

**University of Tartu**  
Faculty of Economics and Business Administration

**DO YELLOW PRICE TAGS  
MATTER TO CONSUMERS?  
THE RELATIONSHIP  
BETWEEN THE  
PRESENTATION OF THE  
PRICE AND THE  
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## **Do Yellow Price Tags Matter to Consumers? The Relationship Between the Presentation of the Price and the Reference Price**

Tanel Mehine<sup>1</sup>

### **Abstract**

The purpose of this article is to find out the relationship between yellow price tags and consumer reference prices. A laboratory study was conducted among 150 respondents, who were put in an experimental purchase situation and their initial internal reference prices were compared affected reference prices. The results revealed that consumers perceive yellow price tags as presenters of discounts. A comparison of the mean values showed that yellow price tags influence the reference price and, moreover, a yellow price tag increased the reference price. As a practical outcome, the results of the study indicated that companies have the opportunity to increase the consumer's reference price and thereby to raise revenues by changing the colour of the price tag without offering an actual discount.

**JEL Classification:** M30, M31, M39

**Keywords:** yellow price tags, consumer behaviour, reference price

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# 1. INTRODUCTION

Reference price is a conceptual, fair price or a price range in the consumer's mind on the basis of which the person compares and judges other prices and also makes buying decisions. The higher the consumer's reference price from the selling price of the product, the more likely the consumer will make a positive decision to buy. The reference price is formed on the basis of external stimuli and previously remembered prices. At the same time, the reference price is not formed solely in the consumer's mind, but is also influenced by the seller.

In retail business, various promotional tools are increasingly being used to capture the consumer's attention and to influence their purchasing decisions. Among such things are price tags, which carry one of the most important pieces of information needed to make a buying decision – the price. In the last couple of years, using yellow price tags has become a strong promotional tool in the Estonian retail business; this can simply be used as an eye-catcher or to indicate a discount price. However, a yellow price tag does not include direct information about the discount or the amount of the discount, and in actual fact does not necessarily have to signify a discount; nevertheless, consumers often assume there is a discount.

The relationship between price tags and reference prices are well studied (Hardesty, Different, 2001; Koala, Lindsey-Mullikin, 2003; Lowe, 2006; Carlson et al. 2007), but a research gap exists in the area of coloured promotional price tags that contain no direct information about a discount and how it influences the consumer's reference price. The present article combines these two aspects creating a conceptual framework of the use of yellow price tags as a promotional tool, and via a laboratory study finds out how yellow price tags influence consumer reference prices.

Hence the author tries to determine, whether the use of yellow price tags in retail business subsequently has an effect on the consumer's reference price, which in reality would mean that the seller has the liberty to increase the price of a product or a whole

selection of products without losing the consumer's trust. The results of the research should interest retailers as well as consumer organizations because if an effect does exist, consumers can, on the one hand, be influenced to act in a way that is advantageous to sellers via a simple and inexpensive promotional technique and, on the other hand, consumer protection should think about more stringent regulations on the use of yellow price tags.

The paper is structured as follows: the first section provides an overview of the literature about the nature and the formation and forming of reference prices. Next, a conceptual framework of the use of yellow price tags as a promotional tool is introduced and is later used in an empirical study. The third section describes the methodology and data followed by the results and discussion. Finally, managerial implications, limitations, future research and conclusions will be presented.

## **2. OVERVIEW OF THE LITERATURE**

In the absence of complete information, the consumer uses various psychological instruments to facilitate the buying decision. One such instrument is comparing prices or reference prices. (Klein, Oglethorpe, 1987; Rajendran, Tellis, 1994; Kalyanarm, Winer, 1995) The reference price is the price the consumer uses to compare other prices (Huq, 2005). Lowengart defines the reference price more precisely as a conceptual price that the consumer uses to compare other prices (Lowengart 2002). Janiszewski and Lichtenstein refer to the reference price as a zero point on the basis of which the consumer compares other prices. Moreover, prices that are thought to be lower than the zero point are considered relatively cheap and prices, which are thought to be higher than the zero point, are considered relatively expensive (Janiszewski, Lichtenstein 1999).

These definitions also reveal the general principle of the reference price, according to which the consumer compares an internally conceived price with the displayed selling price in order to decide whether this price is cheap, expensive or appropriate. The

reference price can thus also be viewed as an aid to making a buying decision (Lowe, 2006). A purchase is made when the reference price exceeds or is equal to a specific selling price because the consumer perceives the deal to be positive (Kridler, Han, 2004). In earlier articles, the reference price is primarily defined as the weighted average of the previous period or past prices (Winer, 1986; Putler, 1992; Rajendran, Tellis, 1994); thus, the main reference points are experiences and the person's memory.

Reference prices are divided into internal reference prices and external reference prices on the basis of the aspect of information collection. If the consumer uses memory, previous experiences, or other internal stimuli in forming a reference price, we are talking about consuming with internal information or of forming an internal reference price. If the consumer uses momentary external stimuli emanating from the environment, such as other prices, the purchase situation and so on, we are dealing with external information as a result of which such reference prices are called external reference prices (Lowengart, 2002). This division is brought out in the discussions of many authors, but the reference price itself can oftentimes only be viewed as an internal reference price. In that case, the external reference price should be viewed as an influencing stimulus, not as a separate reference price.

The concepts of the reference price could be divided into those based on means, price limits and price ranges, values, advertising prices, the purchase location, and the brand (Klein, Oglethorpe, 1987; Lichtenstein, Bearden, 1989; Biswas, Blair, 1991; Mayhew, Winer, 1992; Rajendran and Tellis, 1994; Kalyanarm, Winer, 1995; Breisch *et al.* 1997; Hardesty, Different, 2001; Lowengart, 2002; Thomas, Menon, 2007). Reference prices are divided into internal and external reference prices on the basis of various grounds. Peter and Olson treat internal reference prices as a part of price perception and external reference prices, and on the other hand, as a part of the environment (Peter, Olson, 2005). Campo and Yagüe describe the internal reference price as one formed by the consumer and the external reference price as one formed by the business operator or the seller (Campo, Yagüe, 2007). Whereas Lowengart sees the external reference price as one influenced also

by the buying context; Campo and Yagiie categorize the buying context as an influencer of the internal reference price (Lowengart, 2002; Campo, Yagiie, 2007). Summarising the discussion, the reference price is determined by one of these three influencers: the previous experiences of the consumer (such as previously experienced prices), direct external influencers (such as the displayed or current selling prices), and the context (such as the buying situation, the perceived price band of the store, etc.) (Lowengart, 2002; Shirai, 2003).

