

# **The effect of price-ending on luxury and necessity**

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By  
Chen Chen Zheng

University of Canterbury,  
Christchurch, New Zealand

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## **Abstract**

The purpose of this study is to see whether price endings affect people's perceptions of luxury and necessity goods. There is evidence that the rightmost digits, or endings, of retail prices can communicate meanings to consumers. Some researchers (Schindler and Kirby, 1997; Stiving and Winer, 1997; Thomas and Morwitz, 2005) argued that there are two price ending effects level effects (those effects in which consumers may underestimate the price); and image effects (those effects in which consumers may infer meaning from the right-hand digits). In the study, ninety-three participants were recruited from the University of Canterbury, Christchurch, New Zealand. All participants were given questionnaires to rate the quality and necessity-luxury of the good first; then a distraction session which used for distracting participants' attention from memorizing the prices of the goods; then a recall-test was given. Participants gave significantly different ratings for luxuries and necessities according to the different price-endings. In addition, the idea that the prices ending in 9 tend to be underestimated was also found.

## Introduction

The relationship between price presentation and value communication is complex. The role of the price in the purchasing process is, at the same time, paramount (i.e., it is defined in economic theory as the principal rational decision factor) and complex, in that subjective aspects of price perception are determined by purchasers (Guéguen and Legohérel, 2004). Both managerial insight and academic research suggest that consumers may be sensitive to the final digits of prices. A number of studies have illustrated the common observation that certain digits are more likely than others to appear as the rightmost digit, or “ending”, of an advertised price. In particular, the digits 9, 0, and 5 have been found to occur as the rightmost digit of a price, also referred to as the price’s ending, much more often than chance would predict (Schindler & Kirby, 1997). Some prior studies (Stiving and Winer, 1997; Schindler and Kirby, 1997; Folkertsma, 2002) have indicated that the number “9” occurs as the right-most digit of the price in about 30 percent of prices, the number “0” in about 25 percent of prices, and the number “5” in about 15 percent of prices.

The practice of ending prices with these specific digits is common around the world. The popular practice of “odd” pricing referring to communicating prices using numbers slightly below round values (e.g., \$3.99) has been a pricing tactic in a variety of markets for over 70 years (Ginzberg, 1936). This form of pricing is often contrasted with “even” pricing in which prices are communicated using round numbers, typically with zero endings (e.g., \$4.00). Some researchers have addressed this prevalent

practice from the perspective of consumer behaviour and have argued that there are two effects contributing to the use of particular price endings: level effects; and image effects (Stiving & Winer, 1997; Tohmas & Morwitz 2005). Most studies focus on how consumers process the price information (e.g., from left to right), and are not concerned with how the producing or distributing firm might be perceived (Coulter, 2001). On the other hand, image effects are concerned with consumers' perceptions of the (Schindler, 2001).

Image effect researchers have produced some interesting concepts and theories to explain their findings. For example, the digit "0" is the easiest number to remember and thus creates a positive image as well as being a reference point for other price endings. The digit "9" may be perceived as an indication of a less valuable good (e.g., "lower price", "discount price", and "low quality" etc) (e.g., Schindler 2001; Schindler & Kirby, 1997). There is recent evidence from field studies that meanings or other factors specific to a particular price ending can have substantial effects on consumer sales (Anderson and Simester 2003; Kalyanam and Shively 1998).

The mechanism by which a price's ending can become meaningful to consumers is not entirely clear. Pricing research has shown that the level of a price can communicate meaning to consumers, for example, a high price can communicate that the offered item is of high quality (e.g., Dodds et al. 1991; Rao and Monroe 1989). This appears to be at least partially due to consumers learning that higher quality items generally tend to be sold at higher prices (e.g., Lichtenstein and Burton 1989; Riesz 1978; Sproles 1977). In other words, consumers may have learned this price-level meaning from their

observations of the association between price and quality that exists in the marketplace.

One objective of this paper was to explore how the price's ending related to people's perception of luxury & necessity goods. According to previous research, odd prices communicate an image of low-price and low-quality; I wanted to see whether different price endings would have different effects on how people perceive both luxury and necessity goods. Firstly, I would like to address the following issues:

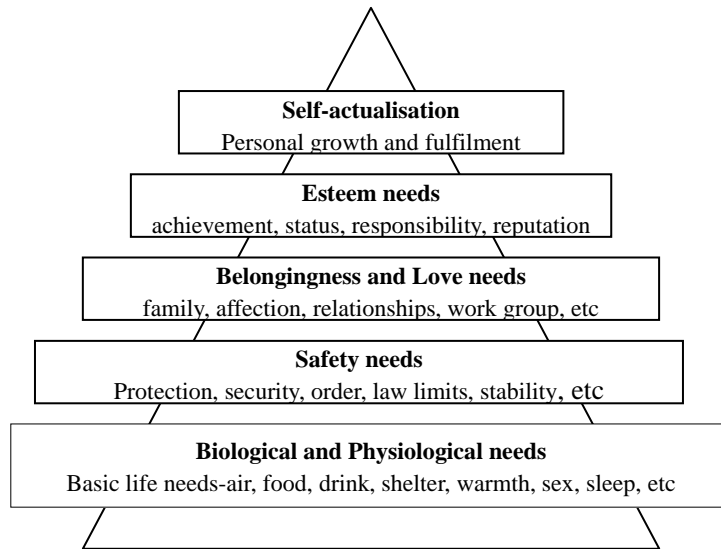
1. The definition of luxury goods and necessity goods;
2. The definition of quality;
3. Do certain price endings (particularly "99" and "00") have specific image effects ?

### **Definition of Luxuries and Necessities**

What is luxury or necessity? There is probably no good that we can say is a necessity or a luxury for all of the people in the world. The most influential psychological theory in the area probably comes from Maslow (1970), who proposed a hierarchy of needs, ranging from basic physiological needs such as food and warmth to needs of self-actualisation (see Diagram 1 below). According to Maslow's theory, lower-level needs must be satisfied before those on the next level become important sources of motivation. One possibility arising from the theory is that different goods which are used in different stage could be ordered on a necessity-luxury continuum.

#### **Diagram 1: Maslow's Hierarchy of Needs (original five-stage model)**





A distinction between a luxury and a necessity can also be made in terms of demand elasticity. The basic principle of elasticity is that demand for some (elastic) goods may be quite heavily affected by price or income changes, while that for other (inelastic) goods is relatively little affected. For example, if the price of potato per kg increased, this will not have much effect on the demand; whereas if the price of real estate (e.g., a house) increased, then it may lead a decrease in demand, e.g., people would rather rent a house than buy a house. For the price elasticity of demand (e.g., Lipsey, 1989), when the prices of necessities rise, the quantity purchased declines relatively little; but purchases of the more dispensable luxuries decline more sharply with price rise. For the income elasticity of demand (e.g., Deaton and Muellbauer, 1980; Lancaster, 1971), the proportion of people spent on luxury goods rises as those people's income rises. For example, some people, especially women, will buy more branded clothes if their income increased.

Berry (1994) attempted both a conceptual analysis of luxury and a historical survey

of attitudes to it. Berry suggested that the status of a good as luxury is partially determined by its natural desirability, and not simply by whether it is an object for conspicuous consumption. He also claimed that a characteristic of luxuries is that they please people rather than simply alleviate a state of discomfort. This basic premise is complicated by other considerations. The perception of what is necessity and what is luxury does vary from society to society, despite the apparently constant nature of basic human needs. Moreover, although the status of goods as luxuries is partly determined by social perception, it is possible for different people to disagree as to whether particular commodities are luxuries or necessities.

Kemp (1998) conducted three experiments to test different theoretical accounts of luxury, which were based on Lipsey (1989) and Berry (1994)'s ideas. His findings were consistent with both the elasticity theory and Berry's conceptual analysis of luxury. Goods perceived as luxuries were also those most likely to be less frequently purchased if the price doubled (Kemp, 1998). For example, if the price of a ticket to go to a concert is doubled, then we may change to buy a CD. Moreover, Kemp's findings suggested the idea of luxury is not simply a matter of personal taste; it is influenced by social values and the preferences of the individual.

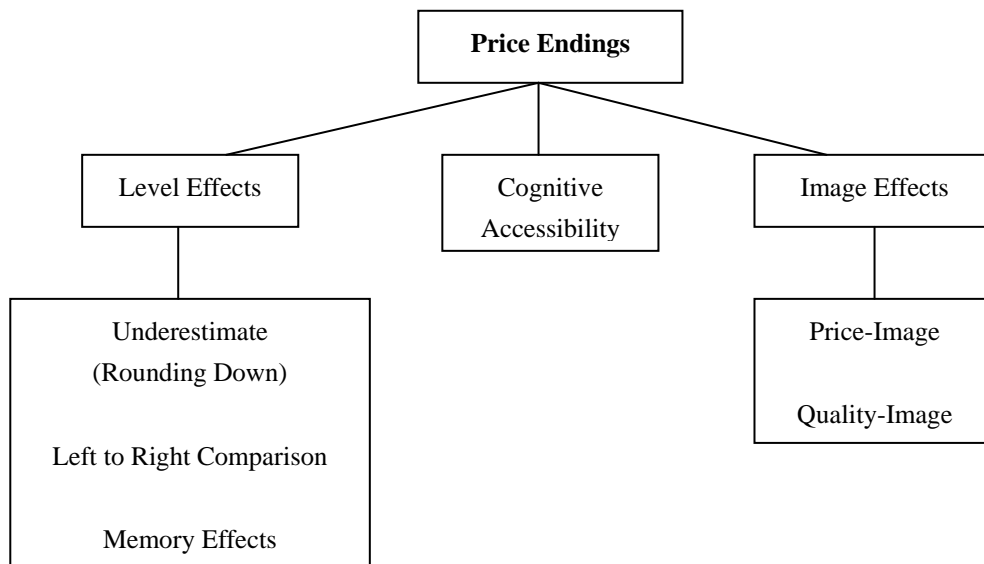
### **Definition of Quality:**

What do we mean by quality? A formal definition is "Originally, in early forms for structuralism, a basic attribute of a sensation, an aspect of a thing that enabled it to be distinguished from other things" (p593. Reber & Reber, 2001), and the degree of

goodness or worth. However, “quality” seems to be ubiquitous term used to describe everything under the sun. In this article, the definition of quality will be based on the idea that quality means fulfilling the customer’s requirements and expectations. It is also important to bear in mind that quality standards must sometimes be set to meet legal requirements.

