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“Consumer Preferences for 99-ending prices: The mediating role of price consciousness” *

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Abstract

This research addresses the persuasive effect of 99-ending prices and carries out a choice-based conjoint analysis among 318 shoppers. We propose that 99-ending prone consumers engage in a heuristic process either consciously — they consider a 99-ending as a signal for a “good deal” — or unconsciously — they round down 99-ending prices. This conceptual framework leads to non-intuitive and completely new sets of hypotheses in the examination of the drivers, mediator and moderators of 99-ending preferences. Results indicate that consumers who are more price conscious are more likely to choose 99-ending prices. Indeed, low involved shoppers (especially those with a low hedonic and symbolic involvement profile), low educated, low income and younger shoppers are prone to choose the 99-ending option. We also demonstrate that the magnitude of this 99-ending effect depends on the price level of the product category and the positioning of the brands. The theoretical contributions to the manner in which consumers process 99-endings has implications for retailers, pricing managers and social welfare.

Keywords: 99-ending prices, Price information processing, Conjoint analysis

JEL Classification:

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Introduction

Nine-ending pricing is a common, and perhaps overused, marketing technique in Western markets (Nguyen, Heeler, & Taran, 2007). Up to 65% of all prices end with a 9 digit either in the US (Schindler, 2009; Schindler & Kirby, 1997; Stiving & Winer, 1997), in New Zealand (Gendall, Holdershaw, & Garland, 1997) or in European markets such as Poland (Suri, Anderson, & Kotlov, 2004) or Finland (Aalto-Setala, 2005). The underlying assumption which encourages retailers to apply those prices is that consumers may underestimate the value of 9-ending prices for two main reasons: by rounding down 9-endings or by considering that 9-ending prices are the cheapest options. Those effects, respectively called “level effect” (Thomas & Morwitz, 2005) and “image effect” (Schindler, 2001) have been clearly but separately identified, which does not account for their relative importance. In addition, previous empirical studies indicate great variability in the impact of 9-endings on perception (Guéguen & Legohérel, 2004), recall (Bizer & Schindler, 2005; Schindler & Wiman, 1989), choice (Baumgartner & Steiner, 2007; Manning & Sprott, 2009) or sales (Stiving & Winer, 1997); including effects that are substantial, medium, weak, or even negative in some cases. In turn, there is a compelling need to explain under which processes and conditions 9-ending prices are effective.

Our research aims to provide a better understanding of the persuasive power of 99-endings by identifying the individual factors that do activate either the level or the image effect of 99-ending prices and the product and brand characteristics that do moderate those effects. Building on the heuristic–systematic model (Chaiken 1980, 1987), we propose that consumers can consciously or unconsciously use 99-ending prices as a heuristic in their decision process. Whereas the image effect of 99-ending prices speaks to a consumer’s conscious and intentional attention to price information, we argue that the level effect of 99-ending prices captures whether incidental attention was paid to prices as part of a sub-conscious process. This implies that price consciousness is a key

variable to identify why consumers prefer 99-endings. In addition, we propose that 99-ending prone consumers should engage to a conscious or unconscious heuristic process of price information according to their involvement and socio-demographics. Two recent studies (i.e., Baumgartner & Steiner, 2007; Harris & Bray, 2007) analyze the influence of age, gender, involvement and time pressure on preferences for odd prices but they reach non significant or conflicting conclusions probably because they used homogeneous samples. Therefore, we designed our research to bridge those gaps by measuring through a choice-based conjoint analysis among 318 shoppers, the impact of Consumer Involvement Profiles (i.e., Interest, Hedonic, Symbolic, Risk) and socio-demographics (i.e., Age, Education, Income) considering price consciousness as a mediating variable and product characteristics as moderating variables (i.e., Price level, Brand positioning and Brand novelty).

To summarize, this paper contributes to our understanding of the why, who and when consumers prefer 99-ending prices. After a brief literature review and presentation of our hypotheses, we describe the choice-based conjoint analysis and related questionnaire conducted to test the theory. We follow up with the findings related to the individual drivers, price consciousness mediator and product and brand moderators of 99-ending preferences. We finally conclude with the theoretical implications for the processing of price information as well as the managerial implications in pricing decisions for retailers and product managers.

Literature Review and Conceptual Model

Our conceptual model is presented in Figure 1 and is elaborated upon in the following sections.

[Figure 1 Goes About Here]

1. Who are the 99-ending prone consumers?

1.1. The persuasive effect of 99-endings

To explain who are the 99-ending prone consumers, a widely used information processing model, the heuristic-systematic model (Chaiken 1980, 1987), is particularly appropriate. This dual-process framework explains how persuasion operates and proposes two basic modes of processing by which a purchasing judgment can be made: heuristic and systematic. On the whole, systematic processing represents a “comprehensive, analytic orientation in which perceivers access and scrutinize all informational input for its relevance and importance to their judgment task,” whereas heuristic processing occurs when people “focus on the subset of available information that enables them to use simple inferential rules, schemata, or cognitive heuristics to formulate their judgments and decisions” (Chaiken, Liberman, & Eagly, 1989, pp. 212–13). In the context of 99-endings, the heuristic–systematic model describes both those who engage in the systematic processing and therefore should not be sensitive to 99-endings and consumers who choose a heuristic mode and therefore should be 99-ending sensitive.

The former diligently, actively, and cognitively evaluate information, so they should not be influenced by either the “level effect” or the “image effect” of 99-ending prices. They do not round numbers down but rather read all the digits of the price and compare the core attributes of several brands prior to making a decision. Their cognitive capacity is sufficient to move beyond the belief that 99-ending prices indicate a discount or good price; instead, they consider information about the brand and competitive brands that enables them to make a good choice. To sum up, individuals taking a systematic route are less responsive to 99-ends,

and we should observe a lower impact of 99-ends on choice in situations where consumers engage more in a systematic mode.