The formation of the reference price is mainly explained through four theories. According to **Helson's Adaptation Level Theory** the consumer adapts him/herself to the level of the prices experienced in the past and in order to assess a new price, it is compared to the previous level (Biswas, Blair, 1991; Mayhew, Winer, 1992; Janiszewski, Lichtenstein, 1999; Kopalle, Lindsey-Mullikin, 2003; Lowe, 2006). According to Volkman's **Range Theory**, the consumer creates a price range with an upper and lower limit on the basis of his/her experiences and remembered prices and a specific price must fall under this range. The attractiveness of a price is determined by its exact location in this range (Janiszewski and Lichtenstein, 1999). In **Prospect Theory**, the consumer has formed for him/herself a reference point in comparison to which s/he perceives a gain or a loss (Lowe, 2006; Kopalle, Lindsey-Mullikin, 2003). Lowengart and Mizrahi add that a perceived loss is more determining than a perceived gain, and thus, people would rather avoid a loss than risk in the name of a gain (Lowengart, Mizrahi, 2000). **The Assimilation Contrast Theory** is a theory of the formation of the reference price where a specific selling price is compared to an affected reference price. According to the theory, the reshaping of the reference price takes place if the old selling price (hereinafter referred to as the OSP) or, in other words, the stimulus for forming the reference price advertised by the business operator is considerably higher or lower than the consumer's internal reference price (IRP). In such a case, assimilation takes place and the internal reference price (IRP) moves in the direction of the value of the old selling price (OSP) or the stimulus, which becomes the affected reference price (ARP). If the change is small, the consumer leaves the internal reference price unaltered. In the same way, a price that is too low or too high

and which is out of the consumer's price limits leaves the reference price unaltered because the price does not seem believable to the consumer – what takes place is referred to as a process of contrast. Thereafter the consumer compares the selling price (hereinafter referred to as the SP) to the affected reference price (ARP) and if the selling price is lower or equal to the affected reference price, the consumer perceives a gain and makes a purchase, but if the selling price is higher than the affected reference price, a purchase is not made (Diamond, Campell, 1989; Lowe, 2006; Kopalle, Lindsey-Mullikin, 2003; Compeau, Grewal, 1998).

Rajendran and Tellis set out a formula for how the reference price is formed, which focuses on existing prices in stores. The reference price forms as the arithmetic mean of the highest, lowest and medium price. The form of the formula is as follows (Rajendran, Tellis, 1994):

$$(1) \quad RP_{jst} = (P_{jst}^H + P_{jst}^L + P_{jst}^M) / 3$$

where  $RP_{jst}$  - the reference price of product group  $j$  at the time  $t$  in buying place  $s$ ;

$P_{jst}^H$  - the highest selling price of product group  $j$  at time  $t$  in buying place  $s$ ;

$P_{jst}^L$  - the lowest selling price of product group  $j$  at time  $t$  in buying place  $s$ ;

$P_{jst}^M$  - the medium selling price of product group  $j$  at time  $t$  in buying place  $s$ .

The formula illustrates the formation of the reference price in a store situation where, in addition to a specific product, the prices of other similar and alternative products are also looked at. The given formula will also be used by the author of the present paper to verify the empirical hypotheses.

Companies have the opportunity to take part in the formation process of the reference price by shaping the stimuli on the basis of which the reference price forms, or, in other words, the contextual factors. What are regarded as different contextual factors include



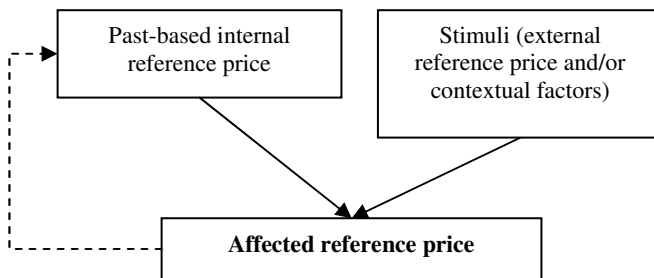
the consumer's peculiarities (e.g. buying patterns, involvement), macroeconomic indicators (e.g. inflation), the specific characteristics of the product (e.g. durable goods versus non-durable goods) as well as the stimuli created by the seller. Three factors have mainly been pointed out which possibly help companies to shape the consumer's reference price. First of all, the existing prices on other products; secondly, the previous price of the product, or, in other words, the advertised price (including discounts); and thirdly, the perceived price band of the buying place (Lowengart, 2002; Lichtenstein, Bearden, 1989; Kalwani et al. 1990).

The following studies also show the important the influence of contextual factors on the reference price. Kalwani *et al.* found that the consumer's reference price forms as the weighted average of the last five prices paid rather than as the last price paid. In addition, it was found that the importance of the last price remembered in forming the reference price decreases when the process is influenced by different contextual factors (Kalwani *et al.* 1990). Mayhew and Winer also reached similar results and found that external influencers of the reference price exert a stronger influence on the reference price than internal factors (Mayhew, Winer, 1992). Rajendran and Tellis claim that contextual factors, such as the perceived price band of the store or the current prices of products, exert a considerably stronger influence than remembered prices because current prices are temporally fresher and more exact. At the same time, remembered prices also play a role in the formation of the reference price (Rajendran, Tellis, 1994).

In several studies, it has become apparent that consumers do not know the exact prices of products. Furthermore, consumers cannot often recall the prices of products even immediately after purchasing them. Still, consumers have reference prices that are also formed through remembered prices (Monroe, Lee, 1999; Dickson, Sawyer, 1990; Goodstein, 1994; von Freymann, 2002). In order to assess a price, consumers also use the method of fitting prices into a value range. Most consumers have specific value limits between which a reasonable or acceptable price falls, or in other words, the consumer's price preferences. The consumer

forms the given ranges on the basis of his/her experiences and consequently, the prices may not correspond to actual market prices (Blois, 2000; Lichtenstein, Bearden, 1989).

