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Consumer choice of pork chops in Taiwan

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ABSTRACT

Digital photographs of pork chops varying systematically in appearance were presented to 716 Taiwanese consumers in a study that aimed to identify the most important characteristics of fresh pork which determine consumer choice in Taiwan. Relationships between consumer segmentation in choice and socio-demographic and cultural differences were also investigated. Colour and fat cover were the most frequently chosen of the four characteristics studied. Dark red colour was preferred by 64% of consumers and lean fat cover by 44%. Marbling and drip were less important in the decision making process being used by less than a half of consumers. The four preference-based clusters of consumers showed no correlation with socio-demographic-based consumer clusters, but did show significant links with possession of a refrigerator, age at which schooling was completed, liking pork for its price and gender of consumer.

1. Introduction

Pigs are Taiwan's most valuable farm product and accounted for 15% of total farm production in 2005 (USDA Foreign Agricultural Service, 2006). This domestic production provides the vast majority of pork meat consumed in Taiwan. In addition, this country is one the top ten of pork consumers in the world. Taiwanese eat about 42 kg pork per capita annually (extrapolated from pork consumption data of the USDA Foreign Agricultural Service, 2006 and population data of the US Central Intelligence Agency, 2009).

A study using photographic images of raw pork chops that varied systematically in appearance demonstrated differences in consumer preferences for pork across 23 countries (Ngapo, Martin, & Dransfield, 2007a, 2007b) including Taiwan. For comparative purposes in the international study countries were considered a unit. However, variations occurred within a country as has been shown in the publications of results from Brazil (Cipolli, Silveira, Ngapo, & Dransfield, 2003), France (Ngapo, Martin, & Dransfield, 2004), The Netherlands (Verbeke et al., 2005), Greece (Fortomaris et al., 2006) and Korea (Cho et al., 2007). When preferences were plotted as a correspondence analysis the former four countries were part of a central group showing relatively similar preferences. Korea, on the contrary, was detached from this central grouping, owing to its stronger preferences for dark red colour and marbling (Ngapo et al., 2007a). Taiwan and Japan were also distanced from this central core for the same preferences as Korea, but these three countries differed for drip and fat cover. Interestingly, China, the only other Asian country included in the international study, was found within the central grouping of countries in the correspondence analysis, albeit on the periphery closest to the other Asian countries (Ngapo et al., 2007a, 2007b). Taiwan and China are cited as two countries in these publications.

Taiwan as a unit tended to an overall preference for dark red pork and marbling as was observed for the other Asian countries studied, but what are the differences in consumer preferences within this country? The aim of this study was both to identify the most important characteristics of fresh pork which determine consumer choice in Taiwan and to show how consumer segmentation in choice relates to socio-demographic and cultural differences. The results presented here form a part of the aforementioned international study.

2. Materials and methods

2.1. Pork chops

The method and chop characteristics are described in detail by Ngapo et al. (2004). Briefly, photographs of 16 commercial pork

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chops were computer-modified to give two levels of each of the characteristics: fat cover (averages of 8% or 17% chop surface area for lean or fat chops, respectively), colour (average CIELAB L^* of 64 or 56, and a^* of 18 or 24 for light and dark red chops, respectively), marbling (absent or about 1.5% of the muscle area) and drip (absent or 5.5% of the chop area). The resulting 256 ($2 \times 2 \times 2 \times 2 \times 16$) images have been published as a book (Dransfield, Martin, Miramont, & Ngapo, 2001) comprised of six 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 chop shapes and each chop represents one of the combinations of the four characteristics studied. Therefore every double-page contains a complete set of all 16 combinations of the two levels of each of the four characteristics. Both the order of representation of the characteristics with respect to the chop shape and the position of the chops in a double-page are randomised. It is important to note that the chop shape was not a factor studied.

2.2. Consumers

A total of 716 consumers were surveyed in February 2003 at a range of sites, including supermarkets and workplaces. All consumers were pork eaters older than fifteen years of age and chosen at random.