In contrast, because of either their low cognitive ability or low accuracy motivation, consumers engaging in the heuristic mode do not try to optimize every decision but rather prefer to make a good decision with the least amount of mental processing. They are strongly influenced by the “level effect” and “image effect” of 99-ending prices, so in a left-to-right comparison, they may make reasonable decisions using only the left most digits without expending extra mental processing effort to evaluate the cents. They rely on 99-ending prices as signals, or heuristics learned and stored in their memory, that indicate the price is good or the item is discounted. However, this heuristic often leads to erroneous conclusions, because 99-endings usually do not provide any relevant economic advantage. Thus, 99-endings serve as persuasive appeals in support of the choice of a particular brand and should have a greater impact in situations that prompt consumers to employ a heuristic information processing mode.

1.2. Individual antecedents of the heuristic effect of 99-endings

Consumer characteristics may affect either motivation and/or cognitive ability in the persuasion process, as delineated by the heuristic–systematic model. Especially, individual involvement and the consumer’s age, education and income may affect the processing mode and lead to a lower or higher impact of 99-ending prices. Low motivation to process systematically and therefore higher 99-ending sensitivity should occur among shoppers who are poorly involved with the product category and have low budget constraints as is the case of high income households. A low ability to process information should lead to higher 99-ending preferences among older and less educated people.

1.2.1. Involvement. Previous research indicates that the motivation to process information systematically is greater with high issue involvement (see Cacioppo, Feinstein, & Jarvis, 1996). Hence, 99-ending preference should be lower for consumers highly involved with the product category. Although Baumgartner and Steiner (2007) investigated the effect of involvement on 99-endings preferences, their results were not significant probably because they operationalized involvement by merely questioning respondents about their consumption frequency of different products. To address this research gap, we propose to measure the impact of the different facets of involvement by applying the CIP (Consumer Involvement Profiles) scale developed by Laurent and Kapferer (1985). We expect that depending on the antecedents of involvement (i.e., perceived interest towards the product, perceived pleasure value, perceived sign value and perceived risk), consequences on 99-ending preferences should differ. For low priced and utilitarian product categories (e.g. detergent, oil, iron, soap, yoghurt) more especially, Laurent and Kapferer (1985) show that the extensiveness of the decision process is higher when consumers perceive the product as pleasurable than when they perceive a risk of mispurchase. To extend on those findings, we argue that if consumers are highly involved, and more especially in the case of hedonic or symbolic reasons (the “feel” dimensions of involvement compared to the “think” facets of interest and risk), they should process more systematically the information which in turn leads them to be less sensitive to 99-ending prices. To test the effect of involvement profiles, we predict that:

H1. Involvement profiles affect 99-ending preference so that:

- a. Overall involvement has a negative impact on 99-ending preference;*
- b. Hedonic and Symbolic facets of involvement have a higher impact on 99-ending preference than Interest and Risk facets.*

1.2.2. Socio-Demographics. Gerontologists and psychologists specialised in cognitive ageing have generally demonstrated that relative to younger adults, older adults appear to exhibit greater

use of schema-based as opposed to detailed processing strategies (Philipps & Sternthal, 1977). In other words, older consumers should rely more on heuristics than younger consumers. Low educated and high income consumers are also expected to engage in heuristic information processing because, respectively, they should have less ability to actively process the information and less motivation to do so. Those types of shoppers, who are relying on a heuristic process of the information, ought to be more sensitive to 99-endings. Therefore, while little attention has been directed to exhibit the effect of age, education and income on 9 endings choice (with the exceptions of Harris & Bray, 2007; and Macé, 2008), we predict that:

H2. Demographics affect 99-ending preference, so that:

- a. Age has a positive impact on 99-ending preferences;*
- b. Education level has a negative impact on 99-ending preference;*
- c. Income has a positive impact on 99-ending preference.*

2. How 99-ending prices influence consumer preference?

2.1. The unconscious and conscious effects of 99-endings

Consumers are either aware of why they made the choice they made or not (Chartrand, 2005). In this regard, shoppers can be either conscious or not of their preference for 99-endings. The unconscious or conscious processing of 99-endings could then be associated respectively to the so called “level” or “image” effects (Stiving & Winer, 1997).

On the one hand, we argue that the level effect of 99-ending prices is mostly due to non conscious awareness of the price processing. Indeed, “level effect” is due to the automatic left to right processing of numerical digits and it is consequently influenced by the number of digits involved in a given price (the more digits, the higher underestimation effect), the changes in the left-hand digits (the effect does not depend on the cents but on the dollar digit) and by the distance between digits (more distance entails more truncation effect) (Thomas & Morwitz, 2005). In other

words, consumers are not consciously aware of their likelihood to focus only on the left-hand digits of prices, which causes them to underestimate 99-ending prices and overestimate its economic advantage compared to the 00-ending option.

On the other hand, the “image effect” is due to the fact that people categorize price information according to different meanings such as a “good deal” or a “low quality” product (Schindler, 2001). Contrary to the “level effect”, the “image effect” is domain specific and it should result from a more conscious process or price information. Shoppers are likely to associate a certain “image” to items on sale or of lower quality when they are exposed to 99-endings. Especially, the analysis of two large samples of newspaper price advertising indicates that there is a strong and robust correlation between the use of the 99 price ending and the presence of a low-price appeal such as claimed discount (Schindler, 2006). Therefore, we consider that consumers may also consciously conclude to a “good deal” from reading the right-hand digits as it leads them to choose the 99-ending price option. Note that we do not test for the “low quality” meaning which should decrease the likelihood of choosing a 99-ending price.

2.2. The mediating role of price consciousness

To specify how shoppers process consciously or unconsciously price information, we adopt the definition of Ailawadi, Neslin and Gedenk (2001) and consider that price consciousness is the degree to which a consumer engages in comparative shopping and that he or she intends to get the best price. Individual factors, such as involvement or demographics may affect price consciousness which in turn should impact 99-ending choice. If both indirect paths are statistically significant, the mediation of price consciousness is then demonstrated (Zhao, Lynch, & Chen, 2010).