In cases where the selling price is higher than the internal reference price, the former is perceived as being negative and the likelihood of the purchase decreases. On the other hand, if the reference price is higher than the price displayed in the buying place, the price is perceived as being positive and the likelihood of the purchase increases (Campo, Yagüe, 2007). Consequently, the higher the internal reference price, the more the consumer is willing to pay for the product. Thus, it is useful for companies to influence the consumer's reference price with different stimuli. Lichtenstein and Bearden found that extremely high and extremely low stimuli of the reference price (e.g. advertised prices) created by a company are not taken seriously by consumers and they do not reshape the actual reference price. Therefore, the likelihood of a purchase also does not increase (Lichtenstein, Bearden, 1989). A similar result was also reached by Thomas (Thomas, 2005).



**Figure 1.** The formation of the affected reference price through the internal reference price and external stimuli

Since in reality, there only exists one comparison price or reference price for the consumer, the author hereinafter defines the reference price as the affected reference price (see also Figure 1), which forms on the basis of previously remembered and experienced prices (the past-based internal reference price) and on the stimuli existing in a particular purchase situation (which forms in the present). In principle, stimuli can be regarded as external reference prices, while, at the same time, it has also become

apparent from different studies that stimuli cannot always be treated as a separate reference price – they also act as contextual factors. An affected reference price becomes the internal reference price for the next purchase situation.

### **3. A CONCEPTUAL FRAMEWORK OF THE USE OF YELLOW PRICE TAGS AS A PROMOTIONAL TOOL**

Manufacturers and resellers use more noticeable, colourful price tags instead of the usual tags with the aim of drawing attention specifically to their product. More specifically, what the author has in mind here are price tags that are otherwise similar to normal price tags in regard to size, information content and visual style; the only difference being the background colour of the price tag (usually yellow or red). Therefore, the author hereinafter uses the concept of a yellow price tag to avoid confusing it with other similar coloured labels/advertisements.

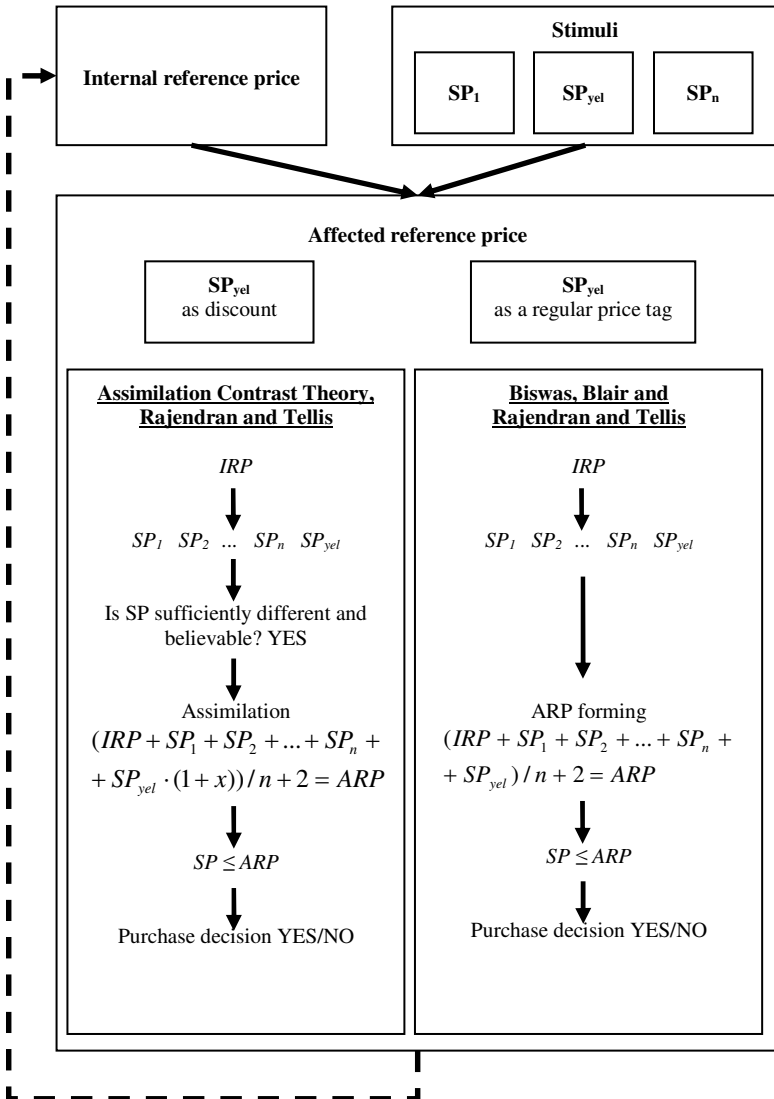
In general, the appearance of price tags is not discussed at length in theoretical literature. The effect of information on price tags on the purchase behaviour, such as the presentation of unit prices (e.g. price per kilogram) and the use of dual prices (e.g. “before and after prices”), has been studied empirically (Myasaki et al. 2000; Kopalle, Lindsey-Mullikin, 2003; Rajendran, Tellis, 1994), but there are no studies on the effect of coloured backgrounds. In the opinion of the author, coloured price tags could fall under promotional tools, being information carriers, eye-catchers, discount markers, but also one of the factors that shape the reference price.

Pride and Ferrel define promotion as an activity or tool, which acts as a direct sales stimulation tool, an enticement to buy, and/or added value offered to resellers or end consumers. Kotler *et al.* add a temporal dimension to the concept of promotion by referring to promotion as a short-term, and at the same time, fast tool for increasing sales (Pride, Ferrel, 1987, Kotler et al. 2008). Both as something to catch the consumer’s attention and carry information

through the price tag, a yellow price tag can be classified as a promotional tool. Being different from the other price tags on the shelf (in terms of background colour), a yellow price tag certainly catches the consumer's attention. At the same time, a price tag also serves as an information carrier, meaning that a yellow price tag performs a practical as well as a promotional function simultaneously while only adding a small expense (Wildrick, 2004).

