



ATTENTION ANALYSIS OF HONEY JAR LABELS USING EYE-TRACKING TECHNIQUES

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ABSTRACT

Honey represents not just a specific product of animal origin, which's major part are plant products, but also the oldest sweetener of human kind. It is actually a sweet substance produced by beetles from nectar plants or from insects excreted on plants. Because of many different reasons (e.g. for trading, handling, storage), in the history of mankind, there have been introduced different forms of packaging and protective means through which this precious product could be protected. The present paper addresses consumer behaviour, focusing on the influence of packaging and labelling on young consumers aged from 20 to 35 years, especially when choosing honey. The realization of the main aim is conditional on meeting the following partial objectives - to identify the basic elements appearing on two samples of honey packaging and their impact on consumer perception, respectively to identify the differences in the perception of individual elements of the packaging, based on the respondents' gender. In the present paper, there are used different marketing research techniques, specifically the eye-tracking observation. The experiment involved exactly 12 samples of honey and finally 35 participants (18 women and 17 men). Based on the results of the authors' own work, it can be stated that the most eye-catching aspects of honey packaging are the producer's brand, as well as the variety description and name given to the honey. The least noticed aspects are the weight details of the packaging and the graphic design.

Keywords: consumer behaviour; labelling; packaging; honey; eye-tracking

INTRODUCTION

Product packaging is one of the key tools of marketing. Its significance varies with the type of consumer product, particularly when it comes to food. Manufacturers are investing in packaging technology, traditional packaging is replaced by modern ecological packaging, with designs that are attractive and emotionally engaging for consumers. The packaging can certainly also grab attention, evoke emotions, carry information, and thereby be a decisive factor in the purchasing decision.

In the case of packaging of honey, the most common form is the glass respectively the plastic packaging. Differently shaped, embossed or smooth packaging shapes do not belong to the only types of packaging into which the bee products are packaged. For several decades, honey has also been packaged in blown plastic packaging, of which the most popular forms are the bear-shaped or jar-wrapper forms. The range of honey packs on the Czech and Slovak markets is supplemented with crucibles, capsules, stick packs or laminate tubes.

Several authors, e.g. **Lehmann and Winer (2005)**, respectively **Kollár (1999)** and **Vysekalová (2004)** have in their works and researches focused on the influence of packaging on the consumer decision making at the time of purchase of goods. At the same time, they have tried to

categorize packaging features from a marketing point of view.

The first work in this area was the study by **Hansen (2005)**, who has highlighted the impact of packaging on consumer purchasing behaviour, primarily through communication, rational and environmental functions. **Bech-Larsen (1996)** has on the other hand, in the cultural context of Denmark, shown that the ecological function has no influence on the consumer's decision to buy the product. **Velčovská (2009)** points to the same situation in the Czech Republic, where there is a lack of motivation of consumers to sort the waste, what affects their attitude to the ecological function of the packaging. The situation in Slovakia is similar to that in the Czech Republic. Based on **Minárová and Kubicová (2008)** research, only four consumers out of 240 consider the recycling of packaging to be important.

Kotler et al. (2007) argues that packaging, in addition to the core function of protecting a product, goes beyond these areas and can become an important marketing tool.

The quality, style, function, and design of the product are considered to be the intrinsic property of the product. **Keller (2007)** encompasses the packaging between the basic elements of the brand and he perceives it as a very effective way to build brand value. In addition to the logistic and protective features of the packaging, he also indicates the

packaging's ability to communicate the brand towards the consumer.

Rigaux-Bricmont (1982) has been interested in the influence of the name of the brand and the packaging on the consumers already in the year 1982. An important moment in buying goods is the consumer decision-making process at the point of sale, where the communication function of packaging is used, especially in the fast moving market segment. Consumers can make their purchasing decisions based on the visual information, which they get.

Pieters and Warlop (1999) have, on the other hand, investigated the effect of visual information on the perception of the brand under the time pressure by the eye-tracking method. They have focused on the knowledge or ignorance of the brand of goods and tracked the amount of time, which the consumers spend on them. Consumers naturally spend more time exploring the preferred product. However, under the time pressure, the process of reading the visual elements changes - they are passing low-value visual characters to high-value characters. Getting the attention of consumers is therefore the main role of the packaging, especially at the point of sale. Customers, who are unable to determine the quality of the goods based on the packaging, choose the product according to its ability to attract their attention. This only works when the packaging is sufficiently attractive and interesting for them.

