

## **Investigating the Price Knowledge Ladder**

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### **Abstract**

Most price knowledge research has been based upon a price recall measure; alternatives include recognition and reference price range measures. The research presented here is based upon Vanhuele and Drèze's (2002) study that investigated all three measures of price knowledge. This study confirms, in a UK setting, Vanhuele and Drèze's finding that recognition rather than recall should be used for researching price knowledge.

**Key Search Words:** *price knowledge, recognition, deal-spotting, reference ranges*

## Introduction

If shoppers are to respond to prices they must be aware of them but price research has shown that awareness is often quite low. For example, Dickson and Sawyer (1990) found that only 47 per cent of shoppers knew the price of the good that they had just placed in their shopping cart. This type of research is based upon *recall* of price and recall may not be an appropriate measure of consumers' price awareness.

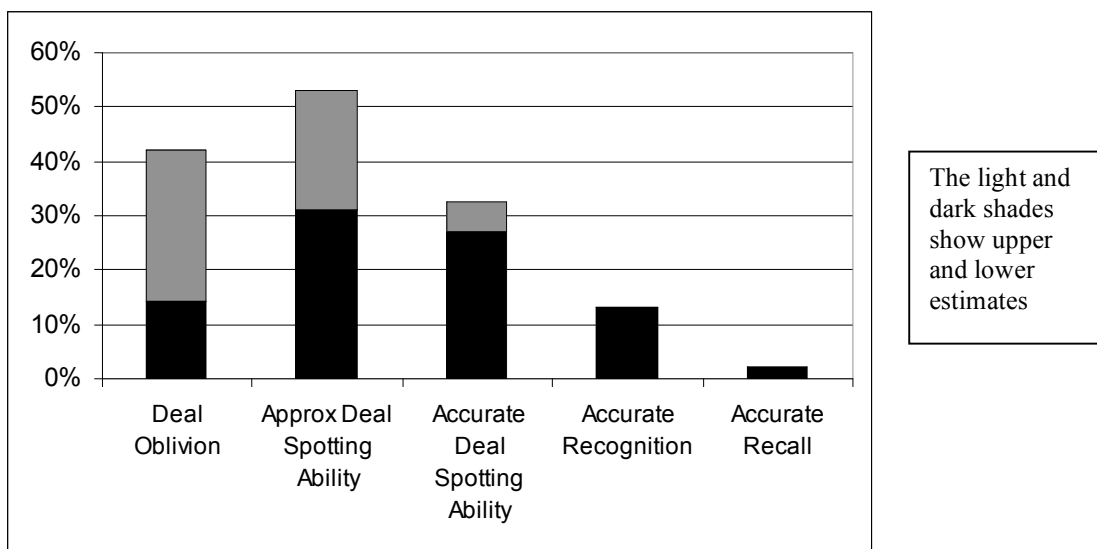
The idea that price recall is not an effective measurement for price knowledge is not new and it is surprising that studies continue to measure price knowledge in this way. In Monroe, Powell and Choudhury's (1986) seminal article, it was argued that recognition is a much more appropriate measure of price knowledge. Before proceeding to explain why this may be the case, we define recall and recognition. Recall is the mental reproduction of a response or item that has been experienced or learned before, whereas recognition is the decision or awareness that a stimulus has been experienced before (Adams 1980). Monroe *et al.* base their argument that recognition is a more effective measure than recall on the nature of learning and the ways of processing information. They state that *incidental learning* happens by chance without active information search, whereas *intentional learning* results from an active search for information, which may occur before, during or after actual shopping (p.594). The key distinction between the two is the degree to which the shopper consciously attempts to acquire and process relevant information. The importance of distinguishing between the two types of learning is that different measurements are appropriate for each one. Thus they argue that grocery shopping involves incidental learning with attention to one item at a time in memory and that this type of learning serves elaborate associations in memory between the chosen item and other product and price information. So, because shoppers usually process one item at a time, most of the learning will be incidental and a recognition test is more appropriate for measuring price knowledge.