Peter and Olson also highlight discounts as one of the promotional methods directed at the consumer (Peter, Olson, 2005). A discount is defined as a significant temporary lowering of prices, which does not come from spending on the product and changes in them (Loy, Weaver, 2002). In specialist literature, price tags that present an actual discount are referred to as advertised prices or stimulus reference prices (e.g. "Previously..." "Now..." prices) (Hardesty, Different, 2001; Kopalle, Lindsey-Mullikin, 2003; Lowe, 2006; Carlson et al. 2007).

In the subjective opinion of the author, the consumer oftentimes regards a yellow price tag as presenting a discount. This statement will be verified in the next part of the present study. Thus, it is possible that a yellow price tag should also be treated as a promotional tool that presents a discount. By contrasting them with the advertised prices and a regular price tag, and on the basis of the theory highlighted in this chapter, the author constructs a theoretical vision of the effect of yellow price tags on the reference price, taking as the basis the previously introduced concept of the affected reference price, Biswas and Blair's concept of reference price, Assimilation Contrast Theory, and Rajendran and Tellis' formula for the formation of the reference price (see Figure 2).



**Figure 2.** The possible effect of a yellow price tag on the reference price (drawn by the author)

As previously stated, yellow price tags can be viewed as advertised prices, the presenters of prices, as well as the presenters of discounts. The first, the advertised price, is described by Assimilation Contrast Theory (the OSP is presented as "Previously..." and the SP as "Now..."). The affected reference price is influenced by the consumer's internal reference price as well as by different stimuli, including the prices of other products in the store. In a situation where there are  $n$  products in the store, and one of them is marked by a yellow price tag, one of two processes could theoretically take place – on the one hand, the yellow price tag could be perceived by the consumer simply as a regular price tag or, on the other hand, the consumer could perceive the yellow price tag as a price tag designating a discount. If the yellow price tag is treated as a regular price tag, and is not perceived by the consumer as a discount, the reference price is formed (according to Formula 1) as the average of the remembered prices and existing prices, where the new internal reference price ARP forms as the arithmetic mean of the previously experienced prices (IRP) and the prices of alternative products ( $SP_1, SP_2 \dots SP_n$ ).

If the consumer perceives the price tag as a discount, however, Assimilation Contrast Theory is applied. In contrast with the advertised prices, where the essence and extent of a discount is clearly indicated, Assimilation Contrast Theory is not fully applied. The fact is that there is no OSP presented and also, if the price tag is perceived as the presenter of a discount, the consumer does not start to question the difference and credibility of the OSP that is the centrepiece of the theory (the perceived presence of a discount lends credibility and a sufficient difference is created by the consumer him/herself in his/her perception). If we also take into account the old internal reference price (IRP), the affected reference price (ARP) is assimilated as an arithmetic mean, which also includes the consumer's assessment of the size of the discount  $x$  on the yellow selling price  $SP_{yel}$ . In contrast with Assimilation Contrast Theory, the author brings in a contextual factor in the form of the prices of alternative products. The established ARP is the new internal reference price.

In order to check whether yellow price tags function as regular price tags or to indicate discounts, an experiment was carried out. The first research question was:

1. *Whether the mean values of the reference price influenced by yellow price tags are different from the mean values of the reference price influenced by the test group?*

Thus, what is verified is the hypotheses, whether the mean values of the reference price influenced in the test group and the mean values of the reference price influenced by yellow price tags are the same ( $H_0$ ) or statistically different ( $H_1$ ). If the zero-hypothesis remains valid, the author has no grounds for claiming that there exists a relationship between the reference price and yellow price tags, so a yellow price tag can be treated as an information carrier and an eye-catcher, but not as the presenter of a discount. However, if the mean values are statistically different, there does exist a relationship between yellow price tags and the reference price. If the average ARP is higher than the IRP, then a yellow price tag also acts as the presenter of a discount.

2. *Whether the average limit points, average reference price, and price limits are situation group specific?*

Since, according to Lichtenstein and Bearden's (1989) approach using price limits, the falling of a particular selling price within the limits of the reference price is decisive in terms of a positive buying decision, the author will also look at the particular effects of yellow price tags on limit points (Rajendran, Tellis, 1994) and reference price limits (research question 2). If the price limits narrow, some products may fall off the consumer's wish list due to, for example, not corresponding to a perceptible quality level, and vice versa. In a situation, however, where the price limits move upwards, the consumer becomes more accepting of more expensive goods, and vice versa. (Lichtenstein, Bearden 1989)

## 4. METHODOLOGY AND DATA

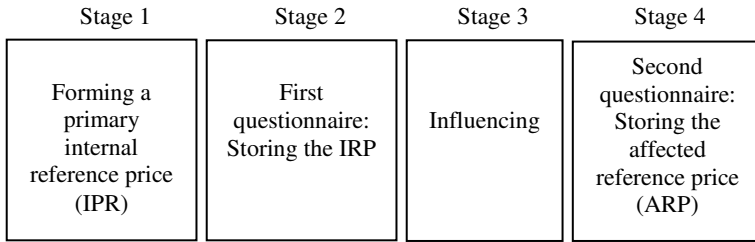
In order to find out the effect of yellow price tags on the reference price, the author carried out an experiment among students and visitors at the Faculty of Economics and Business Administration at the University of Tartu. One hundred and seventy-two (172) people participated in the experiment and correctly answered sheets were returned by 150 of them, or, in other words, by almost 88 per cent of the respondents.

**Table 1.** Sample Description

Sample size	n=172		
Correctly filled-in sheets	n=150 (88%)		
Gender	Female	Male	
	n=90 (60%)	n=60 (40%)	
Age	16-24	25-44	45-54
	n=87 (58%)	n=42 (28%)	n=21 (14%)
Occupation	Student	Working student	Worker
	n=54 (36%)	n=66 (44%)	n=30 (20%)

The experiment tried to imitate a store situation where the consumer has to compare particular prices with previously remembered ones. While taking into consideration the stimuli offered by the seller, the consumer also has to decide about the appropriateness of the prices paid in the future. The products used in the experiment were premium class beers. Beers were chosen because yellow price tags are primarily used in retail businesses in Estonia, especially on staple goods like beverages. The product chosen for the experiment also had to have a low enough customer involvement. In order to avoid possible unwelcome answers arising from brand preferences, the author used beer bottles of identical shape, leaving the letters marked on the bottles as the only basis for distinction (see Figure 3).





