CONSUMER PREFERENCES OF PORK CHOPS: AN INTERNATIONAL CROSS-CULTURAL COMPARISON

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Background

The selection criteria for pork, used by consumers at the point of purchase, has been widely investigated (Emerson *et al.*, 1964; Zuidam *et al.*, 1971; Diamant *et al.*, 1976; Romans and Norton, 1989; O'Mahony *et al.*, 1995; Sikora and Weber, 1995; Becker *et al.*, 2000; Glitsch, 2000). Studies show that the consumer selection process is influenced both by the context in which the purchase takes place, including factors such as place of purchase and cleanliness of the display, and the by the product itself, comprising for example, characteristics such as colour and amount of fat cover. The relative importance of all the characteristics is uncertain because different samples of meat differ simultaneously in several attributes. Furthermore, practical limitations imposed by the short duration of the lifetime of meat samples also make it inevitable that different meats are judged by different consumers.

The difficulties encountered using meat in consumer surveys can be overcome through the use of a large number of images. The use of digital photographs allows controlled manipulation of the images producing defined differences. Such images were produced from photographs of 16 pork chops which were computer-modified to give two levels of each of the characteristics: fat cover, colour, marbling and drip. The selection of these characteristics was based on the results of the reported studies suggesting their importance. The resulting 265 (2x2x2x2x16) images have been published in a book (Dransfield *et al.*, 2001) which can be used as a tool for analysing the importance of those factors in consumer choice. When accompanied by a standard questionnaire, the results from many consumers can be used to investigate the importance of socio-demographics in choice and to identify any consumer segmentation in selection of pork chops. The survey is undertaken so that the consumer is unaware that the images are variations of 16 original photographs. Repeated selection of consumer preferences allows an objective determination of their selection criteria from the modified characteristics and their combinations.

Objectives

The aim of this survey is to identify the most important characteristics of fresh pork which determine consumer choice and to show any consumer segmentation in choice related to their socio-demographic and cultural differences.

Methods

Photographs of 16 pork chops were modified for two levels of each of fat cover, colour, marbling and drip. The levels of the characteristics are comparable to those of chops purchased in French supermarkets and butcher shops. The resulting 256 images have been published (Dransfield *et al.*, 2001) as a book comprised of 6 series of which series 1+2, 3+4, and 5+6 each contain all 256 images. A series constitutes 16 (A4) pages or 8 double-pages. Every double-page contains the 16 different chops and each chop represents one of the combinations of the four characteristics studied. Both the order of representation of the characteristics with respect to the chop and the order of the presentation of the chops in a double-page are randomised.

Consumers, chosen at random, are asked to select their preferred chop from each double-page. The selection is repeated 8 times completing one series. The consumer then completes a short questionnaire asking basic socio-demographic and purchase and eating behaviour information. Each new consumer is given a series in the order 1 to 6 so that all series are used equally throughout a survey period.

This project was initiated by our laboratory as a part of a study of pork production systems involving France and the Netherlands. We have since expanded this project and at the time of writing this publication 24 groups in the following 21 countries expect to undertake the survey in the following regions:

Argentina (Buenos Aires)
Australia (Ballarat, Victoria.)
Belgium (Ghent)
Brazil (Sao Paulo)
Canada (St Hyacinthe, Quebec)
Canada (Lacombe, Alberta)
Estonia (Tartu)
Finland (Helsinki)
France (Clermont Fd, Rennes)
Germany (Kiel)
Greece (Thessaloniki)
Italy (Sicily)
Japan (Hokkaido)
Korea (Suwon)
Mexico (Chihuahua)
The Netherlands (Lelystad)
New Zealand (Hamilton)
Poland (Warsaw)
South Africa (Pretoria)
Spain (Zaragoza)
USA (Ames, Iowa)
USA (College Station, Texas)
USA (New Brunswick, NJ)
Yugoslavia (Belgrade)

Up to 750 consumers are being surveyed by each group. Results have already been obtained from surveys in Mexico, Japan and The Netherlands, and are the property of the group undertaking the survey. We will use the data for analysis in relation to the other participating countries in the survey and for any subsequent publications or reports. It is envisaged that the surveys from all participating groups will be completed by October 2002 and all the results will be analysed by December 2002.