### **Price-Ending Effects:**

Some empirical studies (Lambert, 1975; Schindler and Kibarian, 1996; Stiving and Winer, 1997) have tested the importance of level effects, cognitive accessibility, and image effects. The results indicate that consumers do not consider prices as a whole. Instead, price endings play an important role in consumer choice. However, there is no clear evidence about which of these effects are the most important: level effects, the cognitive accessibility of prices, or image effects.



## **Level effect**

### *Underestimation:*

The original and most common explanation for underestimating a price like \$3.99 is that consumers tend to round prices down (Alpert 1970; Georgoff 1972; Lambert 1975; Schindler 1984; Schindler and Warren 1988). For example, they may round \$3.99 to \$3.00, or maybe to \$3.00 and some change. Schindler and Kibarian (1993) attempted to demonstrate this phenomenon using consumers' recall of prices shortly after they observed the actual price, both in a laboratory setting and at a major supermarket. They expected to find significantly more underestimation in the recall of prices ending in 9 than in the recall of other prices, but no conclusive underestimation was found in either circumstance. If consumers do round down prices, firms would have a great incentive to use odd prices (that is prices just below a round number), providing an explanation for the observed price endings. For example, consumers would round down both \$0.61 and \$0.69 prices to simply \$0.60. Since the demand for the good would then be the same for both prices, the firm would obviously select \$0.69 in order to maximize their profit.

### *Left-to-right Comparison:*

Left-to-right comparison, another proposed explanation for the level effect, concerns the direct comparison of two numbers. Monroe (1979) has provided evidence that consumers tend to compare two numbers by considering the digits from left to right. (This is discussed by Nagle, 1987). In some research papers, the left-to-right comparison is also called a left-digit effect (Thomas & Morwitz 2005) and it refers to

the observation that using a nine ending versus a zero ending, for example, \$3.99 versus \$4.00, changes the leftmost digit (i.e., the dollar digit changes from three to four). In this view, it is the change to the left digit, rather than the one cent price drop, that affects the price magnitude perception.

Stiving and Winer (1997) used scanner panel datasets for tuna and yogurt to demonstrate the effects of left-to-right processing of numbers. They found the left digit exerted a stronger influence than the right digits in price evaluation. The study also included the additional effect of 9, 0 and all other price endings in consumer choice models. For both products, it was noted that consumers paid more attention to the dime (i.e., ten cent) portion of a price than the penny portion of the same price. They (Stiving & Winer 1997) also noted that 9-endings resulted in higher sales for both products than all other digits, while the effect of 0-endings gave higher sales than the remaining (1 to 8) digits to yogurt category only.

Liang and Kanetkar (2006) did a study based on a discrete choice experiment where consumers responded to two-digit prices. Their findings were consistent with those of Stiving and Winer's (1997). The results indicated that consumers process the price separately as left and right digits rather than holistically.

Left-to-right comparison can be considered as a modified version of rounding down (Stiving & Winer, 1997). The consumer behaviour explanations for rounding down and left-to-right comparison may not seem similar. However, they are actually closely related. When the left-hand digits are different, left-to-right comparison and rounding down are indistinguishable, yielding identical results. However, when the

left-hand digits are the same, rounding down makes no statement about which price a consumer may prefer, while left-to-right comparison does.

*Limited Memory Capacity:*

Another explanation for the level effect is based on the limited memory capacity of humans (Brenner and Brenner, 1982). An early study on numerical cognition (Hinrichs and Novick, 1982) has found that when subjects were presented with a multi-digit number, there was generally poorer retention of interior numbers in a sequence relative to the end numbers. In the other words, digits at the beginning and end of a list were recalled most accurately, and digits from the middle of the list were less likely to be recalled. However, the results were different in the pricing context. Because of the cognitive costs of processing price information, customers may not encode some of the rightmost digits (Schindler and Wiman, 1989; Schindler and Kirby, 1997). Since consumers are continuously barraged with information, including prices and other numbers, they most likely remember only the first digits of a price. So when subjects were asked to recalled a multi-digit price, the left digits receive more attention than the right digits. Consequently, recall accuracy should decrease from left to right. For example, when consumers see \$14.99, they may only remember the “14”.

Schindler and Wiman (1989) proposed that during recall of numbers in which only the left-hand digits were remembered, consumers may guess what they think is most likely for the right-hand digits. However, they did not find an overall difference between 9- and 0-ending prices in the level of the mean recalled price. In a subsequent

price recall study, Schindler and Kibarian (1993) found that consumers often recall 9s for digits whose actual values were lower than 9s. However again, they did not observe a statistically significant overall difference between 9- and 0-ending prices in mean level of price recall.

Schindler and Chandrashekar (2004) found results which supported Schindler and Wiman's findings (1989). That is, price recall processes proceed from left to right; and they also reported that the level of price-ending digits affects price recall. That is, prices with a low (1 or 2) ones-of-dollars digit were recalled as higher than prices with the ones-of-dollar digits equal to 6, 7, or 9, which is consistent with Liang and Kanetkar's findings (2006).

### **Cognitive Accessibility**

The ease with which a mental unit is retrieved from memory has been termed its "availability" (Tversky and Kahneman 1973) or its "accessibility" (e.g., Fazio et al. 1982; Higgins et al. 1977). The concept of accessibility is important because if a mental representation comes to mind more easily, then the representation is likely to be used in thought more frequently. Studies that require respondents to generate numbers clearly point to 0-ending numbers as having greater cognitive accessibility (e.g., Hornik et al. 1994; Hultsman et al. 1989)

The high cognitive accessibility of round numbers that helps account for the overrepresentation even price also suggests the reason for the overrepresentation of odd prices. If round numbers are indeed highly accessible in memory, then they may

ten to serve as reference points in the consumer's price evaluations (Schindler & Kirby 1997). Such use of round numbers as reference points might lead the consumer to perceive the odd price as indicating that the retailer is giving a small amount back to the consumer (e.g., Kreul 1982). For example, a consumer might interpret a price such as \$39 as involving a \$1 discount from \$30.

### **Image Effect**

Several possible meanings implied by price endings have been proposed (see Schindler [1991] for a review). These can be further categorized into two topics: price image and quality image. In these, consumers pay more attention to the rightmost digits because of the non-price information that they convey. This contrasts with the customer's emphasis on the left-most digits in the level effect. The different price images or meanings that have been attached to prices that end in 99 or 9 include assumptions that the product is on sale (Berman & Evans 1992; Schindler and Warren, 1988), or that the price has been reduced, or discounted. For example, Salmon and Ortmeyer (1993) describe a department store that uses a 0-cent ending for regularly priced items and 98-endings for clearance items.

#### *Price-Image*

An abundance of support has accumulated for the price-image effect. Statistically significant results have been found that support several claims: Schindler (1984) obtained evidence that a 99-ending price communicates a low-price image. Respondents were asked whether or not a price they had seen two days ago had been



increased. By systematically varying the ending of the previously seen price, Schindler found that respondents' guessing strategies indicated a bias toward assuming that prices with 99 or 98 endings were less likely to have increased than prices with 00 endings. The results showed a tendency for the bias to be stronger for 99 endings than for 98 endings, but the difference between these two endings was not statistically significant.

Quigley and Notarantonio (1992) asked consumers to rate the image of items priced either with 00-endings or with the 99 or 98 endings (one or two pennies lower). They found that a price was more likely to be judged a discount price when it was seen with the 99 or 98 endings than if it had been seen with the 00 ending. Quigley and Notarantonio reported no statistically significant difference between the image effects of the 99 and the 98 endings.

Schindler and Kibarian (1998) presented consumers with price advertisements altered so that one version appeared with a 00-ending price and the other version appeared with the 99-ending price one penny lower (e.g., \$50.00 versus \$49.99). Their findings are consistent with Quigley and Notarantonio's (1992), that consumers were more likely to judge the advertisements with the 99-ending price as being "on sale". In addition, Schindler and Kibarian found that the use of the 99-ending increased their respondents' impressions that consumers would be unable to find this particular item "at a price lower than this advertised price".

These results are consistent with the explanation that price endings of 99 indicate a good deal. Note that these results are not consistent with any of the level effects

described above, as none of the level effects offer an explanation for a higher price, \$0.99, yielding a higher demand than a lower price, \$0.88. This does not mean that level effects do not exist, only that, in the context of this study, the image effects were strong enough to be noticed over and above any level effects.

*Quality-image:*

With many products in the traditional market, it is difficult for consumers to observe quality even at the time of purchase, because they are imperfectly informed about the product or store characteristics (Stiglitz, 1987). Rao and Monroe (1989) observed that consumers might use prices as a cue for assessing quality. Image effect transmits signals that enable consumers to infer something (in terms of “images”) about the product or store based on the rightmost digits of the price (Stiving and Winer, 1997). The quality images proposed include assumptions that \$9-ending prices indicate low-quality and \$0-ending prices (and perhaps \$5-ending prices) imply high quality (Stiving, 2000).

Schindler and Kibarian (1993) attempted to demonstrate the quality-image effects in even prices (i.e., an even price is used to described pricing with round numbers, typically represented by a price ending of zero [see, e.g., Georgoff 1972; Lambert 1975; Moroe 1979; Stiving and Winer 1997]), but found insignificant results when looking for differences in the following areas: the overall quality of the product being advertised, the quality of the other items in the store, and the image of the store itself. An additional justification for consumers associating an even price with higher quality is that, if consumers associate high prices with high quality and higher prices tend to be

even, then consumers could learn that even prices are indicators of higher quality.