**Figure 3.** The stages of the experiment

The experiment was divided into four stages. *The first stage* involved forming a primary internal reference price (IRP). The participant was presented with five different bottles of beer at five different prices. The time limit gave the participant the chance to roughly remember the prices, but not to memorize the exact prices. The aim of the first stage was to establish a common internal reference price level for all participants. The five prices presented were formed so that the mean value of the prices was 11.30 EEK, the minimum price was 10.40 EEK and the maximum price was 12.10 EEK.

*The second stage* involved storing the IRP. During the second stage of the experiment, three questions had to be answered (see Appendix 1) guided by what they had previously seen – the remembered prices. The first question identified the participant’s primary lowest limit point ( $IRP^L$ ). This was taken as one of the three primary internal reference prices. The second question aimed to identify the second, or primary mean internal reference price ( $IRP^M$ ), and the third question aimed to identify the primary highest limit point ( $IRP^H$ ), which was the third internal reference price.

*The third stage* is called influencing. Having answered the three questions, the participants were asked to read through the description of the situation at the third stage and to analyze the prices presented. According to the situation, the participants stand in front of a selection of five different premium beers in a retail

outlet. They are asked to pay attention to the prices (they do not have to choose anything). Every participant in the experiment is randomly given either one of three situations involving a yellow price tag, or a test group situation, where all the prices were white or, in other words, without an influencer. The influencing of the participant takes place via the price tags. The prices indicated in the third stage are equivalent in terms of limit points as well as averages. There were altogether four different situation groups in the experiment: the test group (*SG1*) and three situation groups with a yellow price tag (*SG2* – where the yellow price tag was established in relation to the product with the lowest price, *SG3* – where the yellow price tag was established in relation to the product with the medium price, and *SG4* – where the yellow price tag was established in relation to the product with the most expensive price).

*The fourth stage* involved storing the affected reference price (ARP). In the fourth stage of the experiment, three questions had to be answered again. This time, however, the participants were asked to propose the highest ( $ARP^H$ ), lowest ( $ARP^L$ ) and medium ( $ARP^M$ ) price for the same store.

The hypothesis will be verified on the basis of formula 1 for finding out the reference price, with some changes to the formula:

$$(2) \quad IRP_M = (H_1^L + H_1^M + H_1^H) / 3,$$

where  $IRP_M$  – the mean of the primary internal reference price,

$H_1^L$  – the mean of the primary lowest internal reference price,

$H_1^M$  – the mean of the primary medium internal reference price,

$H_1^H$  – the mean of the primary highest internal reference price.

The mean of the affected reference price ( $ARP_M$ ) takes form on the basis of the same formula, while also taking into account the prices

presented in the third stage, the influencing stage, and adding the previously discovered internal reference price ( $IRP_M$ ) to the external stimuli. The formula for the affected reference price is as follows:

$$(3) \quad ARP_M = (H_2^L + H_2^M + H_2^H + IRP_M) / 4,$$

where  $ARP_M$  – the mean of the affected reference price,

$H_2^L$  – the mean of the lowest affected reference price,

$H_2^M$  – the mean of the medium affected reference price,

$H_2^H$  – the mean of the highest affected reference price,

$IRP_M$  – the mean of the primary internal reference price.

## 5. RESULTS AND DISCUSSION

In order to obtain more adequate results, the author had to eliminate 22 responses from the 172 responses collected because these were filled in incorrectly or were extreme. The extreme values which were removed were prices which were lower than 9.00 EEK or higher than 13.60 EEK. Extreme answers were mostly given when answering the first three questions.

In order to verify the reliability of the data collected during the experiment and to find out the differences between the reference prices, a test group (SG1) was used in the experiment where all the price tags were white. In theory, the internal reference price (IRP) and the affected reference price (ARP) should not differ from one another in case of SG1. In order to compare the differences between the test group's IRP and ARP, first of all, whether the respondents' primary internal reference prices are the same as those indicated in the first stage of the experiment has to be checked. Therefore, pairs of hypotheses have to be posed in order to check all mean values:

$H_0$ : The mean of the primary lowest internal reference price formed by the test group is 10.4.  $\mu=10.4$

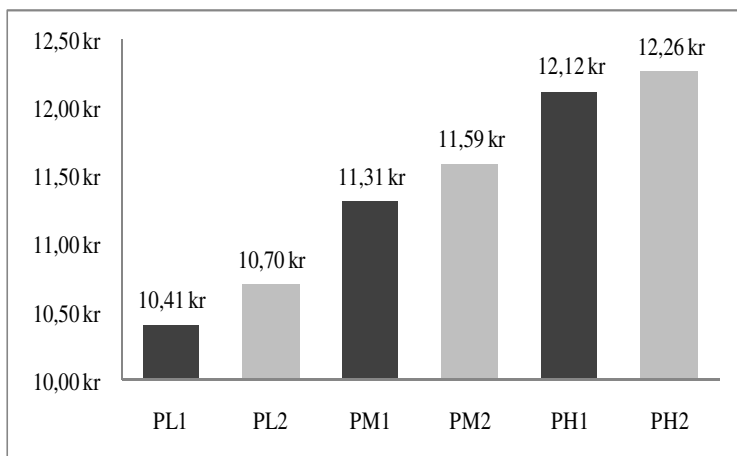
$H_1$ : The mean of the primary lowest internal reference price formed by the test group is not 10.4.  $\mu \neq 10.4$

The value of the t-test was  $t=0.78$ , which does not fall within the critical area (at 5% on the importance level, the critical values are -1.96 and 1.96). Thus, the zero-hypothesis remains valid and it can be claimed that the internal reference price created for the test group is 10.4. In the same way, the mean values of the medium and highest prices proposed were also checked. On the basis of the values of the parameters, it can be claimed that all the mean values are the same as the prices indicated. Looking at the differences between the  $IRP_M$  value of 11.29 and the  $ARP_M$  value of 11.31 for the test group, it can be seen that what has taken place is a small change in the mean value. The t-Test value of 0.703 shows that statistically, there is no significant difference between the two mean values.

