



SEGMENTATION OF HONEY BUYERS' BEHAVIOUR BY CONJOINT ANALYSIS*

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A marketing analysis of Czech consumers' behaviour when buying honey is discussed from the viewpoint of price, origin, honey type, crystallized sugar, and organic quality aspect. The surveyed target groups of honey consumers, who are examined also with respect to their education level, are from Prague and the Central Bohemian Region. The original premise of this research was the hypothesis that, when buying honey, customers focus primarily on its price and type. This hypothesis was verified by conjoint analysis. The results have shown that consumers are interested primarily in the price and origin of honey. An important parameter for buying honey is its (non)crystallization. Although it does not affect objective quality parameters of honey, it affects the consumers' subjective perception of honey quality during purchase. Two clusters of honey consumers emerged through cluster analysis: the first cluster focussing on the origin, type, and price/sugar crystallization of honey, and the second interested in the origin, price, and quality of organic honey.

origin, customer, marketing analysis, cluster analysis, mapping, aspects



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INTRODUCTION

The annual per capita honey consumption in the Czech Republic was 0.7 kg in 2013 (Korinková-Seifertová, 2014). In Germany, a large population and a high per capita consumption add to the high consumption of honey. Germany is also the EU leader in the consumption of organic food and by far the largest market for fair-trade honey in the EU (Ványi et al., 2011). Apart from Germany, the EU member states, where the consumption of honey is consistently high, are also Greece (1.7 kg per year per inhabitant) and Spain (Ministry of Agriculture, 2013).

As the consumers' interest in safe, tasty, nutritious, and healthy food has intensified during the past two decades, demand for food items meeting these requirements has dramatically increased. Higher demand often pushes up revenue for producers and results in elevated production (Hu et al., 2009). Attention has been paid to the consumption of premium food products with enhanced quality properties (Kryštalíš et al., 2007). For instance, the consumption of honey, which is a valuable product for its health preventive benefits, might be of particular interest in those parts of Europe where mortality from preventable conditions is higher than in West European countries

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(Velkova et al., 1997) and has even continued to increase (Döbrössy, 2002).

Almlí et al. (2011) stated that if a product is to be successfully marketable, it must benefit from a positive image and match the expectations with the perception of product attributes. Wu et al. (2015) investigated consumers' response to both private and quasi-public attributes: information related to the safety and quality of honey products relative to conventional alternatives (Schneider, 2011), purported (but not confirmed) health benefits for those with allergies to local plants (Rajan et al., 2002), and the positive local externality of pollination services (Allsopp et al., 2008).

Smith (1956) drew attention to major marketing strategy alternatives that are available to planners and merchandisers of product in an environment characterized by imperfect competition. According to Aghdaie et al. (2014), segmentation is a common and important task for most marketing departments. Benefit segmentation is one of the best approaches for market segmentation.

Conjoint analysis is a tool that has been developed since 1960 for understanding how individuals develop preferences for alternatives (Raghavarao et al., 2010). Aghdaie, Tafreshi (2012) defined conjoint analysis as a multivariate technique with decompositional approach. In a decompositional approach, peoples' preferences scores elicit from their responses with a back-door and indirect way.

Murphy et al. (2000) applied conjoint and cluster analysis to honey market and found two clusters of customers. The first one was the least price sensitive, with the most important attribute being a small scale producer source. The second cluster was distinguished by deriving a high utility from light coloured honey. Wolleger et al. (2015) stated that neonicotinoids have recently been implicated by the media as a contributing factor to the decline of honey and bumblebees. That is the reason why have been sought to better understand to consumer perceptions and willingness to pay for traditional, neonicotinoid-free, bee-friendly, or biological control pest management practices, as growers may seek for alternative management practices to systematic insecticides. Darby et al. (2008) used conjoint analysis and found out that subjects place a similar value on products produced 'in state' and 'nearby' and that consumers' willingness to pay for local production is independent of the values associated with product freshness and farm size.

Better knowledge of Czech consumers' preferences when buying honey can improve the competitiveness of Czech honey and Czech beekeepers.