Visual perception deals with the ability of consumers to interpret the visual elements of the packaging. This issue is not thoroughly dealt with in marketing theory, although in recent years there has been a noticeable increase in its interest. The authors, who addressed the impact of visual images in marketing communication, have examined the processing process of visual information.

Perception in the process of buying behaviour can be characterized as getting the consumer's attention through visual means of expression.

Visual attention is often the only way for consumers to obtain the necessary brand and product information in the intentions of consumer decision-making. Anchoring visual attention can be found in the area of behavioural psychology that refers to the natural curiosity of human individuals who use their gaze to find something new and interesting. In general, one uses eyesight to search for stimuli, and if he finds something interesting, he concentrates his attention on the object. If these claims are transferred to the area of visual attention given to the packaging, consumers are searching for visual stimuli that are substitute symbols expressing goods that they seek for to satisfy their needs.

Simply explained, the purpose of the packaging is to attract the consumer's visual attention, to bring them to examine the specifics of the product (**Koprda and Košková, 2015**).

Clement (2007), based on the knowledge from behavioural and cognitive science, has come to the conclusion that consumers are selectively using some of the principles of attention in their purchasing behaviour. Using eye-tracking, the author has identified six phases of visual perception that are going on during the buying process.

Despite the fact that, up to the results of some researches, it can be concluded, that regarding the purchasing criteria, the most important for consumers are the quality, taste and country of origin while the least important is the design of packaging (**Guziy et al., 2017; Šedík et al., 2018**); results

of the research done by **Grunert et al. (2001)** have confirmed that packaging plays an important role in purchasing, especially when it can form the consumer opinion on product quality.

Consumer-friendly packaging is a competitive advantage for the producer or seller. Taking the definition offered by **Jurášková and Horňák (2012)** '*packaging is a protective and promotional product facility at the point of sale.*' Some authors, such as **Křížek and Crha (2012)** emphasize predominantly the contents as communicated on the packaging, and the packaging as a marketing tool. The packaging content list substitutes for the vendor, the content and design seeks to resonate with the consumer's lifestyle. Not to be overlooked is the legal definition of packaging - in the Czech Republic by **Act No. 66/2006**, which defines packaging as a product made of material of any nature, intended for the containment, protection, handling, delivery or presentation of consumer products, including a definition of the method of labelling, and the foodstuff information. In the Slovak Republic the packaging functions are defined by **Act No 79/2015** for a well-circumscribed product, such as honey, there are numerous other stipulations, listed by **Titěra and Vořechovská (2013)** in a summary of legal regulations.

Given the subject matter of the present paper - the packaging label - we need to encompass the mandatory information: the producer's (bee-keeper's) name, the minimum durability date, the packaged size/weight of the product, the honey variety (flower, honeydew). Mass-producers are required to state the production lot reference. The label can list additional information, such as the way the honey has been processed, its place of origin, the botanical source the honey comes from etc. European legislation prohibits certain expressions being used on the label, such as 'natural', 'genuine', 'unadulterated', 'from honeybees', 'without additives and preservatives' etc.

The aim of the paper is to identify elements on the packaging of the product - honey, how captivating they are, for how long the given element captures attention, and ultimately, the impact of these aspects on the purchasing decisions of consumers. The realization of the main aim is conditional on meeting the partial objectives - to identify the basic elements appearing on two samples of honey packaging (glass and plastic packaging) and their impact on consumer perception and to identify the differences in the perception of individual elements of the packaging by the gender.

Scientific hypothesis

Before the experiment itself, four assumptions were formulated:

1. There are gender differences in the tracking of information on the honey packaging label.
2. Significant elements on the packaging (brand and type of honey) attract more attention.
3. Traditional glass packaging is preferred by customers in comparison with plastic packaging.
4. Traditional packaging is preferred to colorful and modern packaging.