Stiving (2000) collected prices from 12 department stores for 30 product categories. The study reported that higher-end stores were more likely to use round prices than lower-priced stores. Moreover, firms do seem to set higher prices with round numbers, especially within product categories where it is most likely that they are using price to signal quality.

Another study by Schindler and Kibarian (2001) investigated the image of products that have 99- or 0-endings. The study reported that products with 99-ending prices were perceived as having lower prices and lower quality compared with the same products with 0-ending prices. Similar results were also reported by Gueguen and Legohérel (2004).

Anderson and Simister (2003) showed that 9-prices have an impact on demand. They conducted three experiments with mail-order companies that sell moderately priced women's clothing. The result was that 9-ending prices increased demand. They also found that the effect on demand was stronger for new items and weaker when the retailer used a "Sale" sign. They conclude that these findings support the view that image effects dominate over level effects.

It is relevant to note that almost all image-effect studies concern the digits 0 and 9, the two most commonly used price endings. The digit 0 has been suggested as a signal of higher quality, presumably enhancing the desirability of a product. The digit 9 has been proposed as both a signal of lower quality and a signal of a good price, confounding any a priori predictions of the digit 9 as an image effect.

A question could then be asked. If the 99-ending price communicates a favourable price image, then it can increase sales; and if the 99-ending price communicates an unfavourable quality image then it can decrease sales. Note, too, that most previous research showed that the use of the 99-ending price (as opposed to the 00 ending) can substantially increase sales (e.g., Kalyanam and Shively 1998; Schindler and Kibarian 1996). How then can we derive any meaningful prediction in a particular instance? Schindler and Kibarian (2001) answered as follows. The pattern of both favourable and unfavourable 99-ending image effects suggests that a retailer without a particularly high-quality image could expect the use of the 99-ending to have positive results. It would communicate the impression that the price is low and has been discounted, without a counteracting unfavourable effect on quality impressions. However, for a retailer with a high-quality image, the positive price-image effects of the 99-ending are likely to be neutralized, or even be exceeded, by a negative effect on the quality impression.

### **The Present Study:**

The literature provides a number of useful generalizations about price endings. The conclusion to be drawn from the current literature is: yes, 99-ending price is an important pricing strategy. However, most of the previous researches have focused on why the rightmost digit(s) of prices of 00- and 99-ending prices are so prevalent, and what effects these 00- & 99-ending prices have. We expand the perspective beyond the rightmost digit(s) to examine if the rightmost digits of prices (i.e., price-endings)

would have any effect on luxury and necessity perception.

A main purpose of this study was to analyse whether the price-ending would have effects on whether a good was perceived as a luxury or a necessity. In other words, is the even price a signal for a luxury good, and an odd price a signal for a necessity good? One can ask a similar question about the perceived quality of the good. The study will also look at (i) if the different price-endings affect the recalled accuracy of the prices; (ii) if there is a level effect; (iii) and the correlation between the quality and whether the good is perceived as a luxury or necessity. However, since we do not have a very clear definition of what necessity goods and luxury goods are, the research began by first generating a list of luxuries and necessity goods.

I hypothesized as follow:

*H1*: The odd price is more likely to be perceived as a price for a lower-quality good than an even price is.

*H2*: The odd price is more likely to be perceived as a price for a necessity good; while the even price is more likely to be perceived as a price for a luxury good.

*H3*: The even prices are recalled better than the odd prices.

*H4*: The first digit of the price is recalled better than the last digit of the price.

*H5*: There are relationships between the ratings of luxury-necessity and quality scale and the recalled price-endings.

## Method

### *Questionnaire Design:*

Sixty students, who were studying at the University of Canterbury, Christchurch, New Zealand, participated in a survey voluntarily, after giving their informed consent. These sixty students were simply asked to list 10 necessity-goods and 10 luxury-goods within the price range of \$0.00 to \$999.99. The most frequently chosen goods nominated from the 60 surveys combined with some of the goods used in Kemp's (1998) study were used to generate a new list, which contained 13 necessity goods and 13 luxury goods. This list was used in the main study. A feature of the list was that each of the 13 necessity goods was paired with one of the 13 luxury goods (see Table 1).

**Table 1:** Thirteen necessity goods and thirteen luxury goods in the main study questionnaires.

<b>Necessity/Ordinary Goods</b>	<b>Luxury Goods</b>
1. Milk (1L)	Fresh Squeezed Orange Juice (1L)
2. A Loaf of Bread	A Piece of Cheese Cake
3. Internet (per hour) Set	Encyclopaedia Britannica First Edition Replica
4. Bic Biro Pen	Sheaffer Valor Black G/T Ballpoint Pen
5. Colby Cheese (1kg)	Puhoi Parmesan Cheese (1kg)
6. Normal Toothbrush	Electronic Toothbrush
7. Sausages Beef Flavoured (per kg)	Premium Eye Fillet Steak (per kg)
8. Deodorant	Perfume (50ml)
9. A can of CD Beer	93-Hennessy XO Cognac, France 750ml
10. Fish & Chips for Lunch	Buffet for Lunch
11. Warehouse Purse	Louis Vuitton Purse
12. Prescription Glasses	Gucci Sunglasses
13. LG 15" Flatron flat Screen TV	LG 15" LCD TV

After the lists of goods had been decided, the price of each good was also determined through the internet and by visiting supermarkets. Each of the 26 goods was assigned two prices. One was the “odd price” which means a price just below a round number. (In this study, one good had an odd price ending with -89, one with -98, and one with -49; Four goods had endings of -95; and the remaining 19 goods had 99-ending prices). The other price was called the “even price”, that describes pricing in round numbers, typically represented by a price ending of zero. In this study 25 out of the 26 goods ended in -00, and one ended in -50 (see, Appendices 2,3,5,6). The price ending was only to be considered in the cent-part not the hundred-, ten-, or dollar-parts (i.e. the left-hand-side of the decimal point).

The terms “odd price” and “even price” will be used throughout this thesis. For almost all goods, the odd prices of the goods were slightly higher than the even prices of those goods (but these two prices were usually within 1%). For example, Milk: \$1.89 (odd) & \$ 2.00 (even); fresh squeezed orange juice (1L): \$4.95 (odd) & \$5.00 (even). For two goods (out of 26) their even prices were higher than their odd prices, with the left-hand-side (of the decimal point) digits remaining the same. They were 93-Hennessy XO Cognac, France 750ml: \$230.99 (odd) & \$230.00 (even); fish & chips for lunch: \$8.99 (odd) & \$8.00 (even).

Two parallel questionnaires were used, called the A and B questionnaires. Half the goods in each of the A & B questionnaires had odd prices, and half had even

prices. Moreover, goods that had odd prices in Questionnaire A would have even prices in Questionnaire B, and vice versa. (Compare Appendices 2,3 and 5,6)

*Participants:*

All main study participants were recruited from the University of Canterbury, Christchurch, New Zealand. There were ninety-three students (50 females and 43 males; 47 Asian and 46 European), and the average age was 23. Sixty of them were rewarded with a \$10 grocery voucher, and thirty-three of them with course credits.

*Materials:*

Each participant was shown an introduction sheet (see Appendix 1) before the experiment started, and then they received two folders. The first folder contained two questionnaires plus a distraction (see Appendix 2, 3 (or 5, 6), and 4), which totaled 3 pages. There were two versions of the first folder—called Questionnaire A (Appendix 2, 3, 4), and Questionnaire B (Appendix 5, 6, 4). One part of the questionnaires required a luxury-necessity rating; and the other part a rating of quality for each good. As just mentioned, these two types of questionnaires used the same list of goods, but the featured price of each good differed between the two questionnaires. Moreover, the goods in Questionnaire B were presented in reversed order. The second folder contained two pages, with a recall test and a request for demographic information (see Appendices 7, 8). After the experiment finished, participants were given a debriefing sheet (see Appendix 9).



*Procedure:*

The experiment was conducted in three parts: questionnaire—distraction—recall, which all took place within 20-30 minutes. Each participant did the experiment individually.

Participants were given an introduction sheet (see Appendix 1) before the experiment started. Participants were informed that they would be asked to do a recall test in the last part of this study, but they were not informed that the recall test would be on the prices of those goods which they saw in the first part.

In the first part, participants were given questionnaires which consist of two main sections, one on luxury-necessity rating, and one on quality rating (see Appendices 3 & 4 (or 5 & 6)). Exactly the same goods were presented in these two sections (questionnaires). Half the participants received Questionnaire A (Appendices 2, 3, 4), and the other half of the participants received Questionnaire B (Appendices 5, 6, 4). In both questionnaires the luxury-necessity rating section and the quality section presented the same goods in the same order, and the prices of the goods were also the same. The order of the goods followed a single random order.

In the luxury-necessity rating section, participants were informed that this part concerned what goods they consider to be luxuries and what necessities; and they were requested to rate each good on a scale from 1 (you consider it a complete necessity) to 9 (you consider it a complete luxury). They were asked to respond by circling one of the nine numbers provided alongside each item.

The second section, quality rating, listed the same goods in the same order as the luxury-necessity rating. Participants were informed that this section concerns what goods they consider to be high quality and low quality; and they were requested to rate each good on a scale from 1 (you consider it has very low quality) to 9 (you consider it has very high quality). They were also asked to respond by circling one of the nine numbers provided alongside each item.

In half of the questionnaires (both A and B), luxury-necessity rating preceded quality rating; in the other half, this order is reversed.

In the second (distraction) part all participants were asked to answer some general questions (see Appendix 4). The purpose of using these general questions was to distract participants' attentions from memorizing the prices of the goods that appeared in the previous questionnaires, even though participants were not informed that they would be asked to recall the prices of the goods in the previous part.

