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PAPER

DETERMINING THE BEST PRODUCT QUALITY SET FOR PACKED YOGURT IN TURKEY

DETERMINAZIONE DEL GRUPPO DI FATTORI CHE IDENTIFICA IL MIGLIOR DI PRODOTTO DI QUALITÀ PER LO YOGURT CONFEZIONATO IN TURCHIA

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ABSTRACT

The factors affecting consumer demand for packed yogurt were explored, and the best product quality set was determined. A conjoint analysis in the SPSS statistical program was done with the data from 385 household surveys. The three most important factors affecting packed yogurt demand were brand, price and product content. On the other hand, the best product quality set was the Cizmelioglu private label, no-fat yogurt, sold in the supermarket at €0.97/kg with promotion. Results in-

RIASSUNTO

Sono stati considerati i fattori che influenzano la richiesta del consumatore per lo yogurt confezionato ed è stato determinato il gruppo di essi che identifica il migliore prodotto di qualità. È stata effettuata un'analisi congiunta nel SPSS con i dati dei sondaggi su 385 famiglie. I tre più importanti fattori che influenzavano la domanda di yogurt confezionato erano la marca, il prezzo ed il contenuto del prodotto. All'interno di questo gruppo di fattori, il migliore prodotto di qualità è risulta-

- Key words: brand, conjoint analysis, consumer, purchase intention, yogurt -

dicate that consumers prefer a private label of low priced no-fat yogurts.

to essere il marchio privato "Cizmelioglu", yogurt privo di grassi, venduto nel supermercato in promozione a €0,97/kg. I risultati indicano che i consumatori preferiscono yogurt magri di marchio privato, a basso costo.

INTRODUCTION

The total annual world production of milk is about 618 million tonnes. Of this, 148 million tonnes (24%) are produced by the EU25. While Turkey produces about 10 million tonnes of milk yearly, the average productions of Germany, the Netherlands, Italy and Spain are 27, 10.5, 9.9 and 5.8 million tonnes, respectively. Only 20% of the milk produced in Turkey is processed in modern dairy factories, compared to 97-98% in the developed countries (AERI, 2006). This means 80% of the milk produced in Turkey is unregistered[1] (TEKINAY, 2006). This problem obviously affects the whole dairy sector.

Dairy products play an important role in the human diet. The annual average consumption of dairy products per capita, i.e. cheese, milk, butter and yogurt, in Turkey is 8.5 kg, 30 L, 1.3 kg and 34 kg, respectively, compared to 14 kg, 85 L, 4.7 kg and 20 kg in the developed countries (TAN and OZTURK, 2002; KARAGOZLU, 2004). These data clearly show that the over all dairy product consumption in Turkey is much less than that in developed countries, except for yogurt.

Turkey has the highest per capita consumption of yogurt in the world (AYBEK, 2006). That is mainly because yogurt is a traditional food, and the Turkish people have particular tastes and preferences. However, due to the problems in production and marketing, 90% of the yogurt consumed is home-made[2] and only 10% of the total yogurt consumption is packed yogurt (FIRAT, 2002; UNSAL, 2007).

Due to health concerns, food safety and quality control, urbanization, technological developments, regulations to comply with the European Union (EU) standards etc., processed and labelled yogurt consumption in Turkey has been increasing steadily (VURAL, 2001; YURTTUT, 2001; TOPCU, 2006). In the past only generic and national brand yogurts were sold on the market as packed yogurts. After the introduction of giant supermarkets (e.g., Migros and BIM), private label (store brand)[3] yogurts can now be found on the store shelves, as well. The market share and growth rate of private label yogurts are 19 and 34%, respectively (RETAILING INSTITUTE, 2005).

With the steady increase in the demand for private label products, the retailers must determine what attributes their products should have. Increas-

[1] Of this, about 40% is consumed domestically, and another 40% is processed in small, unregistered dairy farms.

[2] People make yogurt themselves using milk they produce on farms or milk they buy from unregistered milk venders in the streets.

