumer can recall only the umbrella-brand or the brand and its variant specified by some qualifying words added to the umbrella-brand.

For the categorization task in the preliminary study, a card was created with represented the package of the selected brands/items, thus indicating clearly the brand. Participating consumers were showed cards depicting n. 69 items within the product category «dietary supplements» and each one was first asked to eliminate the cards that «didn't say nothing to her/him». After the grouping and labelling task for the not-discarded items, subjects were also asked to select the two most similar and the two most dissimilar items in each created group, and to explain the underlying reasons. At last, subjects were asked to integrate the suggested list of items with anyone they had remembered, but not found, when performing the grouping task.

Only three variants were recognized as familiar by all the interviewed subjects. On average, a subjects discarded 16.43 products (std dev 10,12), ranging from a minimum of 4 to a maximum of 43. The brands that "didn't say nothing" to the interviewees were: Biotrefon (83%), Sargenor (83%), Neovis (71%), Neovis Plus (69%), Gegorvit (60%). Interestingly, the names of such variants seem not to clearly suggest specific targets, components or destinations of use.[244] Another noticeable result is that some of the discarded brands have a relatively high market share (i.e., Betotal, Naturamix Ad, Neovis Plus, Vitasohn Jr, Zincorlal). These results might suggest that subjects in the sample may have a different level of experience with the different sub-categories and their various exemplars.

The most recurrent sub-categories for the instances provided from the «dietary supplements» product category (based on the relative frequency of citation) were:

- for sport (25 out of 35 = 71,43%)
- for children (21 out of 35 = 60%)
- specifics, that is with a particular element (14 out of 35 = 40%)
- natural (12 out of 35 = 34,29 %)
- vitamin C (10 out of 35 = 28,57%)

[244] This suggests a potential limitation of the procedure. By asking subjects to discard the brands that "say nothing" to them, maybe they have retained also variants they were not familiar with, because of previous exposure to advertisements or use, but which had a clearly understandable name, so that they can guess a likely sub-category.

- for memory (10 out of 35 = 28,57%).

Most sub-categories reflect the destination of use of the dietary supplement, whereas the others are based on their composition.

Table AppA.2 lists the brands to be categorized in alphabetical order and shows their assignment to the most recurrent sub-categories provided by the convenient sample of subjects with a minimum of self-assessed familiarity with the product category.

Table AppA.2 – The assignment of the brands, in alphabetical order, to the most recurrent snb-categories

Product	SPORT	CHILDREN	Specific	NATURAL	VITAMIN C	MEMORY
Acutil Fosforo		1	4			8
Acutil Multivitaminico			2			3
Benegum		7				
Betotal		2	2			
Biokromaton antioxidant			2		1	
Biokromaton C	1		4		8	
Biokromaton mineral vit	4		1	1		
Biokromaton salinum	3		2		3	
Bioscalin			1			
Biotrefon			1			
C tard			3		9	
Caltrate			9			
Caltrate Jr		15	2			
Carovit forte			7			
Cebion		2	3		10	
Enervit	25					
Enervit Sport	25					
Fon wan eleuthero				3		
Fon Wan Energy	3			9		1
Fon Wan Ginko biloba				9		1
Fon Wan Ginsenergy	1			10		1
Fon Wan Memory			3	4		8
Friliver	19			1		
Gegorvit	1					
Integra b+c	1		4	1	8	
Integra Ferro			9	1	1	
Integra mg e potassio	4		5	1		
Integra Multivitam.	1			1		
Integra Multivitam. E Min.			1			
Integra Prima Scuola		12		1		
Integra Selenio	1		4	1		
Integra Sport	18		1	1		
Integra Start	7			1	1	
Isostad	25					
Isostad Energy	25					
Lievitosohn			6	6		1
Magnosol	1		6			1
Meritene	3		1			
Mgk vis	8		3			
Multicentrum		1				

Multicentrum Jr		16				
Multicentrum Select			1			
Multiup	1			3		
Naturamix adulti				9		1
Naturamix bambini				6		1
Naturamix Jr		11				
Naturamix Senior			10			2
Neovis			1			
Neovis Plus			1			1
Neovis Stress	1		4			2
Polase	10		1			
Polase Sport	25					
Pollingel	1	2	1	6		
Sargenor	1					1
Selenium ace			4		1	
Sillix C			4	3	8	
Supradyn	1				1	
Vitalmix Complex		1		2		
Vitalmix Fos			2	1		1
Vitalmix Jr		14				
Vitasohn Jr		14				
Vitasohn Total		1				
Zigull		13				
Zincoral	1		9			

A first analysis of the table – by looking at each row – shows that the same variant can be included by different consumers in different sub-categories. For example, Integra magnesium and potassium is included in the sub-categories sport (4), specifics (5), natural (1). It is also interesting that despite the brand name of the variant clearly suggesting one destination of use, some consumers have included it in a different sub-category. For example, Caltrate Jr in the sub-category specific (2) vs. children (15), C Tard into specific (3) vs. Vitamin C (9), Fon Wan Memory in natural (4) vs. memory (8).

The analysis of table 5.2, by comparing different rows, suggests that some items are perceived by experienced consumers as good exemplars of only one sub-category (e.g., Benegum and Multicentrum Jr for Children; Isostad and Isostad Energy for Sport, Caltrate for Specific) with a high convergence in categorical assignment; whereas other items have been assigned to more than one sub-category. But, examining the nature of the categories, it seems that this is due to a different level of discrimination and abstraction in choosing the label (e.g., Acutil fosforo in the memory vs. specific sub-categories or Biokromaton C and Ctard in the vitamin C vs. specific sub-categories).

These results overall provide evidence of category flexibility between subjects, due to idiosyncratic experience (e.g., different degree of typicality for an instance related to frequency of instantiation as a member of the category), and within subjects. The same variant may often be cross-classified in different sub-categories according to the salient dimensions (e.g., target, composition).

Such preliminary analyses aiming at mapping the structure of the target-product category according to different subjects' perspectives, served the next fundamental steps for the stimuli preparation phase:

- the definition of the sub-categories in which to articulate the product category, involving naming each sub-category and selecting the items to be included; besides making explicit the underlying commonality;
- the simulation of a paper-guide for the product category, to explain the nature of the product category structure, and realistic to be distributed in a pharmacy;
- the simulation of a shelf display arrangement for the product category, to present the selected assortment, which was realistic for a pharmacy.

a) The definition of the sub-categories in which to articulate the product category «dietary supplements»

Given the kind of treatment groups to be devised for the experiment, the articulation of the product category should be defined to reflect, in one case, the suppliers' and retailers' perspective, and, in another case, to be in line with the perspective of expert and experienced consumers.

The sub-categories most salient to experienced consumers were considered as the starting point in defining the articulation of the product category; they were then compared and integrated with those of expert consumers (i.e., physicians and pharmacists). To achieve a synthesis/integration with the suppliers' perspective, a match has then be performed with the manufacturers' and the retailers' (pharmacists) categorization, to check the degree of overlapping and compatibility.

At last, as a result of the matching between perspectives, some goal-based/driven sub-categories were built, with the goal related to the subject's need when planning to purchase and consume an item (e.g., utility, similar to tree-classification by experts in Medin et al., 1997). The need was both generic (e.g., according to the life style of the subject related to the age or activities) or specific, and was expressed in the sub-category label to reflect the words employed by the sample of experienced consumers. The sub-categories identified were:

- well-being (adults); well-being children; well-being senior, for sport; expressing a generic need
- to recover immediately strength after an effort, to face effortful periods, vitamin C for cold and influenza, and to loose bogy weight, for memory; expressing a specific need .

Not all these sub-categories were employed due to the need of arranging a shelf display with the same number of items in each sub-category for both Supply- and Consumer-based categorizations [see later].

The product assortment classification by sub-categories suggested by the retailer in-store, is thought of as serving inference and action functions for the consumers when purchasing the items. As Barsalou has observed, goal-derived categories may be unusual sets of entities, that individuals create spontaneously for use in specialized contexts in everyday life, whenever they are instrumental in achieving a goal. These sub-categories often include items that can be simultaneously considered members of different taxonomic categories – based on similarities in intrinsic properties of the item such as functional attributes related to performance attributes (e.g. chemical composition). Expert consumers are usually able to cross-classify the items. For example, a physician, based on the theories he possesses, is able to select members of taxonomic categories (e.g., mono-compose vs. multi-component; magnesium and potassium from mono-compose) that can allow the achievement of a certain goal/specific need (e.g., quick recovering from a recent effort). The expert may understand the ideal dimensions of a goal-based product category, as well as know the properties and their relationships of taxonomic categories.

Whereas such goals are salient for experts – so that they frame their perceptions and cue/constraint the particular mental category representation they activate in memory (Ratneshwar et al., 2001: 155) – the same goals may not be salient for novice consumers. Assortment presentation in-store can increase the salience of these goals, also for novice consumers, thus trying to influence the representations they will built when exposed to the assortment (i.e., creating ad-hoc categories) and, later (in following shopping expeditions), activate in memory.

For example, thinking of an assortment presentation for a supermarket which highlights the health-related goals for foods, with a sub-category such as «rich in fiber, to help your intestinal regularity and feed you satiety sense», the salience a consumer places on the cited health-related goal may be induced to increase, and the consumer may learn to consider whole grain bread (included in such category) different from ordinary (not included in such category), because of the performance-attributes related to its component attributes, whereas previously perceived as belonging to the same category «bread» based on the surface or physical appearance similarity.

b) The simulation of a paper-guide for the product category «dietary supplements»

The paper guide to the «dietary supplements» category has to be created so that it can explain the nature of the product category articulation, making explicit the commonalities underlying each sub-category, thus suggesting a rule for sub-category membership.

As the sub-categories selected to articulate the product category - in tune with bothe experienced and expert consumers – are goal-based, the rule might suggest ideal dimensions, namely, the properties an item should have to serve the goal.

Expert consumers should be more able (vs. novices) to compare variants in a category and properties between variants in a category, since they should be more knowledgeable about physical attributes, but also performance attributes and the relationships between them (Mitchell and Dacin, 1996). Furthermore, they should be more able (vs. novice) to ignore irrelevant information, focusing on the properties which are diagnostic of category membership (Alba and Hutchinson, 1987), to assess the importance and value of a property differently in different usage contexts (Mitchell and Dacin, 1996). In the wordings of Smith and Medin (1981), they have well-developed core concept and identification procedures.

It could be useful, as a consequence, to guide novice consumers to compare variants within the same categories and evaluate their category membership focusing on relevant properties, making also explicit the relationships between them. Retailers should guide novice consumers to build and improve their core category concepts as well as identification procedures (i.e., perceptual attributes which are instantiations of more abstract attributes), thus favouring sub-sequent uses of the categories.

The display arrangement, and above all the POP material, could be devised so that they highlight properties with

- high cue validity, to help consumers to easily classify items as category members, and
- high category validity, to help consumers to confidently draw category-based inferences.[245]

The properties related to the determinants of typicality for a category might be good candidate to achieve such objectives, being the properties more common among all the category members (with a high probability of occurring in a category member) for taxonomic categories,[246] and the ideal properties for goal-based categories.[247]

As the categories obtained by experienced and (above all) expert consumers are goal-based and the goal is consumption-related, it is possible to build on Busacca and Castaldo (2000:70)'s suggestion to refer to the means-end chain (e.g., Gutman, 1982; Olson and Reynolds, 1983) to understand the cognitive sequences a consumer follows when interacting with a product and performing consumption activity, and to express the rule underlying the articulation by categories in terms of means-ends where means are product attributes and ends are related benefits or more specific consumption goals. For example, to best serve the purpose of «immediate recovery from a recent effort», that is, seeking something to consume which allows the benefit or more specific goal of saline restore, a rich content in both magnesium and potassium (attributes) is advisable (ideal properties). Attributes and benefits can both be thought of as category-members properties, but at different levels of abstraction.

As in the real world, the prepared stimuli (paper-guide) show a certain degree of overlapping between the sub-categories, in terms of both attributes and benefits. This means that there isn't always an exclusive relationship linking an attribute or a benefit to a sub-category. Different sub-categories may be characterized by the same attribute, but in a different combination with others, and/or by the same benefit, again, in a different combination with others. It's rather the configuration of properties which defines category membership.

For example, the benefit "well being" can be associated with both the sub-categories "for well being over 50 years old" or "vitamin C", and the attributes of multi-vitamins and multi-minerals content are associated with both the sub-categories "for well being and vitality" (alone) and "for the periods of high effort" (in combination with amino-acids). It is the relationships with other benefits or attributes that qualifies an instance as being more typical of one sub-category rather than another.

Benefits are stated in a summary way, that is through key words (similar to cues) and not with a complete and detailed sentence. Key words remind consequences in terms of positive desired

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[245] Attributes with high cue validity are highly diagnostic for category membership, since cue validity expresses the probability that an entity belongs to a category, given that it has the attribute; attributes with high category validity are highly inferable from category membership, since category validity expresses the probability that an entity has that attribute given that it is a category member (Medin and Barsalou, 1987). Medin and Barsalou (1987: p. 482) argue that "Depending on the relative extents to which categories are used for classification versus inference, their representations may be biased toward information high in cue or category validity".

[246] The main reason is that similarity to central tendency or family resemblance is the most important determinant of typicality for taxonomic categories, as shown by Barsalou's studies.

[247] Barsalou's studies have demonstrated that similarity to ideals, together with frequency of instantiation of an entity as a member of the category, are the most important determinants of typicality for goal-based categories.

outcomes (i.e., expansion of muscular mass, tonic) or of negative effects that can be avoided by consuming the dietary supplement (i.e., physical and mental stress, influenza).

Exact wording of the benefit was chosen to reflect the results of the grouping and labelling tasks performed by the consumers familiar with the product category and involved in the preliminary study of the product category structure.