In the third part, each participant received the list of goods. The goods were the same as in the first part of the questionnaire they had viewed before (see Appendix 7), but with the prices omitted, and the order reversed. Participants were instructed to recall the exact price (both dollars and cents) of each product and to write it in the space provided (a blank response for a digit was coded as "unable to recall"). Participants were informed that accuracy was more important than speed of recalling. Prior research suggests that confidence measures are reflective of consumers' subjective store price knowledge, which is likely to influence search behaviour (Flynn and Goldsmith, 1999). Therefore, in addition to recalling the prices of the goods,

participants were asked to indicate how confident they were that each recalled price is the exact price they have seen earlier. Confidence was assessed on a single five-point scale ranging from “not confident” (1) to “very confident” (5).

The last section asked for demographic information. A debriefing sheet (see Appendix 8) was given at the conclusion of the experiment.

## Results

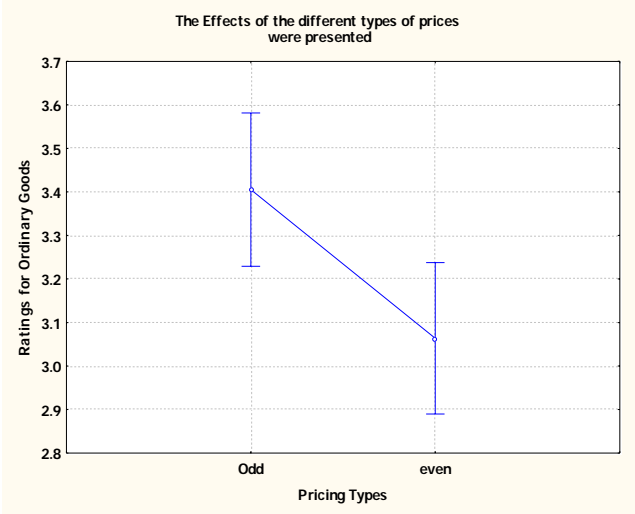
### **The overall differences between odd & even prices in both scales:**

To explore the effect price endings may have on consumer choice, several tests from different points of the view were used. Firstly, four one-way ANOVAs were used to test the overall differences in ratings between different price-endings presented for ordinary goods and luxury goods on both luxury-necessity and the quality scales. In this case, both goods and subjects were mixed together, the ransom factor is the individual judgments. Some unexpected results were obtained, see Figure 1 and 2 below. Please keep in mind that the rating range was always from 1 to 9, where 1 was meant to be completely necessity (or lowest quality); and 9 was meant to be completely luxury (or highest quality).

In the luxury-necessity scale, there was a significant difference between even prices and odd prices while they were presented with ordinary goods, respectively,  $F(1, 1207)=7.34, p<0.05$ , but it was in an unexpected direction from my hypothesis (H2). The results show that the ordinary goods were perceived more luxurious when they were presented with odd prices. On the other hand, there were no significant effects of even prices and odd prices, when they were presented with luxury goods,  $F(1, 1207)=3.05, p>0.05$ . However, from Figure 1(b) we can see, the pattern was consistent with my H2, the even price is more likely to be perceived as a price for a luxury good.

**Figure 1:** The effect of different types of the prices, odd and even, on (a) ordinary goods; and (b) luxury goods in the luxury-necessity scale.

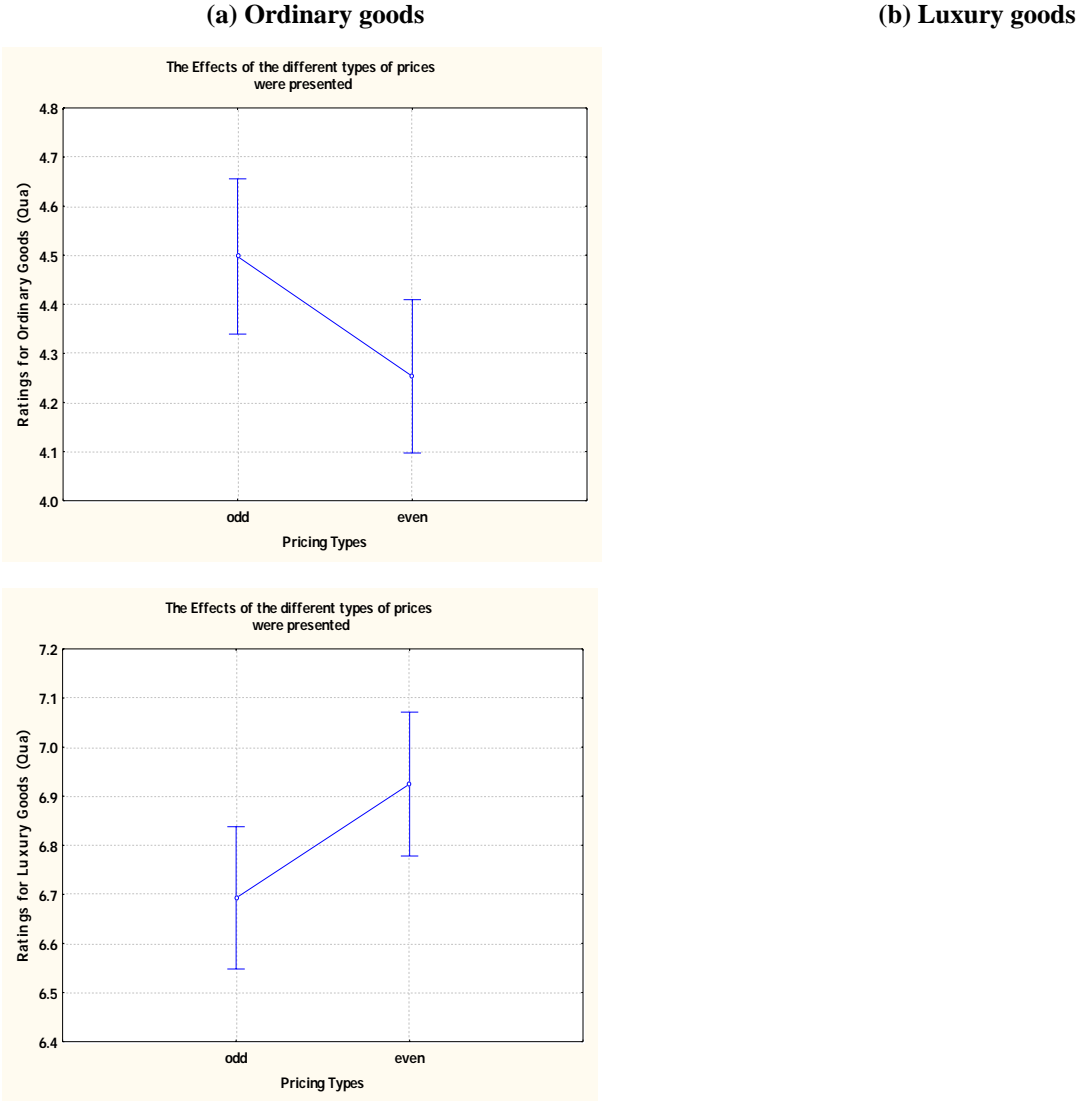
**(a) Ordinary goods**



**(b) Luxury goods**



**Figure 2:** The effect of different types of the prices, odd and even, on (a) ordinary goods; and (b) luxury goods in the quality scale.



In the quality scale, the different types of the price-endings showed significant effects on both ordinary and luxury goods. However, only in the luxury goods condition (see Figure 2(b)), the result,  $F(1, 1207)=4.87, p<0.05$ , support my H1, which is the odd price is more likely to be perceived as a price for a lower-quality good than a even price is. By contrast, the effect of the different price-types on ordinary goods was significant, but in an unexpected direction,  $F(1, 1207)=4.65, p<0.05$ , see Figure 2(a).

The findings for the quality scale were similar to the preceding findings in the luxury-necessity scale, which also had results in the expected direction for luxury goods, but in the opposite direction for ordinary goods. Thus, it would seem important to consider that the different price endings (odd and even) may affect people's perceptions in different ways for different goods.

An additional analysis of variance checked for gender effects. A 2 (Gender) x 2 (Luxury-Necessity) x 2 (odd, even) analysis of variance design no significant gender difference occurred for either measure (luxury-necessity  $F(1, 96) = 0.11, p > 0.05$ , or quality  $F(1, 96) = 1.95, p > 0.05$ ). There was no any significant interactions between any of these factors either.

#### **Luxury-necessity scale:**

To gain a better understand of what types of the goods would be affected by the different types of the prices, the ratings for each goods were computed for each of the two price-ending conditions in luxury-necessity and quality scales.

**Table 2:** Average ratings of Luxury-necessity scale for different price endings of ordinary goods and luxury goods.

Ordinary Goods	Mean	Mean	t	Luxury Goods	Mean	Mean	t
	Even	Odd			Even	Odd	
Milk(1L)	1.479	1.800	-1.300	Fresh Squeezed Orange Juice (1L)	4.667	3.063	4.657**
A Loaf of Bread	1.708	2.267	-2.050*	A Piece of Cheese Cake	5.444	4.646	3.140
Internet (per hour)	3.149	3.778	-1.364	Encyclopaedia Britannica First Edition Replica Set	6.556	6.563	-0.016
Colby Cheese(1kg)	3.396	3.822	-1.073	Puhoi Parmesan Cheese (1kg)	7.023	5.563	1.985**
<u>Fish &amp; Chips for Lunch</u>	<u>5.022</u>	<u>4.375</u>	<u>1.495</u>	Buffet for Lunch	5.396	6.200	-2.058*
Sausages Beef Flavoured (per kg)	2.792	3.867	-3.293**	Premium Eye Fillet Steak (per kg)	6.333	6.125	0.528
Warehouse Purse	3.604	4.644	-2.819**	Louis Vuitton Purse	8.511	8.479	0.161
Bic Biro Pen	1.729	2.022	-1.121	Sheaffer Valor Black G/T Ballpoint Pen	8.333	8.229	0.378
LG 15" Flatron flat Screen TV	5.167	6.349	-2.700**	LG 15" LCD TV	7.933	7.333	1.706
Normal Toothbrush	1.682	1.729	-0.162	Electronic Toothbrush	6.25	6.378	-0.295
A can of CD Beer	5.289	4.188	2.457*	<u>93-Hennessy XO Cognac, France</u> <u>750 ml</u>	<u>7.854</u>	<u>8.333</u>	-1.680
Deodorant	2.458	2.444	0.039	Perfume (50ml)	5.644	5.854	-0.502
Prescription Glasses	2.489	3.021	-1.207	Gucci Sunglasses	7.938	8.422	-1.858

Note: *t*-test for independent; *df* = 91; \*  $p < 0.05$ ; \*\*  $p < 0.01$ .