[3] Generic packed yogurts are produced by smaller scale factories, and are sold with no brand name. National brand packed yogurts are produced directly by manufacturers, and sold nationwide in the stores under their own name. Private label yogurts are produced by manufacturers for retailers, and sold only in the retailers' own stores under their own store name. Therefore, the words "private label" and "store brand" are used interchangeably.

ing competition between the national and private brands forces both parties to pay more attention to the attributes of their rivals' product. In addition, they can benefit from acquiring information about consumer heterogeneity to position their products and set prices according to consumer preferences (APELBAUM, 2000). Thus, an analysis of consumer responsiveness to different product attributes with an emphasis on the choice of private labels over national brands is needed.

Consumers, on the other hand, have access to much more information and a greater choice in today's competitive and global market (LAROCHE and TOFFOLI, 1999). They have limited processing capacity and hence use only a part of the information available when choosing a brand. When evaluating brand attributes, consumers limit themselves to 3-5 items of information in order to reduce the complexity of selection (LAROCHE *et al.*, 2001). For example, for any brand choice, price and quality play an important role since they are often central to consumers' judgment and decisions (KALYANARAM and WINER, 1997). For most brands, consumers believe that price and quality are correlated and their preferences are affected by external variables such as income, family size, social status, profession, etc. (KAMAKURA and RUSSELL, 1989; ALLENBY and ROSSI, 1999). Influenced by all these factors, a consumer defines the purchasing problem, gathers necessary information, evaluates alternatives and makes a purchasing decision (MESÍAS *et al.*, 2003; TOPCU, 2004).

The effects of product attributes on consumer attitudes towards product evaluation have been widely studied (ROWAN, 2000; WANSINK *et al.*, 2001; DELIZA *et al.*, 2003). One of the greatest difficulties in this type of research is to quantify the effect that each product attribute has on the consumer's decision to purchase. Conjoint analysis is a useful tool for investigating the effect of these attributes. It is a market research tool for developing effective product design. Using conjoint analysis, researchers can determine product attributes that are important to the customers, the consumer idea of most desirable level of product attributes and the market preference for different brands (SPSS CONJOINT 15.0, 2006).

Conjoint analysis was used in this study to explore the factors affecting consumer demand for packed yogurt and then, to determine the best product quality set which maximizes the total utility for the customer. With the increasing demand for packed yogurt, and the growing competition between manufacturers and retailers in Turkey, it is interest to determine variations in consumer responsiveness to different yogurt attributes.

MATERIALS AND METHODS

Materials and determination of sample size

The data were obtained from a survey conducted from March to June in 2006. To minimize sample bias and represent the population correctly, the Erzurum city centre[4] was divided into four districts. Based on the population and subdistricts within each district, weighted sample size and survey distributions were determined proportionally for each district (Table 1).

The following formula was used to determine the sample size for each district, (YILDIZ *et al.*, 2006):

$$n = \frac{Z^2 * p * (1-p)}{c^2} = 385$$

[4] Erzurum (39°57' N latitude and 41°15' E longitude) is located on the Silk Road in the north-east region of Turkey (Fig. 1). Erzurum is one of the biggest cities in the region with a total population of 962,000; the city center population is 402,000.

Table 1 - Sample size and distribution in the districts.

Districts	Number of households	The ratio of the number of households in districts (%)	Sample size
Yenisehir	30,022	37	142
Yakutiye	26,099	32	122
Kazimkarabekir	17,976	23	89
Dadaskent	6,562	8	32
Total	**80,659**	**100**	**385**

Source: (DEMM, 2007).

Where:

n = sample size;

Z = Z value, (used 1.96 for 95% confidence level);

p = percentage picking a given choice, (0.5 used for sample size needed);

c = confidence interval, (used 0.05 = ±5).

A simple random sampling method was used to select consumer households. A face-to-face survey method was used with 385 adults. The survey was conducted with adults (with or without children) either at their residence or at shopping centres.