To be more realistic as POP material, as well as for stressing the articulation, in the paper guide some colours could be associated to each sub-category.

The paper-guide employed during the experiment (in Italian) is depicted in Appendix B.

c) The simulation of a display arrangement for the product category «dietary supplements»

The shelf display arranged according to a consumer-based view is intended to be characterized by:

- an assortment composition for the product category «dietary supplements» which is decided by the retailer on the basis of the references manufactured by the suppliers and of the data about demand commonly available (i.e., sales);
- an assortment presentation for the product category «dietary supplements» which is based on an integration of the suppliers' taxonomical classifications of products (usually based on components or targets) with insights about the product category structure in consumers' minds obtained through in-depth interviews of experienced and expert consumers. Such insights can be used to visually organize the product category in sub-categories, by providing to each group of brands and items a label/name, which can be easily understood by every consumers (also the less experts) and can prove useful in guiding the choice process according to personal needs (in a self-service buying situation).

The first decision to be made by the retailer – and by the researcher in the experiment – refers to the product category assortment composition. The brands to be included in the experimental shelf display for the selected sub-categories were first selected on the basis of the following criteria:

a. sales by year in number of pieces > 40000;
b. recognition rate in the preliminary study with consumers familiar with the product category > 50%.

Such criteria may assure a certain degree of shoppability for the items within the category: they should be known by the consumers and bought rather frequently; this will guarantee a minimum of return for the retailer. So far, the procedure of assortment composition resembles the real one, but experimental control must be privileged to realism in "laboratory" study. These brands were then assigned to each alternative categorization (SB vs. CB) to check whether the requirement of exact number of brands in each sub-category was respected. Some adjustments were made to obtain such goal: the sub-categories "for sport" and "for memory" were disregarded. Furthermore, some brands had to be replaced, due to practical difficulties in finding available product pictures on Internet. Some brands, not considered in the preliminary study with familiar consumers, were added, together with a brand considered but showing a low recognition rate (Sargenor) to fill-in the sub-category of amino-acids.

With such changes, required to assure experimental control and to cope with practical feasibility problems, 21 brands were selected that can fit in groups of 3 in 7 sub-categories, each reflecting a supply-based versus a consumer-based perspective.

It is to be noted that:

- two sub-categories have the same composition and a quite similar label in both display arrangements (to loose weight);
- some sub-categories contain the same items but have a different label in the two display arrangements;
- other sub-categories differ both in composition and labels.

The next decisions to be made referred to which kind of display to adopt (vertical vs. horizontal) and which criteria for displaying the sub-categories and the variants (e.g., brands) on the shelves.

The general principle for space allocation is maximizing the return. Sales are sensitive to the quantity as well as the quality of assigned space. In this experiment the focus will be on the impact of display arrangement, interpreted as adjacencies between variants to define sub-categories. Decisions about the quality and quantity of space to allocate – although extremely important to a retailer – will be considered only at margin, thus simplifying the simulation. After having defined the adjacencies, however, the best allocation – in terms of both quantity and quality of shelf-display – might be defined with the support of available software of space management. The emphasis here will be on the "proper sub-categorization" that such software assume as done by the retailer.

There are different criteria for visually organizing a shelf display. The most common is to display the categories and sub-categories in vertical, and the brands both in vertical and in horizontal display. But other solutions might be employed, for example, by putting categories and sub-categories in horizontal. The characteristics of the space available, the degree and complexity of the articulation by sub-categories and the array of belonging variants are all factors to be analyzed.

Different hypotheses of shelf display arrangement have been considered and evaluated (not reported), through simulations. The display arrangement solutions finally chosen is showed in Appendix C and D. To complete the display, some POP materials needed to be added. In particular, given the purposes of the experiment, some labels with the name of the sub-categories must be placed on the shelf display, each one characterized by a specific color.

The names of the sub-categories reflected:

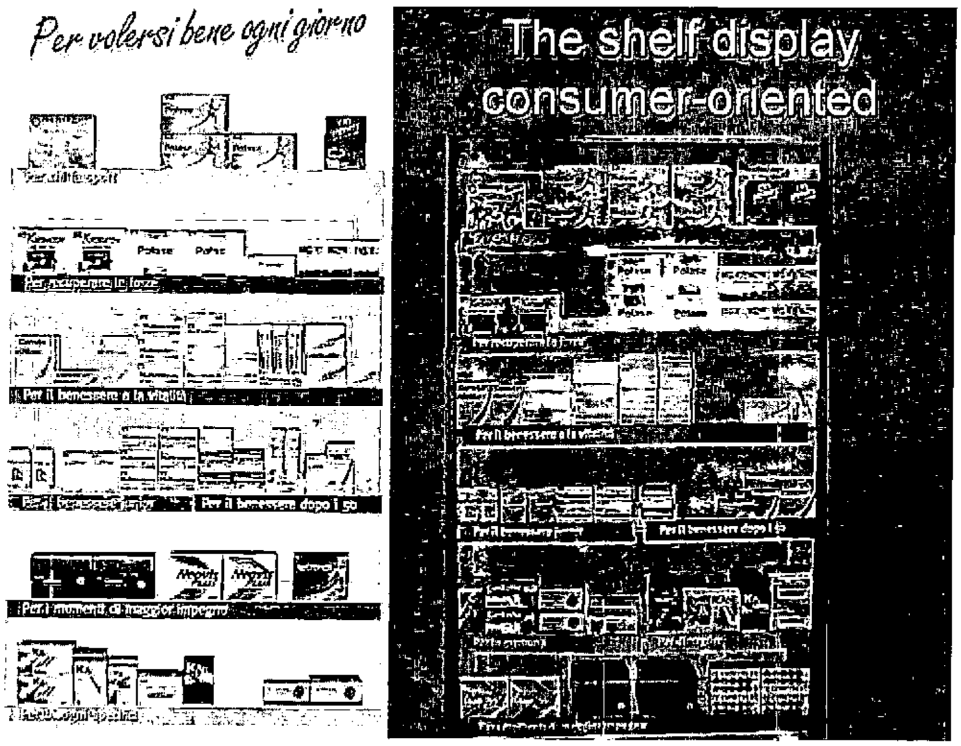
- the wording of the classification employed by the Italian Ministry of Health, when regulating the activity of both manufacturers and retailers of dietary supplements, in the supply-based display arrangement

- the exact wording used by experienced consumers during the preliminary study and in experts' classifications, in the consumer-based display arrangement, thus coinciding with the leaflet.

The colors on the shelves were different from those in the paper-guide. A claim "To love oneself everyday" has been shown at the top of the shelf display.

In this pilot study all stimuli were created with available product pictures and non professional software. Such stimuli must be replaced in future replications of the study with larger samples, with simulations of the shelf display made with professional software or with real arrangements of a shelf, as those in figure AppA1.

Fig. AppA1. Simulated and real display arrangements: an example



Italian Version

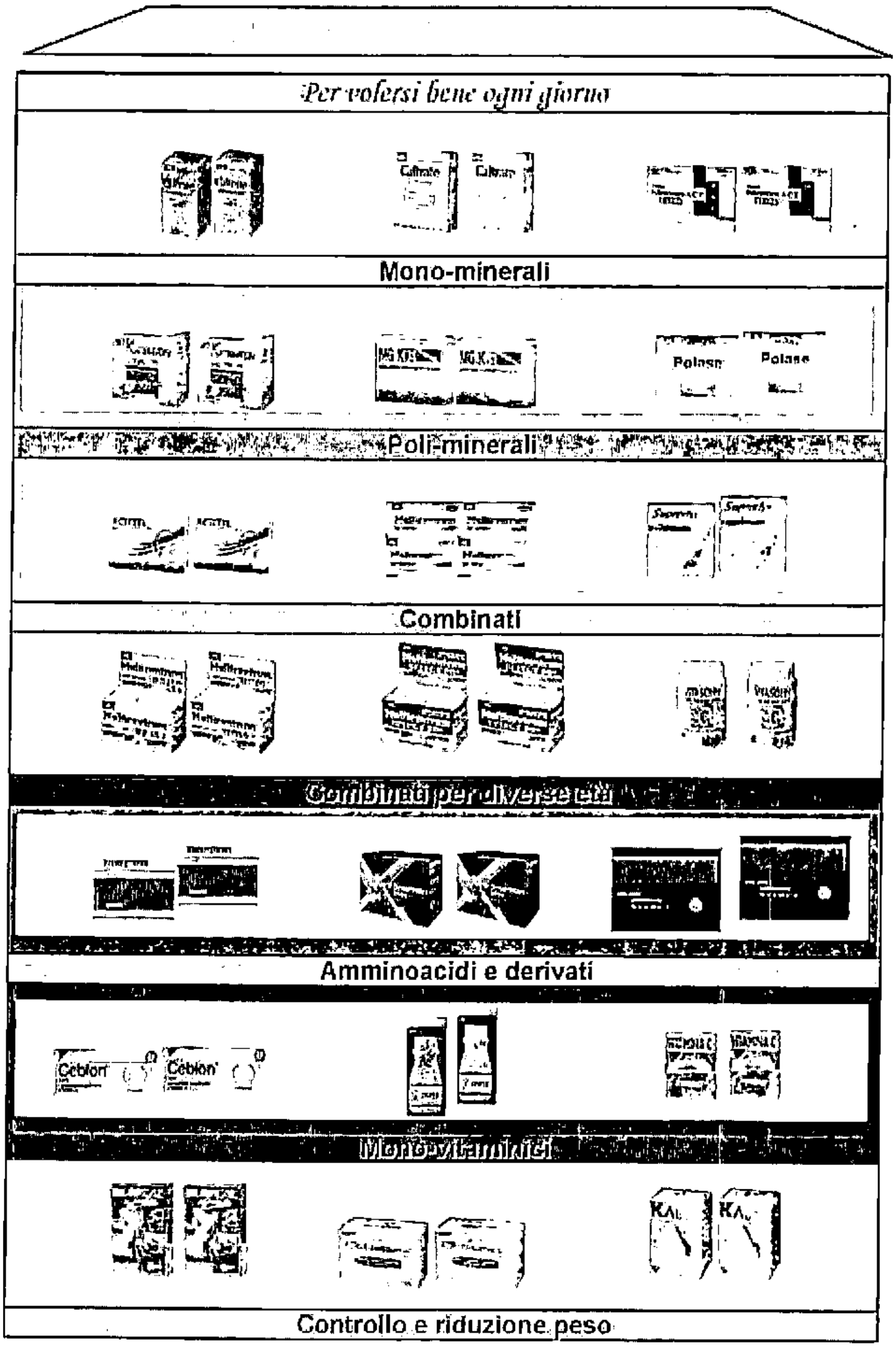
Guida alla Scelta degli Integratori Alimentari

CATEGORIE	COMPONENTI	INDICATO PER
Per recuperare subito le forze dopo uno sforzo intenso	Magnesio Potassio	Reintegro salino Pressione bassa Spossatezza
Per il benessere e la vitalità	Multivitaminici Multiminerali	Stress fisico e mentale Cambio di stagione Spossatezza Ricostituente Integrazione alimentare
Per il benessere junior	Multivitaminici Multiminerali Calcio	Studio Ossa Denti Incremento nutrizionale
Per il benessere senior	Multivitaminici Multiminerali Calcio	Benessere Cambio di stagione Integrazione alimentare
Per fronteggiare i momenti di maggiore impegno	Multivitaminici Multiminerali Aminoacidi	Affaticamento/spossatezza Stress fisico e mentale Ricostituente Cambio di stagione Integrazione alimentare
Vitamina C	Vitamina C	Raffreddore Influenza Benessere
Dimagranti	Componenti naturali di origine animale Proteine Vitamine	Perdere peso Ridurre la fame Ridurre l'assimilazione dei grassi

APPENDIX C - STIMULI EMPLOYED IN EXPERIMENT 1:

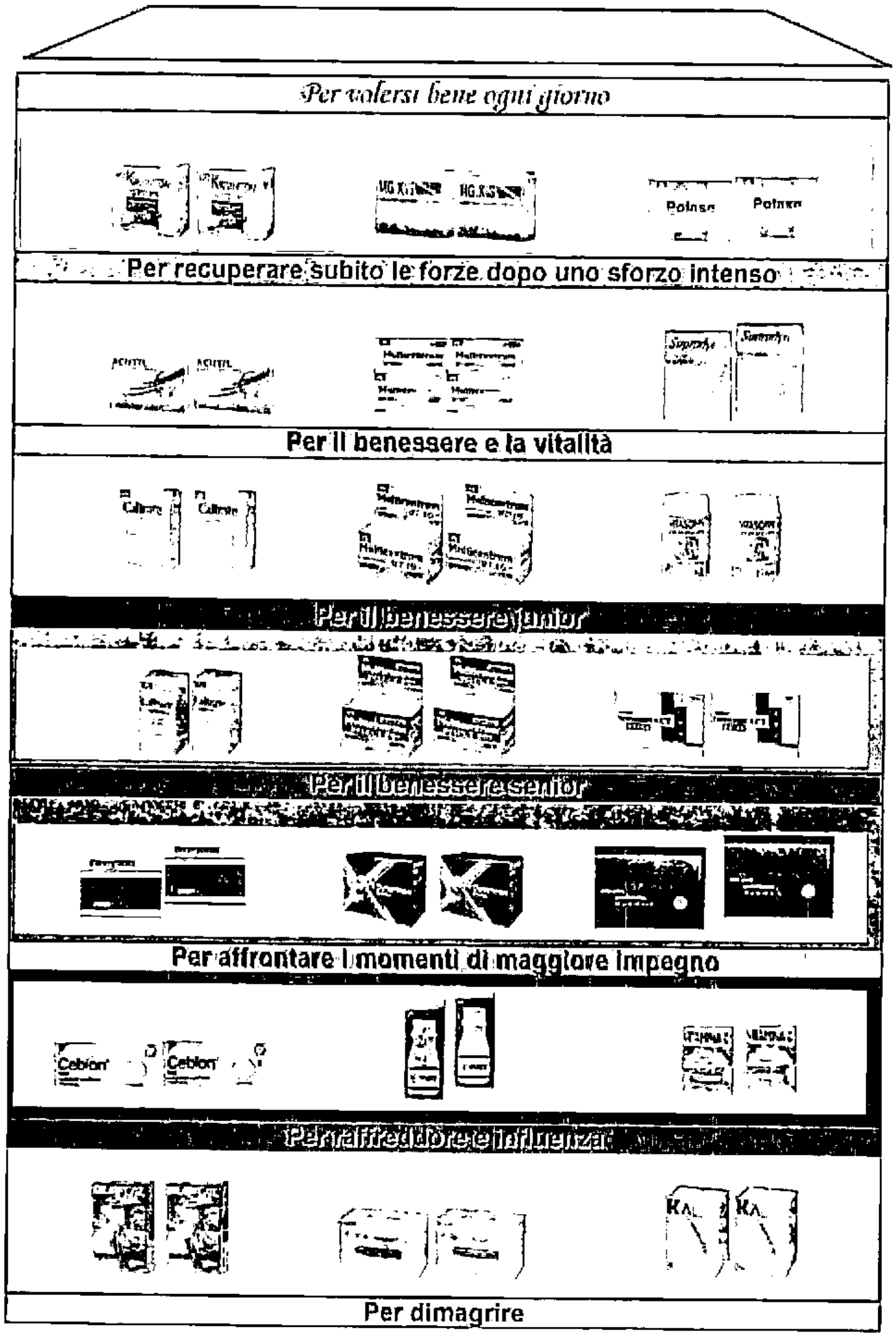
SUPPLY-BASED DISPLAY

Italian Version



APPENDIX D - STIMULI EMPLOYED IN EXPERIMENT 1: CONSUMER-BASED DISPLAY

Italian Version



APPENDIX E – THE COVER OF EXPERIMENT 1

Italian Version

Introduzione

Buona sera, benvenuta/o, e grazie per aver accettato di partecipare a questa iniziativa.

Io sono............NOME E COGNOME DELL'INTERVISTATRICE/TORE........e sono stata/o incaricata/o di condurre questa **intervista approfondita** – che richiederà approssimativamente 45-60 minuti – a **studenti che frequentano attualmente corsi presso l'Università Bocconi di Milano.**

Durante l'intervista ti **verrà distribuito del materiale** (es. foto, brochures), ti verrà **richiesto di svolgere determinati compiti** che ti verranno opportunamente illustrati (es. guardare le foto o leggere le brochures), **e di rispondere ad alcune domande.**
L'intera intervista viene audio-registrata.

Per rispettare il tuo **diritto alla privacy:**

- ti verranno chiesti nome e cognome all'ingresso, semplicemente per dimostrare la tua partecipazione all'intervista ai responsabili del corso che stai seguendo in Università (il foglio con il nome verrà consegnato solo a loro e non al team di studenti);
- tutto quanto accadrà nel corso dell'intervista sarà coperto da stretto riserbo e gli intervistatori sono tenuti al mantenimento del segreto professionale;
- i questionari che dovrai compilare saranno in forma anonima, essendo contrassegnati da un codice che servirà solo per risalire all'identità dell'intervistatore e al momento in cui è stata condotta l'intervista, ma non all'identità dell'intervistata/o;
- anche la registrazione audio dell'intervista verrà utilizzata solo per controllare la correttezza della procedura seguita dagli intervistatori, che deve rispettare un protocollo prestabilito dal committente, e verrà immediatamente distrutta dopo il controllo;
- i risultati delle interviste condotte saranno analizzati in forma aggregata, ovvero senza far riferimento ai contenuti di specifiche interviste a singoli partecipanti.

Non ci sono modi giusti o sbagliati di svolgere i compiti, e risposte corrette o errate alle domande. Dovrai solo ascoltare o leggere attentamente le istruzioni o le domande che ti verranno poste, e, una volta comprese, **eseguirle o rispondere nel modo che ritieni più opportuno.** A volte dovrai ripetere lo stesso compito per diversi prodotti.

L'intera **procedura** è stata **definita da un team di studenti universitari**, che **nell'ambito di un progetto extra-curriculare** di formazione all'attività imprenditoriale, hanno costituito una società fittizia di consulenza alle imprese.
La società è fittizia nel senso che si tratta di un **business-game**, in cui gli studenti partecipanti devono scegliere il tipo di attività che intendono svolgere e definire l'organizzazione e le modalità operative della costituenda impresa.
I coordinatori del business-game, dopo aver approvato la proposta dei singoli team di studenti-aspiranti imprenditori, definiscono la dotazione patrimoniale di cui la società dispone, e assegnano un progetto da portare a termine nell'arco di tempo prestabilito, esattamente come se la società fittizia operasse direttamente sul mercato, in concorrenza con altre imprese. In effetti, nel business-game, altri team di studenti potrebbero aver scelto lo stesso oggetto societario (consulenza in questo caso), rendendo verosimile il confronto competitivo.
Al termine del periodo prestabilito, una commissione esaminatrice costituita da docenti universitari e da rappresentanti del mondo delle imprese, valuterà quanto svolto dalle singole società fittizie partecipanti, non solo in termini di risultati raggiunti, ma anche in termini di modalità di conseguimento degli stessi. Ecco perché, ad esempio, la procedura seguita per l'intervista deve essere registrata e assoggettabile a controllo.
Naturalmente, oggetto di valutazione della commissione saranno i metodi seguiti dalla società fittizia e non le risposte fornite dagli intervistati.
All'impresa fittizia XXXX, committente di questa iniziativa, è stato assegnato come **progetto un'attività consulenziale a un'impresa commerciale** che

• si occupa di distribuzione al dettaglio di prodotti di largo consumo, alimentari e non, e di alcuni beni durevoli
• persegue una politica di marca commerciale (beni prodotti per conto dell'impresa di distribuzione e venduti con un marchio-insegna).
In particolare, la società fittizia è stata incaricata di:
• valutare ed eventualmente migliorare la **politica di comunicazione dell'impresa commerciale**, definendo, se necessario, nuove iniziative ricorrendo a opportuni strumenti e mezzi di comunicazione
• aiutare l'impresa nella **pianificazione dei prossimi lanci di prodotti a marchio commerciale.**
Alcuni consulenti della società fittizia hanno definito la procedura che verrà seguita in questa intervista, affinché costituisca un **test** – da parte di un campione di soggetti selezionati secondo criteri da loro ritenuti idonei – **per validare o migliorare alcuni degli strumenti predisposti e per raccogliere informazioni utili per l'innovazione nel portafoglio prodotti a marchio commerciale.**
Alcune persone sono state incaricate di svolgere il ruolo di intervistatori, senza essere parte del team di studenti, per simulare la cooperazione con free-lance in progetti di consulenza nel mondo reale.
I compiti che ti sarà richiesto di svolgere e le domande a cui dovrai rispondere sono parte del test predisposto dagli studenti-consulenti. Avendo una dotazione patrimoniale fittizia, non possono infatti permettersi di coinvolgere realmente consumatori o esperti, ma confidano nella collaborazione di loro colleghi universitari. A loro nome, ti ringrazio quindi per la collaborazione.
Per rispettare la natura di business-game dell'iniziativa in cui sei stato di fatto coinvolto, rendendola quanto più verosimile e utile possibile per gli studenti-consulenti, **ti chiediamo** cortesemente **di "calarti nella parte" che ti è stata assegnata**, così come le persone che avrai di fronte interpreteranno il ruolo di intervistatori.
In altre parole, nel corso dell'intera intervista, **dovrai rispondere come se tu fossi uno dei soggetti convocati da una società di consulenza per testare alcuni strumenti di comunicazione e raccogliere informazioni**, senza pensare al fatto che si tratta di un'iniziativa di studenti.
Immagina si tratti di una situazione vera e di essere stato **convocato come consumatore e frequentatore di negozi**, e non come futuro esperto di marketing, organizzazione, controllo di gestione, ecc.

Proprio per la natura fittizia della società, nessuna impresa – neppure quelle, realmente esistenti, citate nel materiale che ti verrà distribuito – sono a conoscenza di questa iniziativa, né verranno mai informate dei risultati.

Questo è tutto, relativamente alla presentazione dell'iniziativa.
Grazie ancora per la collaborazione!

Italian Version

SCHEDA PROFILO CONSUMATORE

RISPONDI, PER CORTESIA, ALLE SEGUENTI DOMANDE RELATIVE AL TUO "RAPPORTO" CON GLI INTEGRATORI ALIMENTARI E CON I CEREALI PER LA PRIMA COLAZIONE

T7DIA_1)

Ti capita di ACQUISTARE E UTILIZZARE INTEGRATORI ALIMENTARI?

Mai ☐ Raramente ☐ Di tanto in tanto ☐ Spesso ☐ Regolarmente ☐

T7DIA _2)

Ricordi qualche PUBBLICITA' di integratore alimentare?

Si ☐ No☐

Se si, quale?

....
....
....

T7DIA _3)

Come valuti la tua FAMILIARITA' con la categoria degli Integratori Alimentari?

(barra la casella corrispondente al tuo grado di familiarità, su una scala da 1 a 7, 1= poco familiare, 7= molto familiare)

Poco familiare Molto familiare

1	2	3	4	5	6	7

T7DIA _4)

Anche se non hai mai provato integratori alimentari a MARCA COMMERCIALE (es. Esselunga, Coop ecc.), li acquisteresti, in caso di necessità?

Si ☐ No☐

Se no, perché?

....
....
....
....

T7C_1)

T7C_1)

Ti capita di CONSUMARE CEREALI PER LA PRIMA COLAZIONE?

Regolarmente ☐ Spesso ☐ Di tanto in tanto ☐ Raramente ☐ Mai ☐

T7C_2)

Come valuti la tua FAMILIARITA' con la categoria dei Cereali per la prima colazione?
(barra la casella corrispondente al tuo grado di familiarità, su una scala da 1 a 7, 1= poco familiare, 7= molto familiare)

Poco familiare Molto familiare

1	2	3	4	5	6	7

T7C_3)

Ricordi qualche PUBBLICITA' di cereali per la prima colazione?

Si ☐ No☐

Se si, quale?

....
....
....
....

T7C_4)

Ti capita di consumare i cereali per la prima colazione in ALTRI MOMENTI della giornata?

Regolarmente ☐ Spesso ☐ Di tanto in tanto ☐ Raramente ☐ Mai ☐

T7C_5)

Se si, quando e come?

....
....
....
....

PER CHI HA ACQUISTATO INTEGRATORI ALIMENTARI

T7DIA _5)

QUALI integratori alimentari ti è capitato di acquistare e utilizzare? e con QUALE FREQUENZA?

....
....
....
....

T7DIA _6)

Per quali MOTIVI?

....
....
....
....

T7DIA_7)

Hai deciso tu di assumerli o ti ha consigliato qualcuno (chi?)?

....
....
....
....

T7DIA_8)

DOVE li acquisti o li hai acquistati?

(es. farmacia, supermercato, negozio specializzato in integratori, erboristeria, ecc.)

....
....
....
....

T7DIA_9)

Hai mai usato integratori alimentari a MARCA COMMERCIALE (es. Esselunga, Coop)?

Si ☐ No☐

T7DIA_10)

Se hai utilizzato integratori alimentari a marca commerciale, come ti sei trovato?

....
....
....
....

PER CHI HA ACQUISTATO CEREALI PER LA PRIMA COLAZIONE

T7C_6)

QUALI (tipi, marche) **cereali per la prima colazione consumi?**

....
....
....

Non so ☐

T7C_7)

Quali sono i tuoi PREFERITI, a cui difficilmente rinunceresti?

....
....
....

Non so ☐

T7C_8)

DOVE li acquisti? (es. supermercato, ipermercato, negozio specializzato in prodotti naturali)

....
....
....

T7C_9)

Hai mai provato cereali per la prima colazione a MARCA COMMERCIALE?

Sì ☐ No☐

T7C_10)

Se sì, come ti sei trovato?

....
....
....
....

T7C_11)

Se no, li proveresti?

Sì ☐ No☐

Se no, perché?

....
....
....
....

PER TUTTI

T7DIAC_1)

Quali sono le insegne dei punti vendita che frequenti abitualmente per gli acquisti alimentari?

(Es. Supermercato Esselunga, Pam, Coop, Ipermercato Auchan)

....

....

....

T7DIAC_2)

Con quale frequenza:

	mai						sempre
leggi quotidiani	1	2	3	4	5	6	7
leggi riviste	1	2	3	4	5	6	7
leggi le pubblicità in quotidiani e riviste							
leggi le etichette di singoli prodotti quando sei in negozio	1	2	3	4	5	6	7
confronti le etichette di diversi prodotti quando sei in negozio	1	2	3	4	5	6	7
leggi i magazine o le riviste dei negozi	1	2	3	4	5	6	7
leggi depliant con offerte relative ai prodotti venduti nei negozi	1	2	3	4	5	6	7
osservi la cartellonistica in-store (es. poster)	1	2	3	4	5	6	7
cambi prodotto, trovandone uno simile in offerta in una zona dedicata del negozio	1	2	3	4	5	6	7
leggi le affissioni pubblicitarie negli spazi dedicati delle città	1	2	3	4	5	6	7
cambi canale televisivo quando ci sono le interruzioni pubblicitarie	1	2	3	4	5	6	7
cambi frequenza quando ci sono annunci pubblicitari per radio	1	2	3	4	5	6	7
chiedi aiuto ai commessi nei negozi	1	2	3	4	5	6	7
leggi i cartellini prezzo sui prodotti o sullo scaffale	1	2	3	4	5	6	7
accetti assaggi di prodotti alimentari in negozio	1	2	3	4	5	6	7
provi campioni omaggio di integratori alimentari trovati in riviste	1	2	3	4	5	6	7

Questionario
"ALIMENTAZIONE E INTEGRAZIONE ALIMENTARE"

RISPONDI, PER CORTESIA, ALLE SEGUENTI DOMANDE RIFERITE, IN GENERALE, ALL'ALIMENTAZIONE E ALL'INTEGRAZIONE ALIMENTARE, SCEGLIENDO L'ALTERNATIVA CHE RITIENI APPROPRIATA.