The main aim of this paper is to determine the preferences of Czech consumers when buying honey based on conjoint analysis. The surveyed target groups of respondents are consumers from the Central Bohemian Region and Prague. Sub-goal contribution is the cus-

tomers segmentation and creation of homogeneous clusters of customers in these two areas.

MATERIAL AND METHODS

The conjoint analysis is used for evaluating honey consumers' preferences. It is a multicriterial technique that is commonly used to determine the relative importance of a product's multidimensional features, and it is particularly well suited for measuring human perceptions and preferences (Green, Wind, 1975; Louviere, 1988) based on concept characteristics including information about surveyed parameters (Hebák et al., 2013).

Over the last 20 years, conjoint analysis has evolved as the primary marketing research technique for measuring consumer trade-offs between multiattributed products and services. That is, by measuring the relative contribution of each attribute level to the overall product evaluation, conjoint studies have been used to develop new products, to determine optimal process, to predict market shares, to identify market segments, and to define market opportunities (Marshall, Bradlow, 2002).

According to Marković et al. (2014), conjoint survey does not require a large sample size, because the results of analysis are set of utilities for each respondent. A deeper analysis of the problem was preceded by some pilot researches and studies (e.g. Šánová et al., 2012; Šánová, Benda, 2014; Šánová et al., 2015a, b). Their results enabled us to compile the concepts and identify the main assumptions of the research. In total 234 respondents were selected by the probability random selection and were interviewed on sixteen concepts. The concepts included honey origin, honey type, (non)crystallization at the time of buying, conventional/organic quality of product, and price. These five criteria were selected according to the previous mentioned pilot researches and studies.

Data collection was carried out from June to August 2015 within the area of the capital of Prague and the Central Bohemian region. The aim was to compare data within two regions important from the viewpoint of purchasing power of their inhabitants and with regard to an expected difference in attitudes determined by demography (big city vs towns and villages). The evaluation method was used while collecting data; individual concepts were evaluated on a scale of 1–10. The conjoint analysis was evaluated using the IBM SPSS Statistics 23 software.

Multicriterial statistical analysis of data is based on the matrix created by the conjoint analysis. Specifically, the matrix of values of surveyed parameters of individual respondents was calculated.

Although a number of statistical researchers have developed cluster analysis methods suited specifically for functional data (e.g. Wakefield et al., 2003;

Table 1. Design of profiles

Concept	Honey type	Origin	Organic quality	Price (in CZK)	Crystallization
A	floral	Czech local (directly from a beekeeper)	yes	180.00	no
B	forest	Czech local (directly from a beekeeper)	yes	120.00	yes
C	forest	foreign honey (from EU countries and non-EU)	no	120.00	yes
D	forest	foreign honey (from EU countries and non-EU)	yes	150.00	no
E	floral	foreign honey (from EU countries and non-EU)	no	120.00	no
F	floral	Czech Republic (from retail)	yes	120.00	yes
G	floral	foreign honey (from EU countries and non-EU)	yes	180.00	yes
H	forest	Czech local (directly from a beekeeper)	no	180.00	no
I	forest	Czech Republic (from retail)	no	180.00	yes
J	forest	Czech local (directly from a beekeeper)	no	120.00	no
K	floral	Czech Republic (from retail)	no	150.00	no
L	forest	Czech Republic (from retail)	yes	120.00	no
M	floral	Czech local (directly from a beekeeper)	no	120.00	yes
N	floral	Czech local (directly from a beekeeper)	yes	120.00	no
O	forest	Czech local (directly from a beekeeper)	yes	150.00	yes
P	floral	Czech local (directly from a beekeeper)	no	150.00	yes

Source: own research (2015)

Serban, Wasserman, 2005), to cluster the data scientists often prefer using traditional methods, especially hierarchical cluster analysis. Cluster analysis involves sorting data objects (or items) into natural groupings based on similarity. Grouping the data is important because it can reveal information about the data such as outliers, dimensionality, or previously unnoticed interesting relationships (Ferreira, Hitchcock, 2009).

