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## Research note

## Nine-ending prices and consumer's behavior: A field study in a restaurant

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## ABSTRACT

The effect of nine-ending prices on customer's behavior was tested in a little restaurant (pizzeria-grill) where 1271 customers who ordered a pizza were observed. A list of nine main dishes was proposed in this restaurant and included five different pizzas. The effect of the price-ending of one pizza was tested. During 2 weeks, all the pizzas were proposed with a round 00-ending price (i.e. 8.00 €) whereas for the other 2 weeks a target-pizza was proposed with a nine-ending price (i.e. 7.99 €) whereas the four other were proposed with a round 00-ending price. A last, a third 2 weeks period was tested where all the pizzas were proposed with a nine-ending price. Results showed that an increase in the choice of the target-pizza by the customers was observed when the price of this item was a nine-ending price and the prices of the other items ended with zero. No difference in the choice of the target-pizza was observed when all the items were presented with the same type of ending (9 or 0).

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The effect of prices which end with nine (e.g., \$29.99 rather than \$30.00) on consumer's behavior has been studied long time ago. However, most reports have only been anecdotal (Anderson and Simester, 2003). Schindler and Kibarian (1996) through the cooperation of a direct-mail women's clothing retailer, had conducted a well-controlled experiment testing the sales effect of using retail prices that end in the digits 99 rather than 00. The results indicated that the use of 99 endings led to increase the total amount of money spent by the customers.

To date some studies had examined the effect of price ending in restaurant operations. Kreul (1982) suggested that the use of psychological prices including nine-ending prices is quite common in the food-service industry and found that these prices were not irrational. Naipaul and Parsa (2001) found that menu price endings communicate value and quality where prices ending in 0 are linked with overall quality, while prices ending in 9 are linked with overall value. Recently, Hu et al. (2006) compared prices from restaurants menus in Europe, USA and Taiwan and found a more important use of digit zero in Europe. For the authors, this effect is perhaps explained because dining out is considered more as a cultural activity than as a utilitarian participation. Research also found that menu-items become more attractive when their prices ended with nine. Schindler and Warren (1988) gave to students a menu containing six headings (appetizers, soups, salads...). For each

heading, various food items were proposed and were associated with a nine-ending price (\$4.99) or a zero-ending price (\$5.00). The participants were instructed to make choice for a diner. The results showed a greater likelihood of choosing a particular item when that item had a nine-ending price than a zero-ending price. This study provides clear evidence that pricing an item just below a round number can increase its likelihood of being chosen. Thus we could conclude that nine-ending price were more attractive or led the participant to pay more attention to this item. Attractiveness or attention which led, in return, to increase the probability to choose the item. Despite the interest of such results, these data need some replication and generalization in a real context. So an experiment was carried out in a restaurant where the effect of an item with a nine-ending price mixed with zero-ending price was tested. According to Schindler and Warren (1988), we hypothesized that customers in a restaurant will show a greater likelihood of choosing a menu-item that is priced with nine-ending than with zero-ending.

## 1. Method

### 1.1. Participants

One thousand and two hundred seventy-one patrons of a little pizzeria-grill situated in a small town (2000 inhabitants) of Brittany in France. The restaurant where the experiment was carried was very small (22 place settings) and proposed a small choice of dishes (5 pizzas, 4 meats, 3 fishes and 4 salads).

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## 1.2. Procedure

Before beginning the experiment, an evaluation of the customers' consumption was done to determine an item that will be used to evaluate the effect of the ending price. One pizza was selected because it was found that, in this restaurant, pizzas were the item that was selected by the majority of patrons (more than 50%) whereas the others selected meats or fishes equally. The pizza selected that was called "Pizza Valencenia" was the second preferred (preference evaluated by the rate of consumption before performing the experiment) pizza of the customers. In order to test the effect of the ending price for this item, three menus were constructed. In the first menu all the items used zero-ending prices. The "item target" was proposed at 8.00 €. In the second menu, all but one (the item target) was proposed with a zero-ending price whereas the "item-target" was proposed at 7.99 €. In the third menu all the items used nine-ending prices. This later menu was the menu usually used in the restaurant. Each menu was used during 14 consecutive days: the first menu during weeks 1–2, the second menu during weeks 3–4 and the third menu during weeks 5–6. This method was employed because it was not possible legally to use different menus during the same period. It is legally possible to change the price of the items but it is against the law to use different prices for different customers at the same time.

## 2. Results

The only dependant variable in this experiment was the number of choice of the target-item in the three conditions. These choices were all presented in Table 1.

Before comparing the number of choices, a Chi-square goodness of fit was done among the numbers of patrons in the three experimental conditions. A statistical difference was found between the three groups ( $\chi^2(2, N = 1271) = 23.59, p < .001$ ). This difference was certainly explained by the fact that during the second and the third period, three official holidays occurred whereas non-official holiday occurred in the first period. So given the difference among the number of patrons in the three experimental condition this aspect was controlled.