In France, surveys have been undertaken at two agricultural fairs: 'SPACE', Rennes, September 2001 and the 'Sommet de l'Elevage', Clermont Ferrand, October 2001. A third site in France will be surveyed. The results presented here are results from a total of 414 French consumers (218 consumers at 'SPACE' and 196 at the 'Sommet de l'Elevage'). For each consumer, the greatest repeatability within the 8 choices was defined as the "main choice". For example, a main choice of 3 means that the most repeated combination for that consumer was chosen 3 times out of 8. The probability of achieving the main choice at random was determined by simulation; 8 numbers between 1 and 16 were randomly and independently selected 1000 times and the main choices determined. The total number of chops selected by the consumers was calculated for each of the combinations of the characteristics studied; fat cover, colour, marbling and drip. The effect of the characteristics and their interactions on consumer choices was analysed by analysis of variance (ANOVA) and differences were detected by Newman Keuls test for multiple means comparison using the linear model (proc GLM) procedure of SAS (1996). A correspondence analysis using 10 dimensions (accounting for 80% of the variability) was undertaken on the results of each consumer and the consumers coordinates were used for classification into four clusters using a disjoint cluster analysis by the Fastclus process of SAS (1996). Each cluster was analysed by ANOVA as described for the entire data set.

Results and Discussion

Analysis of the entire data set of consumer choices showed significant preferences for three of the four characteristics studied (Figure 1). Consumers preferred the leaner chops (p<0.001), the chops without drip (P<0.001) and the dark red chops (P<0.05).

Correspondence analysis of the consumers shows that the first and second most important dimensions in consumer choice were colour and fat cover accounting for 21% and 16% of variability, respectively. While the significant preference for the dark red chops (Figure 1) shows that there are a greater number of consumers who prefer these chops (52%), the observation that colour is the first dimension of the correspondence analysis indicates the significant number of consumers for whom light red chops are a preference.

The individual choices with 8 repetitions shows both that the consumers main choices were mostly not random and that the frequency of choice was not extreme (Table 1). Comparing consumers main choices and the probability at random of achieving this main choice shows that fewer single or double choices were made, and more choices were made of 3, 4, 5 and 6 times the same combination than would be expected randomly. No consumers chose the same combination of characteristics 7 or 8 times. The distribution of the repeatability illustrates that the levels of the characteristics used were sufficiently different to allow the consumers to make a positive choice, but were not extreme which would force them to be more consistent.

Four clusters of consumers were obtained using the chop choice results. The number of times a characteristic was chosen within a cluster is given in Table 2. The total number of choices within a cluster divided by 8 (number of choices for a consumer) is given as an estimation of the number of consumers in a cluster. Cluster 1 is comprised of an estimated 145 consumers (35%) who prefer lean, light red meat. Of similar size, cluster 2 contains an estimated 138 consumers (33%) who prefer lean, dark red meat with marbling and no drip. Cluster 3 (estimated 70 consumers, 17%), like cluster 1, is comprised of consumers who prefer lean, light red meat, but who also prefer the absence of drip, and cluster 4 (estimated 61 consumers, 15%) were consumers whose only preference was light red chops.

The next phase of this analysis is to study both the relationships between consumers within a given cluster and the differences in consumers from different clusters using the socio-demographic information of the consumers. Using complete data sets (the results presented here are a based on a data sub-set) the results of these types of analyses of consumers in different countries can be objectively compared for the characteristics contributing to their pork preferences and to determine groups of consumers with similar, or different, preferences.
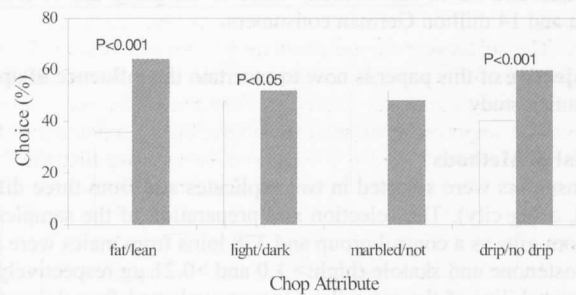

Figure 1. French consumer choices of four chop attributes.
The significant differences are within a chop attribute.

Table 1. Simulated probabilities of randomly achieving main choices and the percentage of consumers with these main choices.

	Number of times (out of 8) that the same combination of characteristics was chosen							
	8	7	6	5	4	3	2	1
Simulated probability at random (%)	0	0	0	0.1	1.8	15.6	71.0	11.5
Consumers main choices (% of 414 consumers)	0	0	0.2	1.2	6.8	31	56	5.3

Table 2. Choices of chop attributes in the four clusters*.

Cluster	Choices/8	Chop Attributes							
		Fat	Lean	Dark Red	Light Red	Marbled	Not Marbled	Drip	No drip
1	145	398	**762**	478	**682**	609	551	563	597
2	138	327	**777**	**919**	185	**658**	446	456	**648**
3	70	164	**395**	180	**379**	240	319	142	**417**
4	61	292	197	149	**340**	211	278	170	319

* Attribute choices in bold are significant (P<0.05) for the given cluster.

Pertinent Literature

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    Abstract