Secondly, the presented IRP and primary (answered) IRP correspondence was checked. The same method was used as in the case of the test group, but this time all the results from situation groups SG2, SG3, and SG4 were examined. The value of the parameter was  $z=0.45$ , which does not fall within the critical area. Thus, the zero-hypothesis remains valid and it can be claimed that the primary lowest internal reference price is 10.4. The same pair of hypotheses was also formulated for the means of the medium and highest reference prices. The values of the parameters turned out to be  $H_1^M z=0.36$  and  $H_1^H z=1.05$ , respectively, neither of which falls within the critical area. Thus, it can be claimed that the three primary internal reference prices of all three situation groups influenced by yellow price tags are the same as the lowest, medium, and highest price presented in the first stage. Consequently, it can also be claimed that the aim of the first stage of the experiment was fulfilled – to establish a common internal reference price level for all the participants.

The following figure (Figure 4) highlights the mean of all six prices given as an answer (the lowest (PL1), medium (PM1), and highest (PH1) primary internal reference price and affected reference prices (PL2, PM2, PH2)). The prices indicated are the

means of the situation groups SG2–SG4, or, in other words, situations where a yellow price tag was the influencer at some level (in the form of the highest, lowest, or medium price).



**Figure 4.** The lowest, medium, and highest prices of the situation groups influenced by yellow price tags when comparing internal reference prices and affected reference prices in Estonian kroons (drawn by the author)

The means of the primary internal reference prices are shown in dark grey and the means of the affected reference prices are shown in light gray. It can be seen that within the framework of the situation groups, every mean value has increased in total. The increase of the lowest price is 0.29 EEK, or 2.8 per cent, the increase of the medium price is 0.28 EEK, or 2.5 per cent, and the increase of the highest price is 0.14 EEK, or 1.2 per cent, and the differences were statistically significant. Calculating the mean of the primary internal reference price ( $IRP_M = 11.282$ ) and the mean of the affected reference price ( $ARP_M = 11.458$ ) on the basis of the previously highlighted formulas, it can be seen that the affected reference price is higher than the primary internal reference price by 0.176 EEK, or 1.6 per cent. There is also a statistically significant difference between  $IRP_M$  and  $ARP_M$  (verified using a t-Test: Paired Two Sample for Means,  $P=$

4.43341E<sup>-18</sup>). Looking also individually at every response from the participants, it can additionally be highlighted that out of 150 participants, 140 participants had an  $ARP_M > IRP_M$ ; in other words, the reference price increased after being influenced in the case of 93 per cent of the participants.

The data collected also makes it possible to discover whether the affected reference price varies in different groups depending on which product is labelled with a yellow price tag. The reference price is now treated as in Rajendran and Tellis's limit points (the lowest and highest limit point and the average price at the store) and Lichtenstein and Bearden's price limits. What has to be noted here is the concept of the mean reference price in the treatment of the second research question. While previously the mean reference price was the arithmetic mean of the limits as well as of the average price, what is now viewed as the medium reference price is the medium price from the answers given in the experiment. In addition, the lowest limit point and the highest limit point are also viewed as separate reference prices when falling within the price limits is also observed, taking the highest limit point and the lowest limit point as the basis of the consumer's reference price range.

The situation groups influenced by a yellow price tag (SG2, SG3 and SG4) are observed as different situations, and the lowest and highest limit points and the average price as separate reference prices are seen as concepts of the reference price. At the end of the analysis, the situations are also observed within the framework of price limits.

Firstly, we checked whether the three primary internal reference prices (the lowest, medium, and highest) in all three situation groups corresponded to the prices presented in the first stage of the experiment. To that end, the following hypotheses were posed,  $H_0: \mu=10.4$ ;  $H_1: \mu \neq 10.4$ ,  $H_0: \mu=11.3$ ;  $H_1: \mu \neq 11.3$ , and  $H_0: \mu=12.1$  and  $H_1: \mu \neq 12.1$  were both verified on the basis of situation groups SG2, SG3 and SG4. The results of the t-Test (see Table 2) suggested that the primary internal reference prices established by the person conducting the experiment was the same in the groups as none of the values of the t-Test fell within the critical area (the critical area

began at -1.96 and 1.96). Then we checked whether the primary internal reference prices of every situation group corresponded to the lowest and highest limit points of the mean affected reference price and the average price.

**Table 2.** Situation groups

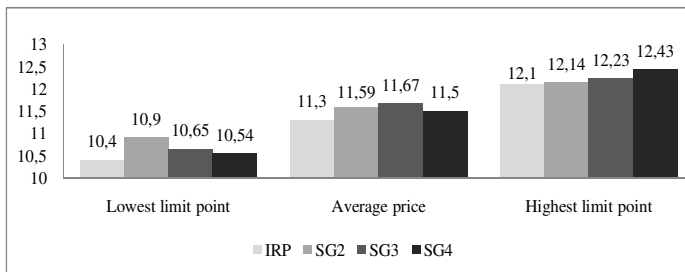
	Yellow price tag established in relation to the product with the lowest price (SG2)	Yellow price tag established in relation to the product with the medium price (SG3)	Yellow price tag established in relation to the product with the highest price (SG4)
Reference price as the lowest limit point	<b>Q1</b> $t(Q1) = -0.17$	<b>Q4</b> $t(Q4) = 0$	<b>Q7</b> $t(Q7) = 0.66$
Reference price as the average price	<b>Q2</b> $t(Q2) = 0.1$	<b>Q5</b> $t(Q5) = 0$	<b>Q8</b> $t(Q8) = 0.96$
Reference price as the highest limit point	<b>Q3</b> $t(Q3) = 0.59$	<b>Q6</b> $t(Q6) = 0.63$	<b>Q9</b> $t(Q9) = 0.89$

In situation group SG2, a statistically significant change has taken place only in relation to the lowest limit point and the average price, where the value of the parameter having a mutual relevance probability was  $P = 2.32E^{-07}$  and  $P = 0.000243$ , respectively, which are both lower than 0.05; in other words, a difference does exist between the primary internal reference price and the affected reference price. Thus, it can be claimed that if a yellow price tag is established in relation to the lowest price in the store, the consumer's reference price increases when the price tag is seen as the lowest limit point or the mean reference price. In addition, the consumer's price limits also narrow if the price limits are treated as the interval between the highest and lowest limit points, the difference between which was 1.72 EEK before being influenced and falling to 1.24 EEK after the interpretation of the yellow price tag.