Among all the patrons observed, a general difference in the three conditions was found in the choice of the target-item ( $\chi^2(2, N = 1271) = 12.1, p < .005$ ). Two by two comparisons revealed a significant difference between the menu 1 and the menu 2 ( $\chi^2(1, N = 900) = 11.1, p < .001, r = .11$ ) and between the menu 2 and the menu 3 was also found ( $\chi^2(1, N = 767) = 5.74, p < .02, r = .09$ ) whereas non-statistical difference between the menu 1 and the menu 3 was found ( $\chi^2(1, N = 875) = 0.52, ns, r = .02$ ).

In order to test the effect of the item-target on the choice of the categorical items proposed in the restaurant (pizzas versus other items) a Chi-square test for contingency tables was done (lines number 1 and two in Table 1). The general difference appeared to be non-significant ( $\chi^2(2, N = 1271) = 1.14, ns$ ). Two by two

comparisons showed that non-significant difference was found between the menu 1 and the menu 2 ( $\chi^2(1, N = 900) = 0.97, ns, r = .03$ ), the menu 2 and the menu 3 ( $\chi^2(1, N = 767) = 0.25, ns, r = .01$ ) and the menu 1 and the menu 3 was found ( $\chi^2(1, N = 875) = 0.64, ns, r = .03$ ). Such non-significant differences would confirm that the price of the item-target was associated with variation of choice between the groups of patrons who ordered a pizza. Such effect is confirmed by data analysis. Between all the patrons who ordered a pizza, a general difference (lines 2 and 3 in Table 1) in the three conditions was found in the choice of the target-item ( $\chi^2(2, N = 636) = 12.3, p < .005$ ). Two by two comparisons showed a significant difference between the menu 1 and the menu 2 ( $\chi^2(1, N = 447) = 10.6, p < .002, r = .16$ ) and between the menu 2 and the menu 3 ( $\chi^2(1, N = 393) = 7.33, p < .01, r = .14$ ). As in the previous comparison, no statistical difference between the menu 1 and the menu 3 was found ( $\chi^2(1, N = 432) = 0.13, ns, r = .02$ ).

## 3. Discussion

In this experiment, it was found that patrons in a restaurant show a greater likelihood of choosing a menu-item that is priced with nine-ending than with zero-ending. Furthermore, the effect is not explained by nine-ending price in isolation. Indeed, the effect of nine-ending prices is observed only when one-item had a nine-ending price whereas the other items were presented with zero-ending prices. Then it appears that, perhaps, a nine-ending price item became more distinctive when it is mixed with zero-ending prices. These results are clearly congruent with the data obtained by Schindler and Warren (1988) who found in a laboratory study that menu items associated with nine-ending prices mixed with zero-ending prices increased the likelihood to choose the items with nine-ending prices. Our experiment confirms these first results in a field setting and with real customers. In Schindler and Warren's study it was found that the effect of nine-ending prices was not explained by an artifact effect of the menu-item because each item associated with a nine-ending price or a zero-ending price was counterbalanced according to participants. For legal reasons evoked above, it was not possible to use this methodology here. Furthermore, it was clearly found that if the item-target had a price that was not different than the other items, it was chosen in the same proportion (experimental conditions 1 and 3). It was also found that when all the pizzas have nine-ending prices, this category of dishes did not become more attractive for the patrons. Indeed, in our experiment, it was found that the proportion of patrons who ordered a pizza was constant in the three experimental conditions. More interesting when all the pizzas have a nine-ending price and then the items of the other categories (fishes, meats) have zero-ending prices (experimental condition 3) no difference was found. Then it is possible that nine-ending price could not influence the choice of the category of items but could influence the choice of one-item within one category. The effect

**Table 1**  
Choice of the targets items by the patrons in the three experimental conditions

	Menu 1: All the items of the menu with zero-ending price	Menu 2: Target-item with nine-ending and other items with zero-ending price	Menu 3: All the items of the menu with nine-ending price
Number of patrons observed ( $N = 1271$ )	504	396	371
Numbers of patrons who ordered a pizza ( $N = 636$ )	243	204	189
Numbers of patrons who ordered the target-item ( $N = 252$ )	83	101	68
Rate of patrons who ordered the target item among patrons who ordered a pizza (in %)	34.15%	49.50%	35.98%
Rate of patrons who ordered the target item between the number of patrons observed (in %)	16.47%	25.51%	18.32%

observed in the second experimental condition and the absence of effect in the third condition was clearly congruent with this later affirmation. Perhaps the absence of change in the third experimental condition is only explained by the fact that customers, when entering in the restaurant, have the intent to order a pizza but with no certainty about their choice within this category of product.

Our results could be explained by the underestimation mechanism (Schindler and Wiman, 1989). According to this mechanism, consumers pay less attention to the end of the price. In our experiment according less attention to the end of the price in the nine-ending price led the subject to underestimate the price of the item-target (7.99 € becoming 7.00 €) whereas this mechanism could not be activate in the case of zero-ending price (8.00 € becoming ... 8.00 €). By the ways of such cognitive mechanism, this item becoming more interesting financially and then, in return, the likelihood of being ordered increased. Then the effect of

the nine-ending price is perhaps not only explained by “.99” per se but by the change in the left most digit changing from 8 to 7.

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