SE NON CONOSCI LA RISPOSTA O NON NE SEI PERFETTAMENTE SICURA/O, BARRA LA CASELLA NON SO.

T7DAL_1)

Indicare, se conosciute, quali sostanze nutritive possono contribuire alla funzione fisiologica dell'organismo umano riportata nella colonna di sinistra

Funzione per il corpo umano	*Sostanze nutritive*
Funzione anti-età o anti-ossidante	
Funzione nervosa	
Funzione immunitaria	
Funzione sessuale e riproduttiva	
Funzione di sostegno ai tessuti e alle ossa	

T7DAL_2)

Scrivere una P accanto a possibili PRINCIPI ATTIVI degli integratori alimentari, una E accanto ai possibili ECCIPIENTI, oppure NS se non si conosce il termine e la sua natura di principio attivo o eccipiente.

Non conosco la differenza tra principio attivo ed eccipiente

☐

Nome della sostanza	*Natura della sostanza* P = principio attivo di integratori alimentari E = eccipiente di integratori alimentari NS = non so
Arginina	
Essenza di amarena	
Coenzima B12	
D.L. – Fosforilserina	
Acido citrico	
E124	
Malto-destrine	
Magnesio stearato	
Clorofilla	
Inulina	
Acido ascorbico	
Calcio fosfato	

T7DAL_3)

Quali fattori potrebbero incrementare il fabbisogno minimo giornaliero di sostanze nutritive?

....

....

T7DAL_4)

Quale/i delle seguenti sostanze, elencate sull'etichetta di un prodotto alimentare, può essere considerata un probiotico?

Lactobacillus bulgaricus ☐ Streptococcus thermophilus ☐ Bifidobacterium ☐ Non so ☐

T7AL_5)

Sai cosa si intende per alimento funzionale?

Si ☐ Non sono sicura/o ☐ No ☐

T7AL_6)

Se si o Non sicuri, potresti provare a dare una definizione di alimento funzionale.

....

....

....

....

T7AL_7)

Ti viene in mente qualche esempio di alimento funzionale che conosci? No ☐

....

....

T7AL_8)

Esprimere il proprio grado di accordo con la seguente affermazione
(ponendo una x sul numero corrispondente al proprio grado di accordo sulla scala indicata)

	Completo disaccordo						Completo accordo
Per me curare l'alimentazione è di fondamentale importanza	1	2	3	4	5	6	7

T7AL_9)

Hai qualche problema di salute che potrebbe essere connesso all'alimentazione?

Si ☐ No ☐

T7AL_10)

Se si, potresti indicare quale?

....

T7AL_11)

Hai qualche problema di salute che potrebbe essere connesso al tuo stile di vita?
(es., stress da attività lavorativa, stress da impegni familiari, problemi di circolazione per sedentarietà ecc.)
Si ☐ No ☐

T7AL_12)

Se si, potresti indicare quale?

....

SCHEDA PROFILO SOCIO-DEMOGRAFICO

Sesso donna □ uomo □

Età ....anni

Stato civile nubile/celibe/single □ coniugata/o □ separata/o, divorziata/o, vedova/o □

Cittadinanza..

Comune di attuale residenza (provincia)..

Comune di abituale residenza (provincia)..
Ultimo titolo di studio conseguito..

Occupazione attuale..

Interessi personali e attività preferite per il tempo libero
....
....
....
....
....

Attualmente vivo
da sola/o □
con partner □
con altri familiari □ (specificare quali, es. moglie e figlio, genitori, fratello o sorella)
....
....
con terzi, non familiari (es. amici, colleghi) □

APPENDIX G – THE SLIDES IN POWER POINT EMPLOYED TO PERFORM EXPERIMENT 1, DIVIDED BY TASK

Notes for reading:

This appendix presents the slides organized by phase or task of the experimental procedure, without a distinction between different treatment groups.
To reconstruct the specific procedure followed for a certain treatment group, it is sufficient to look at the following table, and read only the slides corresponding to the phases/tasks indicating yes for that treatment group, in the sequence defined by the progressive numbers. For treatment groups 3 and 4, the slides of the task 3 to be read are those which specify supply-based (SB) display arrangement, whereas for group 5 and 6, the correct version of task 3 is the consumer-based (CB).
The slides are presented in the original Italian version. A translation in English can be provided, on request, by the author.

			Group 1	Group 2	Group 3	Group 4	Group 5	Group 6
Welcome	Cover	Same all groups	YES	YES	YES	YES	YES	YES
Task n. 1	Initial recall	Same all groups	YES	YES	YES	YES	YES	YES
Task n. 2	POP manipulation	Different based on group	NO	YES	NO	YES	NO	YES
Task n. 3	Display manipulation	Different based on group	NO	NO	YES, SB	YES, SB	YES, CB	YES, CB
Task n. 4	Buffer task	Same all groups	YES	YES	YES	YES	YES	YES
Task n. 5	Post-treatment recall	Same all groups	YES	YES	YES	YES	YES	YES
Task n. 6	Form	Same all groups	YES	YES	YES	YES	YES	YES
Task n. 7	Check	Same all groups	YES	YES	YES	YES	YES	YES

A miniature of the slides is represented, with a higher dimension where the text is more difficult to read. Furthermore, the original slides were coloured whereas here they aren't.

ACCOGLIENZA – **All treatment groups**

Welcome!

L'iniziativa

- Committente: Team di (altri) studenti Bocconi, per un business-game
- Rispetto diritto privacy
- Non è un "esame"!
- Rispondi da consumatore e frequentatore di negozi
- Rispondi nel modo che ritieni più opportuno, in base a quello che pensi e ricordi

Foglio partecipazione

Compilare sempre in stampatello leggibile

Grazie!

TASK 1 – All treatment groups

Practice product-category

Cereali per la prima colazione

Cosa sono PER TE i cereali per la prima colazione?

Tu cosa intendi per cereali per la prima colazione?

Prova a scrivere una tua definizione

1m

Answer

Cereali per la prima colazione

Elenca TUTTE le MARCHE o VARIANTI di cereali per la prima colazione **che ti vengono in mente**

anche se non sei completamente sicuro/a che esistano o che siano corrette

Nome marca/variante	Sicuro	Abbastanza sicuro	Incerto
Marca AA	X		

Nome marca/variante	Sicuro	Abbastanza sicuro	Incerto
Marca AA	X		
Marca BB			X

Nome marca/variante	Sicuro	Abbastanza sicuro	Incerto
Marca AA	X		
Marca BB			X
Marca CC		X	

Marca AA (sicuro)

Marca BB (incerto)

Marca CC (abbastanza sicuro)

Nome marca/variante	Sicuro	Abbastanza sicuro	Incerto
Marca AA	X		
Marca BB			X
Marca CC		X	

Marca AA (sicuro)
Marca BB (incerto)
Marca CC (abbastanza sicuro)

Marche/varianti cereali prima colazione

2m

Answer

Cereali per la prima colazione

Pensando ai cereali per la prima colazione, ti vengono in mente dei SOTTO-GRUPPI?

Elenca TUTTI i SOTTO-GRUPPI che ti vengono in mente
anche se non sei completamente sicuro/a

Nome sotto-gruppo	Sicuro	Abbastanza sicuro	Incerto
Sotto-gruppo 1	X		
Sotto-gruppo 2		X	
Sotto-gruppo 3			X

Sotto-gruppo 1 (sicuro)
Sotto-gruppo 2 (abbastanza sicuro)
Sotto-gruppo 3 (incerto)

Sotto-gruppi cereali prima colazione

2m

Answer

Cereali per la prima colazione

Considera l'elenco di marche/varianti e di sotto-gruppi che hai appena scritto

Prova ad **ASSOCIARE LE MARCHE/VARIANTI AI SOTTO-GRUPPI**

SPIEGA POI I MOTIVI DELL'ASSEGNAZIONE
(perché ritieni che quelle marche/varianti vadano inserite in quel sotto-gruppo e non in un altro)

Puoi aggiungere anche nuove marche/varianti o sotto-gruppi che ti sono venuti in mente in questo momento (che prima non avevi indicato)
Ricordati però di specificare il tuo grado di sicurezza!!!

Puoi lasciare alcune marche o alcuni sotto-gruppi senza associazioni se non ti vengono in mente, pur essendoti sforzata/o di ricostruirle nel tempo a disposizione

1/4

	Nome sotto-gruppo 1		Motivi
Marca AA	*X*		*Perché.......* ....
Marca BB	*X*		

2/4

	Nome sotto-gruppo 1	Nome sotto-gruppo 2		Motivi
Marca AA	X			Perché.....
Marca BB	X			
Marca CC		X		Perché .....

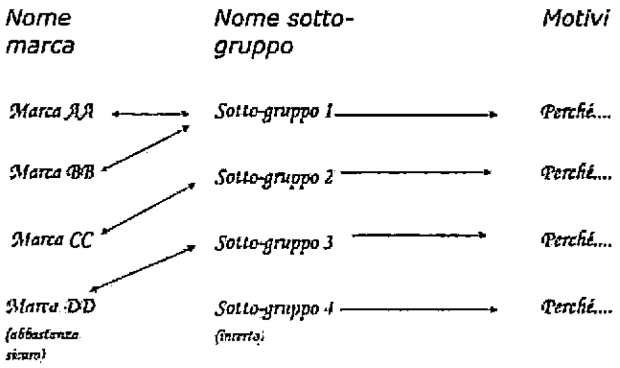
3/4

	Nome sotto-gruppo 1	Nome sotto-gruppo 2	Nome sotto-gruppo 3	Motivi
Marca AA	X			Perché...
Marca BB	X			
Marca CC		X		Perché...
Marca DD (abbastanza sicuro)			X	Perché...

4/4

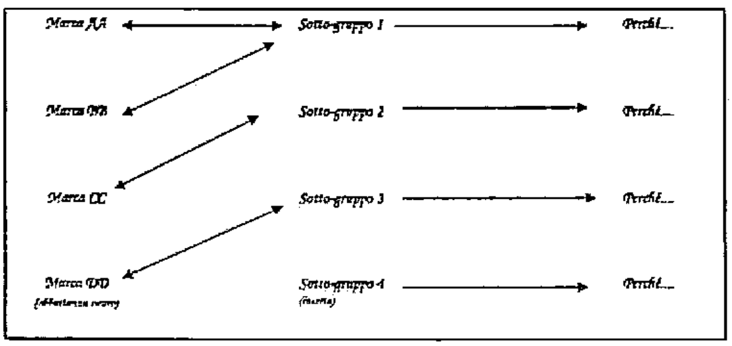
	Nome Sotto-gruppo 1	Nome Sotto-gruppo 2	Nome Sotto-gruppo 3	Nome Sotto-gruppo 4 (incerto)	Motivi
Marca AA	X				Perché...
Marca BB	X				
Marca CC		X			Perché...
Marca DD (abbastanza sicuro)			X		Perché...
				Perché....	

Oppure....



	Nome Sotto-gruppo 1	Nome Sotto-gruppo 2	Nome Sotto-gruppo 3	Nome Sotto-gruppo 4 (inerte)	Motivi
Marca AA	X				Perché...
Marca BB	X				
Marca CC		X			Perché...
Marca DD (abbastanza sicuro)			X		Perché...
				Perché...	

Associazione marche/varianti e sotto-gruppi cereali prima colazione



3m

Answer

Target product-category

Integratori alimentari

Cosa sono PER TE gli integratori alimentari?

Tu cosa intendi per integratori alimentari?

Prova a scrivere una <u>tua</u> definizione

1m

Answer

Integratori alimentari

Elenca TUTTE le MARCHE o VARIANTI di integratori alimentari **che ti vengono in mente**

anche se non sei completamente sicuro/a che esistano o che siano corrette

Nome marca/variante	Sicuro	Abbastanza sicuro	Incerto
Marca AA	*X*		
Marca BB			*X*
Marca CC		*X*	

Marca AA (sicuro)
Marca BB (incerto)
Marca CC (abbastanza sicuro)

Marche/varianti integratori alimentari

2m

Answer

Integratori alimentari

Pensando agli integratori alimentari, ti vengono in mente dei SOTTO-GRUPPI?

Elenca TUTTI i SOTTO-GRUPPI che ti vengono in mente
anche se non sei completamente sicuro/a

Nome sotto-gruppo	Sicuro	Abbastanza sicuro	Incerto
Sotto-gruppo 1	X		
Sotto-gruppo 2		X	
Sotto-gruppo 3			X

Sotto-gruppo 1 (sicuro)
Sotto-gruppo 2 (abbastanza sicuro)
Sotto-gruppo 3 (incerto)

Sotto-gruppi integratori alimentari

2m Answer

Integratori alimentari

Considera l'elenco di marche/varianti e di sotto-gruppi che hai appena scritto

Prova ad **ASSOCIARE LE MARCHE/VARIANTI AI SOTTO-GRUPPI**

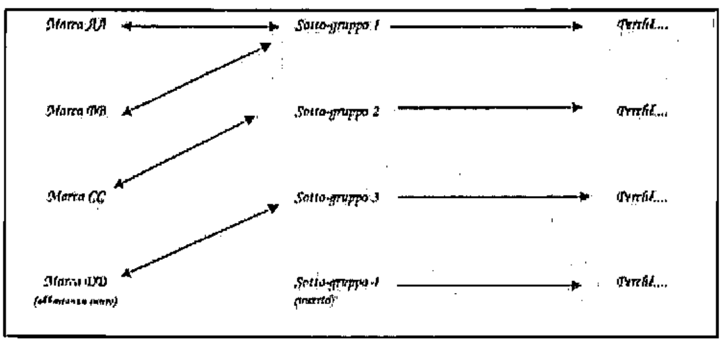
SPIEGA POI I MOTIVI DELL'ASSEGNAZIONE
(perché ritieni che quelle marche/varianti vadano inserite in quel sotto-gruppo e non in un altro)

Puoi aggiungere anche nuove marche/varianti o sotto-gruppi che ti sono venuti in mente in questo momento (che prima non avevi indicato)

Ricordati però di specificare il tuo grado di sicurezza!!!