MATERIAL AND METHODOLOGY

To meet the paper’s investigative aims - whether and how much the packaging and label affects the purchase of the honey - experiments were carried out in the laboratory of the Department of Marketing and Trade at Mendel University in Brno. In the experiment 12 samples of honey were used, purchased randomly throughout the market, from a variety of vendors. Represented were hypermarkets and supermarkets, stall-holder sellers at farmers’ markets and e-shops. Due to the limited range of the paper, 2 out of 12 samples of honey were selected - one in glass and the other in a plastic packaging. The respondents were young people aged 20-35 years old, a total of 42 of them, selected at random. The implementation phase was done at the eye-tracking laboratory, having professionally briefed all respondents and verified that they meet the prerequisites for using the technical equipment. The final number of respondents who took part in the experiment was 35 (18 women and 17 men).

The important part of the technical preparation of research was taking pictures of selected samples, editing pictures, conducting the experiment in the SMI Experiment CenterTM, realisation of pretests and verifying the functionality of research.

During in-depth interviews, respondents answered questions that matched the assumptions. These were questions like: „Does the gender influence the choice of honey? “and „Does the packaging and label of honey influence the buying behaviour?

During the buying of honey, the attention was paid to different types of honey, to different graphic processing of packaging, colours, lid shape, packaging material, packaging size and origin of honey (Czech Republic, EU and outside the EU). The pictures of each sample were taken by the high resolution digital SLR. Pictures were taken in the natural light in the improvised photo-tent. Subsequently, the pictures were edited in GIMP software and saved in the regular jpg format. Edited pictures were used when creating the graphical background in the SMI Experiment CenterTM. Then the picture called the "intentional cross “was used. This cross is important for focusing the eye exactly on the center of the screen. The cross was projected to respondents for the one second time. Then the mere pictures of honey followed. Each picture was projected for the twelve seconds time. An interview was held between projecting of individual pictures. Afterwards, the intentional cross was projected again to focus attention on the center. At the end of the experiment, short identification



Figure 1 Scan paths example. Note: Own processing, output from SMI BeGazeTM.

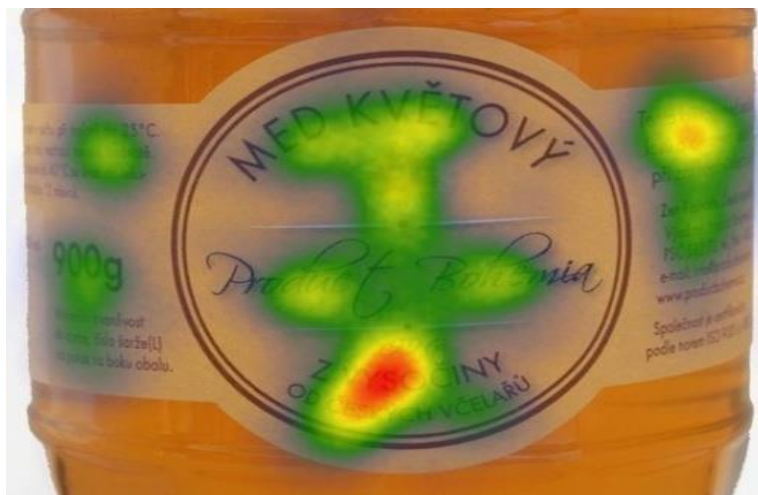


Figure 2 Heat map example. Note: Own processing, output from SMI BeGazeTM.

questions were asked again. The stationary SMI RED 250 eyetracker, which consists of two infrared cameras and high-resolution sensors. The device allows you to monitor eye movements. The software automatically tracks and records movement of the pupils.

The eyetracker works at the frequency up to 250 frames per second and accurately detects eye movement through dioptric lenses and contact lenses. The specialized software SMI BeGaze™, which uses specific metrics, was used to interpret the data obtained from eyetracking research. Scan paths are used to find observations of individual stimuli, heat maps for identification of the exact areas of interest (AOI).