In situation group SG3, a statistically relevant difference has taken place in relation to the mean of all three prices (for the lowest limit point,  $P=4.06E^{-09}$ , for the average price,  $P=5.27E^{-07}$ , for the highest limit point,  $P=0.000019$ ). In general, price limits have narrowed from 1.72 EEK to 1.58 EEK. The values of Pearson's correlation coefficients show that the changes in the lowest and highest limit points are perceived to be of the same size by the participants (the coefficients are 0.837 and 0.898, respectively). By establishing a yellow price tag in relation to the medium-priced product, both of the limit points as well as the average price will increase. As in the previous situation groups, what most often comes to the forefront in the consumer's mind is the indicator marked with a yellow price tag, or, in other words, the average price in this case. The average price limits have also narrowed once again, but to a lesser extent (0.14 EEK).

In situation group SG4, a statistically relevant change has taken place in relation to all three prices, where the value of the parameter with a mutual relevance probability was  $P=6.61E^{-05}$ ,  $P=4.59E^{-07}$  and  $P=5.46E^{-07}$ , respectively, which are all lower than 0.05; in other words, a difference does exist between the primary internal reference price and the affected reference price. While in the previous two situations, the price limits of the reference price narrowed, in the present situation, the price limits increased, but at the same time, they also broadened from 1.7 EEK to 1.89 EEK. According to Pearson's correlation coefficients, consumers perceive the changes to be of the same size in the case of the lowest limit point as well as the average price (the coefficients are 0.888 and 0.816, respectively); in the case of the highest limit point, strong claims cannot be made about the magnitude of similar changes (the coefficient is 0.583).





**Figure 5.** The comparison of the primary internal reference price and the affected reference prices of situation groups SG2, SG3 and SG4 between the lowest and highest limit point of the mean value and the average price

Figure 5 provides an aggregated graph of the lowest and highest limit point of the mean of all three situations affected by a yellow price tag, and the average price in comparison to the primary internal reference price. It can be seen from the graph that regardless of whether the yellow price tag is established in relation to the product with the lowest, medium or highest price, the consumer's assessment of the fair price of the product increases, treating it either as the lowest or highest limit point or the average price. What was not statistically confirmed was the effect of the yellow price tags established in relation to the product with the lowest price on the highest price limit of the reference price. It can also clearly be seen from the graph that by establishing a yellow price tag in relation to the lowest-priced product, what increases the most is the lowest limit point – by establishing it in relation to the medium-priced product, the average price increases, and by establishing it in relation to the highest-priced product, the highest limit point increases the most.

It is important to mention that the mean value of the affected lowest limit point is 10.90, being the same value as the price of the second least expensive product presented in the third stage of the experiment. This leads to the conclusion that consumers do not regard a yellow price tag as a 4.8% discount, but raise their reference price to the level of the next least expensive price (i.e.

10.90). In order to check the validity of the given claim, the author looked at every response separately. About 25 per cent of the respondents found that the new reference price is exactly 10.90 EEK, thus it is possible that consumers establish the price of the next least expensive product as the new lowest limit point. This claim, however, requires further studies and, from the perspective of the present paper, the author still treats a yellow price tag as the presenter of a discount. The author also looked at the same option in relation to the average price (there is no need to look at the higher price in the case of the highest limit point because the product with the highest price in the store was marked with a yellow price tag), but here it is not possible to assert the same result.

The results of the experiment confirmed the influence of yellow price tags on the reference price. By looking at the mean values, limit points or price limits as the reference price, it can be claimed that yellow price tags increase the consumer's reference price. By establishing a yellow price tag in relation to the product with the lowest, medium or highest price, differences can be observed regarding changes in the price limits. What was confirmed in the paper was the behaviour of yellow price tags as discounts in the consumer's mind, even though the company is not actually obligated to offer a discount when establishing a yellow price tag. Thus, a yellow price tag is an effective method for business operators, but if there is actually no discount offered whatsoever, then it acts rather as an unethical psychological tool from the perspective of the consumer.

## **6. MANAGERIAL IMPLICATIONS**

Some general conclusions can also be drawn on the basis of the preceding statistical analysis. Having taken the formula by Briesch *et al* as the basis for finding out the reference price and calculated the mean values, it became apparent that the reference price increased when the participants were influenced by yellow price tags. Thus, it was confirmed that yellow price tags affect the reference price and that the effect of yellow price tags on the

reference price is positive (in the mathematical sense). The consumer therefore perceives a yellow price tag as a price tag presenting a discount and assumes that the price of the product with a yellow price tag is a discounted price. By analyzing the mean values for the primary internal reference price and the affected reference price, we discovered the extent of the increases, which can be interpreted as the consumer's assessment of the actual price of the product. In the experiment, reference prices increased from 1.2 per cent to 2.8 per cent (1.6 per cent on average), which also provides a rough idea of the consumer's assessment of the amount of the discount. Nevertheless, what has to be considered here are the peculiarities arising from the experiment, and there should not be made any general conclusions on the basis of the mentioned percentages.

From a practical perspective, the positive effect of yellow price tags on the reference price means that a company can increase the consumer's reference price in quickly and easily. As was also mentioned in the earlier sections, a higher reference price means that the consumer is more likely to accept expensive prices. For example, this would mean that a consumer has a fixed internal reference price of 10 EEK for a certain product and the prices in the store also offer 10 EEK as the average price, but the price tag on one of the products is yellow. The consumer now interprets the price marked on the yellow price tag as a discount and calculates the average price of the product by adding a value to the yellow price tag (the amount of the assumed discount). The next time s/he goes to the store, however, the price of the product, which seemed too expensive during the last visit, does not necessarily seem so expensive anymore as a result of the increase in the average price of the store and a positive buying decision is more likely. The result is particularly important in the case of brand loyal consumers, where using a yellow price tag and thereby increasing the price helps to gain additional revenues. In addition, what is also important is that the consumer him/herself regards the new higher price as being entirely justified. From the perspective of the business operator, an increase in the consumer's assessment would mean additional revenues as well; at the same time, it is possible to hide a price increase because the limit of the change perceived by the consumer has risen. Thus, since the Estonian legislation does

not set any restrictions on such price tags, the business operator can show the consumer a discount and thereby increase sales quantities without actually lowering any prices and by simply altering the colour of the price tag. So the yellow price tag is a good promotional tool but, at the same time, also an unethical trading method.