2.2.1. First path: The impact of Consumer Involvement Profile (CIP) and demographics on price consciousness. As stated by Lichtenstein, Ridgway and Netemeyer (1993), price

consciousness ought to vary across consumers. Firstly, low involved consumers should be less price conscious than highly involved consumers. Sinha and Batra (1999) particularly show that perceived category risk is a significant and negative antecedent of price consciousness as consumers tend to look for higher prices in order to reduce the risk of mispurchase. In line with those findings, we should also expect a negative impact of the hedonic, symbolic and interest facets of involvement on price consciousness. Secondly, age, education and income should be significant antecedents of price consciousness. However, based on structural equation models, Ailawadi, Neslin and Gedenk (2001) only identified a significant and negative effect of income per capita. As budget constraints are likely to occur among younger and less educated shoppers, we also expect a negative impact of age and education on price consciousness.

Therefore, we predict that:

H3. Price consciousness is negatively affected by:

- a. Involvement profiles;*
- b. Income;*
- c. Education;*
- d. Age.*

2.2.2. Second path: The impact of price consciousness on 99-ending preference. Still, one important question remains: What is the most powerful effect of a 99-ending: the unconscious (i.e., “level effect”) or the conscious (i.e., “image of a good deal effect”)? Until now, they have been clearly but separately identified which does not account for their relative importance. However, considering both the overrepresentation of 9-ending practices in Western markets (Nguyen et al., 2007) and their widely use as a promotional technique (Ngobo, Legohérel, & Guéguen, 2010), shoppers are likely to consider that 99-endings allow for savings. Consequently, we expect highly price conscious consumers to be more sensitive to 99-endings than low price conscious consumers.

To sum up, we predict that:

H4. Price consciousness is related positively to:

- a. The perceived savings of 99-endings.*
- b. 99-ending preference.*

3. When 99-ending prices effects are stronger?

3.1. The moderating role of product price level

The price level of the product category could moderate consumer sensibility to 99-ending prices. Previous cross-sectional studies (Macé, 2008; Ngobo et al., 2010) indicate that 9-ending prices increase sales for low price categories (less than \$2) because high price categories include many premium brands for which consumers are less price sensitive. Alternatively, as the higher price category displays more digits, the magnitude of the level effect should be higher and should result in a higher underestimation of 99-ending prices (Thomas & Morwitz, 2005). In line with this last finding established at individual level, we then expect higher preferences for 99-endings in the higher price level category (around €10) than in the lower price level category (around €1). If highly price conscious consumers are likely to choose 99-endings, this effect should be higher when they are exposed to a price of €9.99 than in the case of a price of €9. Indeed, prices with several “9” digits should convey a stronger image than items displaying fewer “9” digits (Schindler, 2001).

Based on the above, we hypothesize the following:

H5. The price level of the category moderates the impact of price consciousness on 99-ending preference so that a higher price (€XX.XX versus €X.XX) increases this effect.

3.2. The moderating role of brand characteristics

As there is an inference between 9-ending prices and low quality products (Schindler, 2006), we expect brand characteristics to be moderators of the 99-ending price effect. Traditionally, in a

narrow view of product segments, consumers are exposed to three types of brands: Premium brands that are less price sensitive, Intermediate brands that offers a good product for value and Private labels which are the cheapest alternatives. When consumers have strong preferences for private labels, they are likely to be highly price conscious. Conversely, consumers with strong preferences for premium brands should be low price conscious. Respectively, the effect of price consciousness on the preference for 99 endings should be reinforced in the case of Private labels and should be weakened for Premium brands. Thus, we expect the following:

H6. The Positioning of the brand (i.e., Premium, Intermediate or Private label) moderates the impact of price consciousness on 99-ending preference so this effect decreases with more expensive brands.

To go further, we examine the moderating effect of brand novelty. Yet, cross-sectional studies show that the increase in demand is stronger for new items (Anderson & Simester, 2003; Macé, 2008). New brands should benefit from the practice of 99-endings since their potential buyers are likely to look for novelty at an affordable price. Thus, the interaction between high price consciousness and strong preferences for new brands should increase the effect of 99-endings. Based on the above, we hypothesize the following relationship:

H7. The novelty of the brand moderates the impact of price consciousness on 99-ending preference so this effect increases with a new brand.

Study Methodology

1. Sample

A choice-based conjoint analysis and its related questionnaire were conducted on-line over a two-week period in February 2009. A total of 318 shoppers were selected across all Spanish geographic zones thanks to the GFK Internet Panel. To qualify for this online study, shoppers needed to pass two filter questions: they needed to be regular shoppers and they needed to have bought either of the two product categories of pasta or detergent. A quota-sampling technique was used to ensure that each age group (i.e. 20-29 / 30-39 / 40-50) and gender was equally represented and assigned at random to one of the two product categories. Finally, 157 persons were assigned to the pasta category and 161 to the detergent category.

The sample characteristics reflected Spain's general population characteristics as underlined in the Spanish National Statistics Institute's latest census (www.ine.es). The median age of the sample was 34.4 years (in a 20-50 range) and it was equally split in terms of the shoppers' gender (Male= 158, Female= 160). Approximately half of the respondents reported an average monthly per capita income of more than €2500 (8.2% from €240 to €1200; 31.4% from €1201 to €2400; 24.2% from €2401 to €3600; 19.5% €3601 and over, "no response" = 16.7%). In addition, the sample was drawn from a relatively high educational background (No schooling = 0.9%, Elementary school= 1.6%, Middle school= 5%, High school= 37.7%, 2 years at College / University= 23.3%, 4 years at College / University= 30.5%, Other= 0.9%).

2. Design

We used a 4 (price presentation: Low anchor, € .99, € .00, High anchor) * 4 (brand characteristics: Premium, Intermediate, Private label, New) between subjects design including two

product categories with respectively 2 price levels (a €X.XX price level for pasta vs. a €XX.XX price level for detergent). The implementation of this experimental design is shown in Figure 2 and explained in the following paragraphs.

[Figure 2 goes around here]

As recommended by previous studies about 9-ending prices (e.g., Bray & Harris, 2006), shoppers were questioned about utilitarian and frequently purchased products that target different age and gender and for which price is an important attribute. Both products, macaroni pasta and powder detergent, belong to the same low price range. Both product categories are typical commodities in the Spanish shopping basket and, according to price checks in several stores during the study period, prices varied from €0.50 to €2 for a 250 gram pack of macaronis and from €7 to €15 for a pack of powder detergent for 40 washloads.