*If the actual odd price of a good is higher than the even price of the good in the luxury-necessity rating, then the good is underlined in this table.*

T-statistic tests were used to compare the ratings of each good when its odd price was presented with when its even price was presented. As we can see from Table 2, there significant differences for certain goods. From the initial list of ordinary goods, these were: a loaf of bread, the sausage, a Warehouse purse, the LG15" Flatron flat screen TV, a can of CD beer. From the initial list of luxury goods these were: fresh squeezed orange juice, Puhoi Parmesan Cheese (1kg), and buffet for lunch. Clearly then participants did give significantly different luxury-necessity ratings for several goods which had different price-endings. However, most of the significant results were in an unexpected direction. For example, a loaf of bread ( $M_E=1.708 < M_O=2.267$ ); beef sausages ( $M_E=2.792 < M_O=3.867$ ); warehouse purse ( $M_E=3.604 < M_O=4.677$ ), LG15"



flat screen TV ( $M_E=5.167 < M_O=6.349$ ), and buffet for lunch ( $M_E=5.396 < M_O=6.200$ ).

These goods had significantly higher average ratings when presented with odd price than when presented with the even price. For these goods, when they were presented with odd prices they were more likely to be perceived as luxury goods than when they were presented with even prices. Clearly, this finding does not support my Hypothesis 2. Most of these goods were in the list of necessity goods, only one was in the luxury-list.

However, some significant findings were in line with H2. They were: the can of CD beer ( $M_E=5.289 > M_O=4.188$ ) which was from the ordinary-good list; Puhoi Parmesan Cheese (1kg) ( $M_E=7.023 > M_O=5.563$ ) and the orange juice ( $M_E=4.667 > M_O=3.063$ ) which were both from the luxury-list. These goods were more likely to be perceived as luxuries goods with even prices.

Overall it seems that my hypothesis 2 may apply to certain goods, especially to luxury good, but certainly not to every type of good.

A similar pattern of results can be seen in the quality scale results (see Table 3).

## Quality scale:

**Table 3:** Average ratings of Quality scale for different price endings of ordinary goods and luxury goods.

Ordinary Goods	Mean	Mean	t value	Luxury Goods	Mean	Mean	t value
	Even	Odd			Even	Odd	
Milk(1L)	4.438	4.711	-0.643	Fresh Squeezed Orange Juice (1L)	5.867	5.333	1.466
A Loaf of Bread	4.383	5.378	-2.689**	A Piece of Cheese Cake	5.756	5.083	1.932
Internet (per hour)	4.875	5.156	-0.671	Encyclopaedia Britannica First Edition Replica Set	7.333	7.208	0.381
Colby Cheese(1kg)	4.000	4.822	-2.545*	Puhoi Parmesan Cheese (1kg)	7.222	6.542	1.898
<u>Fish &amp; Chips for Lunch</u>	<u>4.467</u>	<u>4.375</u>	0.204	Buffet for Lunch	5.354	5.756	-1.213
Sausages Beef Flavoured (per kg)	3.313	4.222	-2.734**	Premium Eye Fillet Steak (per kg)	7.356	7.292	0.207
Warehouse Purse	3.083	3.4	0.972	Louis Vuitton Purse	7.8	7.667	0.391
Bic Biro Pen	2.938	3.378	-1.143	Sheaffer Valor Black G/T Ballpoint Pen	8.089	8.063	0.095
LG 15" Flatron flat Screen TV	5.229	5.356	-0.360	LG 15" LCD TV	7.289	6.75	1.305
Normal Toothbrush	4.622	4.146	1.285	Electronic Toothbrush	6.396	6.356	0.124
A tin of CD Beer	4.222	3.745	1.244	<u>93-Hennessy XO Cognac, France 750 ml</u>	<u>7.625</u>	<u>7.311</u>	0.971
Deodorant	3.854	4.067	-0.585	Perfume	6.089	6.167	-0.244
Prescription Glasses	6.022	5.708	0.786	Gucci Sunglasses	7.875	7.489	1.314

Note: *t*-test for independent; *df* = 91; \*  $p < 0.05$ ; \*\*  $p < 0.01$ .

*If the actual odd price of a good is higher than the even price of the good in the luxury-necessity rating, then the good is underlined in this table.*

As Table 3 shows, there were also some significant differences in the quality scale between the same goods which had different price endings (e.g., a loaf of bread, Colby cheese, sausages (per kg)) in the ordinary goods list. In this case, all the significant results were in the unexpected direction. The table indicates several goods (these were: A loaf of bread  $M_{00}=4.383 < M_{99}=5.378$ ; the Colby Cheese (1kg)  $M_{00}=4.000 < M_{99}=4.822$ ; the sausages beef flavour (per kg)  $M_{00}=3.313 < M_{99}=4.222$ ), were more likely to be perceived as higher quality goods when they had odd prices. These results were inconsistent with the findings from previous research (e.g. Schindler 2001; Schindler & Kirby, 1997), and did not support my Hypothesis 1 that

the odd price is more likely to be perceived as a signal for a lower-quality good than an even price is. In the luxury goods list, even though there were no significant differences about how participant perceived the quality of the goods with different price endings, the pattern of the results seemed to support my Hypothesis 1. Most of the goods had higher ratings when they were presented with even prices.

### **Recall-test:**

The participants' recall accuracy was computed separately for the first and the last digits that were presented in each of the prices they had seen. The mean percent correct for the first & last digits were 66.47% and 62.96%, respectively.

A one-way analysis of variance indicated a statistically significant decreasing trend,  $F(1, 4626)=6.2141, p<0.05$ , from the accuracy of recalling the first digit to the last digit. This result confirmed the finding from Schindler and Wiman (1989) that the recall accuracy of price digits decreases from left to right. The decrement in recall accuracy for the first and last digits was not as large as expected. This may be because there was relatively less variation in the last digit than in the first digit (the last digits were always 5, 8, 9 and 0, and, among them, mostly 9 or 0).

To gain a better understanding of how the price-ending manipulation affected price recall, the recall results for the first & last digits of the prices, and mean confidence in recall were computed for each of the two price-ending conditions. In order to obtain an indication of the association between the price-endings and the recalled price digits; the recall accuracy of a price digit was coded as 1 when the recalled digit was correct

and 0 when the recalled digit was incorrect. Therefore, the maximum of the mean recalled accuracy should be 1 and the minimum should be 0. The range of confidence was from 1 to 5 (1 = not confident; 5 = very confident).

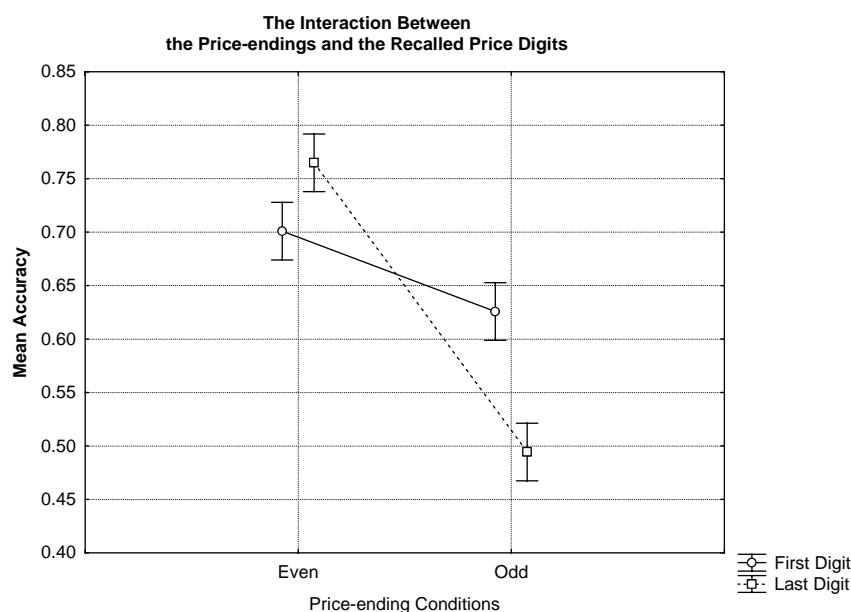
Table 4 shows the mean recalled accuracy of the first and the last digits, and the mean confidence in recall for each of the two price-endings condition. As seen in Table 4, the mean accuracy of the first digit recalled is higher than the mean accuracy of the last digit recalled only for the odd price condition,  $F(1, 2312) = 41.21, p < 0.05$ ; whereas the mean accuracy of the last digit recalled was significantly slightly higher than the mean accuracy of the first digit recalled for the even price condition,  $F(1, 2312) = 12.14, p < 0.05$ . The highest accuracy was for the last digit in the even price condition, which was usually 0. This result supports the ideas that 0-ending prices have the highest cognitive accessibility; and that consumers tend to produce 0-ending numbers when recalling prices (Schindler and Wiman, 1989). In addition to affecting recall of the actual price digits, price-ending type influenced the confidence of that recall. The mean recall confidence was higher in the even price condition than the odd price condition,  $t(1151) = -8.41, p < 0.05$ . Moreover, the recalled price digit by price endings interaction was significant,  $F(1, 4624) = 50.489, p < 0.05$ . One possible conclusion we could draw is that the different price-endings do not only affect the accuracy of the last digit recalled, but also affect the accuracy of the first digit recalled.