## **7. LIMITATIONS AND FUTURE RESEARCH**

The research has certain limitations. Firstly, in this article the reference price was interpreted as the mean of store prices, consumer's limit points and price limits, still there are many alternative concepts for defining the reference price. Secondly, the given experiment is a so-called laboratory test, where the test subjects had to be put in a particular situation in an out-of-the-situation context. Therefore, it can be expected that in an actual store situation, the participants might act differently. Thirdly, using beer as the sample product in the experiment may limit the potential for generalising on the basis of the findings. The results may also vary due to a bias in the sample toward younger people.

However, in order to fully understand the behaviour of yellow price tags in influencing the reference price and the buying situation, several additional studies should be conducted. As a possible development, the relationship between yellow price tags and the reference price could be determined by analyzing the results of a survey conducted in an actual shopping situation. Such a survey would show how yellow price tags work in reality, but drawing in-depth theoretical conclusions would be more complicated because of the various external factors that are not always possible to measure or put into a model. While this experiment examined the one-time effect of yellow price tag presentation on the consumer's reference price, it is important to determine the long-term effect of yellow price tags as well. Kalwani and Yim (1992) found that offering long-term discounts reduces the reference price. Thus, an experiment could be carried out to measure the reference price at different stages of being

influenced in order to look at how the reference price changes over time.

## **8. CONCLUSIONS**

The reference price is a tool for consumers to compare other prices and thereby facilitate the making of a purchase decision. Even though the reference price is a conceptual price formed in the consumer's mind, it is also a method for companies to influence consumers. According to the model created here, the reference price is formed by the internal reference price and external stimuli. The internal reference price is based on the consumer's experiences and remembered prices; promotional tools created by the company were seen as the external stimuli in the framework of the present paper. Through different stimuli, it is possible to raise or reduce the consumer's reference price, which for companies represents an opportunity to gain additional revenues or to change the price limits acceptable to consumers in a direction the companies may deem necessary.

Yellow price tags, which are increasingly being used in shopping places, can be viewed as one such influential stimulus. Yellow price tags are regular price tags, which are distinguished from the other price tags next to them only by their background colour. Thus, they are an eye-catching promotional tool and a perfectly ethical marketing practice. By juxtaposing the formula created for the formation of the reference price with the theory of yellow price tags, a hypothetical model of the possible effect of yellow price tags on the reference price was established. According to the model, consumers may not perceive a yellow price tag only as an eye-catcher, they may also believe that there is a discount behind it. Although there are no indications of a discount on the price tag; sensing a discount could also mean that the consumer's reference price changes. If a yellow price tag can affect the reference price, it would simultaneously be an effective promotional tool and an unethical marketing practice.

What was examined within the framework of the paper was the possible effect of yellow price tags on the reference price. To that end, an experiment was conducted among students and visitors at the Faculty of Economics and Business Administration at the University of Tartu. The results were analyzed on the basis of 150 correctly filled in answer sheets. During the experiment, a common reference price was first of all formed for all the participants, and thereafter yellow price tag as stimuli were used to influence the reference price. During the experiment, the average answers of different situation groups were compared within the framework of different treatments of the reference price. As a result of the study, it was found that consumers perceive yellow price tags as the presenters of a discount. A comparison of the mean values showed that yellow price tags had an effect on the reference price and, furthermore, a yellow price tag always increased the reference price. By establishing yellow price tags in relation to products with different prices, different changes in price limits as well as in limit points could be seen. By establishing a yellow price tag in relation to the cheapest product, the lowest limit point increases the most, and by establishing it in relation to the most expensive product, the highest limit point increases the most.

As a practical result, the results of the present research would mean that companies have the opportunity to increase the consumer's reference price, and thereby also revenues by changing the colour of the price tag without offering any actual discount. The different changes in price limits and limit points also showed that establishing a yellow price tag in relation to the most expensive, medium-priced or least expensive product in a store can have different results in terms of the consumer's acceptable product spectrum. Sensing a discount behind a yellow price tag makes a consumer agree to a price increase, which has not actually occurred, so using a yellow price tag helps to hide an actual price increase.

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## **Appendix 1. Questionnaires**

### First questionnaire

1. How much costs the cheapest domestic premium class beer?
2. What is an average price for domestic premium class beer?
3. How much costs the most expensive domestic premium class beer?

### Second questionnaire

1. How much costs the cheapest domestic premium class beer in this store?
2. What is an average price for domestic premium class beer in this store?
3. How much costs the most expensive domestic premium class beer in this store?

## KOKKUVÕTE

### **Kollase hinnasildi mõju tarbija ostukäitumisele: hinnasildi ja baashinna vaheline seos**

Käesolevas artiklis uuritakse hindade presenteerimise mõju baashinnale. Antud artikli eesmärgiks on välja selgitada kollaste hinnasiltide mõju tarbija baashinnale. Selleks viidi läbi laboratoorne uuring 150 vastaja seas, kus pandi vastajad poesituatsiooni ning võrreldi nende esmaseid siseseid baashindu mõjutatud baashindadega. Uuringu tulemused näitasid, et tarbijad tajuvad kollaseid hinnasilte kui soodustuse presenteerijat. Keskmiste võrdlus näitas selgelt kollaste hinnasiltide mõju baashinnale, seejuures oli kollasel hinnasildil alati baashinda tõstev mõju. Praktilise tulemusena tähendavad antud uuringu tulemused ettevõtetele võimalust hinnasildi värvust muutes ning reaalselt soodustust tegemata, tõsta tarbija baashinda ning seeläbi suurendada tulusid. Samuti näitasid hinnapiiride ja piirpunktide erinevad muutused, et kollase hinnasildi kehtestamine poe kõrgeimale, keskmisele või madalaimale tootele võib omada erinevaid tulemusi tarbija aktsepteeritavas tootespektris. Kollastelt hinnasiltidelt tuleneva soodustuse tajumine, paneb tarbija nõustuma hinnatõusuga, mida reaalselt ei ole tehtud, seega aitab kollase hinnasildi kasutamine varjata otsest hinnatõusu.