Data were analyzed by hierarchical cluster analysis, more specifically by Ward's method; it was calculated from the matrix of consumer preferences (from the conjoint analysis) for subsequent segmentation of consumer behaviour when buying honey. Various types of honey consumers have been identified.

When applying the Ward's method, clusters which are based on a minimum sum of squares are selected. The main aim of the cluster analysis is the classification of subjects and their inclusion in a certain number of clusters (Ward, 1963). Hierarchical clustering is based on a situation in which each subject is an individual cluster; furthermore, clusters are subsequently paired up from the most to the least homogeneous ones (Hebák et al., 2013).

RESULTS

First of all, a questionnaire survey with sixteen product concepts was carried out (Table 1). Based on it, 234 questionnaires were selected by the conjoint method. Holdouts were not used.

Earlier relevant literature has identified several demographic characteristics which may play a role in

distinguishing consumer groups based on their food consumption preferences (see Hayes, Ross, 1987; Walker 1995; Trocchia, Janda, 2003).

Therefore, the collected data were evenly divided according to the following demographic characteristics: gender, age, and education. The most numerous group were consumers aged between 30 and 44 years (32.1%); the smallest group were people aged 16–29 (20.5%). In terms of gender and age, the most numerous group were elderly women (26.9%) and the least numerous was the group of older men (20.5%).

Results of the conjoint analysis

When customers are making a decision concerning buying honey, the most important parameters are the price and origin of honey, which are therefore the most important predictors for modelling. Honey ideal for consumers has the following characteristics: honeydew honey (forest) originating from a Czech local beekeeper, in organic quality, non-crystallized, and available at a lower price (CZK 120 per kg). The least popular proved to be honey nectar (flower) from abroad and from outside the EU, which is not in organic quality, it is crystallized and available at a high price (CZK 180 per kg).

Therefore, for a customer, the most important predictor in the decision-making model is the origin of honey; it influences this model in 63.15% of cases. It is followed by a huge margin by the price, which affects the model in 18.58% of cases. Furthermore, there is honey crystallization (8.20%), honey type (6.19%), and the least important parameter for the customer is its organic quality (3.88%) (Table 2).

Table 2. Importance and values

Importance	Values
Origin	63.150
Price	18.578
Crystallization	8.203
Honey type	6.188
Organic quality	3.881

Source: own research (2015)

According to Pearson’s correlation coefficient, the model is stable and statistically significant ($P = 0.000$). Compliance of the model with reality is 98.7%.

Comparison of preferences according to whether or not the customer is honey-eater. Preferences of customers who consume honey themselves and customers who only buy it (for example for a member of their family) may be different. The comparison of customers’ purchasing preferences depending on whether or not they eat honey is expressed in Fig.1. Each group is represented in its entirety (i.e. 100%).

Totally 60.6% of customers who do not eat honey pay attention to its origin (compared with 63.8% of consumers who do eat it). When buying honey, customers not eating it focus less on the type of honey (only 2.5% vs 6.5%) and its organic origin; in contrast, they are more influenced by price (23.6% vs 18.8%) and sugar content (12.4% vs 8%).

Comparison of preferences according to the region the customer comes from (Prague vs Central Bohemia). This comparison reveals important information about suitably targeted honey offer depending on the customers’ place of residence.

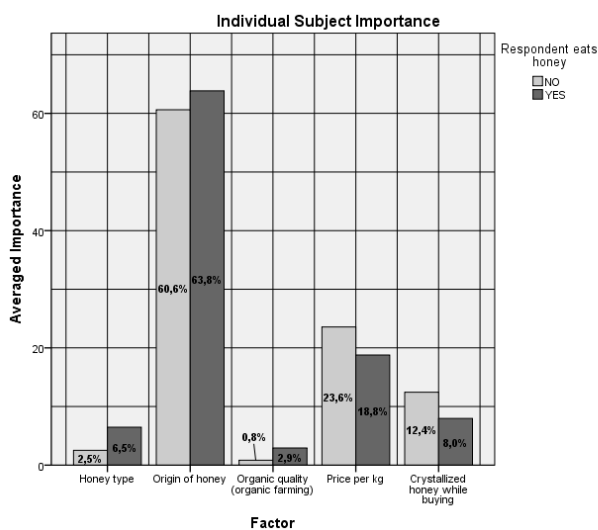


Fig. 1. Honey parameters considered important for two groups of buyers – honey consumers and honey non-eaters
Source: own research (2015)