Table 4: Influence of price condition on accuracy of price-digit recall and recall confidence

	Even	Odd
<b>First Digit Recalled</b>	0.701 (0.458)	0.626* (0.484)
<b>Last Digit Recalled</b>	0.765 <sup>a</sup> (0.424)	0.494 <sup>*, a</sup> (0.500)
<b>Mean Recall confidence</b>	3.894 (1.260)	3.484* (1.280)

Notes: The numbers in parentheses are standard deviations; \*significant differences between price-ending conditions (even & odd), <sup>a</sup> significant differences between price digits recalled (first & last) under one condition.

**Figure 1:** The interaction between the price-endings and the recalled price digits



*Analyzing recall pattern:*

Finally, Table 5 shows the pattern of overall recalled prices in different conditions. The analysis was based on 2305 recalled prices, which were written down by 89 participants (i.e. 9 “unable to recall” responses were excluded from the analysis). Overall, 1099 (47.68%) of the recalled prices were recalled exactly the same as the actual prices; the remaining 1206 (52.32%) of the recalled prices were recalled incorrectly (454 (19.70%) were higher than the actual prices and 752 (32.62%) were lower than the actual prices) (see Table 5). Overall, this is quite good recall. Sixty-three

percent of the exactly-recalled prices were even prices and 37% were odd prices. Thus, the data again support the idea that the even prices (i.e. 0-ending prices) have higher cognitive accessibility.

For the odd prices, 20.49% of the recalled prices were higher than the actual prices and 44.27% lower. For the even prices 18.91% of the recalled prices were higher than the actual prices and 21.01% lower. The results reported here meant the values of the recalled prices were higher or lower than the values of the actual prices. E.g. \$4.99 recalled as \$4.00. The results supported the idea that the underestimation is more likely to occur when the actual price was odd (e.g., Alpert 1970; Georgoff 1972; Lambert 1975; Schindler 1984; Schindler and Warren 1988). Since we can see from the figures here, for the incorrect recalled prices, the odd prices were tend to be underestimated as twice as much than other three situations (44.27% compared with 20.49%, 18.91%, 21.01%, respectively) (For some more data, see Table 7 in Appendix 10).

**Table 5:** The frequency of the recalled prices in any situation (see Table 13 in Appendix 12 &13 for more details)

	Level of	Level of	N	% out of overall (2305)
<b>Total</b>			2305	
Levels	Exactly		1099	47.68%
Levels	High		454	19.70%
Levels	Low		752	32.62%
Levels*Price Endings	Exactly	0	693	30.07%
Levels*Price Endings	Exactly	9	406	17.61%
Levels*Price Endings	High	0	218	9.46%
Levels*Price Endings	High	9	236	10.24%
Levels*Price Endings	Low	0	242	10.50%
Levels*Price Endings	Low	9	510	22.13%

**Correlation:**

Finally, the correlation between the two rating scales (luxury-necessity & quality), and the correlation between the rating scales and the recall test were considered. There was a positively significant correlation,  $r = 0.542$ ,  $p < 0.05$ , between the two rating scales, which indicated that if participants gave a higher (or lower) rating to a certain good in one of the two scales, then they would give a high (or low) rating to the same good in the other scale too.

Regardless of the accuracy of the recalled prices, the recalled price-endings (even and odd) and the rating scores were considered in the correlation between the recall test and the luxury-necessity/quality ratings. In order to analyze the correlation, all recalled even prices were coded as 0, and all odd prices were coded as 9. There were then significant negative linear relationships between the ratings for all the goods and the recalled price-endings in both luxury-necessity scale and quality scale obtained (see Table 6). These results suggested that participants were more likely to recall the prices of the goods, which they rated as more luxurious or higher quality as even prices. On the other hand, if participants rated a good as more of a necessity or of lower quality, then when they did the recall-test, participants were more likely to recall the price of the good with an odd price.

**Table 6:** The correlation between the ratings and the price-endings recalled in Luxury-Necessity and Quality conditions

	<b>r</b>		<b>r</b>
<b>Luxury-Necessity</b>		<b>Quality</b>	
All ratings		All ratings	
Price Ending Recalled	-0.108*	Price Ending Recalled	-0.065*

Note: \* $p < 0.01$

## Discussion

### *Luxury-Necessity & Quality rating scales:*

One purpose of this study was to see whether price endings affected people's perceptions of luxury and necessity. I found that the different price-endings did influence people's thinking about whether a good was a luxury or a necessity; and also about the correlated quality measure. Although many previous researchers have found that odd prices (i.e., 9-ending prices) are a signal of lower-quality, the results here showed that when goods were presented with odd prices they were sometimes but not always perceived to be of lower quality or as a necessity rather than a luxury. In general, the odd prices were perceived as a signal of lower-quality only when they were presented with luxury goods. In addition, when odd prices were presented, luxury goods were also more likely to be perceived as less luxurious. The findings here supported my hypotheses H1 and H2 that an odd price is more likely to be perceived as a price for a lower-quality good, and a necessity good than an even price is.

However, for ordinary goods, the results were quite different to the results for luxury goods, and also not at all consistent with my hypotheses H1 and H2. These results indicated that the ordinary goods presented with odd prices were more likely to be perceived as more luxurious and as higher quality.

In order to gain a better understanding of what particular goods would be affected by the different types of the prices, the ratings for each good were computed for each of the two price-ending conditions for both luxury-necessity and quality scales. Most



of the significant and unexpected results, which implied that the odd price was a signal for a luxury good and a higher quality good, were obtained in ordinary goods list. In addition, most of the results, which showed differences between different types of price presented with luxury goods, were not significant. However, the pattern of the results for most of the luxury goods was consistent with my hypotheses H1 and H2.

The previous finding that odd prices were more likely to be a signal of lower quality (e.g., Schindler & Kibarian, 2001; Stiving, 2000); and my hypothesis H2 that odd prices were more likely to be signal a price of a necessity good thus were only supported for luxury goods. Stiving (2000) demonstrated that when firms were signaling high quality with high prices, they were likely to use round numbers. Perhaps different pricing strategies have different effects on different type of goods. However, the greatest sensitivity to odd pricing occurred for the low-priced common products tested. The explanation for this enhanced sensitivity to odd pricing for such products may be consumers' greater price awareness for these regularly purchased items, or perhaps the fact that the relative price differential between the odd and even prices tested was greater for lower-priced products.

#### *Recall test*

The results were consistent with the idea of left-to-right, as opposed to holistic, processing of price digits. The first digit was recalled more accurately than the last digit, even although it was easier to guess the last digit by chance. The leftmost digits, varied greatly over the different prices. However, 50% of the last digits, or the

rightmost digits, were “0”; and 40% of the rightmost digits were “9”, 8% of the rightmost digits were “8”, 2% were “4”. Therefore, if the prices were recalled or processed holistically by participants, then the accuracy of the rightmost digits should actually higher than the leftmost digits.

The results reported here also showed that the different price-ending digits affected price recall. Both the rightmost and the leftmost digits were recalled better when the prices were even prices (i.e. last digit was 0) than when the prices were odd prices. Thus, it appeared that the price-ending manipulation plays a role in influencing price recall. The results reported here also support the idea that prices ending in 9 tend to be underestimated.

### *Correlation*

There was a significant positive relationship between luxury-necessity ratings and quality ratings. This suggested that a particular good was rated as having a high score in luxury-necessity scale (or quality scale), then the good also had a high score in quality scale (or luxury-necessity scale). This result is simply in line with our expectations of luxury goods.

There were significant negative relationships between the quality/luxury-necessity scales and the last digit of the recalled prices. The findings indicated that the recall of an odd price was more likely to occur with necessities and lower quality goods, whereas the recall of an even price was more likely to occur with luxuries and higher quality goods, which consistent with previous findings (e.g., Stiving, 2000; Schindler

and Kibarian, 2001). These results supported the general hypotheses that lower quality necessities are more likely to be associated with odd price endings.

However, the findings here were not consistent with the results discussed above, which were only found expected significant results for luxury goods in both scales.

One possible explanation is that, when consumers were in the shopping environment, the pricing strategy may not have much effects on them, since they could compare the prices. However, once the consumers were out of that environment, and the price became obscure, consumers were more easily affected by the pricing strategy.

Consumers with limited time and cognitive information processing-capacity constraints, who face a complex environment, such as an assessment and comparison of the prices of dozens and sometimes hundreds of products, will tend to use time-saving devices such as simplified rules, in gathering and processing price information. In other words, they will rationally choose to be selective in the nature and amount of the information they collect and use (Lee et. al., (2006). Thus, it might be rational for consumers to ignore some price information.

#### *Limitations:*

A number of limitations to this study need to be acknowledged. First, the results are based on a list of 26 goods, collected in a survey which was performed by university students. The data may only represent the university student. In future research, we should also consider a wider range of households. In addition, the main study was based on the ratings of the two scales and the recalled prices in the recall test, not on

actual purchase behaviour. Thus, the study provides no information on the important question of how price endings affect sales.

Second, the price range for the goods varied from \$0.00 to \$999.99. A possible reason for my inability to find substantial evidence to support the idea that the odd price communicates a lower quality-image, may be because of the rather low price range use. In future research, it may be beneficial to have more separation between necessity and luxury goods rather than to attempt to pair them. Then another price range could be used for luxuries. Since in the real market, the luxuries are more likely to have prices like \$ 200,000 or \$299,000; unlike the prices in the current study. On the other hand, such goods would have been well beyond the purchasing power of my sample.