Generation of orthogonal design and questionnaire

Conjoint analysis is a multivariate technique based on the assumption that purchasing behaviour reflects a choice,

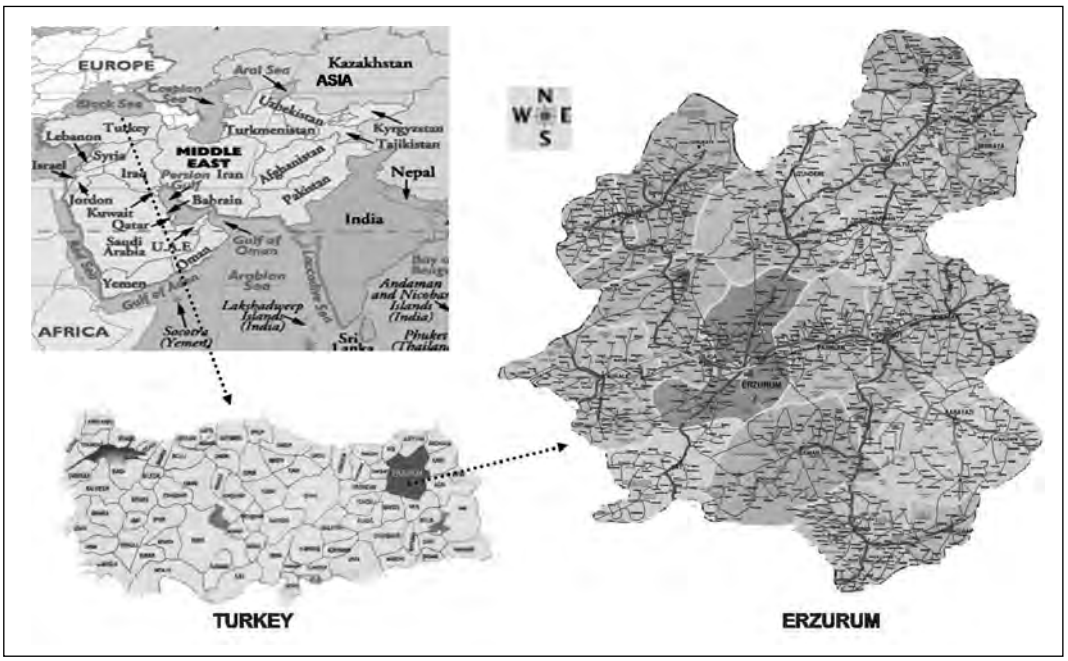


Fig. 1 - Maps of Turkey and Erzurum.

Table 2 - Factors and their levels for packed yogurt used in conjoint analysis.

Factors	Factor levels			
Brands*	P (Pinar)	D (Danone)	M (Migros)	C (Cizmelioglu)
Price (€/kg)**	1.47	1.44	1.32	0.97
Selling point	Supermarket (SM)		Market (MM)	
Content	Whole yogurt (WY)	Low-fat yogurt (LY)	No-fat yogurt (NY)	
Promotion	YES		NO	

* Where, P and D are national brands, and M and C are private labels (store brands). Here, private label "C" is produced locally.

** The product prices were converted from the New Turkish Lira (NTL) to Euro (€) using the exchange rate on October 15, 2007. The conversion rate used was 1.70 NTL/€.

within a product category, among products which possess a set of differentiating attributes. This technique has been used widely in many marketing studies including dairy products such as cheese (SOUZA MONTEIRO and LUCAS, 2001), yogurt (SABA and ROSATI, 2002; LUCKOW *et al.*, 2005; O'CONNOR *et al.*, 2006; HADDAD *et al.*, 2007), and pasteurized milk (DOLEKOGLU, 2003; AKPINAR, 2004; VALEEVA *et al.*, 2005).

To determine the factors influencing consumer purchasing decisions for packed yogurt, a pre-market study was done in March, 2006 to find out the most popular packed yogurt brands (private and national), their prices and availability in the stores[5]. After obtaining these data, based on the factors and factor levels listed in Table 2, the plan which consists of product profiles (i.e., combinations of factor levels) to be rated by the participants were generated using the orthogonal design procedure in the SPSS statistical program.