The results of comparing customers from Central Bohemia and Prague show that respondents in Central Bohemia perceive the origin of honey as more important (70.9% compared to 50.9% in Prague).

Furthermore, respondents from Prague primarily take into consideration the price (a lower price is better for them), crystallization, organic quality, and honey type in comparison with respondents from Central Bohemia. Totally 24% of respondents from Prague base their decision on price. For this group, price is the second most important decision criterion. It is by about 3.9% of respondents more than in the Central Bohemian region.

During decision-making process, by ca. 6.1% more respondents from Prague (in comparison with Central Bohemian) consider the (non)crystallization of honey. Respondents from Central Bohemia almost disregard the organic quality of honey (1.1% within the category) as opposed to respondents from Prague, who pay more attention to this parameter (7.0% within the category). Only 8.2% of Prague respondents focus on the type of honey (forest vs floral), i.e. by about 4.2% more than respondents in Central Bohemia (Fig. 2).

Comparison of preferences according to customers’ education – high schools and universities. Quite frequently, customers with different education levels have also different buying preferences. As seen in Fig. 3, we may conclude that respondents with secondary education (high schools) mainly make a decision based on the parameter of honey origin (66.3% within the unit).

Respondents with university education monitor multiple parameters simultaneously. They more focus on the price (25.5% within the unit) than the secondary school graduates (18.6% within the unit). Furthermore, the (non)crystallization of honey more influences the decision of high school graduates (9.6%); only 5.2%

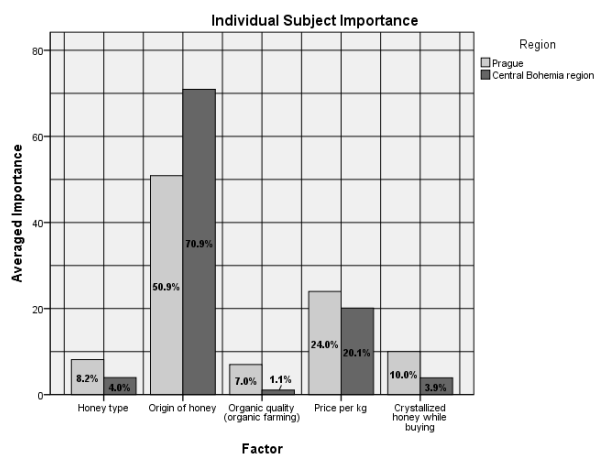


Fig. 2. Honey parameters considered important for two groups of buyers – honey consumers and honey non-eaters
Source: own research (2015)

of respondents with a university degree take it into consideration. High school graduates are also more focused on the type of honey (7.5% within the unit) in comparison with university graduates (5.4% within the unit). The organic quality of honey proved to be quite unimportant for either group; the difference between these units is not too significant.

Results of the cluster analysis

Cluster analysis was applied on the preferences matrix formed by the conjoint method. Therefore, the condition of variables' non-correlation was met. Using hierarchical cluster analysis, two relatively homogeneous groups of honey consumers were distinguished. After that, these two customer groups were compared with an average customer (see his/her characterization); such a customer is primarily interested in the origin, price, and (non)crystallization of honey.

The first cluster of consumers focuses on the origin, price, type, and (non)crystallization of honey. The second cluster is focused on the origin, price, and organic quality of honey. The approach of the consumer clusters is discussed below.