Puoi lasciare alcune marche o alcuni sotto-gruppi senza associazioni se non ti vengono in mente, pur essendoti sforzata/o di ricostruirle nel tempo a disposizione

	Nome Sotto-gruppo 1	Nome Sotto-gruppo 2	Nome Sotto-gruppo 3	Nome Sotto-gruppo 4 (inserito)	Motivi
Marca AA	X				Perché...
Marca BB	X				
Marca CC		X			Perché...
Marca DD [illegible]			X		Perché...
				Perché...	



Associazione marche/varianti e sotto-gruppi integratori alimentari

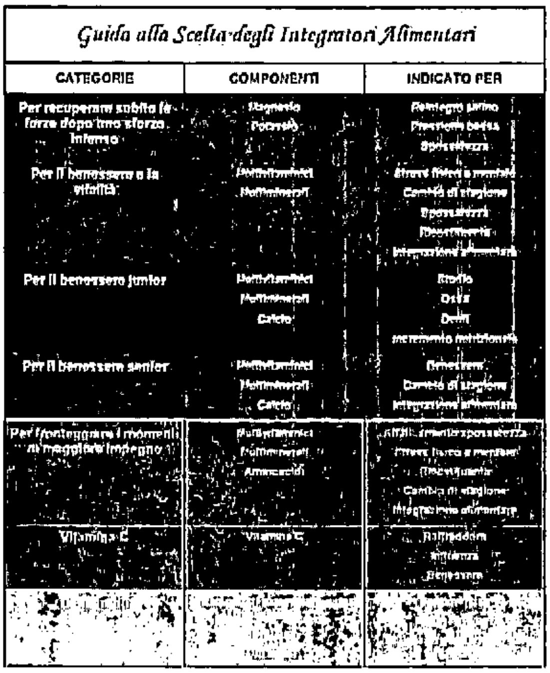
3m

Answer

TASK 2 (POP yes) – Treatment groups 2, 4, 6

Osserva e leggi la riproduzione di **BROCHURE** mostrata a video.

Ti chiederò **POI** di **RISPONDERE** ad alcune domande su un foglio che ti verrà distribuito
SENZA AVERE PIU' LA POSSIBILITA' DI CONSULTARE LA BROCHURE



Link

Brochure per interazione

2m

T2D1 *Ritieni che la grafica (colori, dimensioni del carattere usato per il testo ecc.) della brochure sia adeguata? Se no, perché?*

....

....

T2D2 *Secondo te, chi ha preparato questa brochure?*

....

....

T2D3 *Perché?*

....

....

T2D4 *Dove ti aspetti di trovare questa brochure?*

....

....

T2D5 *Hai trovato qualche errore?*

....

....

T2D6 *Ritieni che sia chiara/comprensibile? Se no, perché?*

....

....

T2D7 *Immagina di dover acquistare un integratore alimentare, pensi che questa brochure potrebbe esserti di qualche aiuto?*

....

....

T2D8 *Perché?*

....

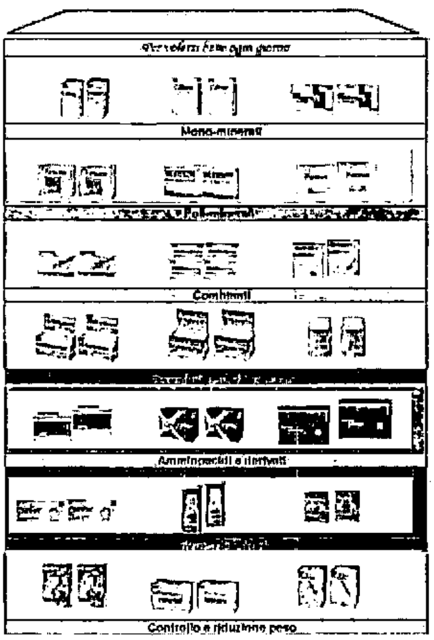
....

Answer

TASK 3 (Supply-based display arrangement) – Treatment groups 3 and 4

Osserva la riproduzione di **SCAFFALE** mostrata a video, esattamente come faresti nel caso in cui fossi interessato all'acquisto dei prodotti esposti

Ti chiederò **POI** di **RISPONDERE** ad alcune domande su un foglio che ti verrà distribuito
SENZA AVERE PIU' LA POSSIBILITA' DI VEDERE LA RIPRODUZIONE DI SCAFFALE



Link

Scaffale SB

per interazione

2m

Ora rispondi alle seguenti domande

<u>T3D1</u> *Quali suggerimenti daresti al farmacista che ha allestito questo scaffale?*

....

....

<u>T3D2</u> *Hai notato qualcosa di strano?*

....

....

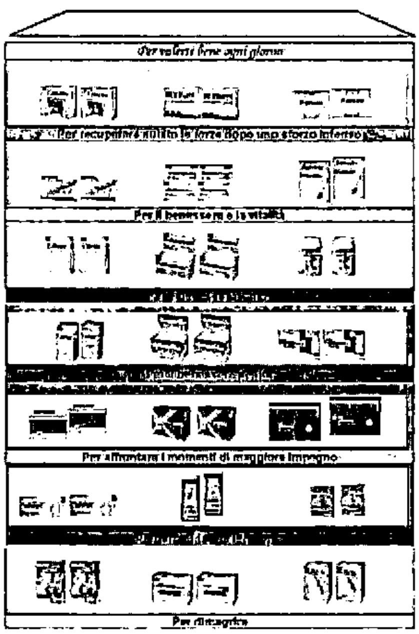
Answer

TASK 3 (Customer-based display arrangement) – Treatment groups 5 and 6

Osserva la riproduzione di **SCAFFALE** mostrata a video, esattamente come faresti nel caso in cui fossi interessato all'acquisto dei prodotti esposti

Ti chiederò **POI** di **RISPONDERE** ad alcune domande su un foglio che ti verrà distribuito

SENZA AVERE PIU' LA POSSIBILITA' DI VEDERE LA RIPRODUZIONE DI SCAFFALE



Link

Scaffale CB

per interazione

2m.

Ora rispondi alle seguenti domande

T3D1 *Quali suggerimenti daresti al farmacista che ha allestito questo scaffale?*

………………………………………………………………………………………………

………………………………………………………………………………………………

T3D2 *Hai notato qualcosa di strano?*

………………………………………………………………………………………………

………………………………………………………………………………………………

Answer

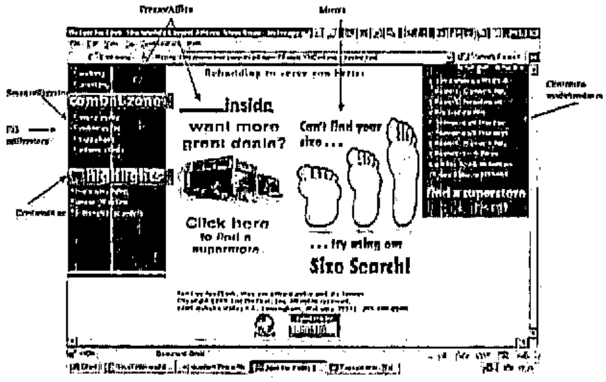
TASK 4 (Buffer) – All treatment groups

I web designer, quando devono progettare **un sito di commercio elettronico**, chiedono indicazioni all'impresa committente in merito ai **criteri da utilizzare per organizzare il catalogo prodotti** e per consentire la ricerca mirata all'interno dello stesso

In altre parole, vogliono sapere quali sono le modalità con cui l'impresa vuole che i visitatori del sito possano effettuare un ***sorting***, cioè una selezione dei prodotti presenti

Guarda questo sito americano che commercializza on-line calzature sportive

L'home page e il menu di navigazione segnalano la possibilità di selezionare i prodotti secondo molteplici criteri



Cereali per la prima colazione

Elenca TUTTI i possibili CRITERI che ti vengono in mente **per ORGANIZZARE la SELEZIONE (sorting)** dal catalogo prodotti di un sito che li commercializza on-line cereali per la prima colazione

2m Answer

TASK 5 – All treatment groups

Le società di consulenza di marketing sono fermamente convinte che le **matrici** siano **utili strumenti manageriali** e sono sempre alla ricerca di **nuove applicazioni**

Ti propongo di utilizzarne una **per rappresentare le associazioni tra marche/varianti e sotto-gruppi** di integratori alimentari

Non devi sforzarti di ricordare esattamente le marche/varianti e i sotto-gruppi che hai specificato all'inizio dell'intervista
Utilizza ciò che ti viene in mente ora

La matrice ti fornisce uno **schema fisso**

Sei però **libero di compilarlo come meglio credi**:
partendo dalle marche (righe)
partendo dai sotto-gruppi (colonne)
e indicando con una x nella cella l'associazione marca/variante ⇔ sotto-gruppo

Ricordati di **indicare sempre**
- i **motivi** delle aggregazioni
- il tuo **grado di sicurezza** per marche/varianti e sotto-gruppi (sicuro, abbastanza sicuro, incerto)

Esempio:
se in questo momento

- A, B, C, D, E sono le marche o varianti che ricordi

- ritieni opportuno aggregare le marche A e C nel gruppo che chiameresti GR1 per i motivi R1, R2, R3 e le marche B, D, E nel gruppo che chiameresti GR2 per le ragioni R4, R5

dovresti compilare la matrice nel seguente modo

Puoi partire da marche/varianti o da sotto-gruppi

	Nome sotto-gruppo ⇒		
Marche/ varianti ⇓	*GR1 (grado di sicurezza)*	*GR2 (grado di sicurezza)*	
Marca A (grado di sicurezza)	x		
Marca B (grado di sicurezza)		x	
Marca C (grado di sicurezza)	x		
Marca D (grado di sicurezza)		x	
Marca E (grado di sicurezza)		x	
Ragioni ⇒	*R1 R2 R3*	*R4 R5*	

3m

Ora rispondi alle seguenti domande

T5D2 ***Pensi che lo schema fornito dalla matrice ti sia stato di qualche aiuto, se confrontato con la situazione di mancanza di uno schema la prima volta che hai svolto lo stesso compito di elencazione delle marche/varianti e dei sotto-gruppi all'inizio dell'intervista?***

....

....

T5D3 *Perché?*

....

....

T5D4 ***Esprimi il tuo grado di accordo con le seguenti affermazioni, utilizzando la scala indicata, e ponendo una x sul numero corrispondente al tuo grado di accordo:***

T5D4A	**Completo disaccordo**						**Completo accordo**
Compilare lo schema predisposto (matrice) ha richiesto per lo svolgimento dello stesso compito un maggiore sforzo	1	2	3	4	5	6	7
T5D4B	**Completo disaccordo**						**Completo accordo**
Compilare lo schema predisposto (matrice) ha velocizzato lo svolgimento dello stesso compito	1	2	3	4	5	6	7
T5D4C	**Completo disaccordo**						**Completo accordo**
L'elencazione delle marche/varianti e dei gruppi senza l'uso della matrice (come nel primo compito),	1	2	3	4	5	6	7
rende lo svolgimento del compito più semplice perché più naturale							

Answer

TASK 6 (Form with socio-demographic data) - All treatment groups

Scheda profilo

TASK 7 (Check) - All treatment groups

Ok. Grazie!
Intervista finita

...ma

Ti chiedo ancora qualche minuto per un paio di domande – sempre in forma anonima, a meno che tu preferisca indicare i tuoi dati –

Verranno utilizzate dai professori che insegnano nei corsi di marketing che tu e gli altri intervistati frequentate in Bocconi, per valutare l'utilità pratica degli argomenti trattati a lezione

IBQ1 *In base alle conoscenze che hai acquisito nei corsi di marketing che hai seguito, come potresti descrivere le finalità dello studio a cui hai partecipato?*

....

....

IBQ2 *Avresti qualche suggerimento da dare agli studenti-consulenti per migliorare la procedura per il loro studio?*

....

....