With 5 factors and a total of 15 factor levels, there are 192 potential product profiles, which is quite unmanageable to deal with[6]. In order to avoid this problem, it was necessary to generate a representative subset known as an orthogonal design, which is the typical starting point of a conjoint analysis. After generating an orthogonal design, the number of product profiles was reduced to 18 cases, 2 of which are holdouts[7] (Table 3).

The design of the survey forms was based on these 18 product profiles. SPSS Conjoint uses the "full-profile" approach, where participants rank, order, or score a set of profiles, according to preference (SPSS CONJOINT 15.0, 2006). In this study, the participants were asked to rank the 18 profiles from the most to the least preferred.

Statistical method

The data file was created using the preference rankings of those profiles collected from the participants. Before an-

[5] Store refers to both small closed markets and larger markets (supermarket) in the city centre.

[6] Five factors affecting consumer preference for packed yogurt are brand, price, selling point, content and promotion. There are a total of 15 factor levels, four factor levels for brand; four for price; two for selling point; three for content; and two for promotion. The combinations of these 15 factor levels give a total of 192 potential product profiles (i.e. 4x4x2x3x2 = 192).

[7] Holdout cases are judged by the subjects but are not used by the conjoint analysis to estimate utilities. They are used to check the validity of the estimated utilities.

Table 3 - Combinations for packed yogurt used in conjoint analysis.

Card number	Brand	Selling point	Price (€/kg)	Content	Promotion
1	C	MM	1.44	WY	Yes
2	P	SM	1.32	NY	Yes
3	M	MM	1.44	NY	No
4	D	MM	0.97	WY	Yes
5	C	MM	1.32	LY	Yes
6	M	MM	1.32	WY	No
7	D	SM	1.32	WY	No
8	D	SM	1.44	LY	No
9	P	MM	0.97	LY	No
10	C	SM	1.47	WY	No
11	M	SM	0.97	WY	Yes
12	P	SM	1.44	WY	Yes
13	M	SM	1.47	LY	Yes
14	D	MM	1.47	NY	Yes
15	C	SM	0.97	NY	Yes
16	P	MM	1.47	WY	No
17[a]	M	SM	1.47	WY	Yes
18[a]	M	SM	1.44	LY	No

[a] Holdout.

alysing the data with the conjoint procedure, the "*factors*" subcommand must be described. The model can be specified by describing the expected relationship between factors and rankings via "*factors*" subcommand (SPSS CONJOINT 15.0, 2006). The discrete model indicates that factor levels are categorical and no assumption is made about the relationship between the factor and the ranks. On the other hand, the linear model indicates an expected linear relationship between the factor and the ranks. The expected direction of the linear relationship can be specified with the keywords "*more and less*". Less linear indicates that lower levels of a factor are expected to be preferred, while more linear indicates that higher levels of a factor are expected to be preferred. Specifying more or less will not affect estimates of utilities (HAIR *et al.*, 1998; SPSS CONJOINT 15.0, 2006).

According to the characteristics of the factors, discrete, less linear and more linear models were used in this study. Brand, selling point and yogurt content were modelled as discrete because there is *no priori* knowledge about the influence of yogurt attributes on purchase intent. Price and promotion[8], however, were modelled as less linear and more linear, respectively. Price was assumed to follow a less linear model since it, typically, shows an inverse relationship with purchase intent. Promotion, on the other hand, was assumed to follow more linear relationships in that consumers are expected to exhibit more positive attitudes toward product promotions (HADDAD *et al.*, 2007).