The first cluster customer (CC1). A consumer of this type primarily focuses on the origin and price of honey; however, the third crucial decision-making criterion spreads evenly between the type of honey and (non)crystallization of honey. The type of honey is slightly more important for CC1 than its (non)crystallization; nevertheless, it is but a small nuance in the end. This type of customer, on average, prefers honeydew honey (forest), Czech local honey directly from the beekeeper, but CC1 does not attach too much weight to its organic quality and prefers honey which is not crystallized.

Honey type. In comparison with the average customer, this customer focuses more on the type of honey. For this CC1, the honey type ranks among the most important parameters in the decision-making process.

Origin. This customer is more focused on honey originating from the Czech Republic (e.g. when buying it in supermarkets/hypermarkets) and on local honey (when buying it directly from a beekeeper); however, CC1 does not strongly condemn even honey from abroad. Nonetheless, the best choice for CC1 is Czech local honey. It is the same as for an average customer.

(Non)crystallization. The interest of a customer from this cluster in the (non)crystallization of honey products is above average in comparison with an average customer. The (non)crystallization ranks among the most important parameters in the decision-making process.

In comparison with the second group of consumers, this customer hardly focuses on organic quality. In comparison with an average customer, his/her interest in organic quality is below average.

The second cluster customer (CC2). Similarly to the average customer, a customer from the second cluster primarily focuses on the origin and price of honey. However, the third parameter which influences CC2 decision-making process and which distinguishes it from the first-cluster-type of consumers is his/her preference of organic quality.

Typically, this CC2 prefers honeydew (forest) as well as Czech honey from retail and/or Czech local honey. However, in comparison with other customers, CC2 is much less willing to buy foreign honey; also, organic quality is important at the expense of other parameters – honey type and non-crystallization of honey. These parameters are not very important for his/her decision-making process when buying honey; nevertheless, (non)crystallization is more important than the honey type.

Honey type. CC2 do not pay much attention to the type of honey. When they take it into consideration, they prefer honeydew (forest honey). The type of honey is an unimportant criterion for them. In comparison with an average customer, their interest in the type of honey is below average.

Origin. Customers of this type downright refuse foreign honey, and they predominantly prefer Czech honey (from retail) and Czech local honey (directly from a beekeeper).

Organic quality. CC2 identify organic quality as the third most important decision parameter. Their preference of organic honey is above average in comparison with an average customer.

(Non)crystallization. The interest of CC2 in (non)crystallized honey products is above average in comparison with the other type of customers.

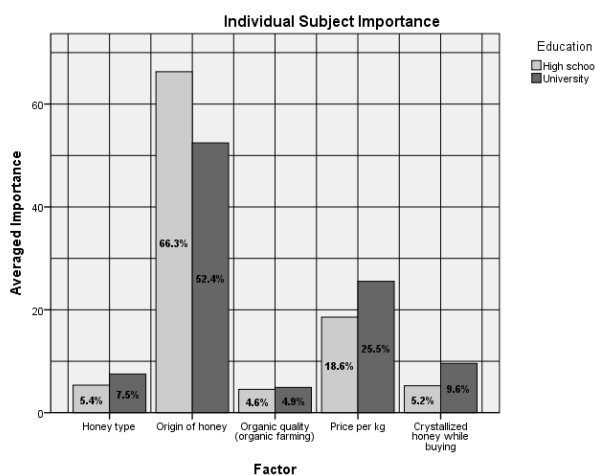


Fig. 3. Honey parameters considered important for two consumer groups of different education level
Source: own research (2015)

DISCUSSION

The recipients enrolled in the research come from Czech regions exhibiting the highest long-term purchasing power. The highest purchasing power has the capital city of Prague (index value 130.1% of the Czech average), followed by the Central Bohemian region. Ahead of Prague it gradually reduces, however the ring of municipalities in the immediate hinterland of the capital city is richer. A significant concentration of higher income categories is e.g. at Úvaly, Černošice, Jesenice u Prahy, and Čelákovice (INCOMA GfK, 2014). The present research intention was to depict the differences between regions with the greatest (and similar) purchasing power, but possibly different social and/or shopping priorities (capital city vs countryside and municipalities).