Prices were presented in 4 conditions (Low anchor, €0.99, €1.00, High anchor). First and in line with Thomas and Morwitz (2005), we selected prices displaying left-hand digit differences between odd and even conditions (i.e., €0.99 vs. €1.00 for pasta and €9.99 vs. €10.00 for detergent). Second, to avoid proposing only small price changes which mostly lead to inconclusive results as stated by Schindler and Kibarian (1996), the upper and lower price conditions were set equidistant at more or less 20% from the even price. Thus, in the macaroni pasta category (250 gram pack), prices were set at: €0.80, €0.99, €1.00 and €1.20. To finish with the powder detergent category (pack for 40 uses), prices were set as follows: €8.20, €9.99, €10.00 and €12.80.

To keep the task easy and realistic, we proposed four brand options (Premium, Intermediate, Private label, New). We looked at the GFK panel and we ran pre-tests to select the respective premium and intermediate brands of Barilla and Gallo for the macaronis and Ariel and Elena for the powder detergent. The private label shown to the interviewee was the one available from his/her usual store as indicated in the preliminary questions. New brands with neutral packaging were

designed during brainstorming and pre-test sessions. We called the two brands respectively “El Trigo” (“the wheat”) for the pasta and “Aire” (“Air”) for the detergent.

3. Procedure and measures

Shoppers were selected from the GFK on-line panel according to their age and gender and were assigned to either the pasta or the detergent category.

In a first part, the respondents were asked about the product category (i.e., involvement and price consciousness) and brands (i.e., knowledge and purchase). They indicated their involvement with the product category by responding to four agree-disagree questions elicited on a five-point scale (“I am not at all interested in (...)”, “I do not find (...) pleasurable”, “The (...) I buy doesn’t reflect the kind of person I am”, “It is not a big deal if I make a mistake in choosing (...)”). Respectively, those items reflect the four consumer involvement profiles identified by Laurent and Kapferer (1985): the interest in the product class, the hedonic related value, the symbolic or sign value attributed and the perceived importance and risk of the product class. Although the scale has been developed to capture involvement facets, an overall score of involvement can be used even if it shows a lower reliability ($\alpha=0.64$). Price consciousness, on the other hand, was measured with the scale proposed by Ailawadi, Neslin and Gedenk (2001). Shoppers scored their agreement level from 1 to 5 on three items (“I compare prices of at least a few brands before I choose one”, “I find myself checking the prices even for small items”, “It is important for me to get the best price for the products I buy”). The price consciousness measure was an average of that three-item scale as all the items loaded on to the same factor ($\alpha=0.83$). Then, respondents were asked through mono-item questions about their knowledge and purchase of the four proposed brands. Finally, they indicated their usual brand.

The choice-based conjoint study is implemented in a second part. For each product category, twenty scenarios were displayed with a combination of the four different brands and prices. Respondents had to choose the brand they preferred among those four options. To avoid any reference points bias both prices and brands were presented randomly without any specific order. We proposed, however, two fixed scenarios: the first one displayed the 4 brands with a €.99 ending and the second one displayed the 4 brands with €.00.

After completing the conjoint analysis questions, on-line respondents had to report in a third part on how they made their previous decisions. Especially, we measured the respondent's tendency to have used either an analytical or intuitive mental strategy to choose among the four options. We used the decision style scale of six items original to Mantel and Kardes (1999). However, the reliability for the six items scale was very poor ($\alpha = 0.49$) as the first two reverse items were loading on a second dimension. Therefore, we decided to keep for this scale the last four items that explain more than 50% of the variance with a reliable α indicator of 0.68. The items measured on a Likert five point scale are as follows: "To choose among the options, I tried to use as much attribute information as possible", "I carefully compared the brands on several different attributes", "My decision was based on facts rather than on general impressions and feelings", "My decision was based on careful thinking and reasoning".

Finally, on-line respondents were invited to evaluate the savings with 99-endings on a set of three Likert scales initially developed in the context of promotions by Chandon, Wansink and Laurent (2000). All three items ("I really save money", "I feel that I am getting a good deal", "I really spend less") loaded high on one dimension ($\alpha = 0.89$). Socio-demographics information such as income and education was gathered at the end of the questionnaire.

The multi-items measures are presented in Appendix 1.

Results

To estimate respondents' part-worth utilities (i.e., individual preferences), we applied the CBC/HB (Choice-based Conjoint with Hierarchical Bayes) proposed by Sawtooth Software. In recent years, choice-based conjoint (CBC) has become a prevalent method that performs well with Hierarchical Bayes (HB) procedures allowing for individual-level estimates (Eggers & Sattler, 2009). The descriptive statistics of the brand and price utilities are presented in Appendix 2.

1. Direct effects of CIP and socio-demographics

Table 1 shows that 99-endings preferences are driven by involvement. Looking at the overall involvement score we observe that the preference for 99-ending prices is lower for highly involved consumers ($\beta = -.136, p < .05$). To go further, we measure the impact of each of the four consumer involvement profiles identified by Laurent and Kapferer (1985). Two among the four involvement facets are significant and negatively related to 99-ending utilities. First, the "hedonic" involved consumers, who consider the product category pleasurable, are less likely to choose 99-ending prices ($\beta = -.146, p < .01$). Second, the consumers who attribute a "sign value" to the product category are also less likely to prefer 99-ending price options ($\beta = -.114, p < .05$). In line with H1, those findings suggest that consumers poorly involved (especially for hedonic or symbolic reasons) are less motivated to actively process price information and are, consequently, more likely to rely upon 99-ending prices and use it as a heuristic.

[Table 1 Goes About Here]

In addition, Table 1 shows that age, education and income do not have any significant direct effects on 99-ending prices. H2 is not supported. Still, we can observe an indirect effect of those variables through the mediation of price consciousness. Those findings are presented in the following paragraphs.