Statistic analysis

The technique of eye-tracking records the respondent’s reaction to a change of stimulus (various labels). The device tracks eye movement over quite a wide viewing angle and at the same time automatically records this movement. Each respondent’s gaze motion is calibrated before the measuring itself begins. The software used was SMI Be Gaze TM, with Scan path metrics. Scan paths as a metric show the movement of the eye pupil as it tracks the stimulus while also recording the time (Holmqvist et al., 2011). Circles and straight lines were used to render the gaze pathways. The diameter of the circle reflects the time of fixation, in direct correlation. Lines show the movement of the pupil to the next point of focus (saccade) Nielsen and Pernice (2010).

Another technique used in the experiment are eye-tracking heat maps. This is a visualization of the eye-tracking monitoring findings. The heat maps are used to show the AOI metric. This is the most widely used tool that allows exploring the relationships between areas (aspects) of interest. Areas of interest are analysed according to KPIs. A description of each KPI metric is shown in Table 1.

RESULTS AND DISCUSSION

The results of the eye-tracking survey of packaging on 12 samples of honey with different designs and different information are illustrated by two samples of honey that best show the packaging fulfilling its function, “med květový z Vysočiny” (‘Flower honey from the Highlands’) and “Medokomerc med lučni” (‘Medokomerc meadow honey’).

Flower honey from the Highlands

The mentioned sample of honey is a lighter colour, which suggests that it is a flower honey, which in its name states not just the type of plants that are its basic raw material, but also the region from which it comes from. This type of honey, is offered to customers in a classic, smooth glass package, with a slight moulding in the top and bottom of the package. In the middle of the packaging is the label with a gold-coloured matte finish, with all the information required by law. The cover is closed with a metal capcovered with a decorative matching skirt. The weight of honey is 900 grams.

Up to the results of the research, it can be stated that all of the examined respondents (100%) have expressed their satisfaction with the packaging and 80% of respondents would buy honey. They have also positively evaluated the nature of the nearby design that evokes honey and the meadow with flowers.

In addition to the packaging and design, respondents have positively evaluated the simple graphic elements of the packaging, font and paper skirt. Most of the respondents were also very perceived by the region of its origin.

The heat map of the sample indicates that respondents focused mainly on the central circle of the label, containing the honey designation, the honey brand and the region. Less attention was paid to the informative data and the weight. For KPI analysis, this sample was ascribed 9 areas of interest.

Table 1 KPI metrics described.

KPI name	Unit	Characteristics
Sequence	count	The order of visits to the AOI based on entry time. Shorter times make better sequencing.
Entry time	ms	The average time to the first fixation of the selected AOI.
Dwell time	ms and %	The sum of all the fixation times and saccades of the given AOI. The total time spent on the selected AOI. The most important metric
Hit ratio	count and %	The number of respondents who looked at least once at the selected AIO.
Revisits	count	Specifies the number of times respondents returned gaze to the selected AOI on average.
Revisitors	count	The number of respondents whose gaze returned to the selected AOI.
Averagefixation	ms	The averaged sum of average fixations of the selected AOI.
First fixation	ms	The averaged sum of the first fixation of the selected AOI.
Fixation count	count	The total number of all fixations of the selected AOI.