Both clusters of honey consumers are origin- and price-oriented. Honey origin is a very specific factor playing role in honey buying in the Czech Republic. The findings of Orth, Fírbašová (2003) suggest that consumer ethnocentrism is a strong and significant predictor of consumer product evaluations. Balabanis et al. (2001) state that e.g. consumer ethnocentrism in Turkey is fueled by patriotism, but in the Czech Republic by nationalism. In the Czech Republic the interest in Czech food product origin rises. According to Bryła (2015), the perceived authenticity of origin products depends mostly on such factors as: natural taste, product quality, sale in the region of origin, and labelling. The most important determinants of origin food selection include: traditional recipe, taste, and product uniqueness. Most of Hungarian consumers (70%) find the Hungarian origin of honey important, too. This trend emphasizes that consumers insist on regionalism and regional products (Töröcsik, 2006; Ványi et al., 2009). But in the case of honey Roman et al. (2013a) stated that the most important factor for the place, where the honey is purchased, is trust in the seller (47.7%). The reason for this may be associated with the popular theory that the honey purchased directly from the beekeeper is of better quality (Bratkowski et al., 2005). So possibly for most consumers the origin of honey 'directly from beekeeper' means true, local, quality products.

The second important item for both clusters is the price. The average price of honey was 152 CZK per 1 kg in 2013 (Korínková-Seifertová, 2014). But its ideal price for consumers stemming from the cluster analysis is lower (120 CZK per kg). More than 60% of consumers in Poland indicated the high or very high price of honey, but put the price only in the fourth place (Roman et al., 2013a).

Customers from the second cluster focus on the organic quality. They are more enthusiastic consumers. In a survey from Poland, Roman et al. (2013b) showed that for only 23% of respondents, the origin of honey and quality guaranteed by certificates were

the most important factors taken into account when deciding on the place or form of a honey purchase. Ványi et al. (2009) stated that analyzing the variables (customers age, gender, and education level), they did not find significant differences in the different customer groups in Hungary; the most important criteria when purchasing honey are quality, price, type of honey, and quality of packaging. The quality, of course, is not more specified in the Hungarian research.

According to Arvanitoyannis, Krystallis (2006), buying honey is mostly motivated by medical benefits of its consumption and dietary quality in Romania. Three clusters of honey consumers in Romania emerged through cluster analysis: the common consumers, the younger consumers indifferent towards honey, and the enthusiastic consumers also more willing to pay the premium prices differentiation for the organic type of honey. These authors of course present the results for 3 clusters, but these results are very similar to ours. Our results cover common consumers and the enthusiastic consumers, too. The results are not significantly affected by the consumers' age.

CONCLUSION

The parameters important for honey buying were identified by conjoint analysis using individual concepts and they were subsequently evaluated using a scale of 1–10. The most important parameter for customers is the origin of honey, which influences the purchasing model from 63.15%. This model is further influenced by the price of honey (18.58%), followed by (non)crystallization of honey (8.20%), type of honey (6.19%), and finally organic quality (3.88%). When honey cannot be tasted by the customer during purchase, these parameters (especially origin and price) decide about honey saleability. Other parameters need more marketing support for sale in the case that the label of origin and/or price are not on the preferred level for the Czech customer.

A comparison of preferences was carried out according to whether a customer eats or does not eat honey, according to customers' region of residence (Prague and Central Bohemia), and level of education (high school vs university). These comparisons brought about some nuances in preferences.

Next, two clusters of consumers emerged from the cluster analysis, the knowledge of which is important for sellers or marketing workers. The first cluster of customers is more focused on honey origin, price, type, and (non)crystallization of honey. The second cluster is more focused on honey organic quality, its origin, and price. The main differences between these clusters are in the consumer's perception of origin. Both clusters prefer Czech honey (from retail or from a local beekeeper), but the first cluster is willing to

accept foreign honey (e.g. at a 'good' price) while the second cluster is not. Therefore, Czech origin is a limiting factor for the second cluster of Czech customers.

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