2.3. The selection process and questionnaire

Consumers selected their preferred chop from each double-page showing the 16 combinations of two options of each of the characteristics of colour, fat cover, marbling and drip. The selection was repeated from eight different double-pages which showed the same 16 appearance characteristics and chops, but in different combinations as previously described (Ngapo et al., 2004). The consumers also completed a short questionnaire asking basic socio-demographic and purchase- and eating-behaviour information (Table 1). The questionnaire was of an exploratory nature since it was neither embedded in a theoretical economic or attitudinal framework, nor based on hypotheses. Each new consumer was given a series in the order 1–6 so that all series were used approximately equally throughout a survey period.

2.4. Data analyses and statistical methods

For each consumer, the greatest repeatability within the 8 choices was designated as the 'main choice' (see Ngapo et al., 2004). The probability of achieving the main choice at random was determined by simulation; eight numbers between 1 and 16 were randomly and independently selected 1000 times and the main choices determined.

The choices consumers made were divided into three categories for each characteristic; in the first two categories the consumer actually chose one of the two levels of the given characteristic, this contrasts with the third category where the given characteristic was not consistently selected. The results were quantified by the definition that if $\geqslant 6$ of 8 choices for one consumer are the same for a given characteristic, the choice is a 'real' choice ($P < 0.14$). If <6 choices are the same, selection for the given characteristic is considered to be 'inconsistent'. This test assumes a binomial distribution of the results ($P = 0.5$). Significant differences in the number of choices were observed using the χ^2 test ($P < 0.05$).

The number of characteristics used to form consistent choices was then obtained by calculating the percentage of consumers using 0, 1, 2, 3 or all 4 characteristics. For each consumer in a sub-panel and using all choices, the sum of the number of times each combination of characteristics was selected, is calculated. Using the sums for each combination, a contingency table is constructed comprising the consumers in the sub-panel and their choices. Using this contingency table, a correspondence analysis using all 15 dimensions was undertaken accounting for 100% of the variability. The coordinates of each consumer obtained in the 15 dimensions of the correspondence analysis were used as the basis for cluster analyses. Firstly, a hierarchical cluster analysis using Ward distance was undertaken using the SAS CLUSTER procedure (SAS, 1999). The number of clusters to be retained was selected by considering the 'distance' between clusters and the profile of the resulting graph. A disjoint cluster analysis was then carried out using the SAS FASTCLUS procedure (SAS, 1999) forcing the consumers into the different clusters. Links between the consumer choice-based clusters and questionnaire items were determined using χ^2 test. Similarly to the choice data, correspondence and cluster analyses were undertaken to define clusters based on the questionnaire items.

3. Results

3.1. Consumer panels

The socio-economic questionnaire composition and responses are given in Table 1. The consumers in the study were a relatively young group (43% <25 years old and only 3% $\geqslant$55 years) reflected in the high proportions of single (60%) consumers, those still studying (44%), those in the lowest income bracket (65%) and perhaps even those living with parents (64%). While more than two thirds of the consumers currently live in a town or city, 59% have, at sometime, lived in the country for more than a year.

Almost two thirds of the consumers were women. More consumers claimed foreign ethnic origin (50%) than Taiwanese (44%) and 14% stated that their culture or religion influenced their diet. A third of consumers had dental prostheses.

Two thirds of consumers eat alone several times a week. A third of consumers eat more than two meals out per day, likely reflected in the high proportion of consumers cooking less than once a week (41%) which, in turn, likely impacts on the low proportion of consumers who buy meat (36%). The meals out, cooking and meat purchase distributions might be a reflection of the young (student) panel, however the simplicity of the questionnaire does not allow for explanation of behaviour. Boiling and stewing were the most popular methods of cooking pork (46–53%). Few consumers have freezers (15%) and only about half a microwave. Furthermore, less than two thirds have a conventional oven.

Almost all consumers eat meat at least several times a week, with 28% eating meat at every meal, every day. And, 89% eat pork more than once a week. Of the third of consumers who claim to have changed their pork consumption, 70% have decreased consumption (21% of all consumers). A majority of consumers like pork, with availability and taste being the most popular reasons for liking pork (54% and 49%, respectively) followed by versatility and nutritional quality (36% and 30%, respectively). Two thirds of consumers think that the pork they buy is almost always of good quality and most think it not expensive (81%).

3.2. Real choices?

Defining the greatest repeatability within the 8 choices for a given consumer as the 'main choice', Table 2 shows a comparison of probability of randomly achieving this main choice versus the respondents' main choices. Fewer single or double choices were