2. Indirect effects through the mediation of price consciousness

In order to test the mediation role of price consciousness, we set up two regressions displayed in Table 2. The first column shows the regression scores of the impact of individual variables on price consciousness. In the second column, the findings regarding the impact of price consciousness on 99-ending preference are presented. Finally, the third column shows the results of the Sobel test for mediation.

[Table 2 Goes About Here]

First, we tested the impact of each independent variable (i.e., involvement profiles, age, education, income) on the mediator (i.e., price consciousness). The regression model of the four consumer involvement profiles is significant ($F(4, 318) = 3.025, p < .05$) and only the facet of interest does not affect price consciousness. Consumers who are not involved, because they do not consider the product class pleasurable (i.e., hedonic facet) or important for them (i.e., risk facet), will be more price conscious ($\beta = -.095, p < .05$ and $\beta = -.043, p < .05$, respectively). Interestingly, we observe a positive relationship between the symbolic facet of involvement and price consciousness ($\beta = .05, p < .05$). In addition, the significant predictors of price consciousness are income ($\beta = -.081, p < .05$), education ($\beta = -.128, p < .05$) and to a lesser extent age ($\beta = -.012, p < .10$). As expected, younger shoppers with low education and low income are more price conscious. Therefore, H3 is supported.

Second, we tested H4 by measuring the impact of price consciousness respectively on perceived savings (H4a) and on 99-ending utility (H4b). We observe that the likelihood of considering that 99-endings convey an image of a good deal is higher for highly price conscious consumers. The regression model presented graphically (see Figure 3) shows that highly price conscious consumers are more likely to consider that 99-ending prices make them save money ($\beta = .125, p < .05$). The analytical process of information has a direct impact on

perceived savings ($\beta = .194, p < .001$) and an indirect effect through price consciousness ($\beta = .268, p < .001$). Therefore, H4a is supported.

[Figure 3 Goes About Here]

Results show that price consciousness is statistically significant ($p = .000$) and positively (in average $\beta = .180$) related to 99-ending utility whatever the dependent variable being controlled (see second column in Table 2). Therefore, as expected, the likelihood of choosing the 99-ending option is higher among highly price conscious consumers who are subsequently more likely to consider 99-ending prices as a good deal. Thus, H4b is also supported.

Finally, to properly test the significance of the indirect path, we apply the Sobel test for its robustness in large samples (Baron and Kenny 1986). The results, displayed in the third column of Table 2, indicate that price consciousness is mediating the impact of three profiles of consumer involvement (i.e., Hedonic, Symbolic and Risk) as well as educational background and to a lesser extent income and age. In line with the typology proposed by Zhao, Lynch and Chen (2010), price consciousness is an “indirect-only mediator” between demographics (i.e., Education, Income and Age) and 99-ending choice because their direct effects are not statistically significant. In the case of hedonic and symbolic involvement profiles, the direct effects were significant and negatively related to 99-ending preferences (see Table 1). The indirect effects are also significant but negative for hedonic involvement and positive for symbolic involvement. Respectively, price consciousness is a “complementary mediator” and a “competitive mediator”.

3. Moderation of product category and brand characteristics

To test the intensity of the impact of price consciousness on 99-ending price choice, we test the moderating role of *i*) the price level of the category (i.e. €X.XX for pasta vs. €XX.XX for detergent); *ii*) brand positioning (i.e., preferences for a premium, intermediate or private

label) and *iii*) brand novelty (i.e., preferences for the new brand). According to Baron and Kenny (1986), the moderator hypothesis is supported if the interaction effect of the moderator with price consciousness is significant. All the variables are continuous, except the price level of the category. Thus, we did not dichotomize the variables and we applied regressions as recommended by Fitzsimons (2008) and Irwin and McClelland (2003).

[Table 3 Goes About Here]

The results displayed in Table 3 show that the price level of the product category moderates the influence of price consciousness on 99-ending choice ($\beta = .126, p < .001$). The detergent category, which has two left-hand price digits (i.e., €XX.XX), increases the effect of price consciousness on 99-ending choice compared to the pasta category with only one left-hand price digit (i.e., €X.XX). H5 is supported.

Surprisingly, the brand preference does not have any significant moderating effect except, at $p < 10\%$, for the intermediate brands ($\beta = .019; p = .066$). Consumers with a high preference for intermediate brands increase the effect of price consciousness upon 99-ending choice compared to consumers with a low preference for intermediate brands. H6 is partly supported.

Finally, the findings show no interaction effect of brand novelty ($p = .439$). H7 is not supported.

General Discussion

The paper examined the drivers, mediator and moderators of 99-ending preferences. We proposed that consumers with a low motivation for actively processing information or/and with a low cognitive ability to do so, are more likely to engage in a heuristic process and consequently

should prefer 99-ending options. Alternatively, consumers ought to be less sensitive to 99-endings when they engage in a systematic process because they are motivated to actively process information or/and have the cognitive ability to do so. However, we also argued that shoppers can consciously or unconsciously process price information which then leads them to respectively choose 99-ending options because those prices convey the image of a good deal or because consumers round down the product's real value. In other words, highly price conscious consumers should prefer 99-endings because they associate to those prices the image of a good deal whereas low price conscious consumers are more likely to choose 99-endings because they round down real values. Furthermore, we assumed that the magnitude of the 99-ending price effects depend on product and brand characteristics.

1. Findings

A choice-based conjoint study among 318 shoppers in two utilitarian categories (i.e., macaroni pasta and powder detergent) showed evidence supporting the contention that low involved consumers (especially those with hedonic and symbolic profiles), who are less motivated to process product information actively but are more price conscious are more likely to choose 99-endings. Low educated, low income and younger shoppers who are more price conscious are more likely to choose 99-endings. Therefore, the likelihood of choosing the 99-ending option depends on price consciousness so that highly price conscious consumers are more likely to choose 99-ending options since they interpret such prices as to identify savings. The image of the good deal effect of 99-endings is especially enhanced when prices are higher, e.g., €9.99 versus €99 as well as in the case of Intermediate brands.