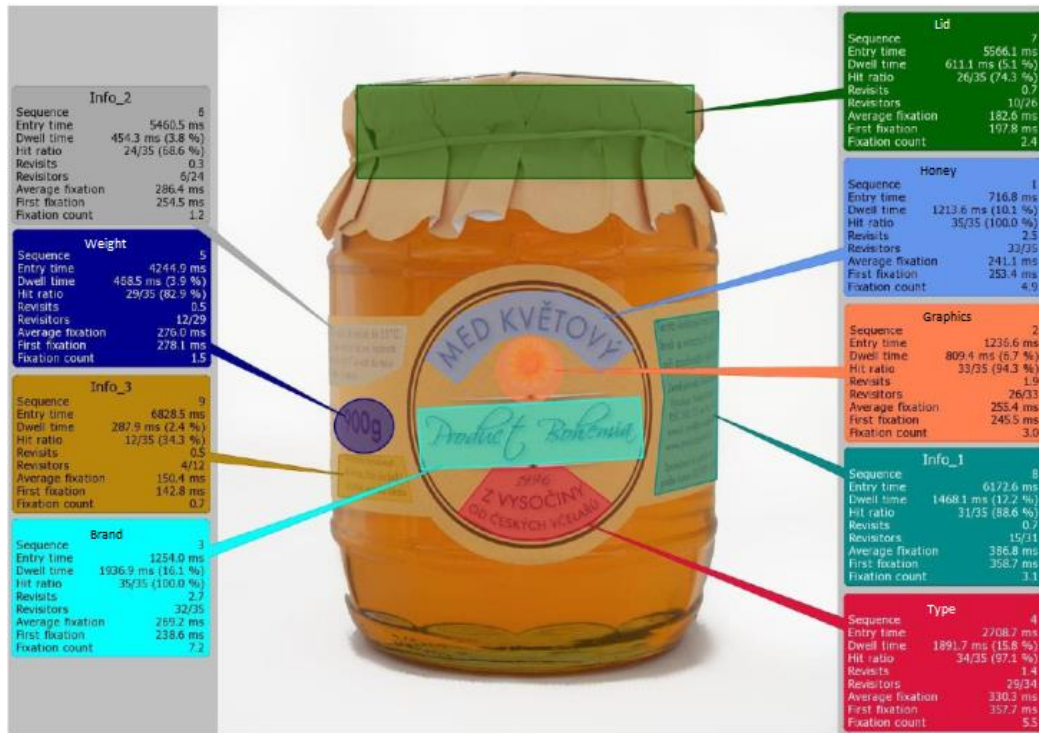


Figure 3 KPI analysis of the Flower honey from the Highlands.

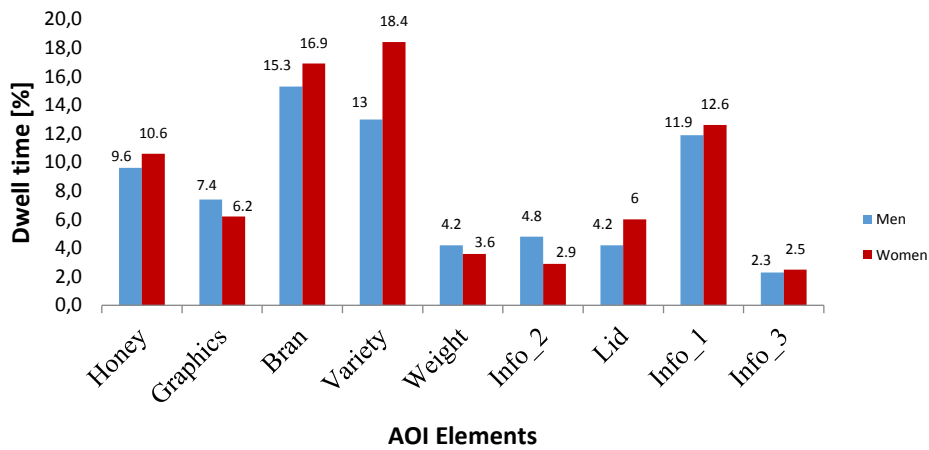


Figure 4 Relative expression of the time spent on the selected AOIs using the Flower honey from the Highlands sample. Note: Own statistical processing with SMI BeGazeTM.

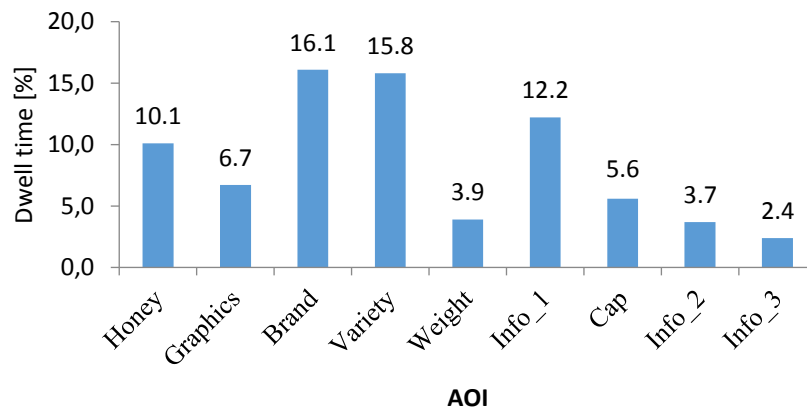


Figure 5 Dwell time on each label area.