Answer

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
N Associations_task 5	,118	49	,086	,962	49	,112
N associat 1to1_task 5	,127	49	,047	,936	49	,011
assoc sure brand & unsure sg_task 5	,106	49	,200	,937	49	,011
assoc unsure brand & sure sg_task 5	,447	49	,000	,451	49	,000
assoc sure brand & unsure sg_task 5	,535	49	,000	,262	49	,000
assoc unsure brand & unsure sg_task 5	,536	49	,000	,197	49	,000
N. correct associat_task 5	,151	49	,007	,895	49	,000
% correct associat_task 5	,178	49	,000	,852	49	,000
N. associat in SB display_task 5	,368	49	,000	,621	49	,000
Dominance associations in SB display_task 5	,383	49	,000	,671	49	,000
Familiarity associations in SB display_task 5	,368	49	,000	,621	49	,000
N. associat in CB display_task 5	,297	49	,000	,642	49	,000
Dominance associat in CB display_task 5	,312	49	,000	,697	49	,000
Familiarity associat in CB display_task 5	,297	49	,000	,642	49	,000
N. sure associat in SB display_task 5	,413	49	,000	,588	49	,000
Dominance sure associat in SB display_task 5	,416	49	,000	,604	49	,000
Familiarity sure associat in SB display_task 5	,413	49	,000	,588	49	,000
N. sure associat in CB display_task 5	,317	49	,000	,652	49	,000
Dominance sure associat in CB display_task 5	,326	49	,000	,684	49	,000
Familiarity sure associat in CB display_task 5	,317	49	,000	,652	49	,000

a. Lilliefors Significance Correction

Tests of Normality

	Kolmogorov-Smirnov [a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
N recalled brands_task 5	,125	49	,052	,945	49	,023
N sure brands recalled_task 5	,152	49	,006	,942	49	,018
% sure brands recalled_task 5	,336	49	,000	,695	49	,000
N proper brands recalled_task 5	,125	49	,054	,963	49	,127
% proper brands recalled_task 5	,418	49	,000	,555	49	,000
N. recalled brands in display_task 5	,227	49	,000	,899	49	,000
Dominance recalled brands in display_task 5	,151	49	,007	,878	49	,000
Familiarity of recalled brands in display_task 5	,227	49	,000	,899	49	,000
N. associated brands_task 5	,144	49	,012	,940	49	,015
% Non associated brands_task 5	,533	49	,000	,310	49	,000
N. sure associated brands_task 5	,158	49	,004	,938	49	,012
% sure associated brands_task 5	,360	49	,000	,656	49	,000
N. proper brands associated_task 5	,114	49	,147	,962	49	,110
% proper brands associated_task 5	,400	49	,000	,624	49	,000
N. associated brands in display_task 5	,220	49	,000	,897	49	,000
Dominance brands associated in display_task 5	,175	49	,001	,851	49	,000
Familiarity associated brands in display_task 5	,220	49	,000	,897	49	,000
N. recalled SG_task 5	,190	49	,000	,934	49	,009
N. sure SG recalled_task 5	,185	49	,000	,940	49	,015
% sure SG recalled_task 5	,354	49	,000	,695	49	,000
N. proper SG recalled_task 5	,165	49	,002	,943	49	,020
% proper SG recalled_task 5	,534	49	,000	,306	49	,000
N. recalled SG in brochure_task 5	,182	49	,000	,898	49	,000
Dominance recalled SG in brochure_task 5	,267	49	,000	,768	49	,000
Familiarity recalled SG in brochure_task 5	,182	49	,000	,898	49	,000
N. recalled SG in SB display_task 5	,311	49	,000	,630	49	,000
Dominance recalled SG in SB display_task 5	,299	49	,000	,705	49	,000
Familiarity recalled SG in SB display_task 5	,311	49	,000	,630	49	,000
N. recalled SG in CB display_task 5	,294	49	,000	,758	49	,000
Dominance recalled SG in CB display_task 5	,249	49	,000	,803	49	,000
Familiarity recalled SG in CB display_task 5	,294	49	,000	,758	49	,000
N. sg Composition_task 5	,344	49	,000	,723	49	,000
% sg Composition_task 5	,368	49	,000	,727	49	,000
% sg Target_task 5	,222	49	,000	,771	49	,000
N sg Target_task 5	,229	49	,000	,837	49	,000
N sg Brand_task 5	,540	49	,000	,201	49	,000
% sg Brand_task 5	,528	49	,000	,171	49	,000
N. sg Form_task 5	,382	49	,000	,672	49	,000
% sg Form_task 5	,398	49	,000	,622	49	,000
N. Associated SG _task 5	,163	49	,002	,937	49	,011
N. Non-assocated sg_task 5	,457	49	,000	,534	49	,000
% Non associated sg_task 5	,452	49	,000	,536	49	,000
N. sure sg associated_task 5	,161	49	,003	,944	49	,021
% sure sg associated_task 5	,432	49	,000	,588	49	,000
N. proper sg associated_task 5	,174	49	,001	,951	49	,039
% proper sg associated_task 5	,523	49	,000	,288	49	,000
N. sg associated in brochure_task 5	,198	49	,000	,873	49	,000
Dominance associated sg in brochure_task 5	,268	49	,000	,757	49	,000
Familiarity associated sg in brochure_task 5	,198	49	,000	,873	49	,000
N. associated sg in SB display_task 5	,285	49	,000	,709	49	,000
Dominance associated sg in SB display_task 5	,297	49	,000	,748	49	,000
Familiarity associated sg in SB display_task 5	,285	49	,000	,709	49	,000
N. associated sg in CB display_task 5	,259	49	,000	,773	49	,000
Dominance associated sg in CB display_task 5	,268	49	,000	,705	49	,000
Familiarity associated sg ASSOC in CB display_task 5	,259	49	,000	,773	49	,000

a. Lilliefors Significance Correction

Tests of Normality[b]

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
delta n. recalled brands	,168	52	,001	,940	52	,011
delta % n sure brands recalled on total	,193	52	,000	,915	52	,001
delta % proper brands on total	,377	52	,000	,664	52	,000
delta dominance recalled brands in display	,184	52	,000	,912	52	,001
delta familiarity recalled brands in display	,209	52	,000	,878	52	,000
delta n. associated brands	,180	52	,000	,929	52	,004
delta % n. not associated brands on total	,445	52	,000	,591	52	,000
delta % n. sure brands on total	,213	52	,000	,858	52	,000
delta % proper brands associated	,400	52	,000	,647	52	,000
delta dominance associated brands in display	,185	52	,000	,884	52	,000
delta familiarity associated brands in display	,184	52	,000	,877	52	,000
delta n. recalled sg	,195	52	,000	,938	52	,009
delta % sure sg recalled	,301	52	,000	,814	52	,000
delta % proper sg recalled	,487	52	,000	,392	52	,000
delta dominance recalled sg in brochure	,263	52	,000	,881	52	,000
delta familiarity recalled sg in brochure	,247	52	,000	,906	52	,001
delta dominance recalled sg in SB display	,289	52	,000	,792	52	,000
delta familiarity recalled sg in SB display	,313	52	,000	,723	52	,000
delta dominance recalled sg in CB display	,277	52	,000	,819	52	,000
delta familiarity recalled sg in CB display	,297	52	,000	,733	52	,000
delta % incid sg composition	,277	52	,000	,849	52	,000
delta % incid sg target	,288	52	,000	,806	52	,000
delta % incid sg form	,536	52	,000	,122	52	,000
delta n. associated sg	,174	52	,000	,918	52	,002
delta % incid not associated sg	,217	52	,000	,914	52	,001
delta % sure sg assoc	,363	52	,000	,780	52	,000
delta % proper sg assoc	,450	52	,000	,571	52	,000
delta dominance assoc sg in brochure	,311	52	,000	,828	52	,000
delta familiarity assoc sg in brochure	,283	52	,000	,883	52	,000
delta dominance assoc sg in display SB	,279	52	,000	,754	52	,000
delta familiarity assoc sg in display SB	,291	52	,000	,735	52	,000
delta dominance assoc sg in display CB	,283	52	,000	,839	52	,000
delta familiarity assoc sg in display CB	,285	52	,000	,795	52	,000
delta n. associations	,152	52	,004	,954	52	,042
delta one-to-one associations	,191	52	,000	,908	52	,001
delta n. associat sure brand & sure sg	,156	52	,003	,941	52	,012
delta % incid correct associat on total	,221	52	,000	,917	52	,001
delta n. associat in display SB	,368	52	,000	,709	52	,000
delta n. associat in display CB	,316	52	,000	,636	52	,000

a. Lilliefors Significance Correction

b. delta % incid sg marca is constant. It has been omitted.

ANALYSIS OF VARIANCE OUTPUT – TASK 5
(Levene's and F-tests)

Total Number of Recalled Brands_task 5

Levene's Test of Equality of Error Variances[a]

Dependent Variable: N marche CITATE_task 5

F	df1	df2	Sig.
1,240	5	48	,305

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: N marche CITATE_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	56,000[b]	5	11,200	3,213	,014
Intercept	912,667	1	912,667	261,801	,000
POP	4,741	1	4,741	1,360	,249
DISP	23,444	2	11,722	3,363	,043
POP * DISP	27,815	2	13,907	3,989	,025
Error	167,333	48	3,486		
Total	1136,000	54			
Corrected Total	223,333	53			

a. Computed using alpha = ,05

b. R Squared = ,251 (Adjusted R Squared = ,173)

N. of Sure Recalled Brands_task 5

Levene's Test of Equality of Error Variances[a]

Dependent Variable: 5V2- N marche SICURE CITATE_task 5

F	df1	df2	Sig.
2,495	5	47	[illegible]

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: 5V2- N marche SICURE CITATE_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	53,699[b]	5	10,740	2,946	,021
Intercept	674,844	1	674,844	185,138	,000
POP	6,635	1	6,635	1,820	,184
DISP	27,738	2	13,869	3,805	,029
POP * DISP	18,903	2	9,451	2,593	,085
Error	171,319	47	3,645		
Total	899,000	53			
Corrected Total	225,019	52			

a. Computed using alpha = ,05

b. R Squared = ,239 (Adjusted R Squared = ,158)

Transformation (Square Root) of N. of Sure Brands Recalled_task 5

Levene's Test of Equality of Error Variances[a]

Dependent Variable: V81SQR

F	df1	df2	Sig.
,935	5	47	,467

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: V81SQR

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	5,116[b]	5	1,023	2,377	,053
Intercept	163,856	1	163,856	380,625	,000
POP	,567	1	,567	1,317	,257
DISP	2,946	2	1,473	3,422	[illegible]
POP * DISP	1,553	2	,776	1,803	,176
Error	20,233	47	,430		
Total	189,000	53			
Corrected Total	25,349	52			

a. Computed using alpha = ,05

b. R Squared = ,202 (Adjusted R Squared = ,117)

N. of Recalled Brands inserted in Display_task 5

Levene's Test of Equality of Error Variances[a]

Dependent Variable: 5V4- n marche CITATE nel display_task 5

F	df1	df2	Sig.
1,346	5	47	,262

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: 5V4- n marche CITATE nel display_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	60,412[b]	5	12,082	3,039	,019
Intercept	334,296	1	334,296	84,096	,000
POP	1,090	1	1,090	,274	,603
DISP	41,780	2	20,890	5,255	,009
POP * DISP	17,180	2	8,590	2,161	,127
Error	186,833	47	3,975		
Total	581,000	53			
Corrected Total	247,245	52			

a. Computed using alpha = ,05

b. R Squared = ,244 (Adjusted R Squared = ,164)

Familiarity of Recalled Brands in Display Stimuli_task 5

Levene's Test of Equality of Error Variances[a]

Dependent Variable: FAMILIARITA' marche CITATE nel display_task 5

F	df1	df2	Sig.
1,346	5	47	,262

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: FAMILIARITA' marche CITATE nel display_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1369,885[b]	5	273,977	3,039	,019
Intercept	7580,406	1	7580,406	84,096	,000
POP	24,707	1	24,707	,274	,603
DISP	947,392	2	473,696	5,255	,009
POP * DISP	389,569	2	194,785	2,161	,127
Error	4236,584	47	90,140		
Total	13174,603	53			
Corrected Total	5606,469	52			

a. Computed using alpha = ,05

b. R Squared = ,244 (Adjusted R Squared = ,164)

N. of Associated Brands_task 5

Levene's Test of Equality of Error Variances[a]

Dependent Variable: n marche ASSOC_task 5

F	df1	df2	Sig.
,612	5	47	,691

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: n marche ASSOC_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	48,177[b]	5	9,635	2,967	,021
Intercept	871,034	1	871,034	268,181	,000
POP	3,007	1	3,007	,926	,341
DISP	23,112	2	11,556	3,558	,036
POP * DISP	21,938	2	10,969	3,377	,043
Error	152,653	47	3,248		
Total	1073,000	53			
Corrected Total	200,830	52			

a. Computed using alpha = ,05

b. R Squared = ,240 (Adjusted R Squared = ,159)

N. of Sure Recalled and Associated Brands_task 5

Levene's Test of Equality of Error Variances[a]

Dependent Variable: 5V8- N MARCHE SICURE ASSOC_task 5

F	df1	df2	Sig.
2,035	5	47	,091

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: 5V8- N MARCHE SICURE ASSOC_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	46,333[b]	5	9,267	2,382	,053
Intercept	660,921	1	660,921	169,861	,000
POP	4,150	1	4,150	1,067	,307
DISP	25,623	2	12,811	3,293	,046
POP * DISP	16,294	2	8,147	2,094	,135
Error	182,875	47	3,891		
Total	889,000	53			
Corrected Total	229,208	52			

a. Computed using alpha = ,05

b. R Squared = ,202 (Adjusted R Squared = ,117)

N. of Recalled and Associated Brands in Display_task 5

Levene's Test of Equality of Error Variances[a]

Dependent Variable: 5V10- N MARCHE ASSOC nel DISPLAY_task 5

F	df1	df2	Sig.
1,244	5	47	,304

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: 5V10- N MARCHE ASSOC nel DISPLAY_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	61,041[b]	5	12,208	3,082	,017
Intercept	324,518	1	324,518	81,928	,000
POP	1,724	1	1,724	,435	,513
DISP	43,363	2	21,682	5,474	,007
POP * DISP	15,630	2	7,815	1,973	,150
Error	186,167	47	3,961		
Total	571,000	53			
Corrected Total	247,208	52			

a. Computed using alpha = ,05

b. R Squared = ,247 (Adjusted R Squared = ,167)

Familiarity Associated Brands in Display_task 5

Levene's Test of Equality of Error Variances[a]

Dependent Variable: FAMILIARITY marche ASSOC nel DISPLAY_task 5

F	df1	df2	Sig.
1,244	5	47	,304

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: FAMILIARITY marche ASSOC nel DISPLAY_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1384,147[b]	5	276,829	3,082	,017
Intercept	7358,688	1	7358,688	81,928	,000
POP	39,104	1	39,104	,435	,513
DISP	983,296	2	491,648	5,474	,007
POP * DISP	354,422	2	177,211	1,973	,150
Error	4221,466	47	89,818		
Total	12947,846	53			
Corrected Total	5605,613	52			

a. Computed using alpha = ,05

b. R Squared = ,247 (Adjusted R Squared = ,167)