Overall, like Baumgartner and Steiner (2007), we argue that consumers are heterogeneous in their preferences for odd (i.e., .99) price endings. To extend on this idea, results show for the first time ever, that *i*) Involvement, and especially its hedonic and symbolic profiles, have direct and

indirect negative effects on 99-ending preferences; *ii*) Education and income only indirectly affect preference for 99-endings through the mediation of price consciousness; *iii*) 99-ending effects are mostly due to a conscious processing of price which means that consumers are more likely to choose the 99-ending option because they consider that it makes them save money; *iv*) 99-ending effects are stronger for the higher price product category and to a lesser extent for Intermediate brands.

2. Theoretical implications

2.1. Consumers' heterogeneity for odd prices preference

Research on 99-ending effects has been mostly conducted at aggregate level and it assumed implicitly that consumers perceive and respond to 99-endings homogeneously. Thus, it could be a major reason for the inconsistency in the empirical studies focusing on 99-endings effects. The contribution of our research is to examine 99-ending preferences at individual level by carrying out a choice based conjoint analysis in line with Baumgartner and Steiner (2007). Yet, contrary to these authors, our conjoint analysis was assigned to a representative sample of shoppers, which allows for applying the test of psychographics (i.e., Consumer Involvement Profiles) and socio-demographics (i.e., Age, Gender, Education and Income) variables. Our results clearly demonstrate that 99-ending preferences depend on individual differences.

The findings that consumer involvement, age, education and income are affecting 99-ending preference extend the scope of previous research. While Baumgartner and Steiner (2007) did not find any significant effect regarding involvement, we measured this concept more sophisticatedly by considering the four profiles of consumer involvement: Interest, Hedonic, Symbolic and Risk (Laurent & Kapferer, 1985). We demonstrated that consumers are more sensitive to 99-endings if they consider that the product category is not pleasurable or is not reflecting the type of person they

are. Thus, we can argue that the consumer's feelings towards a product category (i.e., hedonic and symbolic involvement profiles) reduce the preference for 99-endings. In addition, for the first time ever, we demonstrated that 99-ending prone consumers are younger shoppers with a low education background and low income and that they are more likely to be highly price conscious.

This research also adds to the body of evidence that product and brand characteristics explain the variability in the effects of 99-endings. More specifically, we examined the moderating effects of the price level category (€X.XX for pasta and €XX.XX for detergent) and the preferences for the premium brand, the intermediate brand, the private Label or for a completely new brand. Consistent with Thomas and Morwitz (2005), we observe higher 99-ending preferences for the higher price level category (around €10) than for the lower price level category (around €1). In addition, we argue that €9.99 (vs. €0.99) conveys a strong image that such items are on sale. Surprisingly, our results show that there is no significant impact of brand characteristics on 99-ending preference except for intermediate brands. While previous cross-sectional studies show that the increase in demand is stronger for new items (Anderson, & Simester, 2003; Macé, 2008), we did not find any such effect. And contrary to expectations, 99-ending effects do neither decrease with a premium brand nor increase with a private label. Still, Intermediate brands are more sensitive to the practice of 99-endings.

2.2. Typology of 99-ending effects

Different models and explanations have been proposed to understand 9-ending effects. All of them are based on numerical cognition as in the mostly used analog model proposed by Monroe and Lee (1999) or the inference model proposed by Schindler (2001). They describe how individuals are generally encoding price information and the meaning they give to the practice of 9-ending prices. However, they do not focus on the identification of the individual factors that can affect this encoding and interpretative process even if we know that the motivation and ability of consumers are powerful drivers. When consumers are not motivated or are facing a complex

purchasing task, they often use a mental heuristic to avoid the effort of systematically evaluating brands' differences. We propose that 9-ending prices have an effect on consumer behaviour because it is used as a heuristic by low motivated shoppers who perceive shopping as a complex task.

Furthermore, we assume that consumers can consciously and/or unconsciously use 9-ending prices as a heuristic in their decision-making process. On the one hand, shoppers can unconsciously round down a 9-ending price and thus overestimate its economic advantage compared to a 0-ending price, for instance. On the other hand, they can consciously choose the 9-ending option because they perceive it as a signal of a low price appeal. Those effects, respectively called "level effect" (Thomas, & Morwitz, 2005) and "image effect" (Schindler, 2001) have been clearly but separately identified which does not account for their relative importance. Our research contributes to the literature as it demonstrates that consumers are more likely to choose 99-endings if they are highly price conscious. Thus, the "image of a good deal" effect may be stronger than the "level" effect.

3. Managerial implications

Retailers and manufacturers from Western markets where 9-ending prices are largely adopted should be aware that shoppers do not respond homogeneously to 99-endings. We particularly provide answers to the following questions that managers can raise: Who are the 99-ending prone consumers? How do they perceive 99-ending prices? What are the products and brands that could benefit from this practice?

3.1. The determinants of 99-endings effects

According to the study of the impact of two sets of variables – Individual involvement and demographics, Product category and Brand characteristics – the findings have the following potentially interesting practical implications:

- Nine-endings appear very efficient among consumers low involved with a product category and especially if this category does not provide hedonic or symbolic perceived benefits.

- Low educated and low income shoppers as well as younger adults are more sensitive to 99-endings. However, when retailers and manufacturers want to implement a 99-ending price, they do not need to segment their shoppers according to their gender.

- Retailers could use 99-endings with products more highly priced (around €10 versus around €1). Although both price levels respectively display 99-endings — €9.99 for the €10 product category and €0.99 for the €1 product category, the 99-ending price of €9.99 has a greater impact than in the case of the €0.99 prices.

- Intermediate brand manufacturers should seriously consider using 99-ending prices practice, because the impact of 99-endings is stronger for their brands. Alternatively, to increase the preferences for Premium brands, Private labels or New brands, the use of 9-endings is not particularly relevant.

3.2. Perception of 99-ending prices

Managers should be particularly aware that 9-ending prices have an effect on consumer behaviour because they are used as a heuristic by low motivated shoppers that perceive shopping as a complex task. In particular, consumers that will use 99-endings as a heuristic consciously are more sensitive to 99-endings. When consumers are price conscious they look for the 99-ending option because it conveys the image of a “good deal”. Thus, 99-endings can be used by retailers as a promotional technique. Yet, cross-category scanner panel data (Ngobo et al., 2010) indicate that the likelihood of finding a 99-ending price is greater in highly promotional categories.