*Implications:*

The result found for the quality scale for ordinary goods in this study was inconsistent with the previous findings (e.g., Stiving, 2000; Schindler and Kibarian, 2001) that odd prices are a signal of low-quality. There are some possible explanations can be drawn from this point. One is that the pricing strategy (odd & even) may not apply to all the goods, and may be more likely to apply to luxury goods. The results might also be due to changes in the denomination of New Zealand currency since 2006. In that year the smallest usable coin changed from 5 cents to 10 cents, and it may be that consumers no longer think very much in units smaller than 10 cents at all. Certainly, they do not appear to remember the smaller units very accurately. Another

possible reason may be due to cultural differences, which means this pricing strategy is not applicable in the New Zealand market. There is some evidence suggesting that price-endings are influenced by cultural differences (e.g., Folkertsma 2002; Suri et al. 2004). Suri et al. (2004) found that consumers in US and Poland perceive 9-ending prices differently: American consumers saw them as fairer than Polish consumers. (It is also worth noticing that in the USA the smallest coin remains one cent, unlike most other countries.)

Even though participants did not perceive the even prices as indicating more luxurious or higher-quality goods for all the goods in the two scales, when they did the recall test, they did tend to recall those goods which they thought to be more luxurious or of higher quality with even prices. This suggests that at some level consumers have a belief that an even price is more likely to signal a price of luxury or higher-quality good; whereas the odd price is more likely to signal a price of necessity or lower-quality good.

The recalled confidence was significantly higher when the even prices were asked to be recalled. This suggests that if a retailer sets a price to a good, and for some reason (e.g., having consumers remember that the price is a good deal) the retailer wants consumers to remember the actual price of the good; using an even price would give better results.

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## Appendix 1:

### Introduction

Please read the following note before completing the questionnaires

You are invited to participate in the research study: “Luxury and Necessity”.

The study is being carried out as a requirement for Master of Science in Psychology by ZHENG, ChenChen who can be contacted at

[ccz13@student.canterbury.ac.nz](mailto:ccz13@student.canterbury.ac.nz)

under the supervision of Simon Kemp ([simon.kemp@canterbury.ac.nz](mailto:simon.kemp@canterbury.ac.nz)).

and Murray Simmond ([murray.simmonds@canterbury.ac.nz](mailto:murray.simmonds@canterbury.ac.nz)). They will be pleased to discuss any concerns you may have about participation in the study.

The task is taken about 20-30 minutes to complete; and it consists of two questionnaires, four general questions and one recall test.

The task is anonymous, and you will not be identified as a participant without your consent.

You may withdraw your participation, including withdrawal of any information you have provided, until your task has been added to the others collected. Because it is anonymous, it cannot be retrieved after that.

**By completing the task it is understood that you have consented to participate in the study and that you consent to publication of the results of the study with the understanding that anonymity will be preserve.**

Further details will be made available after a given date (this additional information could be posted on the participant pool notice board and/or e-mailed to participants).

**Thank you for your participation!**

## Appendix 2:

### List of Goods:

This part is concerned what goods you consider to be high quality and low quality. Please rate each good on a scale from 1 (you consider it has very low quality) to 9 (you consider it has very high quality) by circling a score.

Goods	Price	Quality								
		Low								High
		1	2	3	4	5	6	7	8	9
Milk(1L)	\$ 1.89	1	2	3	4	5	6	7	8	9
Gucci Sunglasses	\$ 448.98	1	2	3	4	5	6	7	8	9
A Loaf of Bread	\$ 2.49	1	2	3	4	5	6	7	8	9
Premium Eye Fillet Steak (per kg)	\$ 39.00	1	2	3	4	5	6	7	8	9
Internet (per hour)	\$ 1.99	1	2	3	4	5	6	7	8	9
93-Hennessy XO Cognac, France 750 ml	\$ 230.99	1	2	3	4	5	6	7	8	9
Colby Cheese(1kg)	\$ 6.99	1	2	3	4	5	6	7	8	9
Fish & Chips for Lunch	\$ 8.00	1	2	3	4	5	6	7	8	9
Electronic Toothbrush	\$ 59.95	1	2	3	4	5	6	7	8	9
Buffet for Lunch	\$ 18.99	1	2	3	4	5	6	7	8	9
Sausages Beef Flavoured (per kg)	\$ 5.99	1	2	3	4	5	6	7	8	9
Warehouse Purse	\$ 19.99	1	2	3	4	5	6	7	8	9
Bic Biro Pen	\$ 0.99	1	2	3	4	5	6	7	8	9
LG 15" Flatron flat Screen TV	\$ 299.99	1	2	3	4	5	6	7	8	9
Normal Toothbrush	\$ 4.00	1	2	3	4	5	6	7	8	9
A tin of CD Beer	\$ 4.00	1	2	3	4	5	6	7	8	9
Fresh Squeezed Orange Juice (1L)	\$ 5.00	1	2	3	4	5	6	7	8	9
Deodorant	\$ 3.99	1	2	3	4	5	6	7	8	9
Sheaffer Valor Black G/T Ballpoint Pen	\$ 350.00	1	2	3	4	5	6	7	8	9
Prescription Glasses	\$ 200.00	1	2	3	4	5	6	7	8	9
A Piece of Cheese Cake	\$ 6.00	1	2	3	4	5	6	7	8	9
Puhoi Parmesan Cheese (1kg)	\$ 40.00	1	2	3	4	5	6	7	8	9
Louis Vuitton Purse	\$ 650.00	1	2	3	4	5	6	7	8	9
Encyclopaedia Britannica First Edition Replica Set	\$ 500.00	1	2	3	4	5	6	7	8	9
Perfume	\$ 79.00	1	2	3	4	5	6	7	8	9
LG 15" LCD TV	\$ 900.00	1	2	3	4	5	6	7	8	9

### Appendix 3:

#### List of Luxury-Necessity Goods:

This part is concerned what goods you consider to be luxuries and what necessities. Please rate each good on a scale from 1 (you consider it a complete necessity) to 9 (you consider it a complete luxury) by circling a score.

Goods	Price	Necessity								
		Luxury								
Milk(1L)	\$ 1.89	1	2	3	4	5	6	7	8	9
Gucci Sunglasses	\$ 448.98	1	2	3	4	5	6	7	8	9
A Loaf of Bread	\$ 2.49	1	2	3	4	5	6	7	8	9
Premium Eye Fillet Steak (per kg)	\$ 39.00	1	2	3	4	5	6	7	8	9
Internet (per hour)	\$ 1.99	1	2	3	4	5	6	7	8	9
93-Hennessy XO Cognac, France 750 ml	\$ 230.99	1	2	3	4	5	6	7	8	9
Colby Cheese(1kg)	\$ 6.99	1	2	3	4	5	6	7	8	9
Fish & Chips for Lunch	\$ 8.00	1	2	3	4	5	6	7	8	9
Electronic Toothbrush	\$ 59.95	1	2	3	4	5	6	7	8	9
Buffet for Lunch	\$ 18.99	1	2	3	4	5	6	7	8	9
Sausages Beef Flavoured (per kg)	\$ 5.99	1	2	3	4	5	6	7	8	9
Warehouse Purse	\$ 19.99	1	2	3	4	5	6	7	8	9
Bic Biro Pen	\$ 0.99	1	2	3	4	5	6	7	8	9
LG 15" Flatron flat Screen TV	\$ 299.99	1	2	3	4	5	6	7	8	9
Normal Toothbrush	\$ 4.00	1	2	3	4	5	6	7	8	9
A tin of CD Beer	\$ 4.00	1	2	3	4	5	6	7	8	9
Fresh Squeezed Orange Juice (1L)	\$ 5.00	1	2	3	4	5	6	7	8	9
Deodorant	\$ 3.99	1	2	3	4	5	6	7	8	9
Sheaffer Valor Black G/T Ballpoint Pen	\$ 350.00	1	2	3	4	5	6	7	8	9
Prescription Glasses	\$ 200.00	1	2	3	4	5	6	7	8	9
A Piece of Cheese Cake	\$ 6.00	1	2	3	4	5	6	7	8	9
Puhoi Parmesan Cheese (1kg)	\$ 40.00	1	2	3	4	5	6	7	8	9
Louis Vuitton Purse	\$ 650.00	1	2	3	4	5	6	7	8	9
Encyclopaedia Britannica First Edition Replica Set	\$ 500.00	1	2	3	4	5	6	7	8	9
Perfume	\$ 79.00	1	2	3	4	5	6	7	8	9
LG 15" LCD TV	\$ 900.00	1	2	3	4	5	6	7	8	9



## **Appendix 4:**

### **General Questions:**

1. Please calculate  $5 \times 68 + 92 \times 3 = ???$
2. What is the highest mountain in the world?
3. Identify two active volcanoes in New Zealand?
4. Do you know where the 2008 Olympics will be held?

## Appendix 5:

### List of Luxury-Necessity Goods

This part is concerned what goods you consider to be luxuries and what necessities. Please rate each good on a scale from 1 (you consider it a complete necessity) to 9 (you consider it a complete luxury) by circling a score.