N. of Recalled Sub-groups_task 5

Levene's Test of Equality of Error Variances[a]

Dependent Variable: N SG CITATI_task 5

F	df1	df2	Sig.
2,787	5	48	[illegible]

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: N SG CITATI_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	29,333[b]	5	5,867	3,176	,015
Intercept	726,000	1	726,000	393,023	,000
POP	7,407	1	7,407	4,010	,051
DISP	9,000	2	4,500	2,436	,098
POP * DISP	12,926	2	6,463	3,499	,038
Error	88,667	48	1,847		
Total	844,000	54			
Corrected Total	118,000	53			

a. Computed using alpha = ,05

b. R Squared = ,249 (Adjusted R Squared = ,170)

N. of Sure Sub-groups Recalled_task 5

Levene's Test of Equality of Error Variances[a]

Dependent Variable: 5V13- N SG SICURI CITATI_task 5

F	df1	df2	Sig.
,791	5	48	,562

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: 5V13- N SG SICURI CITATI_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	31,648[b]	5	6,330	3,059	,018
Intercept	480,019	1	480,019	231,955	,000
POP	11,574	1	11,574	5,593	,022
DISP	10,037	2	5,019	2,425	,099
POP * DISP	10,037	2	5,019	2,425	,099
Error	99,333	48	2,069		
Total	611,000	54			
Corrected Total	130,981	53			

a. Computed using alpha = ,05

b. R Squared = ,242 (Adjusted R Squared = ,163)

Familiarity of Recalled Sub-group in SB display

Levene's Test of Equality of Error Variances[a]

Dependent Variable: FAMILIARITA' SG CITATI in SB display_task 5

F	df1	df2	Sig.
8,245	5	48	[redacted]

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: FAMILIARITA' SG CITATI in SB display_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	5925,926[b]	5	1185,185	4,154	,003
Intercept	7316,704	1	7316,704	25,642	,000
POP	241,875	1	241,875	,848	,362
DISP	4202,570	2	2101,285	7,364	,002
POP * DISP	1481,481	2	740,741	2,596	,085
Error	13696,145	48	285,336		
Total	26938,776	54			
Corrected Total	19622,071	53			

a. Computed using alpha = ,05

b. R Squared = ,302 (Adjusted R Squared = ,229)

% of Recalled Sub-groups reflecting Composition_task 5

Levene's Test of Equality of Error Variances[a]

Dependent Variable. % sg COMPOSIZIONE_task 5

F	df1	df2	Sig.
3,282	5	48	[redacted]

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: % sg COMPOSIZIONE_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	8499,312[b]	5	1699,862	1,294	[redacted]
Intercept	39024,743	1	39024,743	29,716	,000
POP	6082,188	1	6082,188	4,631	,036
DISP	1542,179	2	771,089	,587	,560
POP * DISP	874,945	2	437,473	,333	,718
Error	63035,299	48	1313,235		
Total	110559,354	54			
Corrected Total	71534,611	53			

a. Computed using alpha = ,05

b. R Squared = ,119 (Adjusted R Squared = ,027)

N. Recalled Sub-groups reflecting Form

Levene's Test of Equality of Error Variances[a]

Dependent Variable: 5V24- n sg FORMA_task 5

F	df1	df2	Sig.
3,755	5	47	[redacted]

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: 5V24- n sg FORMA_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	30,272[b]	5	6,054	2,549	,040
Intercept	55,626	1	55,626	23,416	,000
POP	11,000	1	11,000	4,631	,037
DISP	9,272	2	4,636	1,951	,153
POP * DISP	9,681	2	4,840	2,038	,142
Error	111,653	47	2,376		
Total	199,000	53			
Corrected Total	141,925	52			

a. Computed using alpha = ,05

b. R Squared = ,213 (Adjusted R Squared = ,130)

% Recalled Sub-groups reflecting Form_task 5

Levene's Test of Equality of Error Variances[a]

Dependent Variable: % sg FORMA_task 5

F	df1	df2	Sig.
13,620	5	47	[redacted]

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: % sg FORMA_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	26547,286[b]	5	5309,457	3,740	,006
Intercept	38580,247	1	38580,247	27,174	,000
POP	9101,789	1	9101,789	6,411	,015
DISP	4280,324	2	2140,162	1,507	,232
POP * DISP	13234,028	2	6617,014	4,661	,014
Error	66728,395	47	1419,753		
Total	133402,778	53			
Corrected Total	93275,681	52			

a. Computed using alpha = ,05

b. R Squared = ,285 (Adjusted R Squared = ,209)

N. of Proper Sub-groups Recalled_task 5

Levene's Test of Equality of Error Variances[a]

Dependent Variable: 5V14- N SG IA senso lato CITATI_task 5

F	df1	df2	Sig.
2,238	5	48	,066

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: 5V14- N SG IA senso lato CITATI_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	33,722[b]	5	6,744	2,658	,033
Intercept	661,500	1	661,500	260,737	,000
POP	4,167	1	4,167	1,642	,206
DISP	5,444	2	2,722	1,073	,350
POP * DISP	24,111	2	12,056	4,752	,013
Error	121,778	48	2,537		
Total	817,000	54			
Corrected Total	155,500	53			

a. Computed using alpha = ,05

b. R Squared = ,217 (Adjusted R Squared = ,135)

Dominance Sub-groups Recalled_task 5

Levene's Test of Equality of Error Variances[a]

Dependent Variable: DOMINANCE SG CITATI in BROCHURE_task 5

F	df1	df2	Sig.
3,212	5	48	[redacted]

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: DOMINANCE SG CITATI in BROCHURE_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	15139,629[b]	5	3027,926	1,720	[redacted]
Intercept	174129,337	1	174129,337	98,917	,000
POP	364,199	1	364,199	,207	,651
DISP	13286,451	2	6643,226	3,774	,030
POP * DISP	1488,979	2	744,490	,423	,658
Error	84496,964	48	1760,353		
Total	273765,930	54			
Corrected Total	99636,593	53			

a. Computed using alpha = ,05

b. R Squared = ,152 (Adjusted R Squared = ,064)

N. of Recalled Sub-groups in SB Display

Levene's Test of Equality of Error Variances[a]

Dependent Variable: 5V17- N SG CITATI in SB display_task 5

F	df1	df2	Sig.
8,245	5	48	[redacted]

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: 5V17- N SG CITATI in SB display_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	29,037[b]	5	5,807	4,154	,003
Intercept	35,852	1	35,852	25,642	,000
POP	1,185	1	1,185	,848	,362
DISP	20,593	2	10,296	7,364	,002
POP * DISP	7,259	2	3,630	2,596	,085
Error	67,111	48	1,398		
Total	132,000	54			
Corrected Total	96,148	53			

a. Computed using alpha = ,05

b. R Squared = ,302 (Adjusted R Squared = ,229)

Dominance Recalled Sub-groups in SB Display

Levene's Test of Equality of Error Variances[a]

Dependent Variable: DOMINANCE SG CITATI in SB display_task 5

F	df1	df2	Sig.
8,411	5	48	[redacted]

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: DOMINANCE SG CITATI in SB display_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	10807,168[b]	5	2161,434	3,641	,007
Intercept	19051,398	1	19051,398	32,092	,000
POP	449,017	1	449,017	,756	,389
DISP	8115,275	2	4057,637	6,835	,002
POP * DISP	2242,876	2	1121,438	1,889	.162
Error	28495,515	48	593,657		
Total	58354,082	54			
Corrected Total	39302,683	53			

a. Computed using alpha = ,05

b. R Squared = ,275 (Adjusted R Squared = ,199)

N. of Sure Associated Sub-groups_task 5

Levene's Test of Equality of Error Variances[a]

Dependent Variable: 5V27- N sg SICURI ASSOC_task 5

F	df1	df2	Sig.
,248	5	47	,940

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: 5V27- N sg SICURI ASSOC_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	21,312[b]	5	4,262	2,257	,064
Intercept	433,721	1	433,721	229,653	,000
POP	8,288	1	8,288	4,389	,042
DISP	5,538	2	2,769	1,466	,241
POP * DISP	7,356	2	3,678	1,948	,154
Error	88,764	47	1,889		
Total	546,000	53			
Corrected Total	110,075	52			

a. Computed using alpha = ,05

b. R Squared = ,194 (Adjusted R Squared = ,108)

N. of Proper Sub-groups Associated_task 5

Levene's Test of Equality of Error Variances[a]

Dependent Variable: 5V28- N sg IA senso lato assoc ASSOC_task 5

F	df1	df2	Sig.
,654	5	47	,660

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: 5V28- N sg IA senso lato assoc ASSOC_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	22,717[b]	5	4,543	2,542	,041
Intercept	542,930	1	542,930	303,782	,000
POP	4,082	1	4,082	2,284	,137
DISP	6,259	2	3,129	1,751	,185
POP * DISP	12,330	2	6,165	3,449	,040
Error	84,000	47	1,787		
Total	652,000	53			
Corrected Total	106,717	52			

a. Computed using alpha = ,05

b. R Squared = ,213 (Adjusted R Squared = ,129)

N. of Associated Sub-groups in brochure_task 5

Levene's Test of Equality of Error Variances[a]

Dependent Variable: 5V29- N sg ASSOC in BROCHURE_task 5

F	df1	df2	Sig.
1,526	5	47	,200

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: 5V29- N sg ASSOC in BROCHURE_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	19,379[b]	5	3,876	1,398	,242
Intercept	197,626	1	197,626	71,274	,000
POP	2,551E-03	1	2,551E-03	,001	,976
DISP	17,845	2	8,923	3,218	,049
POP * DISP	1,236	2	,618	,223	,801
Error	130,319	47	2,773		
Total	346,000	53			
Corrected Total	149,698	52			

a. Computed using alpha = ,05

b. R Squared = ,129 (Adjusted R Squared = ,037)

Dominance Associated Sub-groups in brochure_task 5

Levene's Test of Equality of Error Variances[a]

Dependent Variable: DOMINANCE sg ASSOC in BROCHURE_task 5

F	df1	df2	Sig.
3,493	5	47	[redacted]

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: DOMINANCE sg ASSOC in BROCHURE_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	15196,765[b]	5	3039,353	1,639	[redacted]
Intercept	170741,273	1	170741,273	92,054	,000
POP	734,722	1	734,722	,396	,532
DISP	13438,093	2	6719,046	3,623	,034
POP * DISP	1103,772	2	551,886	,298	,744
Error	87175,772	47	1854,804		
Total	270677,778	53			
Corrected Total	102372,537	52			

a. Computed using alpha = ,05

b. R Squared = ,148 (Adjusted R Squared = ,058)

Familiarity Associated Sub-groups in brochure_task 5

Levene's Test of Equality of Error Variances[a]

Dependent Variable: FAMILIARITY sg ASSOC in BROCHURE_task 5

F	df1	df2	Sig.
1,526	5	47	,200

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: FAMILIARITY sg ASSOC in BROCHURE_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	3954,830[b]	5	790,966	1,398	,242
Intercept	40331,864	1	40331,864	71,274	,000
POP	,521	1	,521	,001	,976
DISP	3641,837	2	1820,918	3,218	,049
POP * DISP	252,268	2	126,134	,223	,801
Error	26595,805	47	565,868		
Total	70612,245	53			
Corrected Total	30550,635	52			

a. Computed using alpha = ,05

b. R Squared = ,129 (Adjusted R Squared = ,037)

N. Associated Sub-groups in SB display_task 5

Levene's Test of Equality of Error Variances[a]

Dependent Variable: 5V31- N sg ASSOC in SB display_task 5

F	df1	df2	Sig.
6,892	5	47	[illegible]

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: 5V31- N sg ASSOC in SB display_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	17,828[b]	5	3,566	3,574	,008
Intercept	32,766	1	32,766	32,844	,000
POP	1,311	1	1,311	1,314	,258
DISP	12,187	2	6,093	6,108	,004
POP * DISP	4,280	2	2,140	2,145	,128
Error	46,889	47	,998		
Total	98,000	53			
Corrected Total	64,717	52			

a. Computed using alpha = ,05

b. R Squared = ,275 (Adjusted R Squared = ,198)

Dominance Associated Sub-groups in SB display_task 5

Levene's Test of Equality of Error Variances[a]

Dependent Variable: DOMINANCE sg ASSOC in SB display_task 5

F	df1	df2	Sig.
3,748	5	47	[illegible]

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: DOMINANCE sg ASSOC in SB display_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	7683,240[b]	5	1536,848	1,945	[illegible]
Intercept	26340,590	1	26340,590	33,349	,000
POP	1210,632	1	1210,632	1,533	,222
DISP	5684,744	2	2842,372	3,599	,035
POP * DISP	767,509	2	383,755	,486	,618
Error	37122,840	47	789,848		
Total	71077,778	53			
Corrected Total	44806,080	52			

a. Computed using alpha = ,05

b. R Squared = ,171 (Adjusted R Squared = ,083)

Familiarity Associated Sub-groups in SB display_task 5

Levene's Test of Equality of Error Variances[a]

Dependent Variable: FAMILIARITY sg ASSOC in SB display_task 5

F	df1	df2	Sig.
6,892	5	47	[illegible]

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: FAMILIARITY sg ASSOC in SB display_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	3638,386[b]	5	727,677	3,574	,008
Intercept	6687,029	1	6687,029	32,844	,000
POP	267,481	1	267,481	1,314	,258
DISP	2487,075	2	1243,537	6,108	,004
POP * DISP	873,469	2	436,735	2,145	,128
Error	9569,161	47	203,599		
Total	20000,000	53			
Corrected Total	13207,547	52			

a. Computed using alpha = ,05

b. R Squared = ,275 (Adjusted R Squared = ,198)