4. Limitations and future research

One of the key limitations of this paper is failing to examine how robust the reported results are to shopping markets (e.g., countries or stores) in which 99-endings are not widely used, to product types (e.g., hedonic products, services), and situational variables (e.g., time pressure, complexity of the task) that would probably affect the impact of 9-endings on choice. In addition, further laboratory experiments building on measures reporting on this field study (e.g., cognitive manipulations) would also add evidence for the unconscious and conscious process of price information and the relative weight of the level or image effects of 99-endings. Finally, future research could explore more deeply the promotional image associated to 9-ending prices by looking for the perceived benefits but also the perceived drawbacks of such a promotional practice.

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Figure 1. Conceptual model

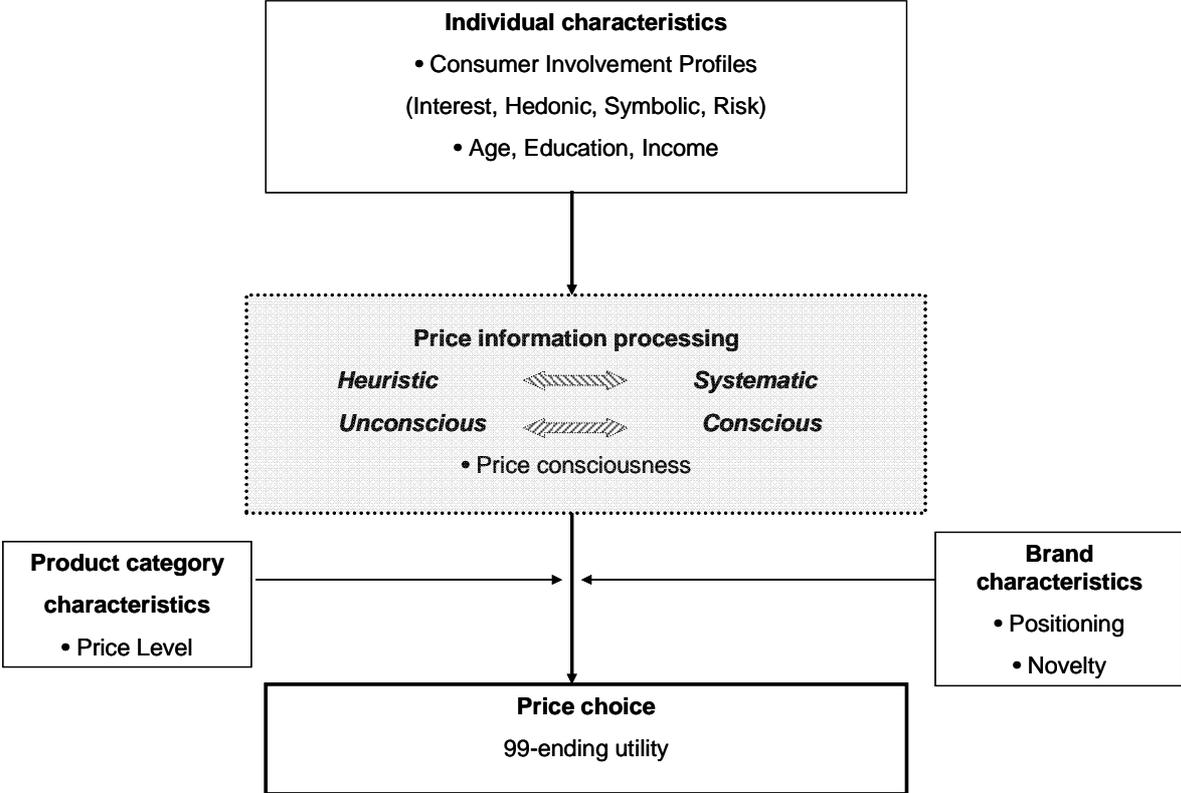


Figure 2. Implementation of the experimental design

€X.XX PRODUCT CATEGORY: Macaronis Pasta 250g				
PRICES	-20%	€0.99	€0.00	+20%
	€0.80	€0.99	€1.00	€1.20
	Premium	Intermediate	Private label	New
BRANDS				

€XX.XX PRODUCT CATEGORY: Powder Detergent 40 uses				
PRICES	-20%	€0.99	€0.00	+20%
	€8.20	€9.99	€10.00	€12.80
	Premium	Intermediate	Private label	New
BRANDS				