An important AOI is the zone of the brand (16.1% of the time), variety (15.8% of the time), designation of the honey (10.1% of the time), graphics (6.7% of the time) and Info_1 (12.2% of the time). Other areas of interest were less significant and include the weight, the lid, Info_2 and Info_3. We can surmise that overall the attention paid to the central circle of the label took 48.7% of the respondents' time. The format of a central circle with fewer elements seems to be very useful for attracting attention. Also of interest is the different attention paid to the information located in three different places, and of different design. Attention was paid to that information section which differed significantly in colour and design.

Attention rates vary within sex. Men on one hand have at first paid their attention to the central elements like honey, graph, mark and species. They began to look up and continued smoothly at the bottom of the circle. Later they have focused on the elements shown on the left side (in the weight sequence), Info_3, Info_2, and just then they have looked to the top and finally looked at Info_1. The tracks of women's attention, on the other hand, was a bit different - their attention was paid to central elements such as honey, brand, graphics and species. Then they have focused their attention on the weight, which is shown on the left, the lid on the top, the Info_2 again on the left, the Info_1 on the right and finally the Info_3, which are shown on the other side of the packaging.

Medokomerc meadow honey

The analysed sample of honey is very light in colour and corresponds to the bee honey. Its packaging is made of plastic with a ribbed surface. The label on the packaging is simple, informative, without distinctive graphic elements. The packaging weight is 300 grams.

Results of the research show, that both, women and men, engaged in research have almost the same views on the appearance of honey. The question whether this honey would be bought by them was answered by almost 83% of respondents' negatively. The reason for the negative evaluation was the plastic packaging that respondents considered to be aesthetically unsuitable for this product.

On the other hand, they have positively evaluated the information on the nutritional values of the product and the practical use of this package when traveling.

Analysis of the heat map shows that most attention is given to the central part of the cover and the top of the label where all the reference elements are located. KPI analysis in this honey consisted of 8 AOIs. The most observed areas were Info_1 (26.5% of the time), Info_2 (23.1% of the time), the honey designation (9.7% of the time), the brand (7.6% of the time) and the other four areas of interest were unremarkable, their values being only in only a few units of % of the time.

Both genders have at first focused their attention on the middle of the etiquette - as the first element they have watched the honey, then the area Info_1 and the species area. Later, the results of the research have differed - men have slightly shifted their attention down to the Info_2, then completely up to the label and finally, they have looked at the lower part of the label, where the code, Info_4 and Info_3 are situated. Women, as the fourth element, have seen the label, which is shown at the top of the etiquette,

then moved to the Info_2 and finally to the bottom at the code, Info_3 and Info_4.

From the results of the investigation we can surmise that unless the respondent's gaze is caught at first glance by an element they consider of interest such as the variety, brand, producer, or if it is not captivated by the design, the respondent will focus on text-based information and look there for what they consider crucial and have not yet ascertained.

As it can be seen, results of the research revealed the extent up to which the packaging, the material from which the packaging is made, the label, the packaging information, the design and the graphics, the colour of the packaging and the etiquette, and last but not least the product itself, affects the consumer in his purchasing decision.

Packaging is a part of the marketing communication between the consumer and the manufacturer. It represents one of the most important elements of modern marketing, while its essential role in protecting the quality of goods and distribution is complemented by an important communication function aimed at the consumer.

Results of some previously done researches have shown, that up to 70% of consumers make their daily decision to buy food directly in the shop; 85% of consumers' shop without gripping alternative goods in their hands; and even 90% of consumers buy only based on the front of the packaging without looking at the product itself. This was also confirmed by the results of authors' own research.

The mentioned shows and highlights the fact, that the visualized packaging incentives are important in the buying process. Consumers buy more and more on the basis of visual stimuli and make their decisions based on their decisions (**Urbany et al., 1996**).

In particular, the packaging is a means of transporting and distributing goods from the manufacturer to the consumer, prolonging the durability of the goods, protecting them from the effects of the environment, allowing efficient storage and handling and, last but not least, communicating the properties of the packaged product to the consumer. This means that the packaging performs several functions at the same time, from the production of the goods to the purchase by the consumer.