The conjoint analysis of the data generates a utility score, called a part-worth,

[8] Promotion involves disseminating information about a product, product line, brand, or company. In this study, we use the term promotion especially for sales promotion, in particular, consumer sales promotion. There are a number of consumer sales promotion techniques such as price deal (a temporary reduction in the price), price-pack deal (the packaging offers a consumer a certain percentage more of the product for the same price), product deal (with the purchase of a product, offering the second of the same product or different product for free or at a cheaper price), coupons and rebates.

for each factor level. These utility scores, analogous to regression coefficients, provide a quantitative measure of the preference for each factor level, with larger values corresponding to greater preference. Part-worths are expressed in a common unit, which allows them to be added together to give the total utility, or overall preference, for any combination of factor levels (NESS, 2000; TOPCU, 2006). For example, the total utility (TU) of a packed yogurt with brand "C", selling point "SM", price "€0.97/kg", content "NY" and promotion "YES" (i.e., card number 15) is:

$$TU = \text{constant} + U(C) + U(SM) + + U(€0.97) + U(NY) + U(YES)$$
$$TU = 6.22 + 0.70 + 0.01 + 3.25 + + 0.41 + 0.27 = 10.86$$

RESULTS AND DISCUSSION

Table 4 shows the correlations between the utility scores (part-worth) and relative importance for each factor level. Pearson's R and Kendall's tau statistics imply that there is a significant correlation between the observed and estimated preferences (NESS, 2000; SPSS CONJOINT 15.0, 2006; TOPCU, 2006). This means the model fits the observed data well.

Higher utility values (part-worth) indicate greater preference. The most and the least preferred brands in Erzurum are the private label "C" (Cizmelioglu) and the national brand "P" (Pinar), respectively. The reasons that consumers prefer the private labels over national brand could be related to knowing the origin. Consumers may have an incentive to support locally produced products to help local or regional economy grow. Moreover, they may trust local products more since the origin is known. Finally, this locally produced product may cause consumers to have a perception of higher quality and/or lower market price due to less transportation (shorter distance to ship), input and labour costs.

The supermarket "SM" as a selling

Table 4 - Conjoint analysis results.

Factors	Factor levels	Part-worth	Relative importance (%)	Standard error
Brand	P	-0.60		1.14
	D	0.15	**33.24**	1.14
	M	-0.25		1.14
	C	**0.70**		1.14
Selling point	**SM**	**0.01**	11.01	0.66
	MM	-0.01		0.66
Sale price (€/kg)	**0.97**	**3.25**		2.36
	1.32	2.44	**22.45**	1.77
	1.44	1.67		1.18
	1.47	0.81		0.59
Content	WY	-0.38		0.88
	LY	-0.03	**20.88**	1.03
	NY	**0.41**		1.03
Promotion	**Yes**	**0.27**	12.42	2.67
	No	-0.13		1.32
Constant	6.22		2.56	
	Correlations among observed and estimated preferences			
		Value		Significance level
Pearson's R		**0.80**		**0.00**
Kendall's tau		**0.60**		**0.00**

Table 5 - Total utilities of the product profiles in orthogonal design.

Card no	Brand	Selling point	Price (€/kg)	Content	Promotion	Total utility	Ranking
1	C	MM	1.44	WY	Yes	8.47	7
2	P	SM	1.32	NY	Yes	8.75	5
3	M	MM	1.44	NY	No	7.91	9
4	D	MM	0.97	WY	Yes	9.50	3
5	**C**	**MM**	**1.32**	**LY**	**Yes**	**9.59**	**2**
6	M	MM	1.32	WY	No	7.88	11
7	D	SM	1.32	WY	No	8.31	8
8	D	SM	1.44	LY	No	7.89	10
9	P	MM	0.97	LY	No	8.70	6
10	C	SM	1.47	WY	No	7.23	14
11	M	SM	0.97	WY	Yes	9.12	4
12	P	SM	1.44	WY	Yes	7.19	15
13	M	SM	1.47	LY	Yes	7.03	16
14	D	MM	1.47	NY	Yes	7.85	12
15	**C**	**SM**	**0.97**	**NY**	**Yes**	**10.86**	**1**
16	***P***	***MM***	***1.47***	***WY***	***No***	***5.91***	***18***
17	***M***	***SM***	***1.47***	***WY***	***Yes***	***6.68***	***17***
18	M	SM	1.44	LY	No	7.49	13

point has a higher utility than smaller markets although the difference between them was minor. It could be said that consumers prefer to purchase their yogurts from bigger stores, perhaps because bigger markets have more product varieties, better quality and price, better customer services, etc. (Table 4). As for "sale price", there was an inverse relationship between price and utility, as expected. Consumers prefered yogurts with the price of €0.97 more than the yogurts with the price of €1.47 per kg since lower prices lead to higher utility.