N. Associated Sub-groups in CB display_task 5

Levene's Test of Equality of Error Variances[a]

Dependent Variable: 5V33- N sg ASSOC In CB display_task 5

F	df1	df2	Sig.
2,942	5	47	[illegible]

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: 5V33- N sg ASSOC In CB display_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	14,494[b]	5	2,899	1,962	[illegible]
Intercept	57,653	1	57,653	39,028	,000
POP	4,429	1	4,429	2,998	,090
DISP	9,125	2	4,562	3,089	,055
POP * DISP	,645	2	,323	,218	,805
Error	69,431	47	1,477		
Total	141,000	53			
Corrected Total	83,925	52			

a. Computed using alpha = ,05

b. R Squared = ,173 (Adjusted R Squared = ,085)

Dominance Associated Sub-groups in CB display_task 5

Levene's Test of Equality of Error Variances[a]

Dependent Variable: DOMINANCE sg ASSOC In CB display_task 5

F	df1	df2	Sig.
2,051	5	47	,089

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: DOMINANCE sg ASSOC In CB display_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	13412,113[b]	5	2682,423	2,604	,037
Intercept	47902,494	1	47902,494	46,503	,000
POP	1687,528	1	1687,528	1,638	,207
DISP	9199,559	2	4599,779	4,465	,017
POP * DISP	2488,966	2	1244,483	1,208	,308
Error	48414,198	47	1030,089		
Total	108630,556	53			
Corrected Total	61826,310	52			

a. Computed using alpha = ,05

b. R Squared = ,217 (Adjusted R Squared = ,134)

Familiarity Associated Sub-groups in CB Display_task 5

Levene's Test of Equality of Error Variances[a]

Dependent Variable: FAMILIARITY sg ASSOC In CB display_task 5

F	df1	df2	Sig.
2,942	5	47	[illegible]

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: FAMILIARITY sg ASSOC In CB display_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	2957,954[a]	5	591,591	1,962	[illegible]
Intercept	11765,989	1	11765,989	39,028	,000
POP	903,848	1	903,848	2,998	,090
DISP	1862,245	2	931,122	3,089	,055
POP * DISP	131,633	2	65,816	,218	,805
Error	14169,501	47	301,479		
Total	28775,510	53			
Corrected Total	17127,455	52			

a. Computed using alpha = ,05

b. R Squared = ,173 (Adjusted R Squared = ,085)

N. One-to-One Associations_task 5

Levene's Test of Equality of Error Variances[a]

Dependent Variable: N associaz 1TO1_task 5

F	df1	df2	Sig.
1,311	5	47	,276

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: N associaz 1TO1_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	68,558[b]	5	13,712	3,046	,018
Intercept	539,796	1	539,796	119,923	,000
POP	,367	1	,367	,082	,776
DISP	22,694	2	11,347	2,521	,091
POP * DISP	45,130	2	22,565	5,013	,011
Error	211,556	47	4,501		
Total	819,000	53			
Corrected Total	280,113	52			

a. Computed using alpha = ,05

b. R Squared = ,245 (Adjusted R Squared = ,164)

N. of Correct Associations_task 5

Levene's Test of Equality of Error Variances[a]

Dependent Variable: 5V38- N ASSOCZ CORRETTE_task 5

F	df1	df2	Sig.
,852	5	47	[redacted]

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: 5V38- N ASSOCZ CORRETTE_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	83,397[b]	5	16,679	3,173	[redacted]
Intercept	702,232	1	702,232	133,593	[redacted]
POP	15,520	1	15,520	2,953	,092
DISP	12,537	2	6,268	1,192	,312
POP * DISP	54,750	2	27,375	5,208	[redacted]
Error	247,056	47	5,257		
Total	1026,000	53			
Corrected Total	330,453	52			

a. Computed using alpha = ,05

b. R Squared = ,252 (Adjusted R Squared = ,173)

% of Correct Associations_task 5

Levene's Test of Equality of Error Variances[a]

Dependent Variable: % ASSOC CORRETTE_task 5

F	df1	df2	Sig.
6,288	5	47	[redacted]

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: % ASSOC CORRETTE_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	14272,890[b]	5	2854,578	2,777	,028
Intercept	235468,384	1	235468,384	229,107	,000
POP	1880,543	1	1880,543	1,830	,183
DISP	3874,668	2	1937,334	1,885	,163
POP * DISP	8500,503	2	4250,252	4,135	,022
Error	48304,956	47	1027,765		
Total	296080,506	53			
Corrected Total	62577,845	52			

a. Computed using alpha = ,05

b. R Squared = ,228 (Adjusted R Squared = ,146)

N. Associations in SB display_task 5

Levene's Test of Equality of Error Variances[a]

Dependent Variable: N ASSOCZ in SB display_task 5

F	df1	df2	Sig.
33,156	5	47	[redacted]

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: N ASSOCZ in SB display_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	23,203[b]	5	4,641	4,848	,001
Intercept	21,749	1	21,749	22,722	,000
POP	2,891	1	2,891	3,021	,089
DISP	14,988	2	7,494	7,830	,001
POP * DISP	5,228	2	2,614	2,731	,075
Error	44,986	47	,957		
Total	90,000	53			
Corrected Total	68,189	52			

a. Computed using alpha = ,05

b. R Squared = ,340 (Adjusted R Squared = ,270)

Dominance Associations in SB display_task 5

Levene's Test of Equality of Error Variances[a]

Dependent Variable. DOMINANCE ASSOCZ in SB display_task 5

F	df1	df2	Sig.
12,580	5	47	[redacted]

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: DOMINANCE ASSOCZ in SB display_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	5861,136[b]	5	1172,227	3,748	,006
Intercept	7381,401	1	7381,401	23,600	,000
POP	1231,081	1	1231,081	3,936	,053
DISP	3744,307	2	1872,154	5,986	,005
POP * DISP	920,498	2	460,249	1,472	,240
Error	14700,157	47	312,769		
Total	27766,851	53			
Corrected Total	20561,293	52			

a. Computed using alpha = ,05

b. R Squared = ,285 (Adjusted R Squared = ,209)

Familiarity of Associations in SB display_task 5

Levene's Test of Equality of Error Variances[a]

Dependent Variable: FAMILIARITY ASSOCZ In SB display_task 5

F	df1	df2	Sig.
33,156	5	47	[redacted]

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: FAMILIARITY ASSOCZ In SB display_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	526,135[b]	5	105,227	4,848	,001
Intercept	493,165	1	493,165	22,722	,000
POP	65,566	1	65,566	3,021	,089
DISP	339,872	2	169,936	7,830	,001
POP * DISP	118,556	2	59,278	2,731	,075
Error	1020,093	47	21,704		
Total	2040,816	53			
Corrected Total	1546,229	52			

a. Computed using alpha = ,05

b. R Squared = ,340 (Adjusted R Squared = ,270)

N. of Associations in CB display_task 5

Levene's Test of Equality of Error Variances[a]

Dependent Variable: N ASSOCZ In CB display_task 5

F	df1	df2	Sig.
7,335	5	47	[redacted]

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: N ASSOCZ in CB display_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	29,289[b]	5	5,858	1,945	,105
Intercept	60,762	1	60,762	20,177	,000
POP	1,860	1	1,860	,618	,436
DISP	26,984	2	13,492	4,480	,017
POP * DISP	3,278E-02	2	1,639E-02	,005	,995
Error	141,542	47	3,012		
Total	230,000	53			
Corrected Total	170,830	52			

a. Computed using alpha = ,05

b. R Squared = ,171 (Adjusted R Squared = ,083)

Dominance Associations in CB display_task 5

Levene's Test of Equality of Error Variances[a]

Dependent Variable: DOMINANCE ASSOCZ In CB display_task 5

F	df1	df2	Sig.
9,222	5	47	[redacted]

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: DOMINANCE ASSOCZ in CB display_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	9854,224[b]	5	1970,845	2,985	,020
Intercept	17706,263	1	17706,263	26,814	,000
POP	222,919	1	222,919	,338	,564
DISP	9402,057	2	4701,029	7,119	,002
POP * DISP	226,396	2	113,198	,171	,843
Error	31036,162	47	660,344		
Total	57925,802	53			
Corrected Total	40890,386	52			

a. Computed using alpha = ,05

b. R Squared = ,241 (Adjusted R Squared = ,160)

Familiarity of Associations in CB display_task 5

Levene's Test of Equality of Error Variances[a]

Dependent Variable: FAMILIARITY ASSOCZ In CB display_task 5

F	df1	df2	Sig.
7,335	5	47	[redacted]

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: FAMILIARITY ASSOCZ in CB display_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	664,139[b]	5	132,828	1,945	,105
Intercept	1377,827	1	1377,827	20,177	,000
POP	42,170	1	42,170	,618	,436
DISP	611,880	2	305,940	4,480	,017
POP * DISP	,743	2	,372	,005	,995
Error	3209,562	47	68,289		
Total	5215,420	53			
Corrected Total	3873,700	52			

a. Computed using alpha = ,05

b. R Squared = ,171 (Adjusted R Squared = ,083)

N. of Sure associations in SB display_task 5

Levene's Test of Equality of Error Variances[a]

Dependent Variable: N ASSOCZ SICURE in SB display_task 5

F	df1	df2	Sig.
12,165	5	44	[redacted]

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: N ASSOCZ SICURE in SB display_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	11,147[b]	5	2,229	2,776	,029
Intercept	11,778	1	11,778	14,667	,000
POP	1,212	1	1,212	1,509	,226
DISP	7,433	2	3,717	4,628	,015
POP * DISP	2,215	2	1,107	1,379	,263
Error	35,333	44	,803		
Total	80,000	50			
Corrected Total	46,480	49			

a. Computed using alpha = ,05

b. R Squared = ,240 (Adjusted R Squared = ,153)

Dominance Sure Associations in SB display_task 5

Levene's Test of Equality of Error Variances[a]

Dependent Variable: DOMINANCE ASSOCZ SICURE in SB display_task 5

F	df1	df2	Sig.
6,594	5	47	[redacted]

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: DOMINANCE ASSOCZ SICURE in SB display_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	2786,871[b]	5	557,374	2,459	,046
Intercept	3877,889	1	3877,889	17,110	,000
POP	485,186	1	485,186	2,141	,150
DISP	1880,485	2	940,243	4,149	,022
POP * DISP	434,779	2	217,389	,959	,391
Error	10652,349	47	226,646		
Total	17237,769	53			
Corrected Total	13439,219	52			

a. Computed using alpha = ,05

b. R Squared = ,207 (Adjusted R Squared = ,123)

Familiarity Sure Associations in SB display_task 5

Levene's Test of Equality of Error Variances[a]

Dependent Variable: FAMILIARITY ASSOCZ SICURE in SB display_task 5

F	df1	df2	Sig.
14,310	5	47	[redacted]

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: FAMILIARITY ASSOCZ SICURE in SB display_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	270,112[b]	5	54,022	3,169	,015
Intercept	288,871	1	288,871	16,946	,000
POP	29,720	1	29,720	1,743	,193
DISP	185,261	2	92,630	5,434	,008
POP * DISP	54,245	2	27,123	1,591	,214
Error	801,209	47	17,047		
Total	1360,544	53			
Corrected Total	1071,322	52			

a. Computed using alpha = ,05

b. R Squared = ,252 (Adjusted R Squared = ,173)

N. of Sure Associations in CB display_task 5

Levene's Test of Equality of Error Variances[a]

Dependent Variable: N ASSOCZ SICURE in CB display_task 5

F	df1	df2	Sig.
7,711	5	46	[redacted]

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: N ASSOCZ SICURE in CB display_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	22,772[b]	5	4,554	1,772	[redacted]
Intercept	49,234	1	49,234	19,159	,000
POP	3,180	1	3,180	1,238	,272
DISP	19,211	2	9,605	3,738	,031
POP * DISP	8,616E-02	2	4,309E-02	,017	,983
Error	118,208	46	2,570		
Total	191,000	52			
Corrected Total	140,981	51			

a. Computed using alpha = ,05

b. R Squared = ,162 (Adjusted R Squared = ,070)

Dominance of Sure Associations in CB display_task 5

Levene's Test of Equality of Error Variances[a]

Dependent Variable: DOMINANCE ASSOCZ SICURE in CB display_task 5

F	df1	df2	Sig.
8,474	5	47	[redacted]

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: DOMINANCE ASSOCZ SICURE in CB display_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	7317,342[b]	5	1463,468	2,400	,051
Intercept	13807,125	1	13807,125	22,641	,000
POP	709,873	1	709,873	1,164	,286
DISP	6479,395	2	3239,697	5,312	,008
POP * DISP	15,243	2	7,621	,012	,988
Error	28661,990	47	609,830		
Total	49409,777	53			
Corrected Total	35979,332	52			

a. Computed using alpha = ,05

b. R Squared = ,203 (Adjusted R Squared = ,119)

Familiarity of Sure Associations in CB display_task 5

Levene's Test of Equality of Error Variances[a]

Dependent Variable: FAMILIARITY ASSOCZ SICURE in CB display_task 5

F	df1	df2	Sig.
8,242	5	47	[redacted]

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+POP+DISP+POP * DISP

Tests of Between-Subjects Effects

Dependent Variable: FAMILIARITY ASSOCZ SICURE in CB display_task 5

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	537,467[b]	5	107,493	1,885	[redacted]
Intercept	1133,787	1	1133,787	19,878	,000
POP	74,969	1	74,969	1,314	,257
DISP	448,476	2	224,238	3,931	,026
POP * DISP	1,814	2	,907	,016	,984
Error	2680,776	47	57,038		
Total	4331,066	53			
Corrected Total	3218,243	52			

a. Computed using alpha = ,05

b. R Squared = ,167 (Adjusted R Squared = ,078)

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