As it was already indicated, **Rigaux-Bricmont (1982)** has demonstrated that the packaging and the brand of goods affect the perceived quality of the product but at the same time, they are not considered to be the only properties that are interconnected.

The results of the authors' own research have also shown the validity of the results of researches carried out more than 30 years ago. Respondents' opinions on the packaging versus the product packaged in it only confirmed the unanimous view that honey, which is considered to be a high-quality organic product packed in a plastic wrap, induces an association of consumers different from that of its producer. The negative rating of the plastic packaging was, on the other hand, mildly contradicted by positives - such as its easy handling during traveling and the disclosure of required information by respondents on the etiquette.

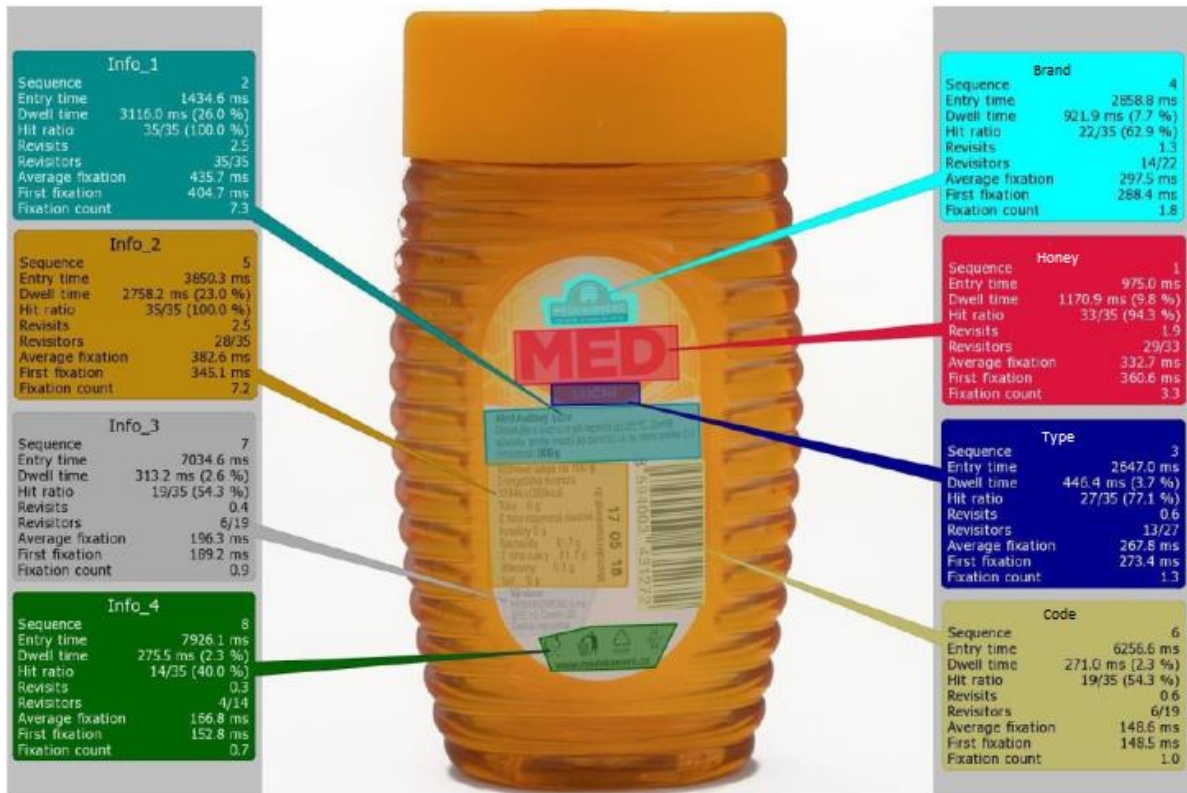


Figure 6 KPI analysis of the the Medokomerc meadow honey sample.