Goods	Price	Necessity									
		Luxury	1	2	3	4	5	6	7	8	9
LG 15" LCD TV	\$ 899.99		1	2	3	4	5	6	7	8	9
Perfume	\$ 79.99		1	2	3	4	5	6	7	8	9
Encyclopaedia Britannica First Edition Replica Set	\$ 499.99		1	2	3	4	5	6	7	8	9
Louis Vuitton Purse	\$ 649.95		1	2	3	4	5	6	7	8	9
Puhoi Parmesan Cheese (1kg)	\$ 39.99		1	2	3	4	5	6	7	8	9
A Piece of Cheese Cake	\$ 5.99		1	2	3	4	5	6	7	8	9
Prescription Glasses	\$ 199.99		1	2	3	4	5	6	7	8	9
Sheaffer Valor Black G/T Ballpoint Pen	\$ 349.99		1	2	3	4	5	6	7	8	9
Deodorant	\$ 4.00		1	2	3	4	5	6	7	8	9
Fresh Squeezed Orange Juice (1L)	\$ 4.95		1	2	3	4	5	6	7	8	9
A tin of CD Beer	\$ 3.99		1	2	3	4	5	6	7	8	9
Normal Toothbrush	\$ 3.99		1	2	3	4	5	6	7	8	9
LG 15" Flatron flat Screen TV	\$ 300.00		1	2	3	4	5	6	7	8	9
Bic Biro pen	\$ 1.00		1	2	3	4	5	6	7	8	9
Warehouse Purse	\$ 20.00		1	2	3	4	5	6	7	8	9
Sausages Beef Flavoured (per kg)	\$ 6.00		1	2	3	4	5	6	7	8	9
Buffet for Lunch	\$ 19.00		1	2	3	4	5	6	7	8	9
Electronic Toothbrush	\$ 60.00		1	2	3	4	5	6	7	8	9
Fish & Chips for Lunch	\$ 8.99		1	2	3	4	5	6	7	8	9
Colby Cheese(1kg)	\$ 7.00		1	2	3	4	5	6	7	8	9
93-Hennessy XO Cognac, France 750 ml	\$ 230.00		1	2	3	4	5	6	7	8	9
Internet (per hour)	\$ 2.00		1	2	3	4	5	6	7	8	9
Premium Eye Fillet Steak (per kg)	\$ 38.95		1	2	3	4	5	6	7	8	9
A Loaf of Bread	\$ 2.50		1	2	3	4	5	6	7	8	9
Gucci Sunglasses	\$ 450.00		1	2	3	4	5	6	7	8	9
Milk(1L)	\$ 2.00		1	2	3	4	5	6	7	8	9

## Append 6:

### List of Goods:

This part is concerned what goods you consider to be high quality and low quality. Please rate each good on a scale from 1 (you consider it has very low quality) to 9 (you consider it has very high quality) by circling a score.

Goods	Price	Quality								
		Low	High Quality							
LG 15" LCD TV	\$ 899.99	1	2	3	4	5	6	7	8	9
Perfume	\$ 79.99	1	2	3	4	5	6	7	8	9
Encyclopaedia Britannica First Edition Replica Set	\$ 499.99	1	2	3	4	5	6	7	8	9
Louis Vuitton Purse	\$ 649.95	1	2	3	4	5	6	7	8	9
Puhoi Parmesan Cheese (1kg)	\$ 39.99	1	2	3	4	5	6	7	8	9
A Piece of Cheese Cake	\$ 5.99	1	2	3	4	5	6	7	8	9
Prescription Glasses	\$ 199.99	1	2	3	4	5	6	7	8	9
Sheaffer Valor Black G/T Ballpoint Pen	\$ 349.99	1	2	3	4	5	6	7	8	9
Deodorant	\$ 4.00	1	2	3	4	5	6	7	8	9
Fresh Squeezed Orange Juice (1L)	\$ 4.95	1	2	3	4	5	6	7	8	9
A tin of CD Beer	\$ 3.99	1	2	3	4	5	6	7	8	9
Normal Toothbrush	\$ 3.99	1	2	3	4	5	6	7	8	9
LG 15" Flatron flat Screen TV	\$ 300.00	1	2	3	4	5	6	7	8	9
Bic Biro pen	\$ 1.00	1	2	3	4	5	6	7	8	9
Warehouse Purse	\$ 20.00	1	2	3	4	5	6	7	8	9
Sausages Beef Flavoured (per kg)	\$ 6.00	1	2	3	4	5	6	7	8	9
Buffet for Lunch	\$ 19.00	1	2	3	4	5	6	7	8	9
Electronic Toothbrush	\$ 60.00	1	2	3	4	5	6	7	8	9
Fish & Chips for Lunch	\$ 8.99	1	2	3	4	5	6	7	8	9
Colby Cheese(1kg)	\$ 7.00	1	2	3	4	5	6	7	8	9
93-Hennessy XO Cognac, France 750 ml	\$ 230.00	1	2	3	4	5	6	7	8	9
Internet (per hour)	\$ 2.00	1	2	3	4	5	6	7	8	9
Premium Eye Fillet Steak (per kg)	\$ 38.95	1	2	3	4	5	6	7	8	9
A Loaf of Bread	\$ 2.50	1	2	3	4	5	6	7	8	9
Gucci Sunglasses	\$ 450.00	1	2	3	4	5	6	7	8	9
Milk(1L)	\$ 2.00	1	2	3	4	5	6	7	8	9

## Appendix 7:

Please write down the exact prices (both dollars and cents) for these items; and indicate how confident you are that each recalled price is the exact price you have seen earlier. Confidence is assessed on a single five-point scale ranging from “not confident” (1) to “very confident” (5).

Goods	Price	Not Confident					High
		Confident					
LG 15" LCD TV	\$	1	2	3	4	5	
Perfume	\$	1	2	3	4	5	
Encyclopaedia Britannica First Edition Replica Set	\$	1	2	3	4	5	
Louis Vuitton Purse	\$	1	2	3	4	5	
Puhoi Parmesan Cheese (1kg)	\$	1	2	3	4	5	
A Piece of Cheese Cake	\$	1	2	3	4	5	
Prescription Glasses	\$	1	2	3	4	5	
Sheaffer Valor Black G/T Ballpoint Pen	\$	1	2	3	4	5	
Deodorant	\$	1	2	3	4	5	
Fresh Squeezed Orange Juice (1L)	\$	1	2	3	4	5	
A tin of CD Beer	\$	1	2	3	4	5	
Normal Toothbrush	\$	1	2	3	4	5	
LG 15" Flatron flat Screen TV	\$	1	2	3	4	5	
Bic Biro Pen	\$	1	2	3	4	5	
Warehouse Purse	\$	1	2	3	4	5	
Sausages Beef Flavoured (per kg)	\$	1	2	3	4	5	
Buffet for Lunch	\$	1	2	3	4	5	
Electronic Toothbrush	\$	1	2	3	4	5	
Fish & Chips for Lunch	\$	1	2	3	4	5	
Colby Cheese(1kg)	\$	1	2	3	4	5	
93-Hennessy XO Cognac, France 750 ml	\$	1	2	3	4	5	
Internet (per hour)	\$	1	2	3	4	5	
Premium Eye Fillet Steak (per kg)	\$	1	2	3	4	5	
A Loaf of Bread	\$	1	2	3	4	5	
Gucci Sunglasses	\$	1	2	3	4	5	
Milk(1L)	\$	1	2	3	4	5	

**Appendix 8:**

Finally, a few personal questions:

How old are you? \_\_\_\_\_

Are you            Male   /   Female

Which ethnic group do you belong to?  
\_\_\_\_\_

## **Appendix 9**

### **Debriefing**

The purpose of this study is to see whether price endings will have effects on people's perceptions of luxury and necessity goods. Several consumer behaviour theories have been offered to explain the preponderance of prices that end in the digits 9 and 0. For example, a product with a price ending in the digit 9 may give consumer a low image (i.e., discount price, sale, lower-quality, etc.) of that good.

In this study, participants were given two questionnaires to rate the quality and luxury-necessity of the good first; then a distraction session which is used for distracting participants' attention from memorizing the prices of the goods; then a recall-test is requested.

I expect the 99-ending prices are more likely to be perceived as a price for necessity goods; and 00-ending prices are more likely to be perceived as a price for luxury goods. I also expect the 99-ending prices are more likely to be perceived as a price for low-quality good; and 00-ending prices are more likely to be perceived as a price for high-quality good.

**Thank you for your participation!**

## Appendix 10:

**Table 7:** The number of the recalled prices in any situation

	Level of	Level of	Level of	N	% of overall (2305)
Total				2305	
<b>Levels</b>	Exactly			1099	47.68%
<b>Levels</b>	High			454	19.70%
<b>Levels</b>	Low			752	32.62%
<b>Price Endings</b>	0			1153	50.02%
<b>Price Endings</b>	9			1152	49.98%
<b>Types of the goods</b>	lux			1155	50.11%
<b>Types of the goods</b>	ord			1150	49.89%
<b>Levels*Price Endings</b>	Exactly	0		693	30.07%
<b>Levels*Price Endings</b>	Exactly	9		406	17.61%
<b>Levels*Price Endings</b>	High	0		218	9.46%
<b>Levels*Price Endings</b>	High	9		236	10.24%
<b>Levels*Price Endings</b>	Low	0		242	10.50%
<b>Levels*Price Endings</b>	Low	9		510	22.13%
<b>Levels*Types of the goods</b>	Exactly	lux		407	17.66%
<b>Levels*Types of the goods</b>	Exactly	ord		692	30.02%
<b>Levels*Types of the goods</b>	High	lux		251	10.89%
<b>Levels*Types of the goods</b>	High	ord		203	8.81%
<b>Levels*Types of the goods</b>	Low	lux		497	21.56%
<b>Levels*Types of the goods</b>	Low	ord		255	11.06%
<b>Price Endings*Types of the goods</b>	0	lux		576	24.99%
<b>Price Endings*Types of the goods</b>	0	ord		577	25.03%
<b>Price Endings*Types of the goods</b>	9	lux		579	25.12%
<b>Price Endings*Types of the goods</b>	9	ord		573	24.86%
<b>Levels*Price Endings*Types of the goods</b>	Exactly	0	lux	275	11.93%
<b>Levels*Price Endings*Types of the goods</b>	Exactly	0	ord	418	18.13%
<b>Levels*Price Endings*Types of the goods</b>	Exactly	9	lux	132	5.73%
<b>Levels*Price Endings*Types of the goods</b>	Exactly	9	ord	274	11.89%
<b>Levels*Price Endings*Types of the goods</b>	High	0	lux	129	5.60%
<b>Levels*Price Endings*Types of the goods</b>	High	0	ord	89	3.86%
<b>Levels*Price Endings*Types of the goods</b>	High	9	lux	122	5.29%
<b>Levels*Price Endings*Types of the goods</b>	High	9	ord	114	4.95%
<b>Levels*Price Endings*Types of the goods</b>	Low	0	lux	172	7.46%
<b>Levels*Price Endings*Types of the goods</b>	Low	0	ord	70	3.04%
<b>Levels*Price Endings*Types of the goods</b>	Low	9	lux	325	14.10%
<b>Levels*Price Endings*Types of the goods</b>	Low	9	ord	185	8.03%