Price knowledge levels are likely to have been underestimated in the past because they have been predominantly established using recall tests. However, Dickson and Sawyer (1990, p.50), although they used recall in their study, also included a simple recognition test of the price label, and correct label recognition was no more accurate than price recall. On the other hand, Vanhuele and Drèze (2002) found that the percentage of correct recognition responses was much higher than that for recall (13.3% versus 2.1%), a result that is consistent with the Monroe *et al.* argument. However, given Dickson and Sawyer's (1990) results, there is a need for further studies to settle this debate.

Another reason why recall measures of price knowledge may be deemed inappropriate can be based on the discussion about reference prices and ranges. Reference prices, as defined by Winer (1986), are the consumer's perceived current price of a brand, or the anticipated price of the brand. This is the price that a consumer expects to pay at the point of purchase. However, discussion seems to have moved away from this approach towards the idea that the consumer possesses a reference price *range*. Kosenko and Rahtz (1988, p.328) explain that the reference price range concept has been derived from psychophysics and Monroe's (1971) work. In this account, consumers possess a range of acceptable prices that they are willing to pay for a product which is bound by a lower and upper price limits, or thresholds. A product priced below or above these thresholds would be less likely to be bought. This thinking suggests that price knowledge can be measured through reference

ranges, and that more knowledgeable consumers are likely to be more discriminating and to have narrower acceptable price ranges (Kosenko and Rahtz, 1988). Thus it is necessary to look at evidence that consumers use reference ranges to process price information. Kalyanaram and Little (1994) hypothesized that “for a given product category in packaged goods, consumers have a latitude of price acceptance around a reference price”. Then, using a multinomial logit model of probability of choice, they found a latitude of price acceptance which is relatively price insensitive. This evidence supports the claim that consumers use ranges to judge prices, and also implies that, because of the insensitivity of the range, price promotions must be relatively large in order for consumers to be aware of them. This evidence supports similar findings from a previous study of coffee data sets (Kalyanaram and Little 1989). Thus, there is support for the notion of price ranges. Further research has shown that reference ranges may act as a representation of the magnitude of the price, and may be used to judge the attractiveness of a price even when not accessible to recall (Monroe and Lee 1999).

Vanhuele and Drèze (2002) also obtain results from their study that imply that consumers have a form of price knowledge that enables them to react accurately to displayed prices although it does not permit price recall. Thus a *relative* measure of price knowledge can be more useful to uncover price knowledge levels. Support for this notion can be seen from Dickson and Sawyer’s (1990) finding that consumers were significantly better at stating whether the price they were shown was a “high price”, “average price”, or “low price”, than they were in accurately recalling the price for the item. Research on this relative measure was based on Zeithaml and Fuerst’s (1983) proposition that the qualitative coding of the relative price of an item may be an easier task for the shopper than the coding of the item’s actual price. Vanhuele and Drèze (2002) also measured price knowledge through a similar measure, which they describe as “deal spotting”; they found more price knowledge with this measure than for recall and recognition.



**Figure 1. The Vanhuele-Drèze Price Knowledge Ladder**

Vanhuele and Drèze (2002) employed all three measures of price knowledge (range, recognition and recall) in order to investigate price awareness. They present their results, using all three measures, as a “price knowledge ladder”; as one progresses from range to recognition to recall, accuracy increases but the proportion

showing price awareness decreases. Figure 1 illustrates this concept using Vanhuele and Drèze's findings (2002). This shows that price awareness based on price recall is two per cent, based on recognition it is 13 per cent and a second form of recognition, the reference price range or "deal spotting" is 27 per cent.

Vanhuele and Drèze also measured price knowledge as long-term rather than short-term memory, unlike previous studies. Someone who has just placed a product in the cart may have short-term recall of the price just seen on the shelf so Vanhuele and Drèze put their questions about price before this point as the shopper entered the store. They also relate their survey procedure to an actual in-store reference price comparison by matching product and price cues through the use of photographs of the products tested, since they reason that prices are more accessible to memory when shown visually. The current study replicates Vanhuele and Drèze's research and seeks to validate their results. Thus, it tests again whether price recall is an appropriate measure of price knowledge levels. This discussion leads to two hypotheses:

***H<sub>1</sub>: When measuring price knowledge through a price recognition measure, price knowledge levels will be higher than when using a price recall measure.***

***H<sub>2</sub>: When measuring price knowledge through a deal spotting measure, price knowledge levels will be higher than when using a price recognition measure.***

If these hypotheses are supported, the results will fit a price knowledge ladder: starting from the right to the left, the higher up the ladder one climbs, the more accurate price knowledge will be.

## **Methodology**

The population sampled in this study were regular shoppers at a specific UK store; regular shoppers were defined as people who normally did their own shopping at the store in question. Brands in eight product categories were chosen. The normal non-promoted prices of each of the brands and sizes in question were noted. Photographs were taken of each of these products, and two folders were put together to act as visual stimuli. One size was chosen for each of the brands for inclusion in the folder. Six consecutive pages represented each brand in the product category. The first page for each brand contained the photograph of the product and a large question mark appeared below it. This was the page that was shown once the respondent had indicated which brand they usually purchased in a particular product category and was used to measure price recall. The following four pages each contained a photograph of the product in question and below it was a price. The prices illustrated in the four subsequent pages were ordered in either ascending or descending order to minimize order bias. The four prices were 5% and 20% below and above the actual price. The last page of each brand illustrated three prices. The actual price of the product was presented alongside a 10% increase and decrease in the true price.

The data were collected through in-store intercept interviews. The researcher was positioned before any of the aisles containing the products that were being researched. This ensured that respondents did not come into contact with any of the product categories prior to the survey so that the survey questions tapped the long-term memory of prices.

A structured questionnaire was employed in this research, which was translated from Vanhuele and Drèze's (2002) original French questionnaire. To ensure a proportional spread between selected product categories, six different versions of the questionnaire were reproduced, providing the interviewer with a different order in which to ask the respondent if they purchased a particular product category. For all questions the prices were presented orally as well as visually. Once the interview had begun, the folder was opened to show the brand in question and the three price knowledge questions were asked. These questions were asked three times for each of the product categories chosen. First, the respondent was asked to give an estimate of the product's normal non-promoted price and this was noted down. This measured price knowledge through a price recall. Following this, the respondent was told that some prices for the product in question would be shown and that the respondent should indicate whether each price represented a good deal, a bad deal or a normal price for the product. This procedure measured the respondent's accuracy in deal spotting. Finally, the respondent was shown the three prices, one of which was the actual price of the product and their response was recorded. This procedure measured price recognition. Data were gathered from 151 shoppers.

## Results

Price recall was calculated by coding the data into four categories of accuracy deviation (0%, 5%, 10% and 20%). Price recognition data was coded so that each answer represented whether a respondent had indicated a price that was 10% below or above the actual price, or whether the respondent had been able to accurately recognize the actual price of the product. However, because some of the respondents would have been guessing, a guessing correction was used. The analysis and corrections for guessing followed the procedure of Vanhuele and Drèze, (2002, p.77). The guessing correction =  $X + (1-X)/3$ . Thus, solving for X, the correct percentage of non-guessers who accurately recognized the actual price of the product is represented in the table below, alongside to the Vanhuele and Drèze (2002) post-correction results:

**Table 1: Accurate Recognition Post Correction**

	Percentage of Correct Responses	
	Current Study	Vanhuele and Drèze Study
Accurate Recognition	14.8%	13.3%

The final measure of price knowledge, which was deal spotting, was calculated by dividing responses into three groups. The first group was composed of respondents who were fairly knowledgeable about price magnitudes; these people responded positively to a large discount and negatively to a large increase in price, even for small changes in price. Thus this first group is made up of respondents who answered "good", "good" or "normal", "high" or "normal", and "high" to a price series of: -20%, -5%, +5%, +20%. The second group was made up of respondents who were completely deal oblivious who labelled the first presented price as "good" when it was 20% above the actual price and as "bad" when it was a 20% reduction. The final group is made up of respondents who have some intermediate form of deal spotting. For example this group may have labelled a price reduction or increase of 20% as "normal". Frequency distributions were run on each of the three price knowledge

measures. Summarized accuracy results (after the guessing correction) are shown in Table 2 together with results from the Vanhuele and Drèze (2002) study.

Examining the column for the current study, we see that recall and recognition results are very different. Recognition level is greater than recall (15% versus 3%), thus supporting Hypothesis 1. Similarly, the deal spotting level is greater than recognition (26-34% for knowledgeable deal spotters versus 15%), thus supporting Hypothesis 2. These results indicate that a deal spotting measure gives the highest price knowledge level out of the three measures.

**Table 2. Price Knowledge Levels Between the Two Studies**

<b>Price Knowledge Measure</b>	<b>Current study %</b>	<b>Vanhuele &amp; Drèze%</b>
Recall Accuracy	3	2
Recall within 5%	20	21
Recall within 10%	31	37
Recall within 20%	48	60
Recognition Accuracy	15	13
Recognition 10% below	19	33
Recognition 10% above	38	25
Deal Knowledgeable	26-34	27-33
Intermediate Deal Spotters	15-46	31-53
Deal Oblivious	19-58	14 -42

The findings support Vanhuele and Drèze's (2002) suggestion that there is a five-step distinction between measures of price knowledge as described by the price knowledge ladder. The results of the current study fit each of the five steps of the price knowledge ladder, and parallel quite well the results of the Vanhuele and Drèze (2002) study; there is a significant correlation ( $p < 0.02$ ) between the two numeric columns in Table 1 when midpoints are used instead of ranges. This indicates agreement with Vanhuele and Drèze that the hierarchy is: deal-spotting > accurate recognition > accurate price recall. The findings support the argument that price recall is not a sufficient measure of price knowledge if deal spotting is the objective and therefore we should doubt the accuracy of past studies based on recall measures.

These results relate closely to those of Vanhuele and Drèze (2002) despite some differences in the product categories used. (It was deemed not appropriate to use the exact product categories of the original study because of national differences between the UK and France). Thus we replicate the Vanhuele and Drèze (2002) study and support the view that recognition rather than recall should be the criterion of price recognition.

## **Implications**

This research has shown that a large proportion of consumers hold some price information in memory for frequently purchased products. Most consumers have the working knowledge required for decisions when it comes to accepting or rejecting a deviation from the actual price of the product. However, the consumer's price knowledge is not an accurate representation of the actual price but, rather, a sense of magnitude. This is consistent with what was found in the Vanhuele and Drèze (2002) study. The findings show that, although shoppers demonstrate low accuracy in specific price knowledge they have the ability to detect attractive and unattractive prices and thus are not as price ignorant as past studies have implied. Past studies have relied upon recall measures and our evidence shows that deal spotting requires a

lesser level of knowledge as Vanhuele and Drèze have pointed out. Our work implies that future research should use different measures of price knowledge in order to predict the responsiveness of shoppers to price. Using a pure recall measure underestimates the level of consumer price knowledge, since it does not detect memory representations that are only accessible to recognition and deal spotting. Our work also shows that a finding first obtained in France is replicated in another country, thus showing that cultural differences are unlikely to play a large part in price recognition.

The recognition measure yielded lower results than the deal spotting measure, indicating, as expected, that consumers are better at recognizing a 20% deviation from the price rather than a 10% deviation. These data imply that retailers have some latitude for changing price before the price change is noticed by many shoppers. However, there are other considerations affecting price hikes and realistic management of price increases will be focused on the categories that are checked by price-sensitive consumers. The findings suggest that discounts should probably deviate from the actual price by more than 10% if they are to be effective. Vanhuele and Drèze (2002) pointed out that this means that two stores operating EDLP strategies are unlikely to have price differences that are large enough to be noticed by consumers. By contrast, competition between HiLo stores or a HiLo and an EDLP store are likely to present some large price differentials.

### **Further Research**

There are two main areas for further research. First, the generalizability of results should be tested by conducting other studies in advanced consumer markets such as the United States and also in simpler economies. In this way, the basic psychological mechanisms can be separated from the cultural influences. Second, it is urged that future studies should measure price knowledge through recognition and deal spotting measures, as here and in the Vanhuele and Drèze (2002) study, because a recall measure does not address the price knowledge that affects everyday purchasing.

### **Conclusion**

This research has validated Vanhuele and Drèze's (2002) price knowledge ladder and has shown that consumers hold some sort of price knowledge that is not accessible to a price recall measure. The price knowledge that consumers hold is best measured by either a recognition or a deal spotting measure since these measures indicate the responsiveness to price changes. The results of this study have implications both for academics measuring price knowledge and for marketing practitioners setting promotional prices.

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