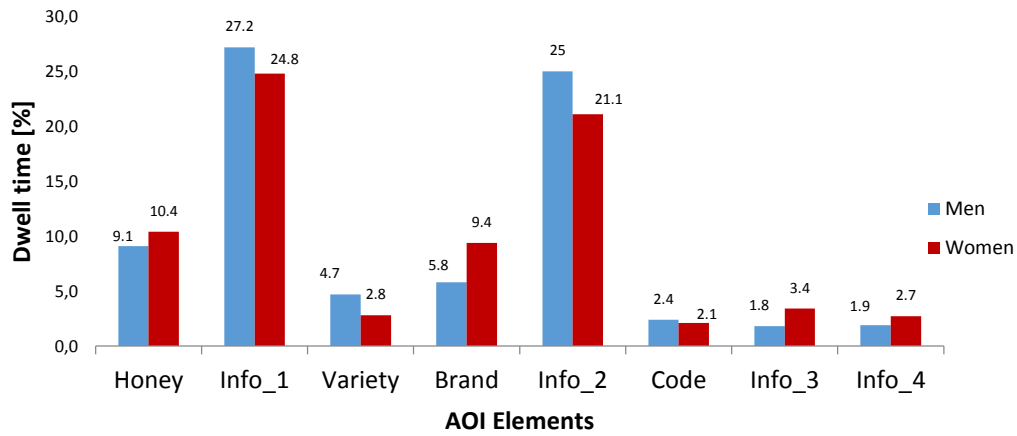


Figure 7 Relative expression of the time spent on the selected AOIs using the Medokomerc meadow honey sample. Note: Own statistical processing with SMI BeGazeTM.

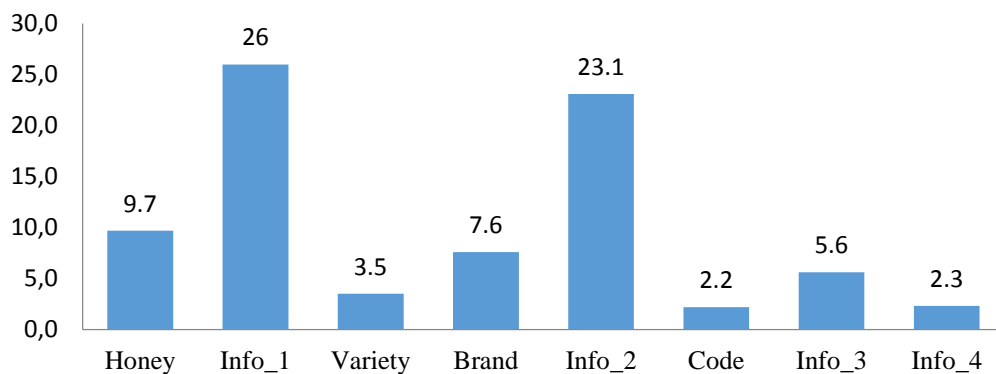


Figure 8 Dwell time on each label area.

CONCLUSION

Summing up the results of the KPI analyses of eye-tracking experiments carried out, we can express the relative time spent attending to specific AOI elements.

From the above Figure 9 we see that the greatest attention is drawn by the producer brand, the honey variety and the honey designation. Attention paid gradually falls away when it comes to the declaration of being Czech honey, additional information on the label and the lid. The least noticed aspects are the weight details of the packaging and the graphic design.

From the results of the eye-tracking experiments on 12 samples of honey and the generated heat maps of their labels we can surmise that the larger graphic elements on the packaging hold the gaze for longer, i.e. attract more consumer interest. Equally we can surmise that unconventional and bold colours attract more attention. The times spent tracking individual areas of the label do not differ significantly between men and women, neither is there any significant difference in the order of tracking the individual label elements.

The KPI analyses carried out lead us to several findings and enrich the subject area of utilizing marketing tools represented by the product, its packaging and the label on it, for a product as specific as honey. Honey has a variety of beneficial and healing properties, is an antiseptic, and has antioxidant and pro-biotic effects. Indeed, these are the reasons why it is consumed as an alternative sweetener, particularly instead of beet sugar. Hence the consumer pays attention to these aspects preferentially when deciding about purchase. This can also be documented by the finding that if the consumer is not captivated by the variety, brand or design, their attention turns to information about the product as such. Honey is therefore perceived by the consumer not only as a staple foodstuff, but a food with specific characteristics, which leads to the distinctive meaning and importance of the prime purchasing decision factors, compared with other consumer goods.

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