"No-fat" yogurt content, on the other hand, gave consumers the highest utility. This could be due to growing health concerns. Increasing knowledge and consciousness about the detrimental and adverse effects of fat[9] could induce consumers to demand more products with lower fat content. Presence of "promotion" corresponded to a higher utility, as expected. This means that consumers preferred more packed yogurts with consumer sales promotion (Table 4). The aim of promotions is Promotions aim to increase consumer demand for a product. In general, the products with promotions were more attractive to consumers in terms of their price, quality, physical appearance, etc.

Table 4 also shows the relative importance of each factor. The results indicate that "brand" had the most influence on overall preference with 33.24% relative importance, followed by "price" with 22.45% and "content" with 20.88%. "Selling point", played the least important role in determining overall preference. Promotion and selling point were not as significant as brand, price and content; the ranges of the first two factors were not as large as the ranges of the latter three factors.

Table 5 shows the total utilities obtained from the part-worths in Table 4, and the ranking of the 18 product profiles in orthogonal design. The results indicate that the product profile "C, SM, €0.97/kg, NY and YES" gave the maxi-

[9] Saturated fat found mostly in animal and dairy products has higher levels of total and low-density lipoprotein cholesterol, and increase the risk of coronary heart disease (PUGLIESE, 2006).

Table 6 - Product profiles maximizing and minimizing consumers' total utilities.

Card #: 15		Card #: 16	
Brand	: C	Brand	: P
Selling point	: Supermarket (SM)	Selling point	: Market (MM)
Sale price	: €0.97/kg	Sale price	: €1.47/kg
Content	: No-fat (NY)	Content	: Whole (WY)
Promotion	: Yes	Promotion	: No
a) Maximum utility		b) Minimum utility	

mum total utility (10.86). On the other hand, the product profile "P, MM, €1.47/kg, WY and NO" gave the minimum total utility (5.91) (Table 6). Since these combinations have all the factor levels with the highest and lowest part-worths in Table 4, there is no way to have total utility values higher or lower than these two profiles.

CONCLUSIONS

This paper estimates the consumer preferences for packed yogurt attributes in Erzurum, Turkey where yogurt is a traditional food and *the per capita* consumption is the highest in the world. Conjoint Analysis was used to investigate the relative importance of five factors and the utility scores of 15 factor levels of packed yogurts in the marketplace. As expected, brand and price influenced consumers' preference the most, while promotion and selling point had the least influence.

The results also show that consumers prefer yogurts with a private label, lower price, promotion and no-fat content. Consumers were more likely to purchase whose origin is known (i.e., a private labelled local product). In addition, price played a central role in consumer purchasing decisions. Given the product attributes, assigning the right price is crucial for marketers. Product content greatly affected consumer preferences. Nutritional information and the health conditions of consumers are expected to strongly influence food choices due to the perceived detrimental long-term health effects of dietary fats. These findings may be beneficial to marketers, manufacturers and retailers who are (re) designing a product or developing new marketing tactics and strategies.

Although this study has some scientific merit for the academic and food manufacturing communities, there are some limitations. The results of this study have a limited generalizability since the data were collected in only one city. The survey should now be conducted nationwide; more data will give more objective results about population preferences. Moreover, in future studies, this model could be expanded to incorporate more factors and factor levels into the model, and the population could be divided based on demographic and socio-economic characteristics. Further study is needed to understand what is driving the preference for private label yogurt over the national brand. This information could be invaluable to manufacturers who could advertise those qualities and thereby build equity within the community.

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