Figure 3. Effects of 99-ends related to information processing

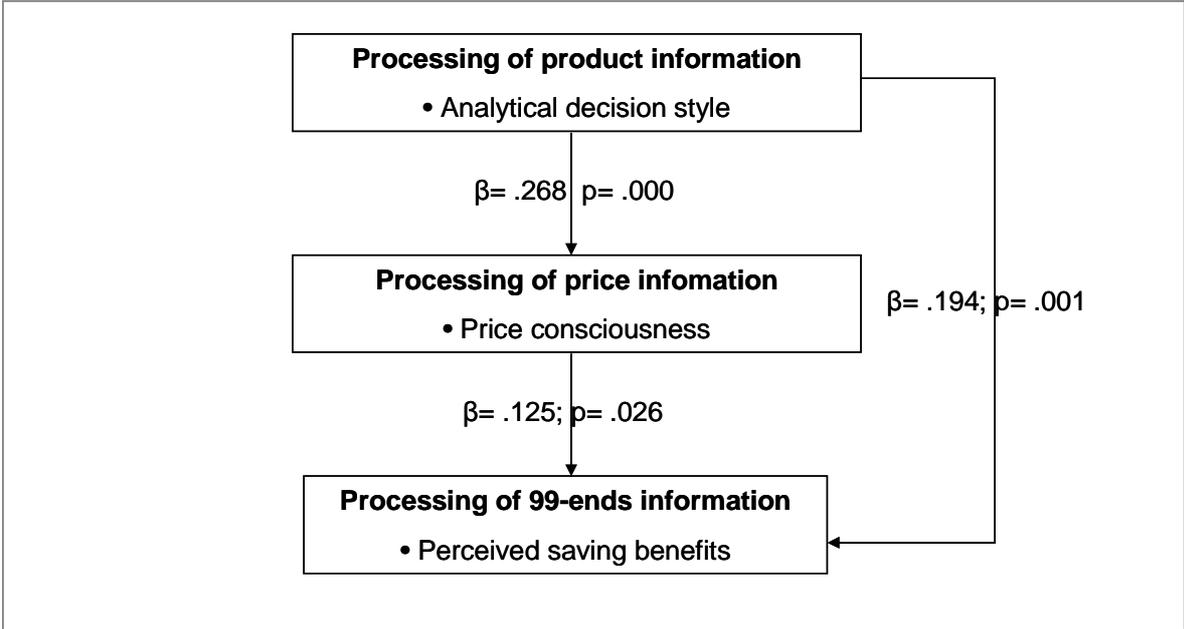


Table 1. Regression scores of the individual drivers of 99-ending utility

	Standardized beta (p-value)
	Overall (n=318)
Overall Consumer Involvement Profile (CIP)	-.136 (.016)**
CIP1 – Interest: Personal interest in the product category	-.078 (.168)
CIP2 – Hedonic: Pleasure associated to the purchase and use of the product category	-.146 (.009)***
CIP3 – Symbolic: The sign value attributed by the consumer to the product class	-.114 (.043)**
CIP4 – Risk: Perceived importance of the consequences of a mispurchase	-.050 (.372)
Age	-.051 (.369)
Education	-.022 (.694)
Income	-.040 (.517)

* $p < .10$
 ** $p < .05$
 *** $p < .01$

Table 2. Estimation of the mediating role of price consciousness

Independent variables (IV)	First regression path (IV*Price consciousness)			Second regression path (Price consciousness*99- ending utility, controlling IV)			Sobel test		
	Raw regression coeff. (a)*	Std. Error (sa)*	Sign.	Raw regression coeff. (b)*	Std. Error (sb)*	Sign.	Test statistic	Std. Error	Sign.
Interest involv.	.061	.039	.118	.181	.036	.000***	1.49	.007	.135
Hedonic involv.	-.095	.039	.015**	.181	.036	.000***	-2.17	.007	.029**
Symbolic involv.	.050	.021	.017**	.181	.036	.000***	2.16	.004	.030**
Risk involv.	-.043	.020	.037**	.181	.036	.000***	-1.97	.004	.048**
Age	-.012	.007	.088*	.179	.036	.000***	-1.62	.001	.105*
Education	-.128	.053	.016**	.182	.036	.000***	-2.18	.010	.029**
Income	-.081	.040	.041**	.170	.041	.000***	-1.82	.007	.068*

N.B.: The Sobel's formula is: $z\text{-value} = a*b/\text{SQRT}(b^2*s_a^2 + a^2*s_b^2)$, with a= raw regression coefficient of the association between IV and mediator; sa= standard error of a; b= raw coefficient for the association between the mediator and the DV (when the IV is also a predictor of the DV); sb= standard error of b.

* $p < .10$
 ** $p < .05$
 *** $p < .01$

Table 3. Estimation of the moderating role of the product category and brand characteristics

Interaction effects on 99-ending utility	Raw regression coeff.	Std. Error	Sign.
Price level * Price consciousness	.126	.023	.000***
Premium brand pref. * Price consciousness.	-.002	.008	.756
Intermediate brand pref. * Price consciousness	.019	.010	.066*
Private Label pref. * Price consciousness	-.010	.010	.351
New brand pref. * Price consciousness	-.012	.015	.439

* $p < .10$
 ** $p < .05$
 *** $p < .01$

Appendix 1. Description of the multi-items measures

Scale	Items	α Cronbach
<p>Consumer Involvement Profiles (CIP) (reduced from Laurent and Kapferer, 1985)</p>	<p>“Concerning products of (...),”</p> <p>CPI1- Interest- “I am not at all interested in (...)”</p> <p>CPI2- Hedonic- “I do not find (...) pleasurable”</p> <p>CPI3- Symbolic- “The (...) I buy doesn’t reflect the person I am”</p> <p>CPI4- Risk- “It is not a big deal if I make a mistake in choosing (...)”</p>	.64
<p>Price consciousness (Ailawadi, Neslin and Gedenk, 2001)</p>	<p>“Concerning products of (...),”</p> <ol style="list-style-type: none"> 1. “I compare prices of at least a few brands before I choose one” 2. “I find myself checking the prices even for small items” 3. “It is important to me to get the best price for the products I buy” 	.83
<p>Cognitive Style (reduced from Mantel and Kardes, 1999)</p>	<p>“In the previous set of questions, how did you choose among the proposed brands?”</p> <ol style="list-style-type: none"> 1. I tried to use as much attribute information as possible 2. I carefully compared the brands on several different attributes 3. My decision was based on facts rather than on general impressions and feelings 4. My decision was based on careful thinking and reasoning 	.69
<p>Saving benefits (adapted from Chandon, Wansink and Laurent, 2000)</p>	<p>“When I buy a product with a 99-ending price”</p> <ol style="list-style-type: none"> 1. “I really save money” 2. “I feel that I am getting a good deal” 3. “I really spend less” 	.89

Appendix 2. Descriptive statistics of brand and price utilities

Utilities Variables	GLOBAL (n=317)		PASTA (n=156)		DETERGENT (n=161)	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Premium brand	3.38	4.24	.89	3.61	5.80	3.29
Intermediate brand	2.55	3.61	4.53	2.82	.63	3.24
New brand	-5.96	2.79	-5.43	2.64	-6.47	2.85
Private Label brand	.029	3.60	.013	2.95	.04	4.14
0.80€ pasta / 8.20€ detergent	5.34	3.41	5.50	3.18	5.17	3.62
0.99 € pasta / 9.99€ detergent	1.24	.66	1.15	.531	1.32	.75
1.00 € pasta / 10.00€ detergent	.433	.86	.56	.425	.310	1.12
1.20 € pasta / 12.80€ detergent	-7.01	3.53	-7.21	3.47	-6.81	3.59