The Value of Beef Tenderness to the Consumer

ERIC DRANSFIELD
Station de la Recherches sur la Viande, INRA de Theix,
Saint Genès Champanelle, 63122 France

BACKGROUND

The perception of meat and other foods depends on their intrinsic properties and also on the way in which they interact with immediate and external factors but the way in which they interact is largely unknown. Appearance plays a key role in assessing quality of fresh meats, today's consumer preferring leaner meat (Dransfield, 1983) and a bright red colour may indicate freshness or wholesomeness (Hood and Riordan, 1973). Unfortunately, for fresh meats, the major quality factors - taste and tenderness - can only be determined after cooking and for information on those qualities, the consumer often relies on the advice from the butcher (Grunert, 1997). Predicting consumer demand is therefore difficult (Richardson *et al.*, 1994) and poorly based and any conclusions reached without tasting are likely to be unproductive (Melton *et al.*, 1996). Price is clearly an important factor on the perception of quality and preference and could have a strong influence on consumer choice. As yet, there has been little quantitation of the effect of price which may be more or less important as consumers appear to be segmenting according to price (Claus, 1991).

OBJECTIVE

To estimate the relative importance of tenderness and nominal price on consumer choice of beef steaks.

METHODS

In total 237 consumers (aged 14 to 73, average 34.8 years) from Clermont Ferrand and 10 experienced panellists from Theix took part. Before tasting, the consumers were asked to choose vacuum-packed steaks. They were asked to repeat the exercise after tasting steaks and could then take home their choice.

Procedure

Consumers were welcomed in a tasting room and asked to complete a short socio-economic questionnaire. They were then conducted, one by one, to a 2nd room to make their choice of individually vacuum-packed beef loin steaks. They then returned to the tasting room and were served grilled steaks to assess (see below). Afterwards, together with their results, they were conducted, one by one, to the 2nd room to make their choice and take away the steaks.

Choice of steaks

Chilled vacuum-packed steaks were arranged in 4 baskets. About 30 steaks, each weighing on average 150g, were bought commercially as aged loins from Charolais young bulls and were randomly assigned to each of the four baskets. The baskets of steaks were each coded with a 3-digit code and were arranged in the same order as that used for tasting for each subject. Subjects were free to view, handle and compare the steaks before making their choice. Subjects were told that the steaks would keep for 1 week in the refrigerator or for 6 months in domestic freezer. They were asked to choose and take home any of the steaks up to a given budget. Without tasting the baskets were priced at unity per steak except for 1 basket, chosen at random for each subject, which was priced '2' per steak. After tasting, the baskets were market 1, 2, 4 and 6 in order of increasing tenderness for each subject. The budget allotted to each consumer was the price of the dearest steak multiplied by the number of people in the household. So each subject could choose one of the dearest steaks for every member of the household or more of the cheaper steaks or, except for those living alone, a mixture of the dearest and cheaper steaks.

Tasting of steaks

Four types of steak were produced for tasting. Loins, from Charolais young bulls, were excised within 2 hours of slaughter, packed under vacuum and stored at 0°C (rapid chill) or 15°C (slow chill) for 8 hours and then transferred to 4°C. The loins were sliced and frozen at -30°C, either on the following day (unaged) or after a further 6 days at 4°C (aged). Steaks were grilled between plates set at 250°C for 2 to 2.5 minutes depending on size. Samples were served hot and tenderness and acceptability scored on non-structured line scales marked 'extremely tough' to 'extremely tender' and 'extremely unacceptable' to 'extremely acceptable'.

RESULTS

Table 1 shows the results of tastings of the four types of steak by consumers and an experienced laboratory panel. Steaks from rapidly-chilled loins (scored between 2.4 and 6.2) were tougher than those (scoring between 3.6 and 6.4) from slowly-chilled loins but ageing had a larger effect than chilling on both the rapidly and slowly chilled samples. The overall acceptability scores were highly correlated (r^2=0.6) with tenderness assessments and ranged from 3.4 to 6.4 on a scale of 10. Taste panel scores showed a similar ranking although the scores (between 2 and 4.6) tended to be lower than those (2.4 to 6.4) for the consumers. Both consumers and taste panellists assessed steaks from the slowly-chilled and aged loins as the most tender and acceptable.

TABLE 1 Means and standard deviations of the assessments given by 140 consumers and 10 trained panellists.

	Rapidly Chilled		Slowly Chilled			Rapidly Chilled		Slowly Chilled	
	Unaged	Aged	Unaged	Aged		Unaged	Aged	Unaged	Aged
Consumer					Panellist				
Tenderness	2.4±2.6	5.8±2.7	3.6±2.6	6.4±2.7	Tenderness	2.0±2.1	3.3±2.4	3.5±3.4	4.6±3.0
Acceptability	3.4±2.8	6.2±2.7	4.6±2.8	6.4±2.7	Acceptability	1.9±2.3	3.7±2.9	3.1±3.1	4.2±3.2

Table 2 shows the effect of price on choice before and after tasting. For each consumer, the number of steaks chosen from each basket was divided by the total number of steaks chosen. For each basket, the accumulative totals for all consumers was then expressed as a percentage of the number of consumers. Before tasting, consumers did not take equal numbers from each basket, more people (32%) chose the dearer steaks. All the others, equally priced steaks, were taken by similar proportion (23%) of subjects. Repeating the same procedure after tasting showed a strong preference for the higher priced steaks which were coded the same as steaks they had judged tender. 73% took steaks which were 4 or 6 times dearer than the cheapest which was coded the same as those they had judged the toughest (Table 2).

TABLE 2 The influence of tasting on the choice of steaks.
Values are the accumulative percentages of 97 consumers choosing steaks with a limited budget.

	Before tasting				After tasting			
Price	1	1	1	2	1	2	4	6
Choice	22	24	22	32	9	18	21	52

DISCUSSION

Purchasing motives and quality aspects appear more complex in France than in Germany, Spain or the UK (Grunert, 1997) although in all those countries, 'tenderness' is an aspect. Some market segmentation according to price is appearing with those consumers choosing the middle range price decreasing and being squeezed by the top and low price-oriented consumers (Claus, 1991).
Before information is given, consumers can rely only on the perception of quality to make their choice. In this study, those consumers who chose the dearer steaks may have done so because they thought that price was an index of quality. A significant number (9%) also cited 'tenderness' as a reason for choice. Those consumers therefore appeared to be reasoning after the event or had an expectation of tenderness based on feel and appearance.
A study 10 years ago (CIV, 1988) showed that overall, more than half of French consumers judged beef not sufficiently tender. In this study, it happened, by chance, that 20% of the consumers took both the 2nd toughest and the 2nd most tender when their prices were 2 and 4 respectively. The difference in tenderness was about 2 points on a scale of 10, a variation found in the market. It therefore appears that there is scope for a much wider price differential than exists currently in the market. Unfortunately this is not realised because consumers cannot be sure of the tenderness of beef in the market place.
Given that price has less of a role to play in acceptability and choice than does tenderness, the industry must position itself to be able to guarantee visual, eating and health qualities before significant improvements in marketing can be made. Producers of tender beef will have a problem in communicating this to consumers and in